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Hormone Research in Paediatrics

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Abstracts

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Oral Session I: Trending diabetes-related topics

O-01

SPISE INDEX (Single Point Insulin Sensitivity Estimator): indicator of insulin resistance in children and adolescents with overweight and obesity

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Introduction: Children with obesity are at increased risk of Type 2 Diabetes Mellitus (T2DM) and cardiovascular disease due to potential insulin resistance. The SPISE index, calculated using fasting triglycerides, fasting HDL-cholesterol, and BMI, showed promise results in predicting insulin resistance and cardiovascluar risk in pediatric population.

Objectives: This study aimed to identify a SPISE cutoff for detecting insulin resistance and investigate the relationship between SPISE and pubertal development, anthropometrics, and glycometabolic profile in children and adolescents with overweight/obesity.

Methods: This study aimed to identify a SPISE cutoff for detecting insulin resistance and evaluate its relationship with pubertal development, anthropometrics, and glycometabolic profile in 232 children and adolescents with overweight and obesity (48 with overweight and 184 with obesity). The cohort included 155 males and 127 females (age 13.2±2.2). SPISE index was calculated with the formula: 600 x HDL Cholesterol^0,185/triglycerides^0,2x BMI^1,338, and patients were categorized based on Tanner stages (Group 1 (18.8%) Tanner I, Group 2 (44.6%) Tanner II-III-IV, Group 3 (36.6%) Tanner V).

Results: A SPISE cutoff ≤ 6.92 or ≤6.13 (depending on the insulin resistance determination method), was identified for Tanner stages I and II, exhibiting good sensitivity and specificity for identifying individuals at higher risk of insulin resistance. SPISE index decreased significantly with increasing pubertal stage ($p<0.0001$) and worsening obesity severity ($p<0.0001$). While no significant differences in SPISE were observed between normal and abnormal glucose tolerance groups within any pubertal stage, SPISE values were significantly lower in patients with confirmed insulin resistance (total sum of insulin OGTT > 535 μU/mL) in all three pubertal groups (Group 1: P=0.008; Group 2: P=0.0008 and Group 3: P=0.002, respectively). SPISE was also significantly lower in patients with HOMA-IR > 99.2 th percentile, in all Tanner stages.

Conclusions: The SPISE index may be a useful alternative to OGTT and other insulin-based methods for evaluating insulin resistance in children with obesity, due to its simplicity, low cost, and reliance on readily available tests. This makes it suitable for large-scale studies and clinical practice.

O-02

Early microvascular complications of type 2 diabetes mellitus in children and adolescents in the DPV registry

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Introduction: Evidence from US cohort studies suggests that microvascular complications such as diabetic nephropathy, retinopathy, and neuropathy are more frequent in adolescents with

type 2 diabetes (T2D) compared to those with type 1 diabetes (T1D). The applicability of these observations to children and adolescents with T2D from German-speaking countries remains unexplored.

Objectives: To determine the risk of developing microvascular complications and cardiovascular risk factors in youth-onset type 2 diabetes compared with type 1 diabetes.

Methods: Using the population-representative DPV database, youths with T2D (diagnosed between the ages of 8-20 years from January 2000 to June 2023) were matched 1:1 to a T1D control group using propensity score matching based on the variables age at diagnosis, sex, migration background, and year of manifestation. Logistic regression adjusted for diabetes duration and maximum number of visits over a follow-up period of up to 5 years was used to estimate odds ratios (95%-CI) for outcomes of interest.

Results: We identified n=976 adolescents with T2D (median age at diagnosis 14.3 years, Q1 12.8; Q3 15.6 years) and compared them with 976 matched T1D counterparts. The adjusted odds ratio for any microvascular complication (microalbuminuria, retinopathy, neuropathy) was 1.47 (1.15-1.88) in T2D compared to T1D adolescents. Odds ratios for microalbuminuria (1.46; 1.11-1.92), neuropathy (2.84; 1.30-6.18) as well as hypertension (3.58; 2.66-4.81), and dyslipidemia (2.22; 1.78-2.76) were also significantly increased in adolescents with T2D. Separate analysis of the odds ratio for retinopathy could not be performed due to low retinopathy frequency in this cohort (n <5).

Conclusions: Adolescents with T2D living in Central Europe are significantly more often affected by microvascular complications in addition to arterial hypertension and dyslipidemia in the early stages of diabetes compared to age-matched adolescents with T1D.

O-03

Putative neuroinflammation in youth with obesity and dysglycemia: preliminary findings

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Introduction: Youth-onset T2D is a more aggressive disease than adult-onset, with early appearance and rapid progression of microvascular complications. Brain health may be at risk from T2D, but the factors responsible are not well understood.

Objectives: Brain microstructural alterations consistent with neuroinflammation have been associated with obesity; It is unknown whether dysglycemia adds to the extent or degree of neuroinflammation.

Methods: We analyzed magnetic resonance images from pubertal youth ages 12-17 years. Youth were categorized as having normal weight with normal glucose tolerance (**NW-NGT, n=16**), overweight/obesity with normal glucose tolerance (**O-NGT, n=28**) or overweight/obesity with dysglycemia (**O-DG, n=13;** none were T2D or on T2D medications). Putative neuroinflammation was measured within major white matter tracts of the brain (Figure; **green** 'skeleton') with restricted fraction (RF) from diffusion basis spectrum imaging modeling. Multiple comparison corrected voxel-wise tests were used to compare groups, covarying age and sex, across the white matter skeleton.

Results: Groups were similar in age, sex, race/ethnicity, pubertal stage, parental IQ and socio-economic status. The groups with overweight/obesity (O-NGT, O-DG) were similar on body mass index (BMI) and had higher RF compared to the group with NW-NGT (**Figure**; **red** and **blue** areas respectively, **purple** for

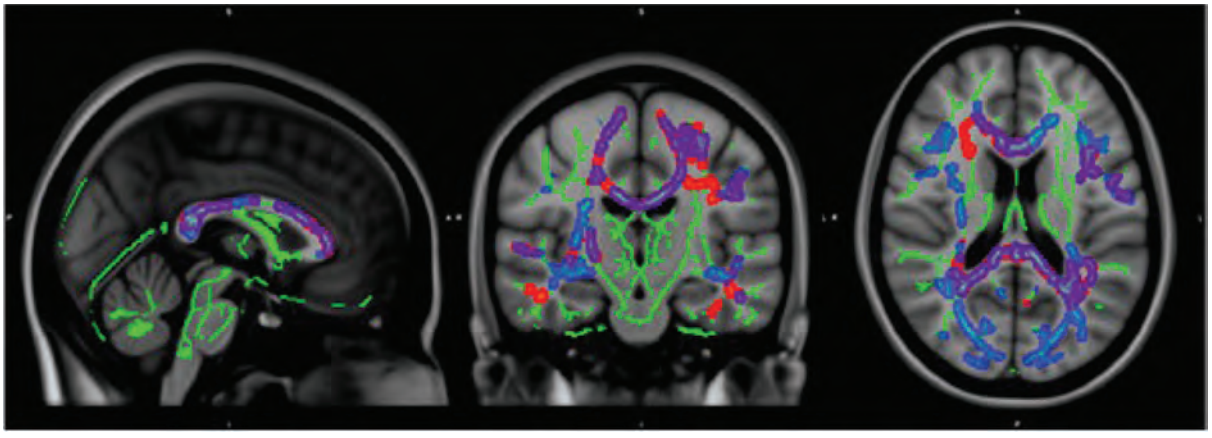

Fig. 1.

Table 1. Demographic and clinical characteristics for all 3 groups. Mean (SD) unless otherwise noted.

	NW-NGT	O-NGT	O-DG	p value
N	16	28	13	
Age in years	15.8 (1.6)	15.4 (1.6)	15.8 (1.8)	0.72
Race, # White/Black/Asian/Other	14/2/0/0	21/7/0/0	8/3/1/1	0.10
Sex, # M/F	6/10	10/18	6/7	0.88
Tanner Stage, # 2/3/4/5	0/2/0/14	0/1/4/23	1/0/1/11	0.23
SES	39.7 (12.9)	38.1 (11.9)	38.1 (19.9)	0.94
Parental IQ	105.1	100.9	105.2	0.61
BMI (Kg/m^2)	21.2 (2.0)*	34.2 (6.5)	37.9 (5.3)	<.001

*Different from other groups

overlap). Although the group with O-DG had a greater number of voxels above statistical threshold than the group with O-NGT (22191 vs. 13717 voxels), no significant differences were found when comparing these groups (O-NGT vs O-DG) directly.

Conclusions: Results are consistent with previous findings of elevated putative neuroinflammation in youth with overweight/obesity. Larger samples will provide more power for determining whether dysglycemia adds to the neuroinflammatory impact of obesity.

O-04

Does body fat mass have an impact on nocturnal hypoglycemia in children with type 1 diabetes?

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Introduction: The most common and feared complication in children with type 1 diabetes (T1D) is hypoglycemia. Although several studies demonstrated that body compositions have an impact on the daily glycemic course, the relationship between body fat mass and the risk of nocturnal hypoglycemia in childhood is unclear.

Objectives: We aimed to reveal factors affecting nocturnal hypoglycemia in pediatric patients with T1D.

Methods: This prospective cross-sectional study was conducted between October 2023 and February 2024. Patients aged 5-18, who were followed up in our department with T1D for at least six months and used continuous glucose monitoring (CGM) were included in the study. Body compositions were measured with bioelectrical impedance analysis.

Results: 40 patients included in the study but nocturnal hypoglycemia was detected in 24 patients (60%) in the last 14 days. A total of 86 hypoglycemic events were examined. There was no significant difference among patients with and without hypoglycemia in terms of body fat ratio, time in range (TIR) or insulin doses (p>0.05). While the long acting insulin dose was higher in cases experiencing hypoglycemia between 00:00 and 03:00 a.m. (n=18) (p=0.002); there was no significant difference in insulin doses or other parameters in those who experienced hypoglycemia between 03:00 and 06:00 a.m. (n=21) (p>0.05). The body mass index SD score, body fat mass and ratio of patients who experienced a severe nocturnal hypoglycemic event (≤54 mg/dL) (n=9) were higher than the others (p<0.05). When individuals with recurrent hypoglycemic event during a night (n=10) were examined, we observed that the risk of severe hypoglycemia was increased in this group (p=0.003).

Conclusions: While body compositions or metabolic control parameters did not affect the risk of nocturnal hypoglycemia, we found that increased body fat mass raised the risk of severe hypoglycemia in children with T1D. This result might be related to the fact that higher body fat mass causes decreased unawareness of hypoglycemia

O-05

Effects of metformin and liraglutide on gut microbiota composition in youth-onset type 2 diabetes: the MIGHTY study

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Introduction: In Youth-onset Type 2 Diabetes (Y-T2D), metformin (Met) and Liraglutide (Lira) are anti-diabetic therapies whose mechanisms of action may be mediated by altering the gut microbial composition. However, the effects of Met and Lira on short-chain fatty acid (SCFA) producing gut bacteria have been inconsistent in adults and there is no data in Y-T2D.

Objectives: To compare the composition and distribution of gut microbiota and plasma SCFA concentrations before and after 3 months of Met+Lira and Met.

Methods: Stool samples were characterized using whole genome shotgun sequencing on Ilumina HiSeq 1000 Platform. Metagenomic Phylogenetic Analysis was used for taxonomic profiling of microbes and their relative abundance. The R packages "ggplot2" and "vegan" were employed to evaluate the community-based association by beta diversity. Alpha diversity determined species richness and evenness between the microbial profiles. Plasma SCFAs were quantified using nuclear magnetic resonance spectroscopy. Paired t-tests compared outcomes pre- to post-intervention.

Results: At baseline, 22 AA Y-T2D (15.3±2.1y, mean±SD, 68% female, BMI 40.1±7.9kg/m^2) received Met+Lira (n=9) and Met (n=13). Met+Lira had higher HbA1c at baseline, and greater reductions in HbA1c (-1.2±0.8 vs. -0.3±0.6%, P <0.01). Microbial signature varied between the two groups at baseline, P <0.01. Compared to baseline, Met significantly (P<0.05) increased abundance of SCFA-producing species: *Eubacterium rectale*, *Bifidobacterium adolescentis*, and lactate-producing species *Bifidobacteirum longum*, while Met+Lira increased abundance of SCFA-producing species *Anaerostipes hadrus* (butyrate producer) and *Bacteroides fragilis*. There was no change in plasma butyrate, acetate, or lactate concentrations post-Met or post-Met+Lira.

Conclusions: Short-term therapy of Met and Met+Lira in Y-T2D induced distinct shifts towards SCFA-producing gut microbiota but no changes in plasma SCFA. Ongoing functional analyses will explore the relationship of gut microbial shifts with glycemia.

O-06

Bone turnover markers in adolescents with type 1 diabetes before and after a low carbohydrate diet versus a mediterranean diet

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Introduction: The popularity of low-carbohydrate (LCD) diets for managing type 1 diabetes (T1D) has surged in recent times. Research suggests that LCDs improve glycemic control among adolescents with T1D, however, less is known about LCD on bone health. This issue is particularly concerning because adolescence is a critical period for peak bone mass attainment.

Objectives: This study sought to examine the impact of a LCD compared to a Mediterranean diet (MED) on bone turnover markers (BTM) in adolescents with T1D.

Methods: In an open-label, randomized controlled trial, 40 individuals with T1D, aged 12-22 years, were randomly assigned to either the LCD or MED for a 24-week intervention period. Baseline levels of C-terminal telopeptide (CTX) and procollagen type 1 N-terminal propeptide (P1NP) were measured before dietary intervention and compared with post-intervention levels. A comprehensive evaluation was carried out on glycemic and nutritional parameters.

Results: Baseline characteristics were similar between the LCD and MED groups. In both intervention arms BTM did not change significantly. Median CTX levels increased from 395pg/ml (232–591) to 423pg/ml (289–591) in the LCD group and decreased from 357pg/ml (244–782) to 296pg/ml (227–661) in the MED group. Median P1NP levels changed from 95ng/ml (68-112) to 88ng/ml (62-97) in the LCD group and from 76ng/ml (54-198) to 71ng/ml (55-122) in the MED group. Dietary calcium (p = 0.035), magnesium (p = 0.001), and potassium (p = 0.05) were significantly lower in the LCD group compared to the MED group after the 6-month intervention. Median daily carbohydrate intake was 60g (45;88) for the LCD group and 128g (104;155) for the MED group (P = 0.001). The delta BMI z-score was lower in the LCD group compared to the MED group (p = 0.08).

Conclusions: The 6-month dietary intervention with LCD or MED did not alter bone turnover markers significantly in adolescents with T1D. Longer-term studies are needed to fully assess the impact of dietary patterns on BTM in adolescents with T1D.

O-07

Omega 3 index in children with and without partial remission of type 1 diabetes after one year of stage 3 T1D diagnosis

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Introduction: After diagnosis of stage 3 type 1 diabetes (T1D), some patients recover partial beta cell function, and their total daily dose (TDD) of exogenous insulin decreases. This phase, called partial remission (PR) typically lasts 6 months, but <30% of patients remain in PR for >12 months. The Insulin Adjusted Hemoglobin A1C (IDAA1C) coefficient is a proxy for PR. Prior data suggests omega 3 (O3) fatty acids (FA) may promote PR. The omega 3 index (O3i) assesses eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) as a proportion of total FA in red blood cell membranes and reflects O3 status over the previous 3 months.

Objectives: To compare the O3i of children with and without PR of T1D

Methods: A case-control study was conducted at a pediatric diabetes center in Central Pennsylvania (U.S.A.) (Nov 2022 - Jun 2023). Inclusion criteria: Stage 3 T1D diagnosis ≥ 1 y; Age (y): 1-17 y; ≥1 positive T1D antibody and on insulin injections (MDI) or insulin pump (CSII). Remitters (R)(Cases) and non-remitters (NR) (Controls) were identified using the IDAA1C. R had IDAA1C ≤9. Clinical/T1D data: Age, sex (F/M), body mass index (BMI) (kg/m^2), Tanner stage, plasma hemoglobin A1C (HbA1C %) and T1D duration (months=m). TDD (unit/kg/day) obtained from a 2-week MDI/CSII download. O3i was measured through a dried-blood-spot sample.

Results: In total, 21 remitters (age 10.9±4 y; male 61.9%; MDI 42.9 %; T1D duration 34.4±23.6 months; IDAA1C 8 ± 0.9) and 63 non-R (age 11.9±3.4 y; male 63.3%; MDI 45%; T1D duration: 47±28.7 months; IDAA1C 11 ± 1.3) were included. The O3i was positively associated with T1D duration (r=0.3). O3i tended to be inversely associated with IDDA1C (r=-0.2; p=0.07) and HbA1C (r=-0.2; p=0.07). No differences in the O3i were observed between cases (3.8 ±0.5) and controls (3.6 ± 0.7).

Conclusions: The O3i was below the target range in all participants. Our preliminary data suggests that a higher O3i may be associated with PR of T1D. Further investigation of the role of O3 intake in promoting beta cell function in children with stage 3 T1D is warranted.

O-08

Assessing the impact of a virtual food skills program for children with type 1 diabetes

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Introduction: Although food and literacy skills programs have been well assessed in healthy populations, they have not been adequately evaluated in children with type 1 diabetes. The 8-week summerlunch+At Home is a well-established Toronto-based food skills program that teaches cooking, nutrition and environmental sustainability. In a questionnaire format, our study aims to assess the impact of this virtual program on food literacy in children with diabetes.

Objectives: The study was conducted to determine if summerlunch+ enhanced food literacy in children with T1D with the objective of improving their understanding of nutrition, cooking confidence, and creating positive exposures to nutritious foods.

Methods: The questionnaire was administered to the parents/guardians of 63 children (with or without input from the children) before and after the program, and 3 and 6 month follow-up points. Scores were combined for 11 food literacy and skills related components (e.g., children's attitude towards cooking, nutrition knowledge, cooking self-efficacy, and food preferences, HbA1c). A pre-post program comparison was conducted with or without adjustment for potential confounders, with the adjusted comparison using generalized estimating equation (GEE) to account for correlations among repeated measures over different periods.

Results: After adjusting for potential confounding, the delivery of summerlunch+At Home program over 6 months period, significantly improved the scores of the preference for vegetables by 1.05 times, cooking self-efficacy by 1.06 times, nutrition behavior by 1.13 times, knowledge about nutrition and healthy eating by 1.17 times, confidence in cooking by 1.13 times, and importance of nutrition or healthy eating when grocery shopping by 1.093 times.

Conclusions: The implementation of summerlunch+At Home program has a positive impact on the participants' preference on healthy food choice (i.e., vegetables), their cooking skills, knowledge and confidence, as well as knowledge in nutritious food and healthy eating.

O-09

Glycemic responses to graded exercise testing in adolescents with type 1 diabetes using two different automated insulin delivery systems

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Introduction: For individuals with type 1 diabetes (T1D), regulating glycemia during physical exercise can be difficult and vary depending on exercise characteristics and insulin delivery system.

Objectives: To characterize plasma glucose (PG) responses to graded exercise testing (GXT) in adolescents using two different automated insulin delivery (AID) systems.

Methods: Twenty adolescents with T1D (13 males, mean±SD age: 14.8±1.5 years, T1D duration: 7.6±3.3 years, VO_{2peak}: 39.0±6.5 mL/min/kg) using either a Medtronic MiniMed 780G (n=10) or Tandem Control-IQ (CIQ) performed a GXT to volitional exhaustion on a workload-controlled cycle ergometer to determine maximal aerobic rate. PG was determined every three minutes during testing. Data were treated via general linear mixed modelling accounting for treatment carbohydrates and starting PG concentrations as covariates P values ≤0.05 were accepted as statistically significant.

Results: Starting PG levels were similar between AID systems (780G: 7.3±2.0 mmol/L vs. CIQ: 8.5±2.5 mmol/L, p=0.157) and remained comparable at all stages throughout exercise (figure 1). There was no overall change in PG during exercise (p=0.280, figure 1), regardless of which pump was used (p=0.390). The magnitude of change in PG over GXT was comparable between AID systems (780G: Δ-0.6±1.4 vs. Control IQ: +0.2±1.7 mmol/L, p=0.679) with no evidence of sexual divergence (Females: +0.5±0.7 vs. Males: -0.5±1.8 mmol/L, p=0.331). There were no incidences of hypoglycemia (PG <3.9 mmol/L) or severe hyperglycemia (PG >13.9 mmol/L) during GXT.

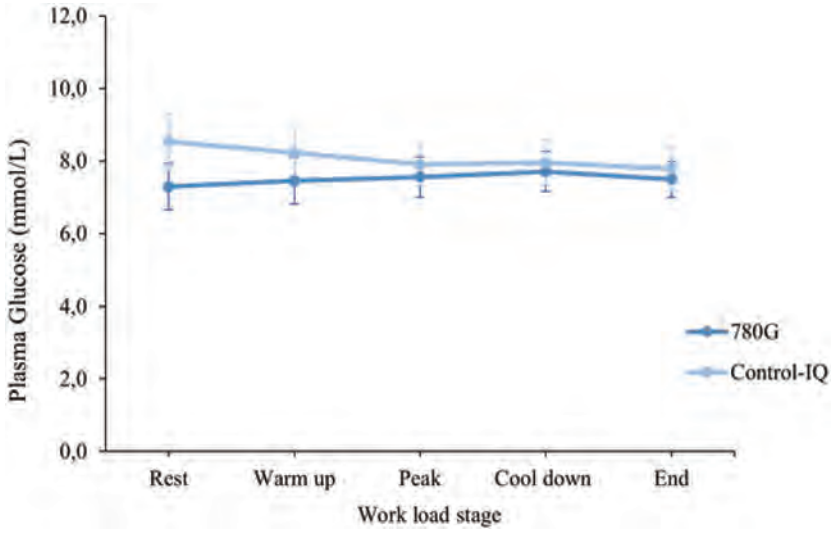

Fig. 1.

Conclusions: These data indicate that in adolescents with T1D using AID systems, GXT carries minimal risk of glycemic disturbance during testing. This information may help healthcare professionals when providing glycemic management advice during exercise.

O-10

Evidence of novel non-autoimmune Aetiology diabetes in sub-Saharan African youths: updates from the young-onset diabetes in sub-Saharan Africa (YODA) study

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Introduction: Type 1 diabetes (T1D) is one of the most common autoimmune diseases, and the major cause of childhood onset diabetes globally. Previous research has suggested type 1 diabetes in sub-Saharan Africa (SSA) may differ from the classical description of the condition in high income settings.

Objectives: We aimed to determine whether clinically diagnosed T1D in young people SSA has an autoimmune aetiology.

Methods: We studied the characteristics of 800 non-obese (BMI <30 kg/m^2) participants with youth-onset (age <30 years) clinically diagnosed type 1 diabetes receiving insulin treatment from SSA (Cameroon (n=248), Uganda (n=398), South Africa (n=182)). We assessed autoimmune aetiology by measuring islet autoantibodies (GAD65, IA-2, and ZnT8) and genetic susceptibility (genetic risk score and HLA type). Endogenous insulin secretion was assessed by stimulated C-peptide.

Results: The 800 youth-onset T1D were 49% female, diagnosed young (15 (11,19) years (median (IQR)), and were slim (BMI 21.6 (19.4, 23.9) kg/m^2)). The majority 66.0% did not have islet autoantibodies, even when restricting to those within a year of diagnosis (61.4%). The 34% of patients with islet autoantibodies had low endogenous insulin secretion 83% <200 pmol/L) and a high genetic susceptibility to T1D as seen in other populations. Participants without islet autoantibodies were still markedly insulin deficiency 65.9% < 200 pmol/L but had a markedly reduced genetic susceptibility to T1D compared to those with islet autoantibodies (median (IQR) Type 1 Diabetes Genetic Risk Score (T1DGRS) 9.51 (7.65, 11.15) vs 11.86 (10.47, 12.87), p<0.0001). Clinical, biomarker and genetic features of islet autoantibody-negative participants were not consistent with type 2 or malnutrition-related diabetes.

Conclusions: Most sub-Saharan African individuals diagnosed clinically with T1D before 30 years do not have immune or genetic characteristics seen in autoimmune T1D. This supports the existence of a non-autoimmune, severely beta-cell deficient subtype of diabetes.

Wednesday, October 16th, 2024

Oral Session II: Diabetes Care and Education

O-11

Improving transition readiness to adult care in adolescents with type 1 diabetes: getting all our ducks in a row!

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Introduction: *Got Transition*® is a national initiative for healthcare providers with the goal of enabling patients to manage their health and effectively use health services. Acquiring type 1 diabetes (T1D) self- management skills during adolescence is positively correlated with treatment adherence and in-target glycemic outcomes in adulthood.

Objectives: Our objective was to improve implementation of transition readiness pathway for eligible T1D adolescents in our diabetes clinic. This included administering transition readiness assessment (TRA), providing transition education, and documenting the transition planning.

Methods: Three diabetes specific questions were added to the Got Transition® to adult care readiness assessment to create our TRA. For eight months, the TRA was administered on paper by staff to T1D patients, starting at age 14 yrs, during a diabetes clinic visit. In May 2023, the form was transitioned to an electronic format. Live results were available for providers to review during clinic visit. A unique SmartPhrase for the electronic health record (EHR) was created to track the discussion on transition planning.

Results: 39% (n=66) of eligible patients (n=171) completed the TRA on paper and 83% patients completed (n=918) the electronic version. In total, 77.5% (n=985) of eligible patients (n=1273), aged 14-24 yrs completed the TRA. The unique SmartPhrase was used 23% of the time.

Conclusions: Our diabetes program recognized transition readiness is a care gap and requires a process for successful graduation from pediatric to adult care. Electronic form of the TRA increased the ability to assess baseline knowledge of transition readiness nearly by 2-fold compared to paper forms. Future interventions will focus on increasing documentation of transition education and creating an alternative transition pathway for adult T1D patients who were not administered the TRA as a minor.

O-12

Family situation and comfort with type 1 diabetes management dimensions in adolescents before transfer to adult care

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Introduction: Transition from pediatric to adult care in adolescents with Type 1 Diabetes (T1D) is associated with glycemic instability and decreased adherence to care. Family situation (parental separation, death or divorce) has been linked to suboptimal glycemic levels in children with T1D.

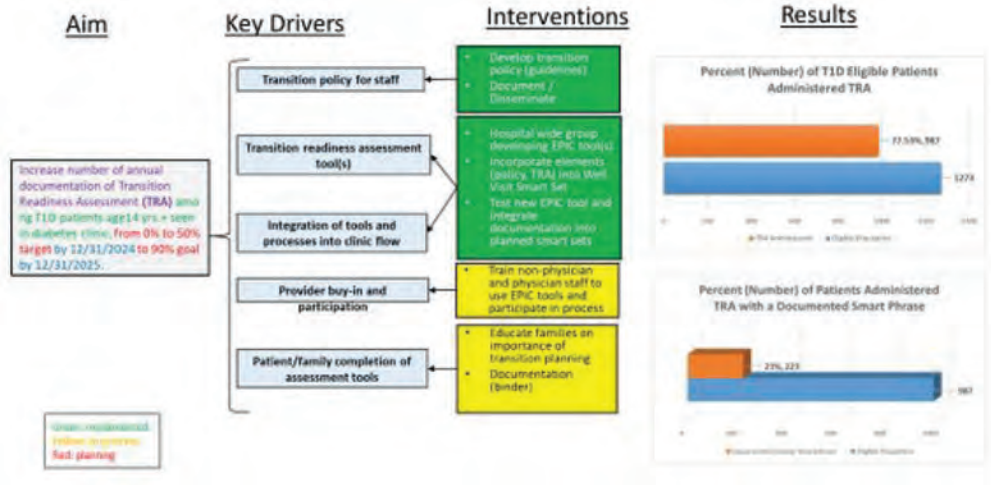

Fig. 1.

Objectives: We examined whether family situation of adolescents with T1D is associated with comfort with diabetes management dimensions and hemoglobin A1c (A1c) before transfer to adult care.

Methods: We conducted a cross-sectional study of baseline data from the Group Education Trial to Improve Transition in adolescents (aged 16-17 years) with T1D in their final year of pediatric care at an academic hospital setting in Montreal. Participants completed validated questionnaires on comfort with diabetes management: self-efficacy (Self-Efficacy for Diabetes Self-Management Measure (SEDM) score 1-10), transition readiness (Am I ON TRAC? For Adult Care (TRAC) score ≥ 8 indicates readiness), diabetes distress (Diabetes Distress Scale for Adults with Type 1 Diabetes (T1-DDS) score ≥ 3 indicates distress). The exposure was family situation (parental separation, death or divorce). We examined associations of family situation with self-efficacy, transition readiness, distress and A1c using multivariate linear and logistic regression models adjusted for sex, diabetes duration, socioeconomic status, mental health comorbidity, technology use and A1c.

Results: Of 202 adolescents with T1D (95, 47% male), 72 (36%) had separated, divorced or deceased parents. Family situation was associated with lower self-efficacy (B=-0.752; 95% CI-1.22 to -0.27) and higher A1c (B= 0.540; 95% CI 0.064 to 1.017). We observed no evidence of association of family situation with other diabetes management dimensions.

Conclusions: Improving health-care transition for teenagers with T1D should consider family situation with respect to self-efficacy to help achieve glycemic stability and improve transition to adult care.

O-13

A virtual, targeted "initiative for diabetes education and awareness for schools" (IDEAS) is practical, sustainable, and is the need of the hour in low- and middle-income countries

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Introduction: India has the highest number of under-18s with Type 1 Diabetes (T1D). Children spend half their waking hours in school and those with T1D need a safe, supportive, and non-stigmatizing environment to perform diabetes self-care activities at school. School staff must have basic diabetes education (DE) to ensure these children's safety and well-being. Given India has ~1.5 million schools, it is practically impossible to impart DE by physical outreach.

Objectives: A few pediatric endocrinologists (PE) and pediatric diabetes educators (PDE) teamed up to formulate a first-of-its-kind "Initiative for Diabetes Education and Awareness for Schools (IDEAS)".

Methods: Monthly, virtual free, 90-minute interactive sessions, interspersed with poll questions to assess knowledge, are conducted voluntarily by two PEs & one PDE. The target audience is teachers and school personnel, reached through the parents of T1D children. Content made for the Indian Society for Pediatric and Adolescent Endocrinology (ISPAE) School Resources project

Table 1. Baseline knowledge and perceptions of school personnel about type 1 diabetes

	Total Responses (n)	% of YES
T1D is caused by	59	
Decreased Insulin production		60%
Insulin resistance in the body		**19%**
Poor diet and lifestyle		**9%**
Strong family history of diabetes		**12%**
What are the symptoms of diabetes in children?	104	
Tiredness		12%
Too much urination		8%
Drinking too much water		1%
All of the above		79%
Childhood diabetes is contagious and can spread by close contact	97	**4%**
T1D is caused by eating too many sweets	97	**15%**
Participating in sports is dangerous for a child with T1D and should be avoided	79	**19%**
Children with T1D should avoid going on overnight trips as it can be dangerous	79	**27%**
Children with T1D is sick and might often need to miss school	85	**38%**
Children with T1D CAN NOT eat a variety of foods like bananas, potatoes, cake, etc.	81	**26%**
Children with T1D DO NOT need to check blood glucose and take insulin during school hours	110	**20%**

is modified and used. Initially conducted in English, it is now being translated into and delivered in regional languages, thus improving reach. Downloadable school resources (session recordings, information brochures, hypoglycemia treatment cards, diabetes management plan for schools, etc.) are available on the ISPAE website: www.ispae.org.in/diabetescare for easy access.

Results: Over 6 sessions (4 English, 1 Kannada, 1 Hindi; Gujarati & Telegu ready), 300+ teachers and school personnel have been educated so far. Poll questions revealed several misconceptions among teachers, underlining the urgent need for correct diabetes education and debunking myths (Table 1). Teachers' feedback has been heartening.

Conclusions: Imparting much-needed basic diabetes education to school staff via virtual sessions in diverse regional languages can be especially suitable for limited resource settings - practical, sustainable, allowing upscaling and wide outreach.

O-14

Identifying challenges in diabetes self-management among adolescents with T1DM in Delhi-NCR, India using the DSMES framework: Findings from a Qualitative Study

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Introduction: Adolescents with type 1 diabetes mellitus (T1DM) seeking healthcare from public hospitals in India face numerous challenges in self-managing their diabetes. However, these challenges have not been adequately documented within this context.

Objectives: This study aims to uncover these challenges using the seven key areas of Diabetes Self-Management Education and Support (DSMES) as a framework. The goal is to identify areas for further research and intervention development to improve clinical outcomes, particularly in resource-poor settings.

Methods: Semi-structured in-depth interviews were conducted with 55 adolescent participants with T1DM and 16 caregivers from four public hospitals enrolled in the PATHWAY Trial, a structured pediatric to adult transition care programme in Delhi-NCR, India (doi: 10.1371/journal.pgph.0000665). Key informant interviews were conducted with five pediatricians and two diabetes educators who were also part of the programme. Data were analyzed using an inductive, thematic approach.

Results: Four major challenges emerged from this study: (1) lack of knowledge about insulin administration, dietary counselling and ongoing diabetes education; (2) financial constraints hindering access to essential resources such as insulin, blood glucose strips, and a healthy diet; (3) insufficient mental health support despite acknowledged psychological burden of the disease; and (4) shortage of trained workforce overburdening diabetes clinics and compromising the quality of diabetes education.

Conclusions: The study underscores the existing gap in diabetes education for adolescents with T1DM in public hospitals in India. Suggestions for future research include context-specific and routine patient-centred DSMES interventions with problem-solving and psychological support components to enhance self-management capabilities for both adolescents and their caregivers.

O-15

Does low child opportunity index at diagnosis predict healthcare utilization and glycemic control during follow-up in youth with type 1 and type 2 diabetes?

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Introduction: We previously demonstrated that Child Opportunity Index (COI), a composite of education, environment, social, and economic factors, was associated with severity at diagnosis of type 1 and type 2 diabetes (T1D, T2D) (in press, *BMJ Open Diabetes Res. Care*).

Objectives: Herein we evaluated the associations between COI and healthcare utilization and glycemic control during follow-up in the same cohort.

Methods: The retrospective cohort of youth admitted in 2021-2022 for new-onset T1D or T2D was evaluated during diabetes outpatient follow-up for 15 months. Associations were assessed between COI (low/very low [LOW], moderate [MOD], high/very high [HIGH]) and both healthcare utilization (number of attended outpatient diabetes visits, emergency visits, and hospitalizations) and HbA1c over time. Models were adjusted for race (White, Black, Multiracial/Other/missing), age, and sex and stratified by diabetes type. Race-COI interaction terms were included if significant ($p<0.05$).

Results: There were 483 youth (T1D n=388; T2D n=95); 46% female (n=220). The table shows unadjusted number of visits and HbA1c by race, COI and diabetes type. Overall, the T2D cohort had 1.4 fewer visits than the T1D cohort ($p<0.001$). In adjusted models, youth T1D-LOW COI attended 0.4 fewer visits than T1D-HIGH COI ($p=0.01$). Youth T2D-MOD COI attended 1.1 fewer visits than T2D-HIGH COI ($p=0.005$). For HbA1c, in T1D and T2D, a race-COI interaction was found such that HbA1c was higher among Black than White youth with LOW COI ($p\leq0.01$), but no race difference existed in youth with HIGH COI. Emergency visits and hospitalizations were infrequent and did not differ by COI.

Table. Unadjusted number of outpatient diabetes visits and mean HbA1c during 15-month follow-up post-diagnosis, by diabetes type, COI, and race.

	Type 1 Diabetes				Type 2 Diabetes			
		COI Category				COI Category		
Outcome	Group	LOW (n=87, 22%)	MOD (n=148, 38%)	HIGH (n=153, 39%)	Group	LOW (n=48, 51%)	MOD (n=28, 29%)	HIGH (n=19, 20%)
Outpatient Diabetes Visits, mean (SD)	Full cohort	3.4 (1.3)	3.7 (1.3)	4.0 (1.2)	Full cohort	2.4 (1.4)	1.9 (1.5)	2.7 (1.1)
HbA1c %, mean (SD)	White (n=318, 82%)	7.4 (1.4)	7.4 (1.1)	7.3 (1.2)	White (n=45, 47%)	6.7 (1.3)	6.3 (1.1)	6.9 (1.6)
	Black (n=39, 10%)	8.3 (2.4)	8.0 (2.0)	7.6 (1.2)	Black (n=42, 44%)	7.4 (2.4)	7.6 (2.2)	7.1 (2.2)
	Other/Multi/ Missing (n=, 8%)	6.9 (1.1)	6.9 (1.2)	7.5 (1.4)	Other/Multi/ Missing (n=8, 8%)	6.4 (1.0)	6.4 (0.4)	5.8 (0.1)

Conclusions: Both COI and race are significant predictors of outpatient diabetes follow-up and glycemic control in youth, but with relationships differing by diabetes type. These findings underscore the intersectional roles of neighborhood-level opportunity and race in diabetes-related care and outcomes.

O-16

Evolving methodologies in crafting ISPAD clinical practice consensus guidelines: insights from the 2024 edition

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Introduction:

Objectives: To describe the historical evolution of the ISPAD Clinical Practice Consensus Guidelines (CPCG) and updated approach for the 2024 edition.

Methods: Review of prior CPGD characteristics, evidence and current 2024 methodology.

Results: The 2024 edition marks the 7th iteration, succeeding editions from 1995, 2000, 2009, 2014, 2018, and 2022. Over the years, the CPCG have evolved to embrace treatment innovations, address health disparities, consider social determinants of health, foster cultural awareness, and emphasize individualized care. Recent editions have witnessed increased global author representation, improved multidisciplinary collaboration and engagement of individuals with firsthand diabetes experience. In 2014, evidence quality grading was incorporated into the CPCG. Yet, a significant proportion of recommendations relied on expert consensus or clinical experience (Grade E; 41% in 2014, 26% in 2018, 43% in 2022). This likely reflects the limited availability of high-quality clinical evidence addressing the diverse aspects of diabetes care encompassed by the CPCG: diabetes education, psychosocial aspects, exercise, dietary management as well as technology and glycemic targets. The 2024 CPCG focuses on updating six high-impact and rapidly evolving chapters. This iteration also introduces a more dynamic process, with streamlined oversight and consistent, optimized evidence grading reviews. Chapters will be concise, with improved graphics, and provide clear guidance on the best practices for care of children and young people with diabetes, recognizing diverse and broader practice settings and resource limitations.

Conclusions: ISPAD CPCG have evolved to enhance their reach and quality. The 2024 guidelines feature significant changes after nearly 20 years, including a journal change, adjusted publication frequency, more concise chapter structure, improved evidence assessment, and graphic design involvement to make implementation more readily feasible.

O-17

Improving diabetes outcomes between different payor systems in a pediatric diabetes program

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Introduction: In the United States, patients are insured by private or public insurance. Research has shown that patients with public insurance have worse glycemic outcomes and lower technology use.

Objectives: To compare glycemic control and technology use of privately versus publicly insured pediatric patients within our urban academic center and demonstrate reductions in disparities between payor types.

Table 1. Hemoglobin A1c Values in Private and Publicly Insured Patients

	Private, N = 341					Public, N = 194				
Characteristic	N	2017, N = 82	2019, N = 94	2021, N = 87	2023, N = 78	N	2017, N = 37	2019, N = 50	2021, N = 59	2023, N = 48
Average Hemoglobin A1c	323					189				
Median (IQR)		8.50 (7.78, 9.95)	8.23 (7.47, 9.19)	7.84 (6.93, 8.88)	7.45 (6.80, 8.51)		9.70 (8.66, 11.57)	8.93 (7.91, 10.05)	8.50 (7.58, 9.55)	7.60 (7.00, 8.70)
Mean (SD)		8.86 (1.74)	8.44 (1.64)	7.99 (1.47)	7.89 (1.83)		10.14 (1.99)	9.38 (1.95)	8.65 (1.57)	8.01 (1.59)

Methods: Between 2017-2023, we aimed to improve glycemic outcomes and increase technology use in patients with public insurance by utilizing technology forward advanced practice providers, creating an education and implementation program on Hybrid Closed Loop Systems, and addressing disparities in appointment access. Data for payor type, technology use, and hemoglobin a1c was collected over 6 years.

Results: There was a significant increase in both insulin pump and CGM use during this time period with a concurrent improvement in hemoglobin A1cs amongst both payor groups. In 2017, the median hemoglobin a1c value for privately insured patients was 8.5%, compared to 9.7% in publicly insured patients. By 2023, the median hemoglobin a1c values were similar between private and publicly insured patients (7.45% and 7.6%, respectively).

Conclusions: Interventions that increased technology use and overcame barriers in access for publicly insured pediatric patients with T1D resulted in reduced disparities in glycemic control between the two payor groups.

O-18

Patient satisfaction with group education sessions for adolescents with type 1 diabetes transitioning to adult care

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Introduction: The Group Education Trial to Improve Transition in Adolescents with Type 1 Diabetes (GET-IT-T1D) aims to assess whether group education sessions better prepare adolescents with type 1 diabetes (T1D) for the transition to adult care. Patient satisfaction is important to evaluate quality of diabetes care.

Objectives: Our aims were to 1) describe adolescent satisfaction with group education sessions, and 2) evaluate predictors of adolescent satisfaction.

Methods: Adolescents (ages 16-17 years) enrolled in the active arm of the trial participated in group education sessions every three months during their last year of pediatric care. Sessions focused on self-care topics to foster autonomy in T1D management. Patient satisfaction was assessed after the last session using a 12-item self-reported online questionnaire, with responses ranked on a 5-point Likert scale. We calculated a mean total satisfaction score. We evaluated potential predictors (diabetes distress, stigma, glycemic control, use of insulin pump or glucose sensor, number of sessions attended) of patient satisfaction using multilinear regression models, adjusted for sex, diabetes duration and socioeconomic status.

Results: Of 106 adolescents randomized to the active arm, 75 (71%) attended group education sessions and responded to the satisfaction questionnaire. 63/75 (84%) would recommend group sessions to other adolescents with T1D. Whereas only 25/62 (40%) agreed that virtual sessions really worked for them, 49/67 (73%) found in-person sessions useful. There was a positive association between number of sessions attended and patient satisfaction (adjusted β 0.317 95% CI 0.137-0.496).

Conclusions: Sustained engagement with multiple group education sessions (ideally in-person) is associated with better patient satisfaction in adolescents with T1D. Our findings highlight the need for providers to develop strategies to increase the feasibility of group education visits and create continued participation in transition care programs.

O-19

Dreams diabetes education portal: a comprehensive digital solution for parents, teachers, and people with type 1 diabetes

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Introduction: Despite the availability of medications and supplies, achieving therapeutic targets remains a challenge, highlighting the need for structured, systematic and customized education. Traditional group education and one-to-one methodologies, while beneficial, often fall short in addressing the complexities of type 1 diabetes (T1D) care. The DREAMS Education Portal, part of Project DREAMS (Diabetes Resources, Education, Advocacy, Mentorship, and Support) initiative by P. Kesavadev Trust, is free digital health education portal, launched on September 25, 2023, and opened to public on November 14, 2023. The portal underscores the importance of comprehensive T1D education.

Objectives: The portal provides tailored educational tools for individuals with T1D, families, teachers, and enthusiasts. With 158 registered users as of March 21, 2024, it offers interactive features like notifications, lectures, virtual classrooms, group discussions, and a knowledge library, enhancing learning and support. This facilitates personalized education and effective condition management.

Methods: The portal actively engages users with alerts to new content and interactive modules. High user engagement is shown by regular access, participation in sessions, and resource utilization. Assessment tests reveal significant improvement, with 90% scoring 100% and others achieving above-average scores, indicating enhanced T1D management.

Results: The success of the education portal demonstrates the efficacy of targeted digital resources in empowering patients and caregivers. It enhances health outcomes and self-management capabilities by providing structured education, real-time support, and interactive learning. The continuous user registration growth and positive feedback highlight its potential as a key player in digital healthcare for diabetes management.

Conclusions: The DREAMS team is dedicated to evolving and expanding the portal to meet the changing needs of the T1D community, ensuring long-term support and impact.

O-20

The global economic burden of type 1 diabetes: current estimates and projections to 2040

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Introduction: The health burden of type 1 diabetes (T1D) has been rising globally over the past decades, especially in low- and middle-income countries. Yet, estimates of T1D's global economic burden and country-specific distribution is lacking.

Objectives: To estimate the global economic burden of T1D, its distribution across different country categories and geographies, and to project its future trends.

Methods: We determined the economic burden of T1D using two alternative methodologies: a cost-of-illness study (COI) and a value-per-statistical-life (VSL) approach. Data on T1D prevalence and mortality by country and broad age groups up to 2040 are derived from the T1D Index. For the COI study, we conducted a literature review to estimate the healthcare costs, the labor income losses, and the caregiver costs associated with T1D across different countries. For the VSL study, we estimated country-specific VSLs using standard methods from the literature.

Results: The current economic burden of T1D is substantial and ranges from $84.4 billion (COI approach) to $479 billion (VSL approach) globally, depending on the adopted economic evaluation method (Table 1). The largest burden is estimated in high-income countries. The economic burden of T1D is expected to more than double by 2040 at the global level. The largest percentage increases in economic burden over time are expected to occur in Africa and South Asia. The COI approach produces more conservative burden estimates since it neglects to account for the intrinsic value of health.

Conclusions: Regardless of the evaluation method used, the economic burden of T1D is high and expected to increase over time, thereby calling for more investment in prevention, early detection, and better treatments for T1D. Our findings can serve as a tool for advocacy, targeted funding choices, and as guidance in investment decisions.

Table 1. Average economic burden of type 1 diabetes by geography and income group (billions, constant 2017 international $)

Region	Cost of illness		Country-specific VSLs		Age and country-specific VSLs		Global uniform VSL	
	2023	2040	2023	2040	2023	2040	2023	2040
World	84.4	264.0	479.0	1360.0	454.0	1010.0	409.0	1140.0
High-income countries	50.3	137.0	289.0	697.0	267.0	411.0	289.0	697.0
Low-income countries	0.3	2.9	4.7	17.3	5.3	20.2	4.7	17.3
Lower-middle-income countries	13.1	63.8	87.9	377.0	87.3	353.0	87.9	377.0
Upper-middle-income countries	20.6	59.9	97.0	273.0	94.8	224.0	97.0	273.0
East Asia and Pacific	6.1	17.5	36.3	99.0	34.8	74.0	31.8	67.2
Europe and Central Asia	31.4	59.9	135.9	306.8	122.7	198.5	76.8	221.0
Latin America and the Caribbean	8.8	29.3	36.0	118.0	39.3	97.1	39.3	135.0
Middle East and North Africa	4.0	27.7	29.3	149.0	29.9	114.0	31.9	129.0
North America	24.7	81.1	178.0	405.0	164.0	245.0	47.1	113.0
South Asia	7.5	38.3	47.8	228.0	47.4	214.0	114.0	285.0
Sub-Saharan Africa	1.9	10.4	15.5	57.7	16.2	64.8	68.3	192.0

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Thursday, October 17th, 2024

Oral Session III: Psychological and Psychosocial aspects of Diabetes

O-21

Impact of a new diagnosis of childhood type 1 diabetes on parents' sleep and employment

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Introduction: Having a child diagnosed with Type 1 Diabetes has considerable impact on family dynamics. Fear of hypoglycaemia at night may impact on parental sleep and the extra burden of looking after a child with diabetes may impinge on employment. Although both these outcomes are recognised anecdotally, the extent to which they occur is poorly understood.

Objectives: The National Paediatric Diabetes Audit (NPDA) for England and Wales aimed to better understand the degree to which these two outcomes affected families and carried out a First Year of Care (FYoC) Parent and Patient Experience Measure (PREM) survey. We sought to quantify how often parents' sleep was disturbed by attending to their child's healthcare needs or by stress relating to their child's health, and the impact on parents' employment.

Methods: The FYoC survey was provided online for six months from July 2023, with all patients of newly diagnosed children between 6-18 months post diagnosis eligible to participate.

Results: 1800 responses were received from parents, representing ~45% of the total number of newly diagnosed children over the study period. 74% reported that their sleep was disturbed at least once per week, with half (47%) reporting sleep disturbance three or more times per week due to attending to their child's healthcare needs. 64% reported disturbed sleep at least once a week due to stress relating to their child's health, with 37% reporting disturbed sleep three or more times a week for this reason. 26% reported that they/their partner had reduced their working hours, and 9% reported that they/their partner had left employment due to the care needs of their child.

Conclusions: A child's diabetes diagnosis can have a significant impact on their parent's wellbeing in terms of sleep deprivation. It can also limit the parent's ability to participate fully in the workforce. Those caring for newly diagnosed children need to be aware of these outcomes and should consider and support family wellbeing in addition to that of the child with diabetes.

O-22

Navigating uncertainty and professional insecurity in constrained systems: a grounded theory study of paediatric diabetes professionals' safeguarding and child protection experiences

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Introduction: Managing diabetes in childhood can be complicated by compromised family ability to meet the child's needs. Understanding of professionals experiences of supporting families where additional family needs impact diabetes management is non-existent. A difficulty exists in a reliance on the child protection system to provide support, creating a need to prove maltreatment. Little research exists on the processes involved in professionals identifying and navigating safeguarding concerns.

Objectives: To understand how, and when diabetes HCPs develop and manage safeguarding or child protection concerns and what influences this.

Methods: Utilising a constructivist grounded theory analysed data from nineteen semi-structured interviews with multi-disciplinary HCPs in England and Wales.

Results: Professionals perceive support needs within families against multifaceted reasoning and degrees of severity. A grounded theory was inductively constructed comprising of a theory; Navigating uncertainty and professional insecurity in constrained systems, a core category and 3 subcategories. Whilst 'moving from uncertainty into action' frustrations arise 'accessing support within a constrained system' causing HCPs to 'become professionally insecure' whilst supporting families 'over and above the diabetes management,' or 'holding responsibility for families'. A discord exists in competing priorities between agencies, and a gap in service provision offering anticipatory support to prevent long-term complications leaving professionals 'feeling, and fearing, that they are failing the child'.

Conclusions: Diabetes teams are uniquely placed to identify maltreatment concerns, however differing thresholds of concern are at cross-purposes. National policy and guidance need updating to include medical neglect within long-term conditions. Specialist HCPs require added training to navigate safeguarding or child protection concerns. Action paths are needed to mitigate absent joint risk comprehension between agencies for this unique patient group.

O-23

Translation and cross-cultural adaptation of the mind youth questionnaire (MY-Q) into Swedish

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Introduction: ISPAD recommends regular clinical assessment of health-related quality of life (HRQoL) in children and adolescents with T1D. The Mind Youth Questionnaire (MY-Q) is designed to identify HRQoL, intended for clinical and research use.

Objectives: To translate and cross-culturally adapt MY-Q for Swedish speaking youths with type 1 diabetes (T1D).

Methods: The principles of good practices for the translation and cultural adaptation process made by the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) were considered. After the authors permission, the translation and re-translation of the original questionnaire from Dutch into Swedish and back to Dutch was carried out by two different pairs of native Dutch and Swedish speakers. A comparison and review of the different versions was made with the original questionnaire. A harmonisation was performed, and some changes were made considering the Swedish cultural and healthcare context. Face validity was performed with ten youths with T1D and eight diabetes nurses. Furthermore, items on stigma were added, one from each domain of the T1D Stigma Assessment Scale (DSAS-1). Items were selected by asking 23 people (12 diabetes nurses, 11 individuals with T1D) to identify the three most important stigmatizing statements in each domain. These were compared with the result in the validation of DSAS-1. A matrix was used to collect information about content, language and any doubts that could be raised with questions related to comprehension and writing. After this the questionnaire was finalized by the research team.

Results: Twelve items required changes: Seven changes considered appropriate Swedish expressions, three were due to cultural aspects (examples of leisure) and two due to updated treatment. Further, three more items related to stigma were included.

Conclusions: The process of translation and cross-culturally adaptation of MY-Q to Swedish has required several changes related to expressions, item content and adding items related to stigma.

O-24

Insights into disordered eating revealed by insulin pump metrics and continuous glucose monitor data in Australian adolescents with type 1 diabetes

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Introduction: Studies on the prevalence of Disordered eating behaviours (DEBs) and eating disorders (EDs) in type 1 diabetes (T1D) have consistently shown increased prevalence in adolescents with T1D compared to age-matched controls across different countries and cultures. As a result of diabetes technologies, the clinician has significantly more data available regarding patterns of insulin administration and glycaemia throughout the day. CGM and IPT data may be able to reflect insulin omission or binge episodes associated with DEB, however no studies to date have reported an association between disordered eating and IPT metrics.

Objectives: Determine the prevalence of DEB in a population of Australian adolescents with T1D and investigate clinical parameters, IPT and CGM metrics, and psychological attributes associated with DEB.

Methods: 50 adolescent participants (27 female, 23 male) were recruited. Diabetes Eating Problem Survey-Revised (DEPS-R) and Strengths and Difficulties Questionnaires (youth and parent versions) were completed. Prevalence of disordered eating was reported, and associations with clinical parameters, IPT and CGM metrics were assessed.

Results: Twenty-four participants (48%) had an elevated DEPS-R score. Participants with elevated DEPS-R were more likely to be female (75% vs 31.6%, p=0.004), with higher HbA1c (8.2%/67mmol/mol vs. 6.9%/51mmol/mol, p<0.002) and BMI Z-score (+1.28 SD vs +0.76 SD, p=0.040). They had lower time in range, 3.9–10 mmol/L (50.3% vs. 63.8%, p=0.01) and higher mean glucose (10.0 mmol/L vs. 8.3 mmol/L, p=0.005). Of the 60% using IPT, participants with elevated DEPS-R had increased bolus overrides (7.9% vs 3.8%, p=0.047). There was no difference in grams of carbohydrates entered per day (206.6g vs. 227.5g, p=0.345), or boluses administered per day (5.02 vs. 5.77, p=0.2).

Conclusions: DEB is common in Australian adolescents with T1D and associated with increased dysglycaemia. This study highlights the role of technology in assisting with early identification of DEB.

O-25

Psychosocial impacts of automated insulin delivery (AID) in parents of youth with type 1 diabetes (T1D) after 12 months of clinical use

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Introduction: Parents play an important role in the management of youth with T1D. Psychosocial outcomes in parents may improve after initiation of AID.

Objectives: To evaluate the psychosocial impacts of AID in parents of youth with T1D.

Methods: One hundred forty-one youth (Mean age 12.0±5.6 yrs, Range 1-17 yrs, T1D duration 3.7±3.2 yrs) starting on the Omnipod 5 AID system as part of their clinical care were enrolled in an observational study with a participating parent. Parents completed surveys at baseline (before AID initiation) and at 3, 6, 9, and 12 months of system use. Surveys included: 1) Insulin Delivery Systems: Perceptions, Ideas, Reflections, and Expectations (INSPIRE), a measure of the psychosocial impacts and expectations of AID, with higher scores indicating more positive perceptions, 2) Problem Areas In Diabetes (PAID), a measure of diabetes burden, with higher scores indicating more burden, and 3) Hypoglycemia Fear Survey (HFS) with 3 subscales: Maintain, a measure of behaviors to keep glucose levels elevated due to worries about low glucose; Worry, a measure of general worry about hypoglycemia; and Social, a measure of worries of the social consequences of hypoglycemia. Higher HFS scores indicate more worry. Linear mixed models were used to model changes in survey scores over time and differences between time points (using baseline as the reference).

Results: INSPIRE scores were high at baseline and increased significantly at 6 and 12 months. PAID and HFS-Maintain, Worry, and Social scores decreased significantly at 3 months and were maintained at 12 months.

Conclusions: These results suggest positive psychosocial outcomes for parents of children with T1D after initiation of Omnipod 5 AID. Reduced burden and fear of hypoglycemia were observed within the first few months after AID initiation and maintained at one year, suggesting that psychosocial benefits of AID begin early and have lasting impacts.

O-26

Characterizing responders versus non-responders to a new scalable digital treatment for diabetes distress in families of school-age children with type 1 diabetes

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Introduction: Diabetes Distress (DD) is a multi-symptom emotional condition that relates to living with or caring for someone living with type 1 diabetes (T1D). We have designed a new, scalable, digital treatment to target DD in families of school-age children with T1D.

Objectives: Here we report on characteristics of responders (reported lower DD scores post-treatment) versus non-responders (reported no change or higher DD scores post-treatment) of our treatment.

Methods: 34 families (mean child age= 10±1.4 years; 53% male, 85% White, mean HbA1c= 7.24±0.71%) participated. All families had 24x7 access to our digital treatment materials via their hospital's patient portal app for 10 weeks. Pre-treatment we collected demographic data, child HbA1c, and parent and child DD using the Problem Areas in Diabetes-Child (PPAID-C and PAID-C, respectively). Post-treatment we collected PPAID-C and

Table: Change in Parent INSPIRE, PAID, and HFS scores after initiation of the Omnipod 5 AID system

Survey (Score range)	Baseline	Month 3	p-value	Month 6	p-value	Month 9	p-value	Month 12	p-value
INSPIRE (0-100)	77.4 (1.4)	79.5 (1.4)	0.13	81.7 (1.4)	0.002	81.8 (1.4)	0.003	83.6 (1.4)	<0.001
PAID (0-100)	53.3 (1.7)	45.9 (1.7)	<0.001	46.0 (1.8)	<0.001	44.0 (1.8)	<0.001	44.2 (1.8)	<0.001
HFS- Maintain (0-12)	5.0 (0.2)	4.0 (0.2)	<0.001	3.9 (0.2)	<0.001	4.1 (0.2)	<0.001	3.8 (0.2)	<0.001
HFS-Worry (0-40)	18.2 (0.7)	15.0 (0.7)	<0.001	15.6 (0.7)	<0.001	14.4 (0.7)	<0.001	14.9 (0.7)	<0.001
HFS- Social (0-20)	3.3 (0.3)	2.2 (0.3)	<0.001	2.4 (0.3)	<0.001	2.5 (0.3)	0.004	2.6 (0.3)	0.01

*scores expressed as mean (SE); p-value reflects change from baseline to 3, 6, 9, and 12 months

PAID-C scores. We determined responder versus non-responder status using the minimum clinically important difference (MCID) in DD pre- to post-treatment. Responders had ≥1 MCID drop in DD, while non-responders had no change in DD or a ≥1 MCID increase in DD. Then, we categorized dyads based on whether both responded (n=14), neither responded (n=8), or only one person in the dyad responded (n=12).

Results: There were no differences in child age, sex, race, or pre-treatment HbA1c for parent-child dyads who both responded, neither responded, or only partially responded. Parent-child dyads who both responded reported higher PAID-C and PPAID-C scores at pre-treatment, though only PPAID-C scores were significant (p=0.01). Parent-child dyads who both responded reported slightly shorter T1D duration than dyads where only one responded (p=0.08).

Conclusions: Responders to our new scalable, digital treatment for DD in school-age children with T1D reported more DD pre-treatment and may be newer to T1D than non-responders. Characterizing responders may help identify future candidates for this intervention.

O-27

Improving psychological outcomes in youth with type 1 diabetes and their caregivers: feasibility trial of the LIFT wellbeing app

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Introduction: Adolescents and young adults (AYAs) with type 1 diabetes (T1D) have an increased risk for psychological disorders compared to peers. Caregivers also report high distress. A digital mental health intervention using a smartphone app could more feasibly be integrated into day-to-day diabetes care for both youth and caregivers.

Objectives: Our study aimed to explore usability, acceptability, and uptake of the LIFT app in AYAs and caregivers. We also examined descriptive changes in psychosocial outcomes (anxiety, diabetes distress, wellbeing, self-compassion, self-efficacy, self-care behaviours) and HbA1c/CGM metrics from baseline to 12-weeks. The feasibility benchmarks were 70% retention of AYAs, 30% retention of caregivers and 80% completion of psychological outcomes at 12-weeks.

Methods: A single arm feasibility study was conducted with 44 AYAs recruited from 3 regions in New Zealand. Eighteen support people were also recruited. After enrolling in the trial, all participants were asked to use the app daily for 12 weeks and complete questionnaires at baseline and 12-weeks.

Results: Forty-four AYAs were enrolled in the trial (72% female) and were between 16-25 years old (M=19.52, SD=2.61) with the majority (66%) identifying as New Zealand European. Mean baseline HbA1c was 69.31 mmol/mol. Out of the 18 caregivers 67% were female. Retention was over 90% for both AYAs and caregivers and over 80% of all participants completed the final follow-ups. Thirty-two AYAs out of 36 who completed the final questionnaires reported that they would recommend the app to others and also reported that LIFT was helpful in normalizing common challenges and increasing self-efficacy. Scores on anxiety, wellbeing, and self-compassion all improved in the AYAs. The other outcomes measures did not change over time.

Conclusions: LIFT was feasible and acceptable to AYAs with T1D with promising psychological improvement. The next step will be a randomized controlled trial to explore changes in psychological outcomes over a longer period.

O-28

Abstract Withdrawn

O-29

Coping with diabetes: supporting mental health and emotional wellbeing for 10-14 year olds living with type 1 diabetes

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Introduction: DigiBete is available through the National Health Service to all 35,000 children and young people (CYP) under the age of 25 years with type 1 diabetes (T1D) in the UK.

Objectives: The 2020/2021 National Paediatric Audit, highlighted that 46.5% of CYP were assessed as requiring additional psychological support. Recognising this pressing need, JDRF UK funded DigiBete to develop an early intervention tool, initially to support 10-14 year olds, with the view to broadening to all ages up to 25 and parents following a successful phase 1 testing and evaluation.

Methods: A 9-month co-design period took place comprising:

- 6 workshops with young people aged 10-14 living with T1D
- 6 workshops with paediatric clinical psychologists, in diabetes teams from across the country
- 4 expert user sessions with older young people living with T1D under 30

Results: *A new 'Coping with Diabetes' tool was created and tested on the* DigiBete app, incorporating real-life stories, animations and activities to help prevent and reduce diabetes distress and burnout for CYP aged 10-14. Testing occurred at Leeds Children's Hospital with on-line surveys completed in clinic by CYPs (N=16 respondents) 80% rated the resources high quality and 81% felt access to the tool was helpful. A multi-disciplinary team of healthcare professionals (n=19) including 7 Psychologists from across the country also evaluated the tool, with all respondents rating the new resources as high quality and agreeing they would use the resources to support CYP with their mental health.

Conclusions: *'Coping with Diabetes'* is now available to all CYP with type 1 diabetes aged 10-14 across the UK and Ireland and marries lived experience with clinical expertise. The development has led to the creation of appropriate, accurate and reliable resources, as an early intervention psychological tool now widely available across the county. A further phase, funded by JDRF UK, developing resources for all age profiles up to 25 and parents, is underway and will be independently evaluated.

O-30

First-degree relatives with high-risk islet autoantibodies less likely to engage in follow-up

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Introduction: Follow-up monitoring of islet autoantibody positive (IA+) persons is critical to early T1D identification, including prevention of diabetic ketoacidosis.

Objectives: We identified factors predicting completion of an initial follow-up monitoring visit after confirming high-risk IA+ (i.e., single IA+ by two methods or multiple IA+).

Methods: The Autoimmunity Screening for Kids (ASK) program screens youth aged 1-17 for IA and offers a free monitoring program if the child is identified as IA+. Multiple logistic regression was used to identify factors associated with completing the initial monitoring visit among youth identified as high-risk for progressing to T1D (i.e., single IA+ by two methods or multiple IA+).

Results: Seventy-nine percent (N=194/246) of youth completed an initial monitoring visit. Controlling for child age, sex, IA status, and race/ethnicity, youth with a first-degree relative with T1D (i.e., parent or sibling) were significantly less likely to participate in the monitoring visit (OR 0.39, p=0.04).

Conclusions: Youth at high-risk for progression to T1D with FDRs were less likely to participate in the ASK follow-up monitoring program compared to individuals without FDRs. These findings are consistent with the TEDDY study which found FDRs were less likely to complete OGTTs and food records. Potential explanations include FDRs are more confident monitoring for signs/symptoms and therefore feel the visits are less necessary. Alternatively, the burden of caring for another individual with T1D already may make follow-up for the individual identified as high-risk less feasible. Further research is needed to better understand reasons FDRs are less engaged in follow-up after being identified as high-risk for T1D. Interventions tailored to address concerns of FDRs may help increase engagement in programs monitoring high-risk IA+ children for progression to clinical T1D.

Thursday, October 17th, 2024

Oral Session IV: Diabetes Aetiology, Epidemiology and less common forms

O-31

Does children and adolescents with type 1 diabetes (T1D) and attention deficit hyperactivity disorder (ADHD) have a worse metabolic outcome than children with T1D without ADHD? – the Norwegian childhood diabetes registry (NCDR)

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Introduction: Treatment of T1D is demanding. ADHD may interfere with a person's ability to organize and manage T1D.

Objectives: To describe the prevalence of medically treated ADHD in children with T1D in Norway, and to compare metabolic parameters in individuals with T1D and comorbid ADHD with individuals with T1D without ADHD.

Methods: In order to identify individuals in NCDR who had received at least one prescription of ADHD-medications, we linked data from NCDR with the Norwegian Prescribed Drug Registry. NCDR includes individuals at age 0-17 years. The Norwegian Prescribed Drug Registry is a national registry and contains data about dispensed drugs starting in 2004. From NCDR, 6 520 individuals (46 % females) with T1D were eligible for inclusion. These individuals had attended standardized annual diabetes controls between 2004-2022. For each year from 2004 to 2019, prevalence rates of medically treated ADHD in NCDR were compared with prevalence rates of medically treated ADHD in the general population. We compared HbA1c in individuals with T1D, with and without comorbid ADHD between 2004 and 2022.

Results: A total of 270 (4.1 %) individuals (46 % females) received medical treatment for ADHD at least once between 2004 and 2019. Mean age for medication start was 10.9 years in boys and 12.6 years in girls. We found similar prevalence rates of medically treated ADHD in individuals with and without T1D. Rates

increased gradually from 2004 to 2019, and was highest in the age group 10-14 years. The ratio boys: girls was 2:1 in both groups. For the period from 2017 to 2022, results show that HbA1c was higher in individuals who had been treated for ADHD. When stratified into genders, the difference in HbA1c was only significant in boys with T1D, not in girls.

Conclusions: In Norway, the prevalence rates of medically treated ADHD in children with T1D were similar to the prevalence rates in the general population. HbA1c was higher in individuals with ADHD and T1D, but this finding was only significant in boys.

O-32

Management of the neonatal diabetes mellitus: results of the ISPAD jenious neonatal diabetes (JENODY) survey

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Introduction: Neonatal Diabetes Mellitus (NDM) is a rare disease requiring specific expertise.

Objectives: This survey aims to investigate how NDM is managed by healthcare professionals (HCPs) who are members of ISPAD.

Methods: ISPAD members were asked to complete a 49-item questionnaire via email, focusing on the management of NDM

Results: Responses were gathered from 108 HCPs (97 pediatric endocrinologists/diabetologists, 4 adult endocrinologists/diabetologists, and 7 other physicians) from 45 different countries, mainly from Europe and the Middle Eastern Asia. Out of the 108 respondents, 103 reported being involved in NDM management. When diagnosing NDM, 95 (87.9%) of participants would start treatment with insulin, while 12 (11%) would prefer sulphonylurea (SU). Over half (54.6%) of the HCPs would initiate insulin treatment using a pump, and 80.6% would utilize continuous glucose monitoring (CGM). Regarding genetic testing, 50.9% believe it should be done when diabetes occur up to 6 months of age, while 40.1% think it should be done up to 12 months. The majority (79.6%) would request genetic testing for NDM cases, with only 29.6% opting not to for various reasons. Most participants (96.3%) see genetic testing as necessary to determine patients who can be treated with SU, although some (26.9%) would try SU before testing. Only 62.9% of the HCPs had received specific training on NDM. In terms of confidence in managing NDM, 60 participants felt fairly or completely confident, while 48 felt less confident.

Conclusions: NDM is a rare condition requiring specialized knowledge for proper treatment. Despite ISPAD guidelines on NDM management, our survey suggests variations in treatment choices and glucose monitoring methods among participants. It indicates that NDM remains challenging for many clinicians, emphasizing the need for additional education to boost confidence in managing NDM.

O-33

Regional deprivation and diabetic ketoacidosis upon diagnosis with type 1 diabetes in children and adolescents: international comparison among six countries from three continents

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Introduction: To investigate the relationship between area-level deprivation indices and DKA at diagnosis of type 1 diabetes considering age and sex in six countries.

Objectives: The prevalence of diabetic ketoacidosis (DKA) at the time of diagnosis of type 1 diabetes in children and adolescents varies between countries and remains high in many regions. This study investigates the relationship between area-level deprivation indices and DKA at diagnosis of type 1 diabetes considering age and sex in six countries.

Methods: We analyzed children diagnosed with type 1 diabetes between 2019 and 2022 across six diabetes registries. Within each country, a regional deprivation index for the area of residency was standardized to mean = 0 and standard deviation = 1 to estimate each patient's regional socioeconomic status. Logistic regression models assessed the association between the standardized area-level deprivation index and DKA, stratified by age groups (<6, 6-<12, 12-<18 years), sex, and country.

Results: There were n=17,316 children with a median age of 9.3 [IQR 5.7-12.5] years and an overall DKA rate of 34.9%. The cohorts for each country were: Germany (n=13,397, DKA 32.6%), Colorado USA (1,318, 54.6%), Italy (1,120, 35.4%), Wales (769, 35.2%), New Zealand (406, 43.8%), and Slovenia (306, 32.4%). In children <6 years of age, higher deprivation was associated with an increased risk of DKA (p<0.0001), but not in the older groups. Higher deprivation was associated with a higher risk of DKA in males (p=0.002) but not in females (p=0.4).

Conclusions: Regional deprivation was significantly associated with the risk of DKA at the diagnosis of type 1 diabetes, with notable differences by age and sex. Males and children under age 6 years appear to be more vulnerable to deprivation than females and older patients. Understanding local and demographic-specific disparities is essential for effective intervention.

O-34

Interim results from a phase 2, open-label study evaluating an oral, fixed-dose combination of sodium phenylbutyrate and taurursodiol in wolfram syndrome (HELIOS)

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Introduction: Wolfram syndrome is a rare and fatal genetic disorder characterized by childhood-onset diabetes mellitus, optic nerve atrophy, deafness, diabetes insipidus, and neurodegeneration. Sodium phenylbutyrate (PB) and taurursodiol (TURSO) has demonstrated pre-clinical efficacy in enhancing survival and viability of neuronal cells derived from induced pluripotent stem cells of patients with Wolfram syndrome and improving diabetic phenotype in a mouse model of Wolfram syndrome.

Objectives: The single-center, phase 2, open-label HELIOS trial is evaluating the safety and tolerability of PB&TURSO as well as its effects on measures of endocrinological, neurological, and ophthalmologic function.

Methods: Adults with a definitive genetic diagnosis of Wolfram syndrome, insulin-dependent diabetes mellitus, and stimulated C-peptide levels of ≥0.2 ng/mL at screening were enrolled from one US site and will receive PB&TURSO for up to 96 weeks. The primary efficacy endpoints are C-peptide area under the curve response at Week 24 and change from baseline in ΔC-peptide at Week 24, both using a 0-240 minute mixed meal tolerance test (MMTT). Secondary efficacy endpoints include measures of glucose control, including HbA1c, and best-corrected visual acuity.

Results: Twelve participants with a median (range) age of 25 (18-39) years were enrolled. As of March 2024, 8 participants completing their Week 24 assessments were included in this interim analysis. Average C-peptide values at Week 12 and 24 were higher throughout the course of the MMTT compared with Screening average C-peptide values. Shorter time-to-peak C-peptide values at Week 24 compared with Screening was observed. Compared to baseline, mean HbA1C values were lower at both Week 12 and 24.

Conclusions: Preliminary evidence shows improvement of pancreatic β-cell function post PB&TURSO treatment in adults with Wolfram syndrome. Analyses once all 12 participants have completed their Week 24 and 48 assessments will provide more insight.

O-35

HNF4a- and HNF1A-MODY in Italian youths: a real-world study about management and blood glucose control

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Introduction: Maturity Onset Diabetes of the Young (MODY) is a subtype of diabetes requiring specific treatment and molecular diagnosis.

Objectives: The objective of this study was to describe the timing of molecular diagnosis, the treatment, and the metabolic outcomes of HNF4a- and HNF1a-MODY in Pediatric Diabetes Centers in Italy between January 2013 and December 2021.

Methods: The study included patients under the age of 18 with genetically confirmed diagnoses of MODY. Data was collected at the time of diagnosis and again 6 months after the molecular diagnosis.

Results: A total of 31 HNF1a- (19 females) and 10 HNF4a patients (7 females) were included. The table summarizes the findings of age and HbA1c levels. HNF1a patients: the average age at first hyperglycemia was 11.9±1.6 years, with one patient identified through amniocentesis due to family history. At the time of referral, 4 patients were prescribed insulin and 2 were prescribed metformin; 22 patients were not on any therapy or diet at that time. During the follow-up visit after the molecular diagnosis, 22.6% of patients were on sulfonylureas (SU), 1 on repaglinide, 3 on metformin, and 3 on insulin. 13 patients did not require any medication. The average HbA1c dropped from 7.1±1.7% to 6.7±0.8% for patients switched to SU. HNF4a patient: the average age at first hyperglycemia was 12.8±2.2 years. At the time of referral, 2 patients

	HNF1a		HNF4a	
	HbA1c (%)	Age (years)	HbA1c (%)	Age (years)
at referral	7.1±2.3	12.1±1.9	6.6 2.1	13.0±2.8
at molecular diagnosis	6.5±1.2	12.6±2.2	7.2 2.1	13.1±2.4
after molecular diagnosis	6.5±1.3§	13.3±2.0	5.9 0.9¤	14.2±2.6

§ vs referral p<0.001; ¤v s referral p=0.021

were on insulin and 1 on metformin, while the others were managing with diet alone. During the follow-up visit after the molecular diagnosis, 50% of patients were switched to gliclazide and 20% remained on insulin.

Conclusions: The average time between the onset of hyperglycemia and molecular diagnosis was less than 18 months. Most patients achieved target HbA1c levels and only a small percentage required hypoglycemic treatment. Female patients were more prevalent, which may be attributed to the younger age of puberty in females with diabetes.

O-36

Demographic and clinical characteristics of children with type 1 diabetes: a real-world data from CDiC-Pakistan

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Introduction: Type 1 Diabetes (T1DM) is an auto-immune disorder and can affect at any age but usually, it ensues in children or adolescents. Children with T1DM need continuous care along with insulin treatment. According to Type 1 Diabetes Index Report 2022, 8.75 million people are living with T1DM globally and 1.52 million people are < 20 years of age. Pakistan is a resource-constrained society with no healthcare system. Approx. 12000 children have T1DM in Pakistan. Most of those children remain unmanaged or develop complications at a very young age due to lack of government support, awareness, and education, out-of-pocket cost of insulin and monitoring, and poor understanding of T1DM among HCPs. To improve this state, the Changing Diabetes in Children (CDiC) project was initiated in Pakistan in 2021 with the provision of free access to care and treatment.

Objectives: To describe demographic and clinical characteristics of children and adolescents with T1DM in Pakistan, using baseline data and clinical characteristics.

Methods: This is a descriptive study conducted from Oct, 21 to Feb 24. The total# of participants was 1642 (853 boys & 789 girls) < age of 25 yrs under 4 main and16 satellite centers across Pakistan. The data was entered into specially designed software linked to the National Diabetes Registry at the time of enrollment with detailed clinical checkup.

Results: Free insulin, pen devices, glucometer, lancets, and testing strips were provided. Majority of participants (78.4%) were on pre-mix insulin followed by 21.6% on basal bolus regimen. Hypertension was seen in 3 participants, CVD in 1, neuropathy in 6, neuropathy in 4, nephropathy in 5, and 2 were smokers. More than 80% of participants had no baseline A1c and 14.8% had A1c > 10% with no deceased child.

Conclusions: Such initiatives can improve the lives of children with T1DM in LIMICs like Pakistan and enhance understanding of their clinical characteristics and support the development of targeted strategies to reduce T1DM mortality and morbidity globally.

O-37

MODY calculator: inclusion of biomarkers improves discrimination in paediatric diabetes population with monogenic diabetes

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Introduction: Maturity-onset diabetes of the young (MODY) is a rare young-onset form of diabetes that is challenging to diagnose. The MODY calculator is routinely used to help identify patients for MODY testing referral, but the current version contains limitations and does not consider informative biomarkers.

Objectives: We aimed to update the calculator to produce probabilities more representative of the general diabetes population, incorporate C-peptide and islet autoantibody results and improve discrimination in the paediatric diabetes population.

Methods: We recalibrated the existing MODY calculator using data from the population-representative UNITED study (1294 patients diagnosed with diabetes <30y; 28(2.2%) MODY positive). We compared the original and new model probabilities for 65,172 patients diagnosed aged 1-35y in routine electronic healthcare records (CPRD). For insulin-treated patients, we augmented this model with additional biomarker information. The model was further tested in paediatric patients (430 additional patients from UNITED study; 11(2.6%) MODY positive).

Results: The mean probability from running the original model in CPRD was 8.8%, suggesting over-estimation (MODY prevalence in UNITED≈3%), whereas the new calculator probabilities were more appropriate (mean 3.9%). In the UNITED population representative cohort, the addition of biomarkers improved diagnostic accuracy over just clinical features (AUC: 0.99v0.93), with probabilities increasing in patients with MODY (18.2%v2.8%) and decreasing in those without MODY (0.5%v0.6%). In the insulin-treated paediatric patients, the addition of C-peptide and antibody testing also improved discrimination of MODY positive compared to MODY negative patients (AUC: 0.90v0.98).

Conclusions: The recalibration and optional inclusion of biomarker data in the MODY calculator leads to improved discrimination in paediatric cases. This presents a step forward in the ongoing improvement and clinical utility of this tool.

O-38

Defective blood glucose control is associated with high frequency of tr3-56 immune cells during T1D progression

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Introduction: Among the main immune cells implicated in the T1D pathogenesis, Tr3-56 lymphocytes have been identified as a significant population associated with beta cell function (1). Glucose represents an important metabolic fuel supporting the function of immune cells; high amounts and/or defective control of its levels may impair immune cell functions, likely contributing to the progression of pathological inflammatory conditions in T1D.

Objectives: To evaluate the effects of *in vivo* glucose levels on the circulating immune cell population of children with T1D and to correlate to their glucometabolic profile obtained from Continuous Glucose Monitoring (CGM) devices.

Methods: We enrolled 36 healthy control (8,5 $\pm$ 3.15 ys, 16 M) and 27 T1D children (9.7 $\pm$ 3.3 ys, 13 M) at disease onset followed-up for 1 (T1) year. Glycosylated hemoglobin (HbA1c), Continuous glucose Monitoring (CGM) metrics and main immune cell subsets were analyzed.

Results: Among all immune cell subsets, the frequency of Tr3-56 cells is reduced at disease onset compared with healthy children (P=0.0049) while significantly increased one year (P=0.0008). In addition, at T1 we observed a statistically significant positive correlation between Tr3-56 cells and both HbA1c levels (r=0.3829, P=0.0487) and time above range (TAR)(r=0.4265, P=0.0335 and r=0.5616, P=0.0035). Conversely, Tr3-56 cell frequency inversely correlated with time in range (TIR) (r=-0.3916, P=0.0434). Thus, we categorized T1D children into two groups based on their glucose control from CGM metrics: time spent with glucose levels between 70-180 ng/ml (TIR) >70% as group 1; and <70% as group 2. We found that the frequency of Tr3-56 cells was significantly higher in group 2 (P=0.0124).

Conclusions: These data reveal that Tr3-56 cells may be affected by glucose levels in children with T1D. Further investigation is needed to better understand the role of glucose in this subgroup of cells, particularly regarding their functions in T1D.

O-39

Loss of multiple islet autoantibody status during progression to type 1 diabetes

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Introduction: Type 1 diabetes (T1D) can be diagnosed before clinical symptoms with the presence of multiple islet autoantibodies (IA) and normoglycemia - stage 1 or IA and dysglycemia - stage 2. Early-stage diagnosis allows for treatment with FDA approved medications or agents being tested in clinical trials. Both options require the presence of two or more IA for eligibility; however, some individuals lose IA prior to clinical diagnosis.

Objectives: We explored the frequency and predictors of regression from multiple to single or negative IA status in youth who progressed to clinical T1D.

Methods: Youth with at least two IA evaluation visits prior to clinical T1D onset were included. They participated in *Diabetes* Autoimmunity Study in the Young (DAISY) cohort (n=90, median 14 visits/person) or Autoimmunity Screening for Kids (ASK) screening study (n=61, median 4 visits/person).

Results: Of those who progressed to clinical T1D, 92% in DAISY and 84% in ASK were multiple IA+ at least once. However, many multiple IA youth, 39% (32/83) in DAISY and 10% (5/51) in ASK, regressed to single or negative IA status prior to clinical diagnosis. The mean time from multiple to single or negative IA status was 5.4 (1.1-47.0) months. IA regression was more common in males (p=0.025), controlling for the effect of study (ASK vs DAISY). Among youth seen while in stage 2, 30% (32/106) had single or negative IA status. 54% (17/32) of progressors with single or negative IA status in stage 2 T1D had previously been multiple IA+.

Conclusions: IA levels fluctuate over time. With cross-sectional screening for T1D, many patients testing positive for a single IA may have had multiple IA historically. Current eligibility criteria for clinical treatment with an FDA approved medication or participation in clinical trials appear too restrictive and may exclude youth who will progress to clinical T1D despite absence of multiple IA.

O-40

Hyperglucagonemia and inappropriate glucagon response occurs prior clinical onset of type 1 diabetes

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Introduction: Autoimmune destruction leading to beta-cell decline is essential in the development of type 1 diabetes (T1D) onset. However, altered alpha-cell function and hyperglucagonemia can also contribute to hyperglycemia and ketoacidosis.

Objectives: Here, we evaluate the glucagon responses during oral glucose tolerance test (OGTT) in high-risk children and adolescent at different early stages of T1D.

Methods: Forty-seven participants, aged 4–25, from the Diabetes Prevention and Prediction (DIPP) study carrying a high genetic risk for T1D, were recruited, and classified into the following groups: islet autoantibody (IAb) negative, one IAb positive, and stages 1,2 and early stage 3 (prior the start of insulin treatment) of T1D. For glucagon levels during OGTT (0, 15, 30, 60, 90, 120 min), blood was collected, cold-centrifuged, and analyzed for glucagon via radioimmunoassay; insulin, C-peptide, and glucose were measured with standard immunoassays.

Results: Fasting plasma glucagon levels increased towards more advanced stages and were significantly elevated in stage 3 and stage 2 T1D compared to stage 1 (P=0.002 and P=0.022, respectively). The longitudinal pattern of glucagon secretion during the OGTT showed significant differences between the groups (P=0.019 for the interaction between time and group), with the most pronounced paradoxical increase in glucagon secretion at the 15-minute timepoint observed in individuals at early stage 3 T1D.

Conclusions: Here we demonstrate that hyperglucagonemia, indicative of alpha-cell dysregulation, develops at the early stages of T1D. These observations highlight the need for further studies aimed at testing the efficacy of pharmacological therapies that suppress glucagon secretion in the pathogenesis of T1D.

O-62

Family Ties and Screening Whys: Decisions in Islet Autoantibody Testing for Type 1 Diabetes

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Introduction: Factors influencing screening could inform approaches to engaging families to screen for T1D.

Objectives: Among families with a history of T1D, we explored influences on caregiver decision making to screen children for T1D risk.

Methods: An exploratory, online survey of families with a history of T1D was completed by adults age ≥ 20 years with children between the ages of 8 - 17 years. Caregivers were recruited from a digital health measurement and engagement platform. Survey themes addressed access to care, trust in healthcare professionals and system, beliefs in screening value, screening anxiety, and general wellness behaviors. Chi-square and t-tests assessed comparisons between those who screened and those who did not. Logistic regression identified the main predictors for screening with screening status as the outcome. P-values are adjusted for group-wise false discovery rate.

Results: 482 caregivers (232 who screened, 250 did not) were identified from potential participants who completed a prior survey on experiences with T1D, with mean age 40.6 years (SD 6.7), 356 (73.9%) females, 345 White (71.6%). Children with first degree relatives with T1D were more frequently screened than those without (31.5% vs 17.6%, p = 0.01). Caregivers who screened had higher thematic scores believing the value of screening (mean 4.3 vs 3.6 p = 0.01). They also reported less favorable self-health (16.8% vs 6.8% for "Fair" health, 32.3% vs 44% for "Very Good" health respectively, p = 0.03 for health states) and lower educational levels, (55.6% vs 70%, p = 0.03 for educational strata). The figure below shows the main predictors in the multivariate model.

Conclusions: In a population of caregivers participating in digital health monitoring, a collection of sociodemographic, objective health indicators, and attitudes differentiated those who had their children screened versus those who did not.

Friday, October 18th, 2024

Oral Session V: Technology in Diabetes Care

O-41

Improving access to diabetes technology for children and young people (CYP) with diabetes living in low-income households: a response to poverty proofing program outcomes, the national paediatric diabetes audit (NPDA) and NHSE core20plus5 for CYP

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Introduction: NPDA and NICE HCL TA943 show improved health outcomes including quality of life with use of diabetes technologies. High levels of deprivation in the North East and North Cumbria (NENC) are a barrier to accessing diabetes technology. Hospital Trusts should responsibly dispose of IT equipment. NPDA data shows inequalities in access to CGM and insulin pump therapy. npda_2021-22_apendix_1_extended_analysis.pdf (rcpch.ac.uk) Overview | Hybrid closed loop systems for managing blood glucose levels in type 1 diabetes | Guidance | NICE

Objectives: To reduce the inequality in accessing diabetes technology for CYP who live in deprivation.

Methods: Gateshead Health NHS Foundation Trust (GHFT) set up digital refurbishment processes. CYP NENC Diabetes Network worked with voluntary sector partners and diabetes teams to develop process pathways and deliver refurbished phones, laptops and charity sims to families to enable access to diabetes technologies, including HCL devices. A business case was submitted to industry to enable a CGM app to become compatible with the donated phones.

Results: Over 12 months March 2023-2024 we received 310 referrals (31% CYP with diabetes in NENC) 297 devices; 232 phones and 66 laptops donated by GHFT; 244 sim cards donated by Vodafone. 60% referrals from families living in IMD deciles 1-3, 25% referrals to families in IMD decile 1.

Conclusions: We facilitated equitable access to life-changing technology for CYP living with diabetes in NENC. Using a poverty proofing approach - no barriers to access we demonstrated that most referrals came from deprived families. This supports a more sustainable climate friendly approach to meeting digital healthcare needs. This project can be translated into all healthcare settings.

Written informed consent was obtained from the individuals depicted for publication of this image.

O-42

Re-training and fine-tuning a deep learning artificial intelligence model for the detection of referable diabetic retinopathy in children and young people with diabetes

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Introduction: SELENA+ (Singapore Eye Lesion Analyser Plus) is a deep learning (DL) artificial intelligence (AI) model trained on 76,370 retinal images from 13,099 adults with diabetes in 2010–2013 (Ting D, et al. JAMA 2017). We found that SELENA+ was able to deliver clinically acceptable performance for detecting referable diabetic retinopathy (DR) in children and young people (CYP) with diabetes, but it did not perform as well as on adult patients (Lim G, et al. Oral 1–ATTD 2024). To-date, no AI-assisted DR screening system has been trained using CYP retinal images.

Model	The original SELENA+		The re-trained AI Models	
Training data	SELENA+ Adult (2010-13) (13,099 adults) (76,370 images) Ting D, et al, JAMA 2017	SELENA+ Adult (2010-13) (13,099 adults) (76,370 images) Lim G, et al. Oral 1-ATTD 2024	CYP only CYP Training data (302 CYP) (4,796 images)	CYP + Adult CYP Training data + Adult (2010-18) (67,695 adults) (582,257 images)
Testing data	Adult (2014-15) (14,880 adults) (71,896 images)	All CYP (2014-23) (467 CYP) (8,126 images)	CYP Testing data (202 CYP) (3,330 images)	CYP Testing data (202 CYP) (3,330 images)
Sensitivity [95% CI]	90.5 % [87.3% – 93.0%]	80.7 % [62.5% – 92.6%]	68.2 % [45.1% – 86.1%]	81.8 % [59.7% – 94.8%]
Specificity [95% CI]	91.6 % [91.0% – 92.2%]	82.1 % [80.7% – 83.4%]	83.5 % [82.2% – 84.7%]	86.1 % [84.9% – 87.3%]
AUC [95% CI]	0.936 [0.925 – 0.943]	0.87 [0.80 – 0.95]	0.76 [0.69 – 0.83]	0.90 [0.86 – 0.94]

Objectives: To improve the performance of our DL AI system in screening for referable DR in CYP by re-training it using CYP retinal images.

Methods: We included 8,126 CYP retinal photos graded by trained professionals in 2014–2023 from 467 CYP (49% male; 65% type 1 and 35% type 2 diabetes; median age at diagnosis 10.8y [IQR 7.3y–13.4y]; first DR screening at 14.1y [11.4y–16.2y]). Referable DR was defined as moderate non-proliferative DR or worse. We split the CYP retinal images into 60% for training and 40% for testing, and expanded the adult training data to include 582,257 retinal images from 67,695 adults with diabetes in 2010–2018. The DL system was then re-trained using [CYP only] or [CYP + Adult] images. The performance of the two re-trained AI models was evaluated.

Results: The table shows the sensitivity, specificity, and area under the ROC curve (AUC) for the re-trained AI models, as compared with the original SELENA+.

Conclusions: The AI model trained using [CYP + Adult] images performed better on CYP than the original SELENA+. Further fine-tuning using more CYP images, especially those with referable DR, is needed in order to match the performance of SELENA+ on adults. While actual CYP retinal images are preferred, we may need to overcome CYP image scarcity and augment CYP training datasets with synthetic retinal images using Generative Adversarial Network (GAN) or the latest Generative AI techniques.

O-43

Decreased system interaction with improved glycemia for children and adolescents with type 1 diabetes (T1D) using the MiniMed™ 780g system

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Introduction: Advanced hybrid closed-loop (AHCL) studies report that auto corrections make up >20% of daily total bolus insulin in children and adolescents with T1D.[1-4] This suggests that

there are multiple missed and/or late meal boluses and/or underestimated carbohydrate (CHO).

Objectives: We conducted a post-hoc analysis of delivered insulin, system interactions and glycemic outcomes of youths using MiniMed™ 780G AHCL.

Methods: Children and adolescents (N=112, 7-17yrs) with T1D were enrolled in a single-arm study (17 sites) of the MiniMed™ 780G system with the disposable all-in-one Simplera Sync™ sensor and completed a run-in period (~2wks) where open-loop or HCL (Auto Basal only) was used, followed by a 12-week study period with AHCL activated. Glucose target (GT) was set to 120mg/dL (first 3wks) and 100mg/dL (next 3wks), with the last ~6wks set per investigator's discretion. An initial active insulin time (AIT) setting of 4hrs (titrated to 2-3hrs) was recommended. Delivered insulin and glycemic outcomes during the last ~6wks of the study period were compared to run-in (Wilcoxon signed-rank test or t-test). The impact of recommended optimal settings (ROS; GT of 100mg/dL and AIT of 2hrs, each used for >95% of the time) were also assessed.

Results: Throughout the study period, automated insulin was increased (comprising >60% of total daily insulin), meal bolus insulin was reduced and there was less user interaction, as suggested by fewer CHO entries per day (Table). AHCL use (93.5±11.3%) significantly improved baseline A1C from 7.7±1.0% to 7.3±0.8% ($p<0.001$[d]) and all CGM-derived metrics were significantly improved. With ROS, 56% met international consensus-recommended targets for TIR, TBR, TAR and the glucose management indicator.

Conclusions: The MiniMed™ 780G system with Simplera Sync™ sensor improves glycemic control while decreasing user interaction in children and adolescents with T1D, as it provides most insulin in an automated fashion.

Table. Daily carbohydrate, delivered insulin and glycemic outcomes during MiniMed™ 780G system with Simplera Sync™ sensor therapy in in children and adolescents with T1D

	Run-in Period[a] (N=112)	Study Period[b]				
		(First 3 weeks) 120 mg/dL GT (N=112)	*(Second 3 weeks)* 100 mg/dL GT (N=109)	(Last ~6 weeks) Settings per investigator		*p* Run-in versus Study (Last ~6 weeks)
				Overall Group (N=109)	ROS[c] (N=41)	
Time in AHCL, %	--	96.2 ± 5.3	94.8 ± 8.4	93.5 ± 11.3	96.9 ± 3.1	--
CGM use, %	95.5 ± 4.3	95.7 ± 3.5	94.1 ± 6.2	92.9 ± 9.6	95.4 ± 2.7	<0.001[d]
Daily CHO, g	184.7 ± 76.9	177.8 ± 65.8	170.8 ± 70.0	160.8 ± 68.8	164.8 ± 63.6	<0.001[d]
Daily CHO entries, N	5.2 ± 2.1	5.0 ± 2.0	4.8 ± 2.0	4.5 ± 2.1	4.8 ± 2.0	<0.001[d]
TDD	53.5 ± 26.0	59.6 ± 30.9	63.2 ± 32.7	62.5 ± 31.9	68.6 ± 35.1	<0.001[d]
Total basal, U	21.4 ± 11.2	20.7 ± 11.5	23.7 ± 14.0	23.4 ± 13.0	24.5 ± 13.6	0.0097[d]
Total bolus, U	32.1 ± 17.3	38.9 ± 20.3	39.5 ± 20.3	39.1 ± 20.0	44.1 ± 22.2	<0.001[d]
Meal bolus, %Total bolus	81.2 ± 15.7	59.4 ± 13.5	56.1 ± 14.7	53.4 ± 14.0	54.4 ± 13.9	<0.001[d]
Auto correction, %Total bolus	--	38.5 ± 13.1	41.6 ± 14.2	44.4 ± 13.3	43.9 ± 13.5	--
Auto basal + Auto correction, %TDD	40.3 ± 9.9	59.3 ± 10.9	62.6 ± 11.4	64.6 ± 10.8	63.3 ± 10.7	<0.001
TBR <70 mg/dL (3.9 mmol/L)	1.6 ± 1.7	1.4 ± 1.1	1.9 ± 1.4	1.9 ± 1.4	1.9 ± 1.2	<0.001[d]
TITR 70-140 mg/dL (3.9-6.7 mmol/L)	32.1 ± 14.1	45.6 ± 10.1	50.1 ± 9.6	49.2 ± 9.7	52.7 ± 9.2	<0.001
TIR 70-180 mg/dL (3.9-10 mmol/L)	54.4 ± 15.7	70.3 ± 10.0	72.1 ± 9.5	71.4 ± 9.9	74.7 ± 9.3	<0.001
TAR >180 mg/dL (10 mmol/L)	44.0 ± 16.1	28.2 ± 10.1	26.0 ± 9.6	26.7 ± 10.1	23.3 ± 9.4	<0.001
GMI, %	7.6 ± 0.6	7.1 ± 0.4	7.0 ± 0.4	7.0 ± 0.4	6.9 ± 0.4	<0.001

Data are shown as mean ± SD.

During run-in, AHCL was inadvertently (temporarily), activated by one participant.

P-values indicate difference between the run-in and the last ~6 weeks of the study period.

[a]Sensor-augmented pump with/without predictive low glucose management or Auto Basal use.

[b]Auto Basal and Auto Correction use. An active insulin time (AIT) of 4 hours titrated to 2-3 hours was recommended.

[c]Glucose target of 100 mg/dL and AIT of 2 hours used independently for >95% of the time.

[d]Wilcoxon signed-rank test, otherwise *t*-test.

AHCL=Advanced hybrid closed loop, CGM=Continuous glucose monitoring, CHO=Carbohydrate, GMI=Glucose management indicator, GT=Glucose target, TAR=Time above range, TBR=Time below range, TIR=Time in range, TITR=Time in tight range, TDD=Total daily insulin dose.

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O-44

Early real-world performance of the omnipod® 5 automated insulin delivery (AID) system in >5,100 children and adolescents with type 1 diabetes in Europe

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Introduction: The Omnipod 5 AID System, which allows for personalized therapy through customizable glucose targets from 110-150mg/dL (6.1-8.3mmol/L) in 10mg/dL (0.55mmol/L) increments recently became commercially available for people with type 1 diabetes (T1D) aged 2 years and older in the United Kingdom (UK) and Germany.

Objectives: This study aimed to evaluate the early real-world performance of the system in the first cohort of pediatric European users.

Methods: A retrospective analysis of continuous glucose monitoring (CGM) and insulin data from Omnipod 5 users with T1D aged 2 to <18 years using ≥5U of insulin per day in the UK and Germany whose guardian provided consent and had ≥90 days of data available in the cloud-based data management system was conducted.

Results: Data from 5,146 users (UK: 89.4%; Germany: 10.6%) with sufficient CGM data (≥75% of days with ≥220 readings) were available at the time of analysis, with >900,000 user-days of data in total. Outcomes are shown in the Table for average glucose targets. Median time in target range (70-180mg/dL; 3.9-10.0mmol/L) was 66.4%, 64.9%, and 60.8% for the 110mg/dL [6.1mmol/L], 120mg/dL [6.7mmol/L], and 130-150mg/dL [7.2-8.3mmol/L] targets, respectively. Time spent in hypoglycemia (<70mg/dL; <3.9mmol/L) was low (median ≤1.63% across glucose targets). Use of the lowest target (used by 53.9% of the total population) was associated with the highest TIR, minimal hypoglycemia, and the highest proportion of users achieving clinical targets.

Conclusions: Collectively, these early real-world results of Omnipod 5 use in >5,100 children and adolescents with T1D in the UK and Germany demonstrate that the highly favorable glycemic outcomes first reported in the United States are achievable across populations. Additionally, these findings support the idea that users seeking to improve their TIR should consider decreasing their glucose target toward the lowest setting whenever possible.

Table. Real-world glycemic outcomes in children and adolescents with T1D in the United Kingdom and Germany across average glucose targets with the Omnipod 5 AID System*

Target Glucose#	110 mg/dL (6.1 mmol/L)	120 mg/dL (6.7 mmol/L)	130-150 mg/dL (7.2-8.3 mmol/L)
N† (%)	2,773 (53.9%)	1,585 (30.8%)	788 (15.3%)
Age (y)	13 [10, 15]	11 [9, 14]	10 [7, 14]
Days of Use	166 [122, 210]	154 [120, 203]	149 [115, 204]
GMI (%)	7.2 [6.9, 7.5]	7.3 [7.0, 7.6]	7.5 [7.2, 7.8]
% Time <54 mg/dL (<3.0 mmol/L)	0.31 [0.16, 0.58]	0.29 [0.14, 0.56]	0.27 [0.13, 0.56]
% Time <70 mg/dL (<3.9 mmol/L)	1.63 [0.96, 2.73]	1.59 [0.90, 2.60]	1.42 [0.75, 2.49]
% Time 70-180 mg/dL (3.9-10.0 mmol/L)	66.4 [58.9, 73.2]	64.9 [58.2, 71.3]	60.8 [52.8, 67.7]
% Time >180 mg/dL (>10.0 mmol/L)	31.6 [24.3, 39.1]	32.9 [26.5, 40.0]	37.2 [30.2, 45.9]
Insulin Use (U/d)	46.4 [29.7, 61.6]	37.0 [22.2, 54.8]	31.9 [16.6, 51.2]
Users meeting consensus guidance‡, n (%)	871 (31.4%)	423 (26.7%)	131 (16.6%)

Data are median [interquartile range] unless otherwise indicated
*All results are preliminary pending final validation
#Calculated as the time-weighted average glucose target per user
†Users with ≥75% of days with ≥220 readings
‡Users with ≥70% time in target range (70-180mg/dL; 3.9-10.0mmol/L) and ≤4% time below 70mg/dL (3.9mmol/L)

O-45

A systematic protocol for testing features for clinic-deployed machine learning models that predict near-term glycemic outcomes in youth with type 1 diabetes

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Introduction: Metrics of glycemia among youth with type 1 diabetes (T1D) have the potential to improve the performance of machine learning (ML) models designed to predict near-term clinical outcomes.

Objectives: We developed a systematic protocol for testing proposed features for existing clinic-deployed ML models that forecast 90-day change in hemoglobin A1c (HbA1c) and 180-day risk of diabetic ketoacidosis (DKA).

Methods: For each proposed feature, our protocol facilitates exploring different encoding schemes for categorical variables, computes correlation with existing features, and measures data availability for our patient population. The model is retrained with the proposed feature appended to the training set and the percent change of the relevant model performance metric between the new and old model is computed. If the proposed feature does not meet pre-defined retention criteria, it is rejected.

Results: We tested 19 variations of 12 candidate features, derived from diabetes device data, clinical biomarkers, routinely collected patient surveys, and geocoded metrics. We accepted two features: (i) mean HbA1c during the first year following T1D diagnosis, which improved the root mean squared error of the HbA1c ML model by 5% and the average precision of the DKA risk model by ~26% and (ii) the Child Opportunity Index 2.0, a geocoded neighborhood quality metric, which improved the HbA1c model by a further 5% but did not improve the DKA model. All other features were rejected as they did not substantially improve model performance.

Conclusions: A systematic protocol for testing new ML features efficiently and markedly improved the predictive performance of two clinic-deployed ML models. Identification of new features that improve ML model performance and that represent modifiable risk factors may guide the development and targeting of interventions designed to improve near-term outcomes.

O-46

Problem-solving intervention improves time in range 70-180 mg/dl (TIR) among adolescents with type 1 diabetes (T1D) using hybrid closed loop (HCL) in a randomized controlled clinical trial

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Introduction: Despite advancements in HCL, many adolescents with T1D still do not achieve TIR ≥70% due to human factors including missed or late boluses. Better care models are needed to support HCL users and optimize success with novel technologies.

Objectives: This 16-week trial used a predictive model to identify adolescents unlikely to achieve TIR ≥70% after starting HCL and then randomized those identified to a structured problem-solving intervention (PxSolving) or education-only follow up (Care+).

Methods: Adolescents starting a new HCL system (N=54, 43% F, Age 13.0±3.0 y, T1D Duration 3.7±3.0 y) were observed clinically for 4 weeks. A predictive model incorporating 1-month TIR, number of boluses per day, and hypoglycemia fear survey low blood glucose worry score was used to determine those likely to achieve a goal TIR ≥70% after 12 months of use. Those predicted to meet goal continued clinical observation (n=28). Those predicted to not meet goal were randomized 1:1 to PxSolving (n=12) or Care+ (n=14). The PxSolving intervention was delivered remotely via telemedicine and was based on an approach to improve disease-specific problem solving while reducing family-centered conflicts. Intervention/education visits occurred at 6, 8, and 12 weeks after starting HCL with follow-up data collected at 16-weeks.

Results: TIR significantly improved for participants receiving PxSolving intervention (+14.5%, p<0.001) while those receiving Care+ and observed clinically did not see a significant change in TIR (Table). The group predicted to meet goal continued to have a TIR >70% at 16-weeks.

Conclusions: The predictive model identified individuals needing additional support with new technology. The PxSolving intervention demonstrated success in improving TIR for these individuals. Future work can allow targeted interventions in individuals starting new technology and provide tools to aid greater success with expanding diabetes technologies.

Table. Group-Based Change in TIR During 16-Week Follow Up

Group	n	Percent TIR 70-180 mg/dl			
		Baseline	16 week	Change	p-value
Clinical Observation Only	28	73.2	75.4	2.3	0.334
PxSolving	12	44.8	61.6	14.5	0.001
Care+	14	55.1	63.6	6.3	0.127

O-47

Filaggrin mutations and dermatological complications due to diabetes devices

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Introduction: Dermatological complications are a major obstacle for use of diabetes devices especially in children and adolescents. Filaggrin (FLG) mutations seen in 8% of the Danish population are associated with atopic dermatitis and skin barrier impairment.

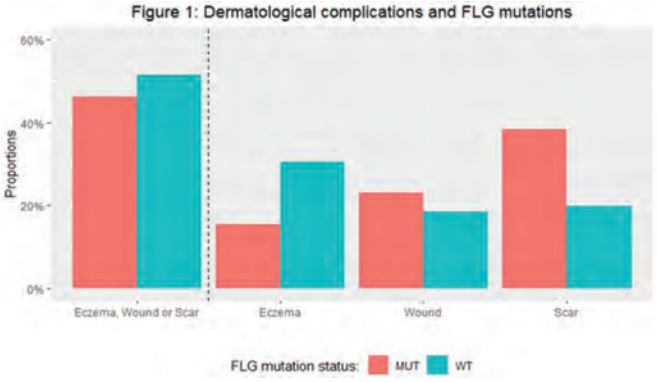
Objectives: We aimed to investigate the association between FLG mutations and the risk of dermatological complications due to diabetes devices.

Methods: A prospective study of children and adolescents with type 1 diabetes followed the first year after initiation of diabetes devices with quarterly visits including visual examination of the skin and genotyping for the five most frequent mutations in FLG gene. All study participants (or caregivers) scored their perception of skin dryness at baseline on a scale from 0-100. Descriptive statistics, unpaired t-test, and two-proportions Z-test were used as statistics.

Results: Of 155 participants 13 (8.4%) had mutation in FLG (one homozygous and 12 heterozygous). The proportions of dermatological complications due to diabetes devices during follow-up are shown in Figure 1 separated by FLG mutation status. No significant differences were found for developing eczema, wound, scars or any reaction depending on FLG mutation. The proportions of eczema with FLG mutation were 2/13 (15%) vs. 43/141 (30%) in the wildtype (WT) group and for scars 5/13 (38%) in mutation (MUT) group compared with 28/141 (20%) in the WT group. The baseline perception of skin dryness showed mean ± standard deviation in MUT group of 63 ± 17 compared to 34 ± 26 in WT group (p-value from t-test: $p < 0.001$).

Conclusions: Having one of the most common FLG mutations are not proved associated with dermatological complications despite increased skin dryness. The relatively small study sample and having dry skin supports better skin care habits may contribute to the negative findings. Further research is needed in a bigger sample also including skin FLG expression data.

Figure 1: Dermatological complications and FLG mutations



O-48

The role of nurse practitioner and certified diabetes care and education specialists in the evolution of the 4t program

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Introduction: The role of the Nurse practitioner (NP) and Certified Diabetes Care and Education Specialist (CDCES) is crucial for diabetes technology initiation.

Objectives: Describe the time from T1D diagnosis to starting diabetes technology in the cohorts of the Teamwork, Targets, Technology, Tight control (4T) program, focusing on the NP and CDCES workflows.

Methods: The CDCES team and NP developed a workflow to offer CGM in the month following diagnosis. Following the CGM start, the family is scheduled for a 1-week CGM follow-up with an NP or CDCES followed by a provider follow-up at 1 month. Remote patient monitoring (RPM) is weekly then monthly, with messages sent via Electronic Health Records to the family. A pre-pump class was protocolized in study 2 to systematically introduce pump/AID in the first 3 months following diagnosis.

Results: Historically, 2% (N=6) of newly diagnosed patients started CGM in the first 30 days, and 33% (N=89) started on a pump in the first year. In the 4T pilot, 92% (N=124) started on CGM in the first 30 days, and 36% (N=48) initiated a pump in the first year. In the 4T study 1 (N=131), 99% started on CGM in the first 30 days, and insulin pump use was 50% (N=66) within the first year (median 162 days) following diagnosis. Currently, in 4T study 2 (enrolling), 98% started CGM in the first 30 days following

diagnosis, and 46% of participants started on pump/AID systems within the first year (median 83 days) following diagnosis. Of those on CGM in Study 2, 45% are publicly insured, 55% are privately insured, 84% are English speakers, and 16% are non-English speakers (Table).

Conclusions: From historical data, the pilot, Study 1, and Study 2, the workflow created by the NP and CDCES team has increased the number of patients on diabetes technology and decreased the time to initiate CGM and pump/AID systems. The 4T program requires a strong CDCES team and NP to support the education necessary to meet the needs of families starting technology.

Table 1. Characteristics of the Historical, Pilot 4T, 4T Study 1, and 4T Study 2 Cohorts

Characteristic	Historical	Pilot 4T	4T Study 1	4T Study 2
N	272	135	133	122
Baseline characteristics				
Age (years) at T1D diagnosis, median (Q1, Q3)	10 (7, 13)	10 (7, 13)	11 (6, 14)	11 (8, 13)
Sex, n (%)				
Male	137 (50.4)	71 (52.6)	74 (55.6)	53 (43.4)
Female	135 (49.6)	64 (47.4)	59 (44.4)	69 (56.6)
Race/ethnicity, n (%)				
Non-Hispanic White	120 (44.1)	53 (39.3)	52 (39.1)	38 (31.1)
Non-Hispanic Black	5 (1.8)	0 (0)	1 (0.8)	1 (0.8)
Hispanic	69 (25.4)	29 (21.5)	49 (36.8)	55 (45.1)
Asian or Pacific Islander	25 (9.2)	19 (14.1)	11 (8.3)	14 (11.5)
American Indian or Alaska Native	1 (0.4)	0 (0)	0 (0)	1 (0.8)
Other	21 (7.7)	19 (14.1)	17 (12.8)	13 (10.7)
Unknown / Declined to state	31 (11.4)	15 (11.1)	3 (2.3)	0 (0)
DKA at diagnosis, n (%)	94 (34.7)	67 (49.6)	72 (54.1)	65 (53.3)
HbA1c (%) at diagnosis, mean (SD)	10.9 (2.5)	12.3 (2.1)	12.2 (2.4)	11.4 (2.7)
Insurance type, n (%)				
Private	197 (73.0)	104 (77.0)	83 (62.4)	67 (54.9)
Public	73 (27.0)	31 (23.0)	47 (35.3)	55 (45.1)
Both	0 (0)	0 (0)	2 (1.5)	0 (0)
No Insurance	0 (0)	0 (0)	1 (0.8)	0 (0)
Primary language, n (%)				
English	245 (90.1)	117 (86.7)	112 (84.2)	103 (84.4)
Non-English	27 (9.9)	18 (13.3)	21 (15.8)	19 (15.6)
Follow-up characteristics				
CGM initiation within 1 year, n (%)	102 (37.5)	132 (97.8)	133 (100)	121 (99.2)
Initiated CGM <= 30 days, n (%)	6 (2.2)	124 (91.9)	131 (98.5)	120 (98.4)
Days to CGM initiation, median (Q1, Q3)	100 (50, 172)	7 (5, 11)	10 (6, 18)	6 (4, 13)
CGM wear time* (%), median (Q1, Q3)	N/A	90.7 (55.8, 96.0)	96.4 (89.3, 97.9)	97.3 (91.7, 98.6)
Insulin pump use within 1 year, n (%)	89 (32.7)	48 (35.6)	66 (49.6)	56 (45.9)
Predictive Low-Glucose Suspend	2 (0.7)	2 (1.5)	2 (1.5)	0 (0)
Open loop	66 (24.3)	30 (22.2)	34 (25.6)	5 (4.1)
Automated Insulin Delivery (AID)	21 (7.7)	17 (12.6)	33 (24.8)	55 (45.1)
None	183 (67.0)	87 (64.4)	67 (50.4)	66 (54.1)
Days to pump initiation, median (Q1, Q3)	178 (111, 250)	142 (91, 256)	162 (86, 255)	83 (63, 166)

*Percentage of time CGM is worn out of eligible hours of device wear.

O-49

Can the use of closed loop (CL) therapy improve the cardiovascular risk factors exposure in children and adolescents with T1D?

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Introduction: Poor glycemic control, hypertension, overweight and dyslipidemia are the main cardiovascular risk factors (CVRFS) for developing chronic complications in subjects with type 1 diabetes (T1D). No studies have assessed the potential impact of different insulin treatment modalities and glycemic monitoring, including Closed Loop (CL) systems, on cardiovascular risk in children and adolescents with T1D.

Objectives: To assess whether CL systems can improve CVRFs exposure in children and adolescents with T1D.

Methods: This longitudinal observational study recruited 456 children and adolescents with T1D (age 6-18 years). Demographic,clinical, biochemical, and glycemic parameters were measured at the recruitment and follow-up visits after 12-18 months. The subjects were categorized into four groups based on the therapy used at follow-up: group 1-MDI therapy+FGM; group2-MDI therapy+rtCGM; Group3-SAP therapy; group 4-CL therapy. The association between glycemic metrics and cardiovascular risk factors was studied using correlation analysis. Group comparisons were performed using ANOVA followed by post-hoc pairwise analysis; within, group comparisons were conducted using paired Student's t-tests.

Results: In subjects initiating CL therapy, a statistically significant improvement was observed in both glycemic control (TIR+15%, TAR−14%) and lipid profile (HDL-c+4.7 mg/dL, LDL-c−4.8 mg/dL,triglycerides−5.4 mg/dL) at the follow-up visit. These changes were significantly meaningful compared to those observed in the groups continuing MDI or SAP therapy. No significant changes were observed in BMI and blood pressure.Correlation analysis showed a positive correlation between the increase in TIR and HDL and a negative correlation between the increase in TIR and the reduction in LDL and triglycerides.

Conclusions: CL therapy in children and adolescents with type 1 diabetes improved glycemic control and lipid profile, reducing exposure to cardiovascular risk factors from the pediatric age.

O-50

Time in tight range among users of advanced hybrid closed-loop systems: real-world data from a large pediatric cohort with type 1 diabetes

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Introduction: Time in tight range (TITR), defined as the percentage of time spent in target glucose range of 70 - 140 mg/dl, is a promising novel continuous glucose monitoring (CGM) metric. It holds potential to become a critical marker for optimizing glucose control to reach near-normal levels and, consequently, reduce the risk of diabetes complications, particularly among pediatric advanced hybrid closed-loop (AHCL) systems users with type 1 diabetes (T1D).

Objectives: To evaluate real-world TITR data in a large cohort of children and adolescents with T1D using AHCL systems (Medtronic Minimed™ 780G and Tandem t:slim X2™ Control IQ).

Methods: A multicenter cross-sectional study was conducted by collecting clinical and real-world CGM data from children and adolescents with T1D during quarterly follow-up outpatient visits. AHCL use for at least six months was considered as inclusion criterion. Demographical and clinical data, including CGM data and AHCL settings, were collected and analyzed.

Results: A total of 613 children and adolescents with T1D, aged 6-18 years, were recruited in the study. The average TITR was 47.4 ± 11.8%, and 43.9% of study participants achieved TITR >50%. Stratification of the study population by TITR quartiles revealed significant improvements in all glycemic metrics with increasing TITR ($p<0.001$ for all metrics), with several significant pairwise differences between TITR quartile subgroups (Table 1). Multivariate regression analysis identified automatic mode use and the number of different insulin-to-carbohydrate ratios as significant predictors of higher TITR.

Conclusions: In a large pediatric population using AHCL systems, TITR levels drop near the suggested threshold of 50%. TITR offers additional insights into patients' glycemic profiles beyond those provided by TIR alone, thereby assuming significance among AHCL users.

Table 1. Clinical characteristics and CGM metrics according to TITR quartiles. Data are presented as the mean (standard deviation of the mean) and absolute frequencies (percentages).

	1st quartile <40% (n=153)	2nd quartile 40-48% (n=153)	3rd quartile 48-55% (n=154)	4th quartile >55% (n=153)	p-value	Overall (n=613)
Age (years)	12.2 (3.1)	12.7 (3.2)	12.4 (2.8)	12.8 (2.8)	0.700	12.6 (2.9)
HbA1c (%)	7.1 (0.69)	6.8 (0.65)	6.7 (0.55)	6.4 (0.56)	<0.001	6.8 (0.67)
TIR (%)	58.8 (8.3)	69.9 (5.0)	75.6 (4.8)	83.1 (4.8)	<0.001	71.9 (10.6)
TBR (%)	1.5 (1.3)	2.3 (1.8)	3.2 (2.5)	3.4 (2.5)	<0.001	2.7 (2.2)
TBR_1(%)	1.1 (0.99)	1.8 (1.3)	2.4 (1.7)	2.7 (1.8)	<0.001	2.0 (1.6)
TBR_2 (%)	0.76 (0.54)	0.77 (0.63)	1.16 (0.91)	1.21 (0.93)	<0.001	0.92 (0.78)
TAR (%)	39.9 (8.2)	27.9 (5.1)	21.4 (4.5)	13.6 (4.6)	<0.001	25.6 (11.2)
TAR_1 (%)	27.1 (4.6)	21.1 (3.8)	17.2 (2.9)	11.6 (3.3)	<0.001	19.23 (6.8)
TAR_2 (%)	12.9 (6.6)	6.8 (3.5)	4.1 (2.8)	1.9 (1.8)	<0.001	6.39 (5.6)
CV (%)	34.8 (4.9)	35.4 (5.3)	35.6 (5.5)	32.8 (4.4)	<0.001	34.67 (5.2)
Mean sensor glucose (mg/dl)	177.5 (18.5)	157.1 (11.0)	146.5 (11.2)	133.1 (8.0)	<0.001	153.3 (20.6)
Automatic mode use (%)	94.5 (5.9)	95.1 (5.7)	95.1 (5.9)	96.7 (4.5)	0.006	95.4 (5.6)
Number of daily ICR						
% participants using < 2 different ICR	39.2% (60)	33.3% (51)	23.4% (36)	28.8% (44)		31.1% (191)
% participants using 2 to 4 different ICR	32.0% (49)	29.4% (45)	31.8% (49)	32.0% (49)	0.054	31.3% (192)
% participants > 4 different ICR	28.8% (44)	37.3% (57)	44.8% (69)	39.2% (60)		37.5% (230)

O-61

The LENNY Trial: The use of MINIMED 780G system in young pediatric users (2-6 years old) is safe and effective

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Introduction: The MiniMed 780G system (MM780G) is currently not yet approved for use in children under the age of 7 (and in people with a TDD<8U).

Objectives: To evaluate safety and effectiveness of MM780G in children with type 1 diabetes (CwT1D) aged 2-6 years (with a TDD>6U).

Methods: This randomized crossover trial involved CwT1D aged 2-6 years and a TDD>6U. A 2wk run-in was followed by a 26wk study phase. During run-in, subjects used the MM780G with G4S sensor in manual mode (MM, Suspend Before Low feature was activated). During study phase, subjects were randomized into 2 sequences, consisting of a 12wk auto mode (AM) period, a 2wk wash-out and a 12wk MM period (sequence A), or vice versa (B). Endpoints related to glycemic control and safety were compared between treatments.

Results: In total, 98 subjects entered study phase (A:50, B:48). Mean (± SD) age was 4.72±1.16 yrs and mean baseline HbA1c was 7.53±0.96%. Results for glycemic control are shown in the figure; mean TIR was 58.1±14.3% at run-in, 68.3±6.9% during AM, and 58.3±12.5% during MM (adjusted between treatment difference: 9.9%, 95%CI: 8.1-11.7%, p<0.0001). Mean HbA1c was 7.00±0.53% (53.01±5.82mmol/l) during AM and 7.61±0.91% (59.72±9.90mmol/L) during MM (-0.61%, -0.76--0.46%, p<0.0001). Median TAR250 was 7.3% (IQR:4.8-9.7%) during AM and 11.1% (5.5-18.8%) during MM, and median TAR180 was 27.4% (23.4-30.4%) and 37.9% (28.0-46.8%), respectively. Median TBR54 was 0.7% (0.3-1.1%) during AM and 0.5% (0.3-0.9) during MM, median TBR70 was 4.5% (3.1-5.6%) and 3.0% (2.0-4.7%), respectively. Regarding safety, 9 SAEs were reported: 5 during AM, 2 during MM, and 1 each during wash-out and run-in. No SAEs were device related. There was 1 DKA, which occurred during AM and followed a case of bronchiolitis with vomiting. No Serious Hypoglycemic Events, SADEs or USADEs occurred.

Conclusions: The LENNY trial demonstrated that the use of MM780G in children 2-6 years (and TDD>6 units) is safe and effective.

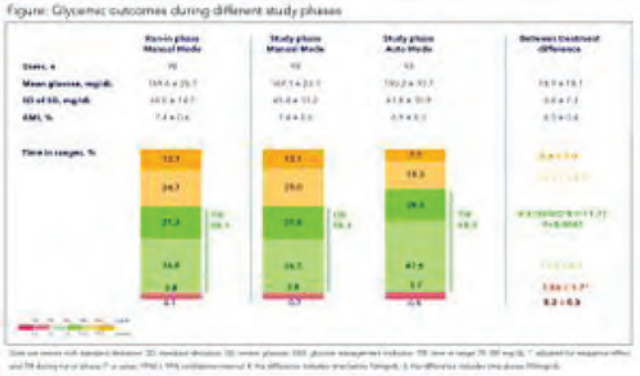

Fig. 1.

Friday, October 18th, 2024

Oral Session VI: Diabetes Complications and Associated Diseases

O-51

New insights into diabetic complications associated with type 1 diabetes

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Introduction: Diabetic microangiopathy affects cochlear structures by causing thickening of the basement membrane of the capillaries of the stria vascularis leading to significant loss of outer hair cells. Few studies have evaluated the presence of hearing loss in children with type 1 diabetes (T1D).

Objectives: To evaluate the effects of T1D on the audio-vestibular system in young adolescents.

Methods: 31 T1D pediatric subjects without associated comorbidities wearing a real time continuous glucose monitoring system were enrolled. Executed evoked potentials (ABR), tonal audiometric examination, high-frequency (HF) tonal audiometric examination, acoustic otoemissions (TEOAE, DPOAE), impedancemetry, vestibular semeiology, Video Head Impulse Test (vHIT), cervical myogenic vestibular evoked potentials (cVEMP) were performed. Analysis of the relationship between absolute latency time of waves I, III and V and parameters such as age, gender, disease time, 14 day sensor glucometrics (time in range- TIR, Glycemia risk index-GRI, Glycosilated haemoglobin- HbA1c, and mean glycemia value) was made.

Results: Characteristics of the individuals are shown in Table 1. A significative correlation (p: 0.0214) was found between both the absolute latency time in wave III and disease duration; and between the analysis of the interpeak latency time between waves I-III (p: 0.0006) and disease duration. Finally, high values of GRI were correlated with high scores of high frequencies (16000 Hz).

Conclusions: There is increasing experimental evidence suggesting a link between gluco-metabolic derangements, oxidative stress and microangiopathy in the peripheral degeneration associated with T1D, which might clarify our interesting association between audio-vestibular alterations and both longer disease time and poor glycemic control. Therefore, prospective studies are needed.

Parameters:	**Patients:**
Age Mean±SD	14.6±2.3
Gender Male Female	 45.2% (14) 54.8% (17)
Disease time (months) Mean±SD	72.8±52.6
TIR (%) Mean±SD	54.8±22.0
Therapy Multiniectivity Microinfusion	 80.5% (25) 19.5% (6)
HbA1c Mean±SD	7.6±1.2
HbA1c mean value Mean±SD	7.5±1.2
Insulin dose total Mean±SD	51.3±17.4
Glycemia risk index (%) Mean±SD	55.4±30.5
Glycemic mean value Mean±SD	174.4±39.5

O-52

Bone, muscle and physical activity difference in children with type 1 diabetes

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Introduction: Type 1 diabetes (T1D) is associated with an increased risk of fracture beginning in childhood and continuing throughout adult life. Alterations in childhood bone development have been postulated to mediate this increase in fracture risk.

Objectives: We aimed to assess differences in bone, muscle and physical activity (PA), and explore if better muscle and PA measures would mitigate bone differences between children with T1D and typically developing children (TDC).

Methods: We matched 56 children with T1D (mean age 11.9yrs) and 56 TDC (11.5yrs) by sex and maturity from 237 participants (6-17yrs, 66 T1D). We assessed the distal radius and tibia with high-resolution peripheral quantitative computed tomography (HR-pQCT), and the radius and tibia shaft bone and muscle with pQCT. We also measured muscle function from force-related measures in neuromuscular performance tests (push-up, grip test, countermovement, and long jump). We compared PA based on questionnaire scores and accelerometers between groups. Bone, muscle, and neuromuscular performance measures were compared using MANOVA. We used mediation to explore the role of PA and muscle in bone differences.

Results: Children with T1D had a 6-10% lower trabecular density, bone volume fraction, thickness, and number at both distal

sites, along with 11% higher trabecular separation at the distal radius. They also had 3-16% higher cortical and tissue mineral density, and cortical thickness at the distal radius, 5-7% higher cortical density and 1-3% higher muscle density at both shaft sites. PA mediated the between-group difference in trabecular number (indirect effect -0.04) at the distal radius.

Conclusions: Children with T1D had lower trabecular bone density and deficits in trabecular micro-architecture, but higher cortical bone density and thickness at the radius and tibia. They engaged in less PA but had comparable muscle measures to those of TDC. Participation in physical activity may assist in mitigating deficits in trabecular number observed in children with T1D.

O-53

Which glomerular filtration rate equation should be used in youth with type 1 diabetes?

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Introduction: Diabetic kidney disease (DKD) is a leading cause of end stage renal disease in people with type 1 diabetes (T1D). Early detection of subclinical DKD relies on the assessment of albuminuria and glomerular filtration rate (GFR). However, as of now, there are no widely accepted GFR equations that have been validated in youth with T1D.

Objectives: The aim of this study was to evaluate the performance of traditional and newly developed GFR equations in youth with T1D.

Methods: We compared measured GFR (mGFR) using plasma clearance of Inutest with estimated GFR (eGFR) in a 141 youth with T1D. eGFR was calculated using 9 equations: Full-age spectrum (FAS)-height, FAS-age, Lund-Malmo (LM)-revised, Chronic Kidney Disease Epidemiology (CKD-EPI, CKD-EPI1, CKID-EPI40), CKD Disease in Children equations (CKID, CKID1, CKID2). Bland-Altman analyses was employed to estimate performance (i.e. bias and accuracy [P30]).

Results: The study included 141 children and adolescents (79 males) who underwent a direct GFR assessment (mGFR) at a mean age of 13.5±3.3 years (range 6.2-18.4 years) and T1D duration of 5.7±1.6 years. Mean serum creatinine was 45.6±12.1 umol/L, and mGFR was 142.3±25.0 ml/min/m^2. No participant had a mGFR <90 ml/min/m^2, and 72.3% had a GFR in the hyperfiltation range (>125 ml/min/m^2). For the whole population, the equations with the best performance were FAS-height (bias= 8.4 ml/min/m^2; P30 = 85.1%) and CKID (bias= 11.9 ml/min/m^2; P30= 81.6%). While this was consistent in various subgroups analyses including females, youth <11 years and 11-15.9 years of age, the top-performing equations in males and youth aged 16-18.4 years were CKID (bias= 5.23 ml/min/m^2; P30= 81.0%) and CKD-Epi (bias= -0.04 ml/min/m^2; P30= 84.6%) respectively.

Conclusions: Our results indicate that different subgroups of youth with T1D may benefit from using different formulas to calculate eGFR for a more accurate assessment of renal function and subclinical DKD.

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Vascular changes in children with well-regulated type 1 diabetes- highly sensitive methods support time in tight range and increase pathophysiological understanding

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Introduction: Highly sensitive methods may detect subclinical structural and functional vascular changes in children with type 1 diabetes.

Objectives: Our objective was to explore the presence of, and determinants for early vascular changes in children with well- regulated type 1 diabetes.

Methods: Fifty children with type 1 diabetes (6-15.99yy) and 44 healthy controls were included. Ultra-high frequency ultrasound (UHFUS) scanning the radial, dorsal pedal (DP) and carotid arteries, assessment of vascular elasticity as pulse wave velocity (PWV) and endothelial function as reactive hyperemia peripheral arterial tonometry (RH-Pat) was performed. Autonomic regulation of the heart was assessed by measuring QT-variability index (QTVI). Blood- and urine samples were collected as well as glucometrics from continuous glucose monitoring (CGM) devices.

Results: Children with type 1 diabetes showed increased wall thickness predominately in the dorsal pedal artery (DP), intima thickness (IT) was increased by 10% and intima- media thickness (IMT) by 14 % (p=0.002-0.008) compared to healthy controls. Children with type 1 diabetes and HbA1c >48mmol/mol (6.5%) showed a 6.5% increased PWV and children with type 1 diabetes and BMI z-score >1 showed impaired QTVI compared to healthy controls. Carotid IT was associated with several glucometrics including time in range (TIR) and time in tight range (TITR) (r= -0.64- -0.47 p= <0.001-0.014), and type 1 diabetes was the most important determinant for IT across all examined arteries.

Conclusions: Both structural and functional vascular changes are detectible even in this cohort of children with well-regulated type 1 diabetes and hyperglycemia is the most important risk-factor. Arterial remodeling involves predominantly the intima and type 1 diabetes diagnosis is the most important determinant for IT in all examined arteries. Overweight is also an important CVD risk factor associated with cardiac autonomic dysfunction in type 1 diabetes.

Table 1. Demographic baseline data and results from vascular examinations. Comparison between children with type 1 diabetes and healthy controls and separate comparison in male and female groups. Values presented as mean ± SD and median (range) when appropriate. Abbreviations: BMI – Body mass index, SBP – Systolic blood pressure, DBP – Diastolic blood pressure, TIR – Time in range, TITR – Time in tight range, CV – Coefficient of variation, HDL – High density lipoprotein, LDL – low density lipoprotein, HbA1c- Hemoglobin A1c, QTVI- QT variability index, PWV- pulse wave velocity, RHI- reactive hyperemia index, UHFUS- ultra-high frequency ultrasound, DP- dorsal pedal, IT- intima thickness, MT- media thickness, IMT- intima-media thickness

	Type 1 diabetes n=44 Healthy controls n=37	p-value	Female type 1 diabetes n=22 Healthy controls n=17	p-value	Male type 1 diabetes n=23 Healthy controls n=19	p-value
Age (years)	12.04 ± 2.34 11.34 ± 2.46	0.192	11.92 ± 2.36 11.41 ± 2.56	0.509	12.14 ±2.37 11.27±2.44	0.249
Type 1 diabetes duration (years)	7.22 (5.25, 11.46)	--	--	--	--	--
Height (cm)	156.5 ± 15.0 152.3 ± 16.3	0.228	153.57±14.25 151.27±15.26	0.625	159.34±15.40 153.30±17.67	0.244
BMI z-score	0.35 ± 0.77 0.29 ± 0.89	0.731	0.27±0.81 0.14±0.85	0.615	0.42±0.73 0.43±0.92	0.969
SBP z-score	0.50 ± 0.23 0.45± 0.23	0.378	0.49±0.25 0.45±0.25	0.638	0.50±0.21 0.45±0.21	0.433
DBP z-score	0.59 ± 0.17 0.50 ± 0.18	0.019	0.60±0.17 0.53±0.16	0.158	0.58±0.17 0.47±0.19	0.066
Glucometrics						
HbA1c (%(mmol/mol))	6.4 (5.5, 7.8) (46.5 (36.0, 61.0)) 5.0 (4.6, 5.4) (31.0 (27.0, 35.0))	<0.001	--	--	--	--
TIR (%) (3.9-10.0 mmol/l)	63.0 (40.0, 81.0) --	--	--	--	--	--
TITR (%) (3.9-7.8 mmol/l)	41.0 (23.0, 61.0) --	--	--	--	--	--
Microvascular function						
Cystatin C (mg/l)	0.89 (0.58, 1.25) 0.845 (0.69, 1.15)	0.356	0.88 (0.69, 1.13) 0.84 (0.69, 0.95)	0.339	0.9 (0.58, 1.25) 0.86 (0.7, 1.15)	0.483
QTVI	−1.460±0.238 −1.482±0.257	0.712	−1.474±0.261 −1.550±0.204	0.361	−1.448±0.221 −1.418±0.291	0.728
Vascular function						
Aortic PWV	5.0±0.7	0.719	4.9±0.6 4.9±0.5	0.925	5.2±0.7 5.1±0.6	0.739
RHI	1.70±0.53	0.592	1.64± 0.59 1.87± 0.57	0.222	1.76±0.47 1.65±0.48	0.503
UHFUS measurements						
Carotid IT (mm)	0.106±0.013 0.111±0.013	0.176	0.105±0.013 0.109±0.015	0.486	0.107±0.014 0.113±0.011	0.192
Carotid MT (mm)	0.198±0.036 0.201±0.043	0.769	0.188±0.027 0.198±0.044	0.413	0.207±0.042 0.204±0.044	0.841
Carotid IMT (mm)	0.305±0.040 0.312±0.046	0.484	0.294±0.034 0.307±0.046	0.332	0.314±0.042 0.317±0.047	0.847
Radial IT (mm)	0.062±0.009 0.056±0.010	0.002	0.060±0.0081 0.058±0.011	0.554	0.065±0.010 0.053±0.009	<0.001
Radial MT (mm)	0.064±0.022 0.065±0.021	0.813	0.058±0.017 0.059±0.019	0.764	0.070±0.025 0.071±0.021	0.924
Radial IMT (mm)	0.126±0.026 0.121±0.021	0.286	0.118±0.021 0.118±0.016	0.986	0.135±0.027 0.124±0.026	0.190
DP IT (mm)	0.064±0.010 0.058±0.010	0.003	0.062±0.007 0.059±0.009	0.737	0.066±0.011 0.057±0.010	0.008
DP MT (mm)	0.087±0.029 0.075±0.023	0.060	0.082±0.026 0.070±0.021	0.153	0.092±0.032 0.080±0.025	0.190
DP IMT (mm)	0.151±0.032 0.133±0.026	0.008	0.144±0.027 0.129±0.023	0.074	0.158±0.035 0.136±0.029	0.042

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Ultrasound-diagnosed hepatopathy in Indian adolescents with type 1 diabetes: prevalence and risk factors

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Introduction: Glycogen hepatopathy is becoming increasingly rare in type1 Diabetes(T1D) & is being superseded by metabolic dysfunction-associated fatty liver disease; the two being radiologically indistinguishable

Objectives: Estimation of prevalence & risk factors for hepatopathy in T1D using ultrasound-based screening

Methods: Cross-sectional study. Inclusion: Confirmed T1D, duration>1yr. Group A-Hepatopathy absent(457); group B-Hepatopathy present(53). Exclusion:Uncontrolled hypothyroidism/celiac disease/autoimmune polyendocrinopathy. Parameters:Clinical, biochemical, diet, body composition, muscle function (jumping mechanography), resting metabolic rate(RMR), ultrasound abdomen. p<0.05-significant

Results: Mean age:13.3±4.6yr, 270 girls, diabetes duration:6.0±3.9yr. Prevalence of hepatopathy:10.4%. Comparison of hepatopathy vs no hepatopathy:Both groups were similar in age, disease duration, diet intake. Those with hepatopathy were significantly shorter (height SDS: -1.2, -0.5). Waist circumference SDS, systolic, diastolic blood pressure, fat mass index were significantly higher in group B. HbA1c,ALT,AST were significantly higher among group B; insulin sensitivity, serum albumin, 25(OH) vitamin D, hemoglobin were significantly lower. Total, LDL, non-HDL cholesterol, triglycerides, urine albumin/creatinine ratio were significantly worse in group B. Muscle function (EFI SDS,force efficiency SDS,maximum power/weight) was significantly lower in group B; RMR was similar across groups. Gender (OR female=0.3), waist circumference SDS (OR=1.1), daily insulin dose/kg body weight (OR=5.1), glycemic control (OR HbA1c>9.5 =2.8), serum triglyceride (OR=1.1), RMR (OR=0.8), weekly moderate/vigorous activity (OR=0.8) were associated with hepatopathy in T1D.

Conclusions: A high prevalence of hepatopathy exists in Indian adolescents with T1D. Obesity, insulin resistance, glycemic control, dyslipidemia, physical activity are modifiable risk factors which may help in hepatopathy prevention.

Parameters	Group A: Hepatopathy Absent (n=457)	Group B: Hepatopathy Present (n=53)	P value
Daily insulin dose (U/kg/day)*	1.0 ±0.3	1.3 ±0.4	0.001
Waist circumference SDS*	-1.0 ±1.0	-0.6 ±1.0	0.031
Fat mass index (kg/m^2)*	8.4 ±4.3	9.8 ±4.4	0.037
HbA1c (%)*	9.8 ±2.0	11.3 ±2.5	0.0001
Insulin sensitivity (SEARCH)*	9.2 ±2.7	6.4 ±2.7	0.0001
ALT (IU/L)*	16.7 ±10.8	34.0 ±53.3	0.002
Non HDL-Cholesterol (mg/dL)*	101.2 ±25.8	125.9 ±45.8	0.0001
Esslinger Fitness Index SDS*	-1.5 ±0.9	-2.2 ±1.0	0.0001
Resting Metabolic Rate (kcal/day)	1439.2 ±353.2	1448.2 ±415.9	0.691

O-56

Glycometabolic evaluation using continuous glucose monitoring before and after treatment with CFTR modulators: preliminary data of pediatric patients with Cystic fibrosis

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Introduction: CFTR modulators represent a new approach for the treatment of cystic fibrosis (CF) with beneficial effects on its course and complications. However, they do not appear to have a significant impact on glucometabolic alterations. (1)To date, there are few studies evaluating their effectiveness on the glucometabolic profile of pediatric patients.(2)

Objectives: The objective of this study is to evaluate the glycemic profile of pediatric patients with CF, before and after receiving CFTR modulators, using both OGTT and continuous glucose monitoring (CGM) systems.

Methods: We collected data regarding genetic mutations, anthropometric parameters, metabolic control variables (glycosylated hemoglobin, insulin, c-peptide, OGTT) and CGM metrics [Time-in-range (TIR), Time-above-range (TAR), Time Below Range (TBR), coefficient of variability (CV), mean glycemia, glucose management indicator (GMI)] of children with CF, before and six months after starting treatment with Elexacaftor- Tezacaftor-Ivacaftor.

Results: Eight children were enrolled (1 male, mean age 9.8±1.7 years). The OGTT analysis showed a statistically significant reduction in mean blood glucose at T120 after therapy (172±33 mg/dl vs 144±28 mg/dl, p < 0,05). No significant differences in insulin, c-peptide and glycosylated hemoglobin were observed. Analyzing the CGM metrics, we observed no significant difference in TIR, whereas we observed a significant reduction in TAR (decreased from 3.4±3.8% to 0.7±0.7%, p < 0,05) after of CFTR modulators.

Conclusions: In our previous mixed study (adolescents and adults), treatment with CFTR modulators showed no significant-improvement of the glucometabolic profile.In this study on pediatric patients, CFTR modulators shows a significant positive impact in mean blood glucose at T120 and of TAR. Further long-term studies on a larger sample of pediatric patients are needed to understand whether timely initiation of modulators can prevent beta cell dysfunction and glycemic alterations.

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Erk is activated in type 1 diabetes, as well as in celiac disease, intestinal biopsies from children both constitutively and after gliadin treatment

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Introduction: Type 1 Diabetes (T1D) and (CeD) are autoimmune disorders with a shared genetic background. T1D subjects have 1.6-16.4% probability to become CeD during their life. Mucosal inflammation signs are present in duodenal biopsies from T1D subjects. In vitro studies organ culture of T1D subjects show an immune response to gliadin [1,2]. Hyperglycemia and environmental factors can activate protein kinases/mitogen-activated protein kinases (ERK/MAPK) signaling pathways in T1D β-cells [3]. In CeD biopsies crypts proliferation is mediated by ERK/MAPK signaling pathways [4].

Objectives: Our aim: to study the ERK activation in intestinal biopsies from T1D and CeD children before and after treatment with gliadin peptides.

Methods: Duodenal biopsies (5 subjects for each group) were obtained from controls (CTR) affected by gastroesophageal reflux, T1D patients (negative EMA), gluten containing diet (GCD-CeD) patients with positive serology (anti-tTg antibodies >100 and positive EMA), gluten free diet (GFD-CeD) patients with negative serology, and potential patients (POT) (Marsh 0) with positive serology. The biopsies were cultivated for 24h and ERK phosphorylation was assessed by western blot analysis before and after gliadin treatment.

Results: In intestinal biopsies ERK was activated respect to CTR in T1D and in CeD subjects at different stage of the disease. ERK was increased in T1D subjects (1.4%+/- 0.26%) compared to CTR (0.35%+/−0.05% and in CeD (GFD CeD 0.7%+/−0.17%, GCD CeD 1%+/−0.3%, POT 1.1%+/−0.28%). Gliadin increased ERK phosphorylation not only in CeD (GCD CeD 0.46%+/−0.13 % vs untreated 0.26%+/−0.11%), but also in T1D subjects (T1D 0.57%+/−0.07% vs untreated 0.13%+/−0.09%) but not in CTR.

Conclusions: ERK is constitutively activated and enhanced by gliadin in both intestinal biopsies from CeD at different stage of the disease and from T1D subjects. This indicates that stress/inflammation signaling in the intestine can have a role in the pathogenesis of these diseases.

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Early assessment of 24-hour ambulatory blood pressure and arterial stiffness in children with type 1 diabetes mellitus to protect vascular health

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Introduction: Cardiovascular complications are the leading cause of mortality in children with type 1 diabetes (T1D), and early assessment is crucial.

Objectives: Our study aimed to determine the impact of diabetes on vascular health by monitoring 24-hour ambulatory blood pressure (ABPM) and measuring arterial stiffness (AS) in children with T1D.

Methods: Seventy-four consecutive children with T1D and 68 age and sex-matched healthy controls were included. AS and ABPM were evaluated using the Mobil-o-Graph device, and SPSS-28 was used for statistical analysis.

Results: Our study included 39 girls and 35 boys with T1D. The mean age of children with T1D was 13.8±3.4 years, and the healthy group was 13.1±3.4 (p=0.123). The average diastolic blood pressure (DBP) and mean arterial pressure were significantly higher in children with T1D (p=0.022 and p=0.001, respectively). The average glomerular filtration rate (GFR) was 115.94±19.87 mL/min/1.73m^2 in patients and 107.18±11.33 mL/min/1.73m^2 in the healthy group (p=0.009). The DBP was significantly lower in those with hyperfiltration than those with normal GFR (p=0.006). Males had significantly higher pulse wave velocity (PWV) and Augmentation index (Aix) than females. When both sexes were analyzed separately, the daytime Aix values of children with T1D were significantly higher than healthy children (females p=0.046 and males p=0.048). PWV all day and night were significantly higher in children with poor glycemic control than those with good glycemic control (p=0.037 and p=0.043, respectively). In our study, age had the greatest impact on AS, compared to the duration of T1D and HbA1c.

Conclusions: Our study underscores the importance of early evaluation of ABPM and AS to monitor complications. Poor glycemic control emerges as a key factor affecting AS, while age also plays a significant role in the development of complications. The significant increase in Aix among subgroups of our cohort suggests it could serve as an early marker, warranting further investigation.

Table 1. Linear regression models.

	BMI-SDS[1]	SBP-SDS[1]	LDL-C[2]	TG[2]	HDL-C[2]
TIR	-0.007 (0.001)***	-0.004 (0.001)***	-0.12 (0.03)***	-0.59 (0.056)***	0.002 (0.015)
TITR	-0.009 (0.001)***	-0.003 (0.001)**	-0.11 (0.03)***	-0.54 (0.063)***	0.015 (0.017)
TBR	-0.022 (0.006)***	0.009 (0.005)	-0.33 (0.16)*	-0.46 (0.31)	0.42 (0.086)***
TAR	0.007 (0.001)***	0.003 (0.001)**	0.12 (0.028)***	0.54 (0.053)***	-0.018 (0.014)
CV	-0.004 (0.003)	0.004 (0.002)	0.01 (0.07)	0.91 (0.14)***	0.12 (0.040)
GRI	0.005 (0.001)***	0.003 (0.001)***	0.10 (0.022)***	0.48 (0.043)***	-0.007 (0.013)
GRI hypo	-0.026 (0.008)**	0.012 (0.007)	-0.38 (0.19)	-0.48 (0.37)	0.50 (0.10)***
GRY hyper	0.008 (0.001)***	0.004 (0.001)***	0.17 (0.033)***	0.70 (0.063)***	-0.012 (0.017)

Standard error values are reported in brackets. *P < 0.05; ** P<0.01; ***P<0.001.
[1]Model adjusted for age, diabetes duration, gender, insulin treatment and CGM modalities groups.
[2]Model adjusted for age, diabetes duration, gender, insulin treatment, CGM modalities groups and BMI SDS.c
Abbreviations: BMI, body mass index; SDS, standard deviation score; SBP, systolic blood pressure; LDL-C: low-density lipoprotein-cholesterol; TG, triglyceride; HDL-C, high-density lipoprotein-cholesterol; TIR, Time in range 70–180 mg/dL (3.9–10.0 mmol/L); TITR, Time in tight range 70-140 mg/dL (3.9 – 7.8 mmol/L); TBR, Time below range <70 mg/dL (< 3.9 mmol/L); TAR, Time above range >180 mg/dL (>10.1 mmol/L); CV, Coefficient of variation; GRI, Glycemia Risk Index.

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Time in range, time in tight range, glycemia risk index and other key continuous glucose monitoring metrics are associated with cardiovascular risk factors exposure in children and adolescents with type 1 diabetes: data from the sweet international database

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Introduction: Cardiovascular risk factors (CVRFs) such as hypertension, obesity and dyslipidemia are the main risk factors for developing chronic complications in people with type 1 diabetes (T1D). Not many studies have assessed the association of CVRFs and continuous glucose monitoring (CGM) metrics.

Objectives: The main aim of this study was to examine the association between CVRF's and CGM metrics in a large international cohort of children and adolescents with T1D from the SWEET registry to test the hypothesis that CGM metrics independently contribute to CVRFs exposure.

Methods: This cross-sectional study included participants with T1D duration≥1 year, aged 6-18 years, who had a documented 2-week CGM with >70% completeness and CVRFs (lipids, Body Mass Index-BMI and blood pressure-BP) data from January 2019–June 2023. Linear regression models were applied to test the independent association between CGM metrics and CVRFs, adjusting for confounding factors (age, diabetes duration, gender, insulin treatment, CGM modalities groups and BMI SDS, except for the model run with BMI SDS as output variable).

Results: Data from 3,107 children and adolescents with T1D (median age 14.30 yrs, median T1D duration 7.37 yrs, 51.5%males) were analysed. Linear regression showed that Time In Range (TIR), Time In Tight Range (TITR), Glycemia Risk Index (GRI), and the other key CGM metrics were significantly associated with CVRFs (Table 1). In particular, TIR, TITR, Time above range, GRI, and GRI hyperglycemia component were significant independent predictors of BMI-SDS, systolic BP-SDS, LDL cholesterol and triglycerides (TG). The coefficient of variation was a significant predictor of TG. Time Below Range (TBR) and GRI hypoglycemia component were significant predictors of BMI-SDS and HDL cholesterol. TBR was also a significant predictor of LDL cholesterol.

Conclusions: In children and adolescents with T1D, TIR, TITR, GRI and the other key CGM metrics significantly contribute to CVRFs exposure.

O-60

Predictors of steatosis in adolescents and adults with type 1 DM and its association with retinopathy in the northern Indian population

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Introduction: Liver disease in Type 1 diabetes mellitus (DM) is a rare complication and may arise from glycogen deposition, fatty liver, or autoimmune hepatitis. Insufficient data is available to establish the appropriate ALT threshold for identifying hepatic fibrosis. Transient elastography (TE), a non-invasive tool for assessing hepatic steatosis and stiffness, correlates with liver biopsy results in adults.

Objectives: To evaluate predictors of transient elastography-identified liver disease in type 1 diabetes mellitus (DM) Indian adolescents and adults.

Methods: Transient elastography (for liver stiffness measurement, LSM, and controlled attenuation parameter, CAP), and metabolic workup were performed in 40 subjects (12 adolescents and 28 adults; mean age 24.3 ± 10.3 years, BMI 20.6 ± 3.8 kg/m^2) presenting to our Endocrine Clinic.

Results: Participants were monitored for an average of 13.8 ± 8.5 years, (age of onset of 10.4 ± 6.1 years). The mean levels of HbA1c were 8.9% ± 2.6, with 20% of subjects having controlled levels (<7%) and 80% having uncontrolled levels. The mean alanine transferase (ALT) level was 24.5 ± 20.8 IU/L, and only 7.5% of subjects had elevated ALT levels. Steatosis indicated by a Controlled Attenuation Parameter (CAP) score > 248 db/m was present in 10% of cases. Participants with steatosis had a longer duration of T1DM (26.3 ± 19.8 years compared to 12.4 ± 5.2 years), elevated BMI SDS (0.94 ± 1.45 compared to -0.21 ± 1.02 SDS), and higher ALT levels (46.1 ± 33.4 compared to 22.1 ± 18.1) compared to those without steatosis. The CAP score showed significant correlations with the duration of diabetes, BMI SDS, and ALT levels. Moreover, individuals with steatosis had 17 times higher odds of abnormal fundus examination results compared to those without steatosis. Subjects with elevated ALT levels had 35 times higher odds of having retinopathy. However, the duration of T1DM, BMI SDS, and ALT levels did not emerge as determinants of steatosis in T1DM.

Conclusions: Patients with type 1 diabetes mellitus (DM) may face an increased risk of non-alcoholic fatty liver disease (NAFLD) which may correlate with diabetic retinopathy. The correlation between steatosis and retinopathy requires examination in larger cohorts.

Wednesday, October 16th, 2024

Poster Corner 1: Pumps and CGM

P-01

A comparison between the Dexcom continuous glucose management indicator (GMI) and the point-of-care HbA1c in the context of children and adolescents with type 1 diabetes living in socially deprived north-western English region

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Introduction: Glucose management indicator (GMI) from continuous glucose monitoring (CGM) devises like Dexcom are increasingly used as alternatives to Point-of-Care haemoglobin A1c (HbA1c) in children (≤12 years) and adolescents (> 12 years) with type 1 diabetes (T1D). However, evidence is scarce on the relationships between GMI and HbA1c in the context of a socio-economically deprived population.

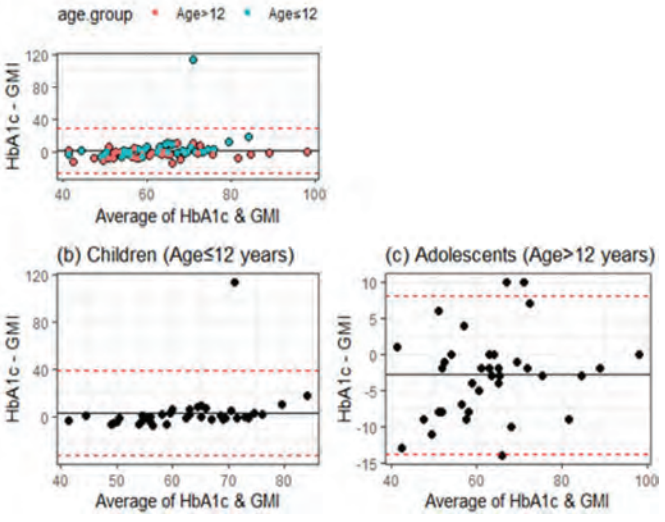
Objectives: To investigate the concordance between GMI and HbA1C in children and adolescents living in a deprived region.

Methods: GMI, Body Mass Index (BMI) and HbA1c measurements were collected retrospectively between Sept'2022 and Dec'2023. Eighty (80) patients (51.3% children) met the inclusion criteria which was sensor usage ≥70% and consenting to use of their data. Patient groups were compared by sex, age, BMI, GMI, HbA1c, and T1D duration. The Bland-Altman plots and Spearman correlations were used to assess the agreements between GMI and HbA1c.

Results: Only 80 patients (51.3% children) were included. The Age≤12 (vs Age>12) group were younger (mean ± SD: 9.3 ± 2.5 vs 15.4 ± 1.7 years), with lower BMI (mean ± SD: 18.5 ± 3.3 vs 23.1 ± 4.1), and shorter T1D duration (Median [IQR]: 2.2 [1.2-3.9] vs 5.4 [3.6-7.6] years). All comparisons were statistically significant (p<0.001). For children, GMI and HbA1c values were poorly correlated compared to adolescents (5.7% vs 90.5%), and the correlation was equally poor for combined data (42.5%). Bland-Altman plots show that GMI and HbA1c are concordant for the adolescents, satisfying normality requirement for their differences (Shapiro Wilk test p=0.089). P-values for children and combined data were <0.01, showing discordance

Conclusions: In our study, GMI and HbA1c were found to be concordant in adolescents and discordant in children. This shows that the confounding factors such as age, BMI and T1D duration should be a clinical consideration in CGM data interpretation. 14 and 90 days GMI is useful to assess diabetes control for all ages.

Fig. 1: Bland-Altman plots (showing Mean (black line) & 95% CI (dotted lines))



P-02

Prevalence of skin complications due to insulin pumps in children and adolescents (<18 years) with type 1 diabetes (T1D) depending on presence of Lipohypertrophy or not

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Introduction: Use of insulin pumps (CSII) may cause skin complications, including lipohypertrophy (LH), eczema/contact dermatitis and scarring. Rotating device wear locations may help prevent skin complications, however, for youth with limited skin surface area and subcutaneous tissue, frequent rotation can be challenging. Avoidance of areas with LH limits the device rotation even more, thereby potentially increasing the risk of skin complications.

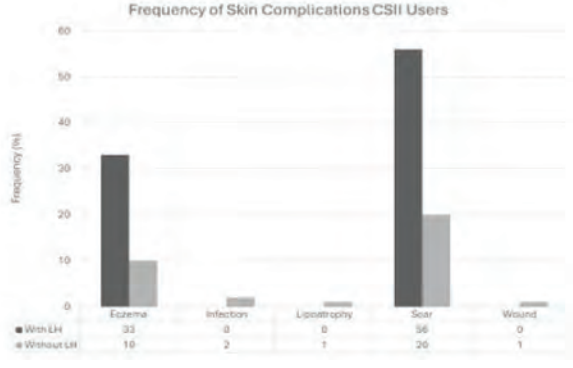
Objectives: The purpose of this study was to evaluate if the risk of skin complications was higher for youth with LH compared to youth without LH.

Methods: This was a prospective study in youth with T1D at the Barbara Davis Center using CSII and/or continuous glucose monitor (CGM) who were assessed during routine clinical encounters for the presence of device related skin complications over a 4-week period (April-May 2023). Data collection included demographic data and prevalence of current skin complications at CSII infusion sites, including measures of LH. Logistic regression was used to compare the risk of skin complications for youth with LH compared to those without LH.

Results: One hundred and nine youth were assessed during the study timeframe and 91 were using CSII and included in this analysis (52% male; 52% 13-17 years; 41% 8-12 years; 7% 4-8 years). The prevalence of LH was 10% (N=9). Eczema was observed at CSII sites in 33% of youth with LH vs. 10% without LH but the difference was not statistically significant (OR 4.62 [0.85-21.56] 95% CI); p=0.06). Similarly, scars were reported at CSII sites in 56% of youth with LH compared to 20% in youth without LH (OR 5.16 [1.23-23] 95% CI; p=0.02) (Figure).

Conclusions: Scarring and eczema at CSII sites may be more prevalent in youth with concurrent LH, however the low prevalence of LH in this sample limits the interpretation of these findings. Further research is needed with larger samples to support this relationship.

Figure 1



P-03

Abstract Withdrawn

P-04

Glycated hemoglobin and time in range variability on an insulin pump pediatric population

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Introduction: When integrated with continuous glucose monitoring, insulin pump therapy is related to greater metabolic control. Achieving target glucose reduces short and long-term complications of diabetes and improves quality of life.

Objectives: Evaluate HbA1c, time in range (TIR) and the effect of age and disease duration with two different insulin pumps.

Methods: Single center, retrospective, cross-sectional and analytical study. Patients with at least one year of insulin pump therapy were included, divided in two groups: automated insulin delivery system (AID) and not integrated pumps (NIP).

Results: Total of 68 patients included in the study (75% (51) NIP). NIP group: median age 15 years, last year HbA1c average 7,6% (21,6% under 7%) and TIR average 47,6% (3,9% above 70%). Adolescent's and children's HbA1c and TIR average were 7,5% and 49,1% and 7,8% and 43,3%, respectively. Patients with over five years of disease presented with higher HbA1c (7,7% vs 7,5%) and lower TIR values (47,5% vs 47,8%). AID group: median 14 years, last year HbA1c average 6,8% (70,6% under 7%) and TIR average 73,4%, (70,6% above 70%). Adolescent's and children's HbA1c and TIR average were 6,8% and 74%, and 6,8% and 72,1%, respectively. Patients with over five years of disease presented with higher HbA1c (6,9% vs. 6,6%) and lower TIR values (72,6% vs 74,3%)

Conclusions: In this study, we confirmed that patients with longer time of disease seem to have higher HbA1c and lower TIR. Adolescents seems to have a lower HbA1C and higher TIR than children. As previously described in the literature, our study also suggests that AID system seems to be much more effective than NIP, with more than two-thirds of our AID group having HbA1c under 7% and TIR above 70%.

P-05

Evaluation of fructosamine, an intermediate-term glycemic index, as a proxy to continuous glucose monitoring: experience from a resource limited setting in western India

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Introduction: Continuous glucose monitoring(CGM) has become increasingly popular as the standard-of-care tool for monitoring dysglycemia. Literature on performance of an intermediate-term glycemic index such as fructosamine with CGM metrics is scarce.

Objectives:

- To study relationship of glycemic indices(GI's)(glycated hemoglobin(HbA1c), fructosamine, mean blood glucose(MBG)) with CGM metrics in children and youth with Type 1 Diabetes(T1D)
- To assess temporal trends of GI's and response to standard of care over 12 weeks(subset)

Methods: Design: Prospective, observational; Participants:100 children and youth(50 boys) with T1D. Blood was drawn at baseline, 3 and 12 weeks;HbA1c and fructosamine were assessed. MBG was calculated from self-monitored blood glucose at each visit. A masked CGM device(FreeStyle Libre Pro-Abbott) was fitted for 2 weeks at baseline, and then again at 12 weeks in a subset(n=40). Correlations between CGM metrics and GI's and percent change in GI's were computed at 3-time-points(0,3 and 12wks)

Results: **Table 1** describes participant demographics at baseline. Significant correlations were observed between all indices(Time-in-range(TIR), glycemic variability(%CV), HbA1c, fructosamine and MBG) at all time-points (**Figure 1**). Correlation coefficients were higher between fructosamine and TIR(-0.75) ($p<0.001$) than HbA1c and TIR(-0.7)($p<0.001$) at baseline and 12 weeks. Fructosamine showed a steep decline from baseline to 3 weeks and plateaued in the weeks thereafter;HbA1c decreased gradually from baseline to 12 weeks.

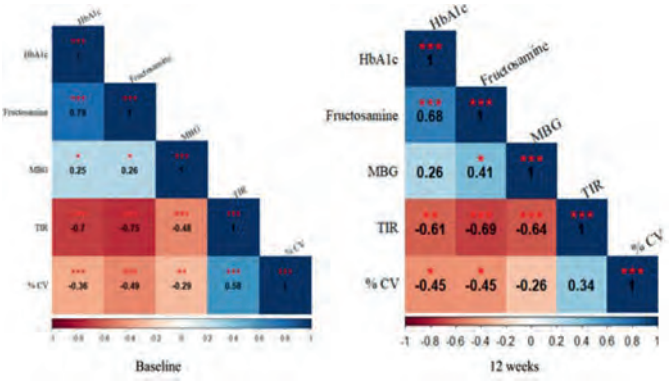

Fig. 1. Correlogram of GI's and CGM metrics

Conclusions: The relationship between intermediate-term GI's and CGM metrics was studied. Fructosamine was more strongly corelated with TIR, than HbA1c, at baseline and 12 weeks. Our study suggests that fructosamine may thus serve as a proxy to CGM in resource-limited settings in conjunction with HbA1c.

Table 1. Demographics of study participants at baseline

Parameter	Total (n=100)	Males (n=50)	Females (n=50)	Level of significance (p-value)
Age (years)	14.7 (12.2, 16.9)	15.1 (12.3, 17.1)	14.4 (11.6, 16.8)	0.497
Diabetes duration (years)	6.2 (3.8, 10.3)	6.1 (2.7, 9.8)	6.6 (4, 10.7)	0.558
HbA1c (%)	9.7 (8.9, 11.1)	9.8 (9, 11.5)	9.6 (8.7, 10.8)	0.268
Fructosamine (umol/L)	412 (374.5, 458)	425 (377.3, 483.8)	406 (367.5, 442)	0.129
MBG (mg/dL)	211.6 (183.6, 243.7)	211.1 (183.3, 246.6)	213 (184, 241)	0.689
Time above Range (%)	61.5 (50.3, 73.2)	65.4 (55.1, 79.3)	59.9 (46.3, 69.6)	**0.018**
Time in Range (%)	28.6 (21.3, 38)	28.1 (16, 34.5)	30.3 (23.2, 38.9)	**0.043**
Time below Range (%)	8.2 (4.3, 13.4)	7.45 (2.9, 10.4)	9.7 (4.5, 15.3)	**0.025**
Glycemic variability (%CV)	49.5 (43.0, 55.0)	48.5 (39.8, 54.3)	50.0 (43.8, 57.0)	0.237

P-06

The assessment of clinical factors influencing GMI-HbA1c discordance in children with DT1 – one-year real-life observation

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Introduction: The GMI is a parameter which provides an estimation of HbA1c using CGM data. Published data pointed that there are some discordance between GMI and laboratory HbA1c which cannot be ignored, but the reasons for these differences have not been fully examined.

Objectives: The aim of this study is to identify potential clinical factors leading to discordance between laboratory HbA1c and GMI.

Methods: Retrospective study of 99 patients using different types of CGM (Dexcom - 31, Abbott -30, Medtronic - 38) was conducted. Inclusion criteria were: DT1, continuous use of one type of CGM (with >70% sensor activity) over the last year and regular (every 3-4 months) visits. At each visit we collected clinical data: age, sex, BMI, duration of diabetes, DDI, sensor type, CGM report (14 and 90 days) and laboratory HbA1c.

Results: MARD calculated for 14 and 90 days revealed similar and high compliance of GMI with HbA1c laboratory results (MARD 5.55 for 14 and 5.21 for 90 days). We confirmed linear relationship between HbA1c and GMI, but the higher HbA1c result, the more differences HbA1c-GMI occur. The HbA1c-GMI discordance was categorized to four thresholds: 48.7% <0.25; 20.1% in range 0.25-0.5; 22.4% in range 0.5-0.75 and 8.7% >0.75. Patients with HbA1c-GMI 90 discordance <0.5% had significantly lower HbA1c (6.80 vs 7.59%), shorter time of diabetes (<5 years) and better stability of HbA1c (differences <0.4 between results). Other factors: sex, age, BMI, DDI, type of sensor and CGM parameters did not reveal influence on HbA1c-GMI discordance.

Conclusions: One-year real-life observation showed that clinically significant discordances (HbA1c-GMI 90 >0.5%) occurred only in less than 1/3 children. Results of analysis confirmed that a higher difference is more likely to occur in patients with higher HbA1c values, longer duration of diabetes and lesser stability in glycemic control, which could be a practical guideline during ongoing assessment of treatment.

P-07

Glucose management indicator (GMI) as an alternative for conventional HbA1c measurement in diabetes clinics?

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Introduction: HbA1c is a gold standard point of care test (POCT) in diabetes clinics. This level can be spuriously affected by various conditions posing challenges to interpretation. Regular quality control testing is important for its accuracy. Newer technologies offer alternative methods for assessing glycaemic control using glycaemic parameters (TBR, TIR, TAR) and Glucose management indicator (GMI) data. Generally, MDT teams use the latest 2 weeks' glycaemic parameters for analysis and management but variable practices exist.

Objectives: 1) To assess the usefulness of GMI indicator and its correlation with POCT 2) To assess the use of Time in Range (TIR) in predicting overall glycaemic control

Methods: Retrospective analysis of all children using Dexcom CGMS (G6 &G7) in a district hospital paediatric diabetes clinic, UK. The latest clinic appointment information was used to collect POCT HbA1c. We then looked retrospectively at 2-weeks, 1-month and 3-months data on GMI and TIR from online database (glooko). People with insufficient data capture or those not sharing data, were excluded. **Pearson correlation coefficient test** was used to assess the correlation between POCT HbA1c vs GMI and TIR vs GMI at above time points.

Results: Total of 91/98 children with T1D using CGMS of which 75 (21-G7, 54-G6) were analysed,16 excluded. Results are summarised in Table-1 [**correlation coefficient (r)** and **p value]**

1. 1-month GMI indicator has a very strong positive correlation to the measured HbA1c, although the other timed parameters have similar relationship
2. 3-month TIR has a strong negative correlation to the predicted GMI but 2 weeks and 1-month data closely follow similar trend

Limitations: Retrospective analysis and small numbers

Table-1 Correlation coefficient assessment between parameters

X / Y axis	2 weeks	1 month	3 months
HbA1c Vs GMI	r(73)= .759, p < 0.00001	**r(73)= .824, p < 0.0001**	r(73)=.804, p < 0.0001
TIR Vs GMI	r(73)= - .960, p < 0.0001	r(73)= - .957, p < 0.0001	r(73)= -.967, p < 0.0001

Conclusions:

1. 1-month predicted GMI could be considered as an alternative for POCT HbA1c
2. 2-weeks glycaemic parameter data is comparable to 1-month data and either could be considered in the clinic
3. Adopting a standardised approach by diabetes MDT team is crucial

P-08

Building diabetes educator workflows for remote patient monitoring billing

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Introduction: Revenue-generating Diabetes Educator-led workflows are needed for remote patient monitoring (RPM) of CGM.

Objectives: Develop workflows and billing processes for a Diabetes Educator-led RPM program.

Methods: We identified stakeholders within a pediatric endocrinology clinic, including hospital compliance, system analysts, billing specialists, and clinical informatics, to identify, discuss, and approve billing codes and a billing workflow. The group evaluated billing code stipulations, such as the timing of CGM interpretation, scope of work, providers' licensing, and EHR documentation necessary to meet billing compliance standards. We developed a workflow for Diabetes Educator asynchronous CGM interpretation and intervention. We initiated a pilot in February 2024.

Results: We started with existing codes for CGM interpretation (95251) and then built a workflow with the Diabetes Educator as the billing provider, which was novel for the clinic. The workflow includes data review, patient communications, and documentation (Fig 1). Over the first month of the pilot, RPM billing codes were submitted for 38 RPM reviews for 18 patients. Revenue analysis is underway.

Conclusions: We designed and piloted workflows and billing processes for a Diabetes Educator-led remote RPM program. The continuous involvement of Diabetes Educators and numerous hospital stakeholders was essential to incorporate all relevant aspects of clinical care, workflows, compliance, and documentation. CGM interpretation and RPM billing allow Diabetes Educators to work at the top of their licensing credential and increase clinical care touch points. While some added work is involved with the documentation of the CGM interpretation, billing will facilitate revenue generation to expand patient data review and enhance diabetes care. As evidence of the clinical benefits of RPM continues to mount, the processes developed here may facilitate broader adoption of revenue-generating Diabetes Educator-led care.

P-09

Family experience of unblinded CGM-guided education for presymptomatic T1D

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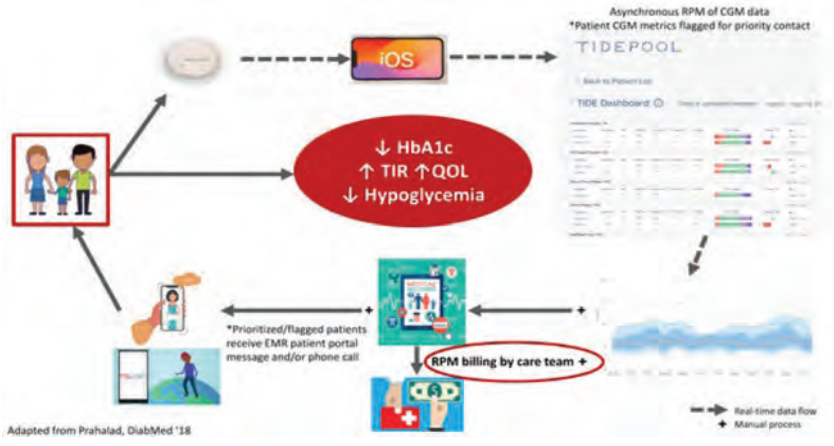
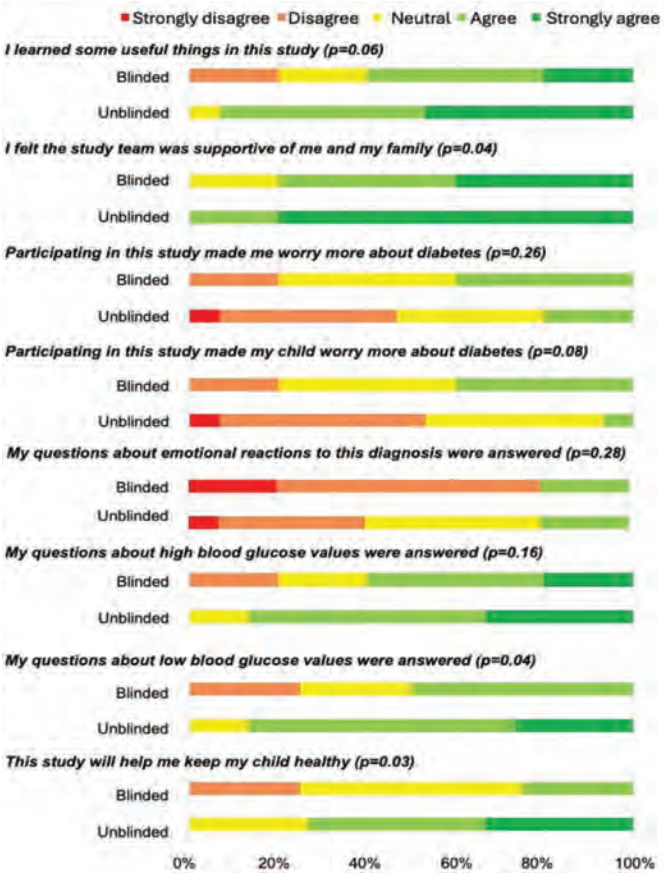
Introduction: Continuous Glucose Monitoring (CGM) can be used to assess glycemic changes in presymptomatic type 1 diabetes (T1D).

Objectives: Explore family experience of unblinded CGM-guided education compared to blinded CGM monitoring only.

Methods: Participants (N=31) with dysglycemia by A1c, OGTT, CGM and/or home glucose testing were randomized 2:1 into 6 months intervention (2 **unblinded CGM** wears/month and montly telemedicine education) vs control (q3 month blinded CGM wear for monitoring). Multidisciplinary team included





physician, registered nurse, dietitian, and mental health clinician. Exit surveys with Likert-scale responses and guided interviews were used to assess patient and family experience. Average response scores of parents in intervention (n=20) and control (n=5) groups were compared using student t-test.

Results: Unblinded vs blinded CGM participants had no significant difference with the physical experience of wearing CGM (e.g. discomfort with application or wear, child embarrassment or anxiety about CGM wear). However, parents in the unblinded group were significantly more likely to endorse that their experience during study participation would help keep their child healthy (p=0.03) and that they felt supported by the study team (p=0.04). Fewer parents in the unblinded group felt the CGM wear caused their child to worry more about diabetes, but this did not reach significance (p=0.08) (**Figure1**). More parents using unblinded CGM endorsed that their questions regarding blood glucose were answered, but this was only significant with regard to hypoglycemia (p=0.04). All parents of children wearing unblinded CGM who progressed to stage 3 T1D chose to use CGM continuously following diagnosis and endorsed that they felt they "understood how and when to use insulin" and "were able to make changes to insulin dose when needed."

Conclusions: Use of unblinded CGM for education of children with presymptomatic T1D was positively regarded when compared to blinded CGM.

P-10

Diabetes technology, glycemic control and social vulnerability in youth with type 1 diabetes

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Introduction: Diabetes Technology has been shown to improve glycemic control in children with Type 1 Diabetes Mellitus (T1DM). However, children from socially disadvantaged groups used these modern technologies less in clinical practice.

Objectives: This study aimed to assess the relationships between these health disparities, diabetes technology use, and glycemic control in youth.

Methods: This retrospective billing code analysis included 1459 patients with T1DM, ≤ 23 years old who were seen at Washington University between January 2020 and April 2022. A univariate linear regression analysis was performed using age, use of a continuous glucose monitor (CGM), use of a pump, ADI score, age, sex, race, insurance, and number of visit encounters, to screen for potential influence factors of HbA1c. These variables were included in a multiple linear regression model due to clinical relevance.

Results: Of the patients studied, 44.8% used an insulin pump, and 56.3% used a CGM. 37.3% used both a CGM and an insulin pump. The mean area deprivation index was 57.0 (SD = 24.7). 66.4% of patients were on managed care insurance, while 28.8% were on Medicaid insurance. There was significantly lower usage of diabetes technology in Black patients, those on Medicaid, and those with lower SES as defined by ADI score. Independent insulin pump use and CGM use were significantly associated with lower HbA1c. There was a greater effect of insulin pump or CGM use on HbA1c levels among the patients from the most disadvantaged population. [$R^2 = 0.206$, $F(11, 1459) = 63.783$, $p < 0.001$]

Conclusions: This study highlights inequities in the use of diabetes technology and suggests that insulin pumps and CGM use improve glycemic control, particularly among patients from disadvantaged backgrounds. Further studies are needed to ascertain the impact of implicit bias among disadvantaged youth in CGM and pump use. Additionally, clinical trials in disadvantaged youth are needed to determine the effects of diabetes technologies on these children.

Wednesday, October 16th, 2024

Poster Corner 2: Automated Insulin Delivery, Closed Loop

P-11

Enhancing equity in access to automated insulin delivery systems in an ethnically and socio-economically diverse group of children with type 1 diabetes

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Introduction: Manufacturer-supported didactic teaching programmes offer effective Automated Insulin Delivery (AID) systems onboarding in children and young people (CYP) with type 1 diabetes (T1D). However, this approach has limited flexibility to accommodate the needs of families requiring additional support.

Objectives: Evaluate the efficacy of an in-person manufacturer-supported didactic teaching programme (Group A), in comparison to a flexible flipped learning approach delivered virtually or in-person (Group B).

Methods: Retrospective analysis of CYP with T1D using CGM, who were initiated on AID systems between 2021 and 2023. Compare CGM metrics from baseline to 90 days for both groups A and B. Additionally, compare the two groups for change in CGM metrics over the 90-day period (Δ), patient demographics and onboarding time.

Results: Group A consisted of 74 CYP (53% male) with median age of 13.9 years and Group B 91 CYP (54% male) with median age of 12.7 years. From baseline to 90-days, Group A lowered mean (±SD) time above range (TAR, >10.0 mmol/L) from 47.6% (±15.0) to 33.2% (±15.0) ($p<0.001$), increased time in range (TIR, 3.9-10.0 mmol/L) from 50.4% (±14.0) to 64.7% (±10.2) ($p<0.001$). From baseline to 90-days, Group B lowered TAR from 51.3% (±15.1) to 34.5% (±11.3) ($p<0.001$) and increased TIR from 46.5% (±14.5) to 63.7% (±11.0) ($p<0.001$). There was no difference from baseline to 90-days for time below rage (<3.9 mmol/l) for Group A and Group B. Δ TAR, TIR and TBR for both groups were comparable. Group B consisted of CYP with higher socio-economic deprivation, greater ethnic diversity, and lower carer education achievement ($p<0.05$). The majority of Group B (n=79, 87%) chose virtual flipped-learning, halving diabetes educator time and increasing onboarding cadence by five-fold.

Conclusions: A flexible virtual flipped learning programme increases onboarding cadence and capacity to offer equitable AID system onboarding.

P-12

Predicting achievement of continuous glucose monitor (CGM) targETS for American youth with type 1 diabetes (T1D) using automated insulin delivery (AID) systems

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Introduction: Despite improved access and use of diabetes technologies, glycemic outcomes remain suboptimal for American youth with T1D. Understanding the barriers to improvement in glycemic outcomes for youth using AID systems is essential to ensure that all youth can benefit from advances in T1D care.

Objectives: We evaluated potential factors and their influence on achieving CGM glycemic targets among youth with T1D using AID systems to better understand the suboptimal glycemic outcomes among American youth with T1D.

Methods: This is a retrospective chart review of youth with T1D using AIDs and seen at a tertiary care center between 1/1/2023 to 12/31/2023. Most recent clinic note was used to determine CGM glycemic measures. Demographic characteristics of youth were summarized by achievement of CGM glycemic targets (time in range (TIR) >70%, time above range (TAR) <25%, time below range (TBR) <4%). Binary logistic regression was used to assess effects of age, T1D duration, biologic sex, race/ethnicity, and health insurance on achievement of CGM glycemic targets.

Results: Chart review identified 891 youth (median age 14.7 years, median T1D duration 5.5 years, female 53.5%, Non-Hispanic White (NHW) 54.9%, Non-Hispanic Black (NHB) 22.2%, Latinx 10.7%, other race 12.2%, publicly insured 39.9%). Demographic characteristics and predictor variables of youth on AID achieving CGM glycemic targets are described in table 1. Youth with longer T1D duration were more likely to achieve all CGM glycemic targets, while older youth were more likely to achieve TIR >70% and TAR <25%, but not TBR <4%. NHB youth were less likely to achieve all CGM targets.

Table 1. Demographic Characteristics and Odds Ratios (95% CI) for Covariates on Achieving CGM Glycemic Targets

	TIR >70% 32.1% (n=286)	TAR < 25% 28.7% (n=256)	TBR <4% 74.9% (n=667)	TIR >70% vs TIR ≤ 70%	TAR < 25% vs TAR ≥ 25%	TBR < 4% vs TBR ≥ 4%
Age (years) (median, IQR)	15.0 (11.5,17.7)	15.0 (11.6, 17.7)	14.7 (11.1,17.6)	**OR 1.06, CI 1.01-1.10**	**OR 1.06, CI 1.02-1.10**	OR 1.03, CI 0.98-1.07
Duration of T1D (median, IQR)	4.8 (2.1,9.4)	4.8 (2.0, 9.4)	5.2 (2.3,9.6)	**OR 0.93 CI 0.89-0.97**	**OR 0.93, CI 0.89-0.97**	**OR 0.94, CI 0.91-0.98**
Female % (n)	55.9 (160)	55.1 (141)	54.7 (365)	OR 0.81, CI 0.61-1.08	OR 0.86, CI 0.64-1.16	OR 0.77, CI 0.57-1.05
Race/Ethnicity % (n)						
NHW	55.9 (159)	56.7 (140)	56.2 (364)	OR 0.56, CI 0.23-1.35	OR 0.55, CI 0.23-1.36	OR 0.36, CI 0.83-1.60
NHB	15.9 (44)	15.4 (38)	20.1 (130)	**OR 0.31, CI 0.12-0.79**	**OR 0.32, CI 0.12-0.81**	**OR 0.20, CI 0.05-0.90**
Latinx	12.7 (35)	13.4 (33)	11.7 (76)	OR 0.65, CI 0.25-1.70	OR 0.72, CI 0.27-1.90	OR 0.45, CI 0.10-2.15
Other	13.8 (38)	14.6 (36)	12.0 (78)	OR 0.60, CI 0.23-0.55	OR 0.67, CI 0.26-1.76	OR 0.28, CI 0.06-1.28
Private Insurance % (n)	39.9 (114)	39.5 (101)	41.3 (274)	OR 0.76, CI 0.78-1.42	OR 1.01, CI 0.74-1.38	OR 1.36, CI 0.98-1.90

Conclusions: Continued efforts to understand the unique characteristics that influence optimal use of diabetes technologies are needed. Approaches that aim to improve AID system uptake and sustained use must consider developmentally appropriate and culturally competent strategies so that youth with T1D are set up to succeed.

P-13

Sustained improvement of glycemic control and person-reported outcomes one year after tandem control IQ^{tm} initiation in children with type 1 diabetes in real-world

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Introduction: Real-world data add value to outcomes from randomized controlled trials on the use of hybrid closed-loop systems in the management of children with type 1 diabetes (T1D).

Objectives: To assess the real-world impact of Tandem Control IQ^{TM} on glycemic control and person-reported outcomes (PROs) in children ≥6 years with T1D over 12 months.

Methods: Between Oct 2021 and Dec 2022, all children ≥6 years with T1D who started Tandem Control IQ^{TM} (n = 114) were recruited at 13 Belgian centers. Data were prospectively collected during routine visits at start, and 4, 8 and 12 months after start of Tandem Control IQ^{TM}. PROs were evaluated through questionnaires (Diabetes Quality of Life for Youth [DQOLY], Hypoglycemia Fear Survey [HFS], HAPPI-D). Data are reported as mean ± SD or least-squares mean (95% CI).

Results: Children were 12.0 ± 3.2 years old, predominantly girls (61.4%), had T1D for 6.1 ± 3.6 years, and 80.7% used an insulin pump before. Time in range (70-180 mg/dL) increased from start to 4 months (51.6% [47.6-55.5] to 67.0% [63.8-70.2], p<0.001) and was sustained up to 12 months (64.4% [61.2-67.5], p<0.001). After 12 months, HbA1c decreased from 7.8% (7.6-8.1) to 7.1% (6.9-7.3), time <70 mg/dL from 3.9% (3.1-4.8) to 2.7% (1.9-3.5), time >180 mg/dL from 44.1% (39.8-48.5) to 32.9% (29.2-36.5), and time >250 mg/dL from 21.7% (17.9-25.5) to 13.0% (10.7-15.3) (all p<0.001). Children scored better on DQOLY satisfaction (70.4 [67.8-73.0] vs 74.0 points [71.3-76.6], p<0.001) and DQOLY impact (54.6 [50.9-58.3] vs 51.3 points [47.4-55.1], p=0.001), and parents on HAPPI-D (22.5 [21.1-23.9] vs 19.6 points [18.2-21.0], p<0.001) and HFS worry (25.0 [21.6-28.4] vs 20.3 points [17.0-23.5], p<0.001) after 12 months. Children missed fewer days of school (620.2 vs 328.1 days/100 patient years, p=0.001) and parents missed less days of work (408.0 vs 95.5 days/100 patient years, p<0.001). Figure 1 shows the overall performance of Tandem Control-IQ^{TM} as composite diabetes octagon.

Conclusions: One year real-world use of Tandem Control-IQ^{TM} in children with T1D is associated with better glycemic control, more diabetes-related QoL and less worries about hypoglycemia for parents.

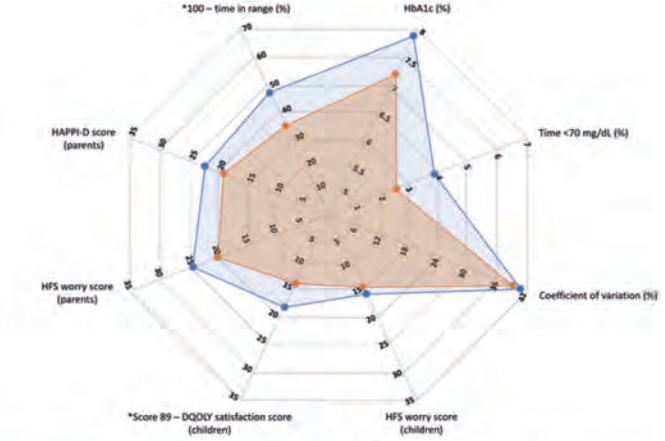

Figure 1. Composite diabetes octagon. Each axis represents a diabetes metric for which the outcomes are compared at start (blue) with those at 12 months (orange), with a lower score indicating better outcomes. *For time in range and DQOLY satisfaction, the difference between the maximum score and the score at start or 12 months was calculated to ensure that a lower score on each axis indicates a better outcome. HFS, Hypoglycemia Fear Survey; DQOLY, Diabetes Quality of Life for Youth questionnaire.

P-14

Simplified meal announcement and its characteristics in adolescents with type 1 diabetes using MiniMed 780g for one year

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Introduction: Simplified meal announcements using Minimed 780G system can be used as alternative approach to precise carbohydrate counting in Adolescents with Type 1 Diabetes (T1D) and reaches international targets of glycemic control.

Objectives: To describe and analyze simplified meal announcements, presets of three carbohydrates amounts, pump settings and glycemic outcomes in adolescents T1D using MiniMed 780G system for one year.

Methods: 34 participants (12-18 years) with T1D were randomly assigned to simplified meal announcement versus precise carbohydrate counting to initiate MiniMed 780G system. Participants were followed for one year with scheduled visits every 3 months. HbA1c, Time in Range (TIR), Insulin to Carb ratio (ICR), active insulin time (AIT), glucose target, meals and carbs per day and average carbohydrate amounts were analyzed every 3 months.

Results: Glycemic outcomes (HbA1c <7% and TIR (70-180mg/dl) were reached after 3 months and maintained over the study period. ICR with rule of 360, AIT of 2h and target of 100mg/dl were used more than 94% of participant without any change during the study period. Meal announcement as snack of 20gr, regular meal of 60gr and large meal of 90gr were used in more than 70% of participants, without any change during the study.

Conclusions: Adolescents on MiniMed 780G system with simplified meal announcement were able to maintain international glycemic control targets over one year without adjusting the pump settings (An ICR rule of 360, AIT of 2 hours and target of 100 mg/dl). Additionally, the presets of carbohydrate amounts remained consistent throughout the study.

Simple Meal Announcement and Its Characteristics in Adolescents with Type 1 Diabetes over 12 months Follow up

	Baseline	3 months	P	6 months	P	9 months	P	12 months	P
Glycaemic Control									
HbA1c, %	8.0±2.1	6.8±0.3	0.026	6.9±0.3	0.354	6.7±0.3	0.069	6.8±0.5	0.492
HbA1c, mmol/mol	64±26.2	51±3.3	0.026	52±3.3	0.354	50±3.3	0.069	51±5.5	0.492
<54 mg/dL	0.2±0.4	0.1±0.3	1.000	0.1±0.4	1.000	0.2±0.3	0.445	0.3±0.4	0.544
54-70 mg/dL	1.4±0.5	1.5±1.5	0.605	1.5±0.9	1.000	1.6±1.4	0.617	1.5±1.2	0.632
70-180 mg/dL	47.5±18.3	73.5±6.7	0.001	72.7±7.8	0.765	72.3±6.9	0.882	72.9±5.6	0.795
180-250 mg/dL	22.6±8.1	19.0±5.2	0.122	20.5±6.2	0.478	18.4±5.1	0.319	19.5±4.0	0.516
>250 mg/dL	28.3±15.9	5.7±3.6	0.001	5.2±3.1	0.688	7.5±4.2	0.090	5.8±3.6	0.277
Insulin, meals and Carbs									
TDD, u/kg/d	1.0±0.6	1.1±0.4	0.517	1.1±0.8	1.000	1.1±0.6	1.000	1.1±0.7	1.000
Meals per day	4.5±1.3	3.7±0.9	0.048	3.9±1.2	0.615	4.1±1.1	0.639	3.8±0.9	0.445
Carbs, g per day	165±72	165±66	1.000	168±52	1.000	172±41	0.816	170±56	0.919
ICR, g	7.5±2.2	5.8±1.6	0.014	5.8±2.1	1.000	5.7±2.3	0.902	5.7±2.1	1.000
Users with optimal settings, %									
Target,100 mg/dl	94	94		100		100		100	
Active Insulin Time, 2h	82	94		94		94		94	
ICR, Rule of 360	82	94		94		94		94	
Average carbohydrate amounts per meal									
Regular meal, gr	47.8±11.4	50.6±10.2	0.456	53.8±7.4	0.543	55.1±6.0	0.603	53.7±9.1	0.622
Large meal, gr	75.6±12.4	79.4±11.9	0.369	82.4±8.1	0.424	81.4±7.2	0.720	84.1±6.5	0.290
Snack, gr	20.0±3.2	19.6±3.1	0.582	19.2±4.4	1.000	19.4±3.1	1.000	19.8±5.6	1.000

P-15

Real-life achievements of MiniMed 780g advanced closed loop system in youth with type 1 diabetes: awesome study group multi-center prospective trial

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Introduction: The MiniMed 780G advanced hybrid closed-loop (AHCL) system has impacted diabetes care for children with type 1 diabetes (T1D).

Objectives: We assessed real-life glycemic outcomes and predictors of composite measures of optimal glycemic control in children and adolescents with T1D during their initial 12 months of 780G use.

Methods: This prospective observational multicenter study collected demographic, clinical, and two-week 780G system data at five timepoints. Optimal glycemic control was defined as a composite glycemic control (CGC) score requiring the attainment of four recommended continuous glucose monitoring (CGM) targets, as well as the glycemia risk index (GRI) of hypoglycemia and hyperglycemia. Outcome measures included longitudinal changes in multiple glycemic parameters and CGC and GRI scores, as well as predictors of these optimal measures.

Results: The cohort included 93 children, 43% girls, with a median age of 15.1 years [IQR 12.9, 17.0]. A longitudinal analysis adjusted for sex, age, and socioeconomic index yielded a significant improvement in glycemic control for the entire cohort (p_{time}<0.001) after the transition to 780G. Boys spent more time in the lower ranges and less time in the higher range of glucose compared to girls (p<0.05). Optimal glycemic control measures improved at 12 months post 780G; CGC improved by 5.6-fold (p<0.001) and was attained by 24% of the participants, and GRI score improved by 10-fold (p=0.009) and was achieved by 10% of the participants. Lower baseline HbA1c levels and increased adherence to 780G usage were predictors of achieving optimal glycemic control.

Conclusions: The 780G system enhances glycemic control in children and adolescents with T1D, demonstrating improvements in HbA1c and CGM metrics, albeit most participants did not achieve optimal glycemic control. This underscores the importance of maintaining proactive involvement in diabetes management for healthcare professionals, youth, and caregivers.

P-16

Time in tight range improves significantly and sustainably with aHCL system in pediatric and adolescent patients not reaching glycemic goals with conventional treatment options

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Introduction: While time in range (TIR) has been recognized as an indicator of glycaemic control, time in tight range (TITR), a marker of normoglycaemia, has recently emerged for preventing diabetes complications.

Objectives: This real-life study investigates the influence of two-year treatment with advanced hybrid closed loops system (aHCL) on TITR in children and adolescents with T1D, who do not reach treatment goals with conventional treatment options.

Methods: This retrospective study included all the patients (n=79) aged 7 to 15.99 years with T1D, having HbA1c levels above 53 mmol/mol, who initiated the aHCL system between Nov 2020, and Jan 2022, in the Helsinki University Hospital. Time in tight range (TITR), and effect of aHCL sensor glucose (SG) target and active insulin time (AIT) on glycemic parameters were analyzed at 0, 3, 12, and 24 months.

Results: The improvement of glycemic control was seen already at 3 months after initiating the aHCL-system. TITR increased significantly ($p<0.01$) between 0 (33.3 [10.8 SD] %) and 3 (45.2 [7.9 SD] %) months, favorable effect lasted up to 24 (42.4 [10.9] %) months. Patients who had SG target 5.5 mmol/l and AIT 2 hours had similar HbA1c, TITR, TIR than those with looser pump setting ($p>0.01$) at all time points analyzed. At 12 and 24 months, patients with tighter settings had lower number of manual boluses than the subjects with looser settings (3.5 [SD 1.7] vs. 6.5 [SD 2.2], $p<0.001$; 4.4 [SD 1.8] vs 6.6 [SD 2.6], $p<0.001$, respectively).

Conclusions: TITR improved significantly after the initiation of the aHCL system and the favorable effect lasted throughout the follow-up. Patients with recommended settings (SG target 5,5 mmol/l and AI 2 hours) seemed to take manual boluses less than the others, indicating that diabetes team tried to push better control with tighter settings. However, aHCL treatment leads to significantly improved glycemic control, even with nonoptimal use of the system and is a promising option for treatment of all pediatric patients with type 1 diabetes.

P-17

Sick days in children using an aHCL system: a single-center observational pilot study

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Introduction: Advanced Hybrid Closed Loop (AHCL) systems have proven effective in improving glycemic outcomes in adults and children. However, there is no evidence regarding the performance of AHCL systems during specific events, such as acute illness in children.

Objectives: To evaluate the performance of the Medtronic 780G system during sick days in children by comparing glycemic outcomes before, during, and after the period of sickness

Methods: An online and in-paper questionnaire was proposed for all families currently using this system in our center, 119, to fill out when their children were experiencing an acute illness. The questionnaire asked about the symptoms' duration and type, if any therapy was given, and parents' actions regarding the system and insulin. Out of the families, 101 agreed to participate in the project. We evaluated the Carelink reports and compared the outcomes by considering 14 days before the onset of the illness, the total days of symptoms, and one and two weeks after the symptoms were resolved.

Results: Between October 2023 and March 2024, 47 complete responses were recorded. Considering all the events, no significant statistical difference was found (glucose metrics two weeks before vs. during symptoms, one week after, and two after, p-value >0.50). However, when the events were classified into two categories - symptoms resulting in hypoglycemia (gastrointestinal symptoms)

	Two weeks before	During symptoms	p-value	One week later	p-value	Two weeks later	p-value
TIR, %	71,0±10,9	67,8±10,5	*0,015**	69,9±9,6	*0,327*	70,2±10,6	*0,491*
TAR-1, %	19,8±8,2	22,5±6,9	*0,029**	19,2±6,8	*0,639*	19,3±6,3	*0,552*
TAR-2, %	6,3±5,0	7,6±5,6	*0,149*	7,5±5,7	*0,144*	7,2±5,4	*0,208*
TBR-1, %	2,4±2,2	1,7±2,0	*0,046**	2,8±2,3	*0,397*	2,6±2,0	*0,208*
TBR-2, %	0,5±0,7	0,4±0,6	*0,422*	0,5±0,6	*0,812*	0,5±0,7	*0,689*
Mean blood sugar, mg/dl	150,2±18,8	157,6±17,4	*0,010**	152,1±16,4	*0,439*	151,3±16,8	*0,589*
TDD of insulin, U	21,7±14,3	21,6±14,5	*0,873*	21,0±13,0	*0,462*	21,6±12,6	*0,864*
Auto correction, U	4,2±2	4,8±2,7	*0,019**	4,3±2,1	*0,704*	4,2±1,8	*0,906*

and symptoms resulting in hyperglycemia (fever and respiratory infections) - a statistically significant difference was found in metrics for hyperglycemic symptoms. The results are shown in the table. Considering hypoglycemic symptoms instead, no significant difference appeared. It was also observed that the number of actions caregivers took did not vary significantly between the two groups.

Conclusions: The Medtronic 780G system was completely effective in managing hypoglycemic symptoms, and metrics in hyperglycemic symptoms returned to the baseline after one week.

P-18

Automated insulin delivery (AID) systems in the real world of pediatric care: acceptance and quality of metabolic control after one year of use (AID-A study)

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Introduction: Current German pediatric evidence-based guidelines (2023) recommend AID systems (advanced hybrid closed-loop systems) for all children/teens with type 1 diabetes.

Objectives: The single-center longitudinal study (AID-A) evaluates the acceptance of AID systems in unselected children and adolescents and the consequences on their metabolic outcome parameters and BMI after one year of use.

Methods: Longitudinal metabolic data (HbA1c, TiR, TbR, GMI), BMI, and acceptance/use of the AID system were collected from 111 unselected children/adolescents with type 1 diabetes (46% female, mean age: 12.1±3.8 years; mean diabetes duration: 6.1±4.0 years) before and 12 months after initiation of an AID system.

Results: After one year, 109 patients decided to keep their AID system, two stopped because of technical problems or competitive sports. Mean HbA1c (8.1±1.1% vs. 7.7±1.0%), time in range (55±11% vs. 64±11%), time below range (2.6±2.2% vs. 1.8±1.7%) and GMI (7.6±0.5% vs. 7.3±0.5%) all improved significantly after one year (each $p<0.001$). Children and adolescents who used the system in the automated mode more than 80% of the time benefited more in terms of metabolic outcomes. The positive effects on metabolic parameters did not differ between preschoolers, primary school children and adolescents. In contrast, BMI SDS increased significantly (+0.57±0.89 SDS vs. +0.69±0.93 SDS).

Conclusions: Under real-world conditions, the use of an AID system in unselected children and adolescents with type 1 diabetes is associated with significant and clinically relevant improvements in glucose parameters. With very few exceptions, the children and adolescents would like to continue using their systems. To further optimize health outcomes, specific nutritional counseling should be provided to prevent adverse weight gain. Finally, young people should be motivated and supported in the long term to use their AID system continuously.

P-19

Evaluation of the MiniMed 780g system in young paediatric subjects (2-6 years old) with type 1 diabetes in a home setting: the Lenny study

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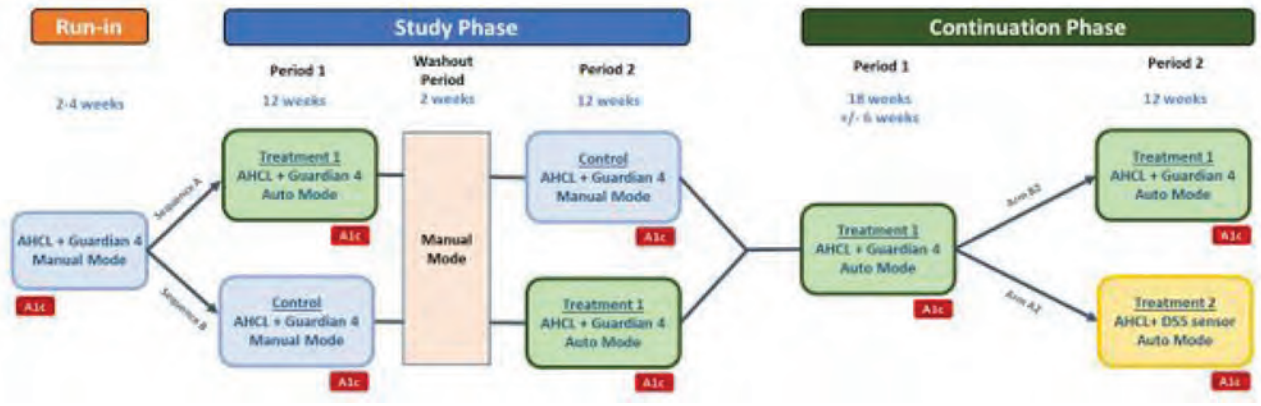
Introduction: The Advanced Hybrid Close Loop (AHCL) MiniMed 780G system has not yet been approved for individuals with type 1 diabetes under the age of 7.

Objectives: The aim of the LENNY study is to demonstrate the safety and performance of the MiniMed780G system in paediatric subjects (2-6 years old) with type 1 diabetes. It will provide key clinical evidence on the use of this AHCL system in very young children to support labeling extension.

Figure. The LENNY study design: a multi-center, interventional, prospective, open-label, randomized crossover study



Methods: Approximately 100 subjects aged 2-6 years, with type 1 diabetes duration ≥ 6 months, and HbA1c <11% (97 mmol/mol) will be enrolled in this multi-center RCT. The figure shows the LENNY study design. After a 2- to 4-week run-in phase, subjects will randomly undergo two 12-week periods using the AHCL system with Guardian 4 sensor in Manual Mode (*Control*) compared to Auto Mode (*Treatment 1*), in a cross-over design, with a 2-week washout period. The study phase primary endpoint is the between-treatment difference in time in range (%) (70-180mg/dL; 3.9-10.0mmol/L). A continuation phase consists of a first period where all subjects continue with *Treatment 1* for 18 weeks. Then, they will be randomized into two parallel arms, either using the updated AHCL system with the new DS5 (Simplera sync) sensor (*Treatment 2*) or continuing with *Treatment 1*. The continuation phase primary endpoint is the between-treatment difference in mean HbA1c at the end of the 12-week second period. Secondary endpoints include CGM-derived measures of glycemic control and HbA1c.

Results: Per the time of abstract submission, 101 participants were enrolled, 98 were randomized (across 12 sites, in Slovenia, the UK, Finland and Italy) and 88 finalized the study phase.

Conclusions: Study phase results will be presented at ISPAD 2024.

P-20

Stable glycemic control in or out of school in children using the MiniMed 780g system - a real world study from Italy

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Introduction: Days off school can disrupt the routine of school days and lead to changes in terms of diet, activity, and sleep patterns. This variation may pose challenges in maintaining glycemic control for young people with type 1 diabetes.

Objectives: In this analysis we aim to evaluate the real-world performance of young Italian MiniMed 780G system users on days with a school routine compared to days without.

Methods: MiniMed 780G system users with type 1 diabetes, self-reported to be aged ≤15 years, and living in Italy were included in the analysis. The observation period was from 01DEC2022 to

Table: Real-world performance of young Italian MiniMed 780G system users on days without school compared to days with a school routine.

	Comparison 1		Comparison 2	
	Week	Weekend	School	Vacation
General				
N	947	947	947	947
Glycemic control				
Sensor glucose, mg/dL	151.9 (14.1)	153.0 (14.3)	151.6 (14.1)	153.5 (14.4)
Standard deviation of SG, mg/dl	53.6 (9.9)	55.2 (10.0)	53.6 (9.8)	54.9 (10.2)
Glucose management indicator, %	6.9 (0.3)	7.0 (0.3)	6.9 (0.3)	7.0 (0.3)
Time in ranges, % of time				
Time below 54 mg/dL	0.5 (0.5)	0.5 (0.5)	0.5 (0.6)	0.4 (0.5)
Time below 70 mg/dL	2.4 (1.8)	2.3 (1.7)	2.5 (1.8)	2.2 (1.7)
Time between 70-140 mg/dL	47.2 (8.6)	47.1 (8.5)	47.2 (8.6)	46.9 (8.6)
Time between 70-180 mg/dL	71.8 (8.7)	70.8 (8.7)	71.8 (8.7)	70.9 (8.7)
Time above 180 mg/dL	25.8 (9)	26.9 (9.0)	25.7 (9.0)	26.9 (9.0)
Time above 250 mg/dL	6.0 (4.7)	6.6 (4.9)	5.9 (4.7)	6.7 (5.0)
Users reaching targets, % of users				
TIR>70%	61.5	57.6	62.41	58.29
TB70<4%	83.8	84.5	82.26	86.17
GMI<7%	61.8	59.1	63.36	56.18
Insulin				
Carbohydrates, g/d	190.4 (71.2)	192.4 (74.3)	191.3 (71.5)	190.5 (73.9)
Insulin to carbs, ratio	15.0 (8.1)	15.2 (8.2)	15.0 (8.1)	15.1 (8.2)
Total daily insulin dose, U/d	41.7 (19.9)	42.0 (20.2)	42.2 (20.2)	41.0 (19.7)
Insulin delivery, % of TDD				
Autobasal	41.2 (5.9)	41 (5.8)	41.3 (6.0)	40.7 (6.0)
Autocorrection bolus	19.5 (6.0)	19.6 (6.1)	19.6 (6.0)	19.4 (6.3)
Manual bolus	39.3 (9.6)	39.4 (9.6)	39.1 (9.6)	39.8 (9.7)

Values are represented as means (standard deviation) or as percentages/ N, population size/ SG, sensor glucose/ TIR, time in range/ TB70, Time below 70/ GMI, glucose management indicator/, TDD, total daily dose.

30NOV2023, and users had to have >10 days of sensor glucose data in this period. Endpoints were metrics of glycemic control and insulin. The first analysis compared aggregated endpoints of all weekdays versus all weekend days in 2023. The second analysis compared all days in 2023 designated as vacation according to the Ministry of Education versus all other days in that year.

Results: The table shows the outcomes per comparison. In total, 947 users were included. All metrics for glycemic control remained stable across the four groups, consistently meeting international targets. This includes time in range, which remained at 70.8% or higher, time in tight range which stayed at 46.9% or higher, and time below 70 mg/dL which stayed at 2.5% or lower. In terms of insulin, no meaningful changes were observed in the total daily insulin dose, nor in the percentages insulin delivered by bolus (manually), by autobasal or by autocorrection.

Conclusions: In this real-world study, glycemic control is not affected by varying schedules in young Italian users of the MiniMed 780G system. The MiniMed 780G system effectively adjusts to school, weekends, (summer) vacation and the variability of childhood.

Wednesday, October 16th, 2024

Poster Corner 3: Telemedicine, Digital Health, Decision Support

P-21

Try: telehealth to support diabetes technology adoption in at risk youth

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Introduction: Technology use, critical for management of Type 1 Diabetes (T1D), is lacking in non-white youth. Telehealth may provide an opportunity to support adoption of diabetes technology in youth struggling to meet diabetes related goals.

Objectives: Using telehealth to increase effective technology adoption in an at risk T1D population.

Methods: Eligible youth were ages 12-18 with T1D for ≥ one year, Medicaid insurance, and A1c ≥ 9%. Participants had to be willing to wear a continuous glucose monitor and be open to starting an insulin pump. We provided virtual visits, weekly with a diabetes educator and monthly with a nurse practitioner, over 6 months. We measured A1c at quarterly clinic visits and tracked Emergency Department (ED)/hospitalization rates and technology adoption. Diabetes metrics for comprehension, quality of life, distress, and self-efficacy were measured at baseline and at 6 months.

Results: Youth (n=18, 61% female, 77% minority) were aged 11-17, diabetes duration 4.6±3 years, 83% on Multiple Daily Injection (MDI) regimen. There was a significant difference between baseline A1c (mean 11.4%±2.5%) at 3 months (mean A1c 10.5%±2.7) p=0.0129 and at 6 months (mean A1c 9.7%±2.7) p=0.012. Over the 6 months, 67% of participants transitioned from MDI to insulin pump. Diabetes comprehension scores were higher at 6 months (mean diabetes comprehension 4.2±0.9) compared to baseline (mean diabetes comprehension 3.6±1) p=0.052. There was no significant difference in teen or parent diabetes distress or quality of life, or teen diabetes self-efficacy at 6 months compared to baseline. There was no significant difference between hospitalizations during the intervention compared to 2 years prior. There was a trend towards significance in ED visits with less occurring during the intervention (p=0.052).

Conclusions: A telehealth intervention focused on diabetes technology for a group of high-risk youth with T1D improved glycemic control over 6 months. Longer term studies are needed to evaluate the durability of this approach.

P-22

Listening to PwD, clinicians and researchers: co-designing a digital diabetes platform

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Introduction: Digital solutions in diabetes have potential to accelerate research and drive improvements in care and health outcomes.

Objectives: This study aimed to engage young people with Type 1 Diabetes (PwD) and parents/carers of PwD, clinicians, and researchers in a collaborative process to identify their needs and priorities for a digital diabetes platform.

Methods: Structured consultation sessions were conducted Mar-Dec 2023 by the Children's Diabetes Centre, based in Perth, Western Australia. Participants included PwD and parents/carers, clinicians (endocrinologists, diabetes educators, dietitians, social workers) and researchers. Sessions were in-person and online and included interviews, focus groups and participatory design workshops. Data were analysed to identify common themes, preferences and priorities.

Results: 100+ stakeholders participated in the consultation sessions, including ~25 PwD/parents, ~50 clinicians, and ~40 researchers. Participants resided in Western Australia (90%), other parts of Australia (8%) and overseas (2%). Analysis of the qualitative data revealed several key themes and preferences regarding the desired features and functionalities of the digital diabetes platform:

- PwD/parents: data security, personal data tracking, individualised education, access to resources, communication with care team, enrolment to research trials, reminders, and use of data to drive improvements.
- Clinicians: patient prioritisation tools, patient monitoring, alerts, connectivity with patients, and equitable care.
- Researchers: identification of patients eligible for trials, rapid recruitment, collection of patient-reported data, dissemination of research findings, and consumer engagement.

Conclusions: This collaborative process provides crucial insights to inform the next phase of the development. Understanding diverse user requirements and maintaining engagement will ensure that the ongoing co-design process delivers a platform that meets the needs of the different user groups and can be scaled to other centres.

P-23

Karlotta 2.0 (kids + adolescents research learning on tablet teaching Aachen) – implementation of a digital educational app for paediatric patients with type 1 diabetes

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Introduction: Educational programs in the clinical routine lead to more therapy adherence and to improved transition-readiness.

Objectives: Improvement of disease-specific knowledge in paediatric patients with type 1 diabetes using a digital app and individualized teaching.

Methods: We developed an app called KARLOTTA (Kids + Adolescents Research Learning On Tablet Teaching Aachen), a serious game including quizzes and mini games of skill to be used right before the appointment in our outpatient clinic. The users get an immediate visual feedback about right or wrong answers and the caregivers get these mirrored. The quiz is based upon established educational programs used in Germany. The aim of our first diabetes pilot study was to assess the acceptance and functionality and to collect qualitative feedback of T1D patients. A previous version has been successfully tested with 30 IBD patients.

Results: A total of 8 patients took part in the evaluation (4 female, 3 male, 1 diverse). The mean age of the patients was 12.75 years (SD=3.77). The youngest participant (8 years) was excluded as certain questions were misunderstood. The patients evaluated as follows: System Usability Scale (SUS). The resulting SUS acceptability was 76.80 (SD=10.57). A value above 71.10 is considered "good". Further, the patients rated learning development, design and appearance as good (2,5 out of 7; adaptation of the UXKQ). The third questionnaire concerned motivation to deal with T1D and the difficulty of questions and answers. In our current randomized-controlled pilot study we included 52 patients to evaluate acceptance, transition-readiness, changes in behaviour and attitude related to glycemic control (HBA1c, Time in range) and will report further results.

Conclusions: In chronic diseases like T1D there is a need for individualised teaching, children and adolescents demand communication and entertainment. The KARLOTTA app reveals individual gaps in knowledge, provides tailor-made teaching and can be easily implemented in the outpatient clinic.

P-24

Co-design and development of a text message-based intervention (keeping in touch (KIT) to support transition to type 1 diabetes adult care

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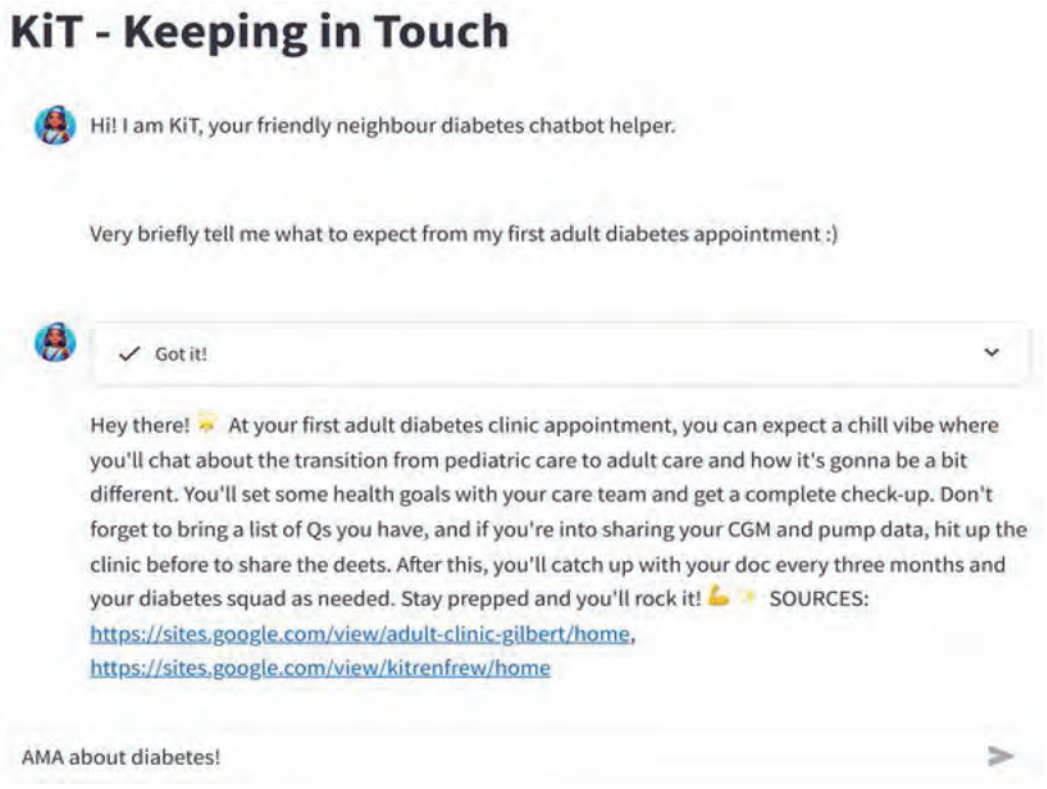
Introduction: Existing interventions to support transition to adult diabetes care are limited by their ability to engage young adults (YA), generalizability, and scalability.

Objectives: To develop a personalized and scalable digital intervention for YA as they transition from pediatric to adult type 1 diabetes (T1D) care to improve diabetes self-efficacy

Methods: We co-designed an automated, personalized text message-based intervention with YA and diabetes care professionals. We conducted 3 co-design sessions to define the core features and content of the intervention. After the initial design, artificial intelligence (AI) technology advanced rapidly, exposing the limitations of the intervention. We then used Large Language Models (e.g. GPT-4) to build a natural language chatbot to augment the intervention.

Results: Participants reported gaps in knowing how to navigate the adult health system and access relevant and trusted T1D self-care knowledge during the co-design sessions. The intervention therefore includes three core features: care coordination, education, and question and answer (Q&A) in English and French. Care coordination consists of appointment reminders and messages about what to expect in adult clinics. Education features provide customized delivery of T1D information based on responses to the Readiness Assessment of Emerging Adults with Type 1 Diabetes Diagnosed in Youth (READDY) tool and users' interests. The Q&A feature answers questions posed by the user from a database of



trusted online sources. The newer AI-chatbot also responds to users' queries about diabetes using natural language by drawing from the same trusted online sources as the text-message based feature (see figure).

Conclusions: This novel text message-based intervention addresses current gaps in transition care including support for care navigation and access to relevant and trusted T1D resources for YA. We are now testing the intervention in a multi-site randomized controlled trial.

P-25

Abstract Withdrawn

P-26

Huddle4parents: a proof-of-concept digital support intervention for parents of children ages 5 to 9 with type 1 diabetes

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Introduction: Parents assume the majority of management responsibilities for young children with T1D.

Objectives: We aimed to (1) examine the feasibility, acceptability and potential mental health impact of a digital peer support intervention involving videoconferencing and text-based support for parents of school aged children living with T1D; and (2) to analyze posts exchanged by parents on a peer support texting platform.

Methods: Eighteen parents were recruited for Huddle4Parents, a 4-month digital intervention that involved four synchronous group-based zoom sessions coupled with an asynchronous 24/7 peer support texting room. Primary outcomes were feasibility (i.e., ability to recruit n=20 parents and retain at least 75%) and acceptability (i.e., satisfaction ratings of

"good" to "very good."). Baseline and 4-month assessments also measured diabetes distress, quality of life, and perceived support. We also conducted a content analysis of text exchanges over the course of the intervention.

Results: Of the 15 parents who completed the intervention, all attended at least one of the four Huddles and posted at least one message on the 24/7 peer support room. Retention rate was 83%. Participants reported high satisfaction for both platforms, with 100% indicating that they would "definitely" or "probably yes" recommend both platforms to peer parents. They also rated the topics, facilitator, and overall Huddle as "good," "very good" or "excellent". No changes were observed for psychosocial endpoints. Of the 1,804 texts posted in the 24/7 peer support room, core support themes included (1) dealing with technology and devices, (2) seeking and providing emotional support, (3) exchanging tips and strategies, (4) managing T1D in the school setting.

Conclusions: Huddle4Parents, a digital T1D caregiver intervention that offers both synchronous and asynchronous support is feasible based on recruitment, participation, and attrition rates and acceptable as demonstrated by engagement and satisfaction ratings for the 24/7 peer support room.

P-27

Analyzing and monitoring cardiometabolic data in adolescent patients with type 1 diabetes in relation to non-alcoholic fatty liver disease using wearable technology in Mathura city, India

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Introduction: Non-alcoholic fatty liver disease (NAFLD) is a prevalent and burdensome condition globally, particularly affecting children and adolescents. Wearable sensor networks, coupled with smartphone applications, are being explored for their potential in monitoring and managing NAFLD in adolescents.

Objectives: This study aims to develop methods to analyze and monitor the intersection of cardiometabolic data with NAFLD using wearable technology, specifically the fire-boltt quantum watch, among school-going adolescents in Mathura city, India.

Methods: A total of 116 school-going adolescents diagnosed with NAFLD were included in the study, with an equal distribution of male and female participants. Participants wore wearable monitoring devices (fire-boltt quantum watch) on their wrists for 30 days, during which they also completed a questionnaire. Blood glucose levels were measured daily, and various parameters such as step count, sleep patterns, blood pressure, calorie expenditure, insulin dosage, and physical activity were monitored and recorded using the wearable device.

Results: The findings indicated that participants who engaged in more physical activity, such as walking, exhibited normal heart rates, higher calorie expenditure, better blood sugar control, and improved sleep quality compared to those with less physical activity. Following lifestyle modifications aimed at increasing physical activity among less active participants, their post-NAFLD outcomes improved, requiring fewer medication doses.

Conclusions: Monitoring daily activities using wearable devices, such as the fire-boltt quantum watch, can provide real-time data on NAFLD in adolescents. This approach enables technologists to understand medical aspects and clinicians to utilize technological processes, aiding in providing tailored assistance to adolescents with NAFLD.

P-28

The impact of wearable technology and geo-fencing devices on physiological data management and quality of life in adolescents with type 2 diabetes and obesity

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Introduction: Incorporating a novel wearable technology designed to continuously monitor mobility patterns among obese adolescents with type 2 diabetes, this study aims to harness the potential of such data transmission to the cloud, presenting a groundbreaking advancement for researchers and patients.

Objectives: The research endeavors to explore the efficacy of wearable devices, specifically the fire-boltt quantum watch, in conjunction with geo-fencing technology, in monitoring the daily life activities, health parameters, and quality of life among obese adolescents with type 2 diabetes in Gurugram city, India.

Methods: A cohort of 1050 obese adolescent patients with type 2 diabetes, evenly distributed across genders, wore the wearable monitoring devices and geo-fencing devices for 30 days, alongside completing a questionnaire to provide additional insights. Daily monitoring of blood pressure, blood glucose levels, step count, calorie expenditure, motion time, sleep patterns, calorie consumption, and heart rate will be recorded for analysis. The wearable bands will issue alert cues with sensing alerts if patients move out of the geo-fenced area, persisting until they return within the designated boundary.

Results: Preliminary findings reveal a notable normalization of heart rate ($p<0.05$), increased calorie expenditure, significant reductions in blood glucose and blood pressure levels ($p<0.01$), and a substantial increase in sleep duration among physically active obese patients with type 2 diabetes compared to their less active counterparts, as assessed by professional physiotherapists. Furthermore, lifestyle modifications among less physically active patients resulted in improved memory and reduced instances of wandering, necessitating lower medication doses.

Conclusions: In conclusion, this study underscores the potential of wearable devices to provide real-time assistive feedback to obese adolescents with type 2 diabetes, thereby fostering health awareness, promoting exercise, and inspiring further research endeavors.

P-29

Evaluation of Real-Time sensor data to assess correlations between heart rate and glucose change in young children with type 1 diabetes

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Introduction: Little is known about correlations between physical activity (PA) metrics such as heart rate (HR) and subsequent change in sensor glucose (ΔSG) in children with type 1 diabetes (T1D). Evaluating these relationships may facilitate informed decision-making in diabetes management and augment understanding of PA-associated glycemic outcomes.

Objectives: Using data from multi-sensor Kiddo wearable smart bands and continuous glucose monitors we analyzed correlations between HR and baseline sensor glucose (bSG) and ΔSG in children with T1D.

Methods: We retrospectively analyzed sensor data (44,605 time-delineated observations) from 29 children aged 3-8 years old (48.3% female; 72.4% non-Hispanic White; median age 5 [IQR: 5,8] years) in the care of a pediatric T1D clinic network in the Midwest USA. Using Spearman's rank-order (ρ) correlations, we assessed relationships between 10-minute mean (10MM) HR (calculated in 10-minute intervals) and bSG, and between 10MM HR and overall ΔSG calculated 20, 40, 60, 120, and 240 minutes later. In a sensitivity analysis we evaluated correlations between the same variables when 10MM HR was ≥110 beats per minute (BPM).

Results: We observed only weak correlations between 10MM HR and bSG and ΔSG (range of ρ values: ≥-0.03 and ≤0.04 at each time point). The sensitivity analysis revealed correlations generally in the same direction, but slightly weaker (ρ values: ≥-0.02 and ≤0.03 at each time point) than those observed in the primary analysis. We identified no difference in SG variability (coefficient of variation [CV%]) when HR was ≥110 vs. <110 BPM (CV median[IQR]:25.5 [18.2,33.3] vs. 25.4 [18.1,33.5], respectively; p=0.76).

Conclusions: We did not observe clinically significant correlations between HR and bSG or ΔSG. Additional research is needed to evaluate the cumulative impact of elevated HR and the impact of other PA metrics (e.g., step count) on glycemia in children with T1D.

P-30

Use, effectiveness, and patient satisfaction of T1D emergency telephone service (ETS): preliminary results

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Introduction: Although an Emergency Telephone Service (ETS) available 24 hours a day for T1D patients is recommended by ISPAD guidelines, there is not enough data related to the use and effectiveness of this service.

Objectives: The primary aim of the study is to evaluate the effectiveness of T1D Emergency Telephone Service in reducing the number of Emergency Department (ED) admissions. Secondary aims are to evaluate the satisfaction of patients using ETS and to analyze the type of requests to strengthen educational interventions.

Methods: In this observational study clinical and contact data of each call received on ETS will be recorded over a 1-year period. The total amount of calls and the correlation of requests with time and type of user will be analyzed. The satisfaction of patients using ETS will be evaluated with a validated questionnaire.

Results: The preliminary results at the 8 month-report: 804 contacts (approximately 4/day) of which 103 at night, 125 on weekends or holidays, 354 not clinical-related and 456 made by AHCL users. The most frequent types of clinical requests are hyperglycemia (11.7%) and general advice on T1D management (9.9%), as well as intercurrent illnesses (4.6%), breakage of the pump (4.7 %), hypoglycemia (3.3 %), skin reactions (2%), set failure (1.3%) and insulin administration errors (0.8%). Based on the type of clinical request we estimated that 49 to 200 patients would have gone to the ED if ETS was unavailable. Out of 100 patients who filled out the questionnaire showing a high satisfaction, 27 stated they would have gone to ED and 56 would have requested an adjunctive outpatient visit in case of ETS unavailability.

Conclusions: Preliminary results show a high use of ETS, which is expected to further increase alongside the use of AHCL. Given the cost of each ED admission avoided (estimated 350 to 1200 €/patient), we believe it is essential to make data available on the use and effectiveness of the service to better define and supply such an important service in technological era.

Wednesday, October 16th, 2024

Poster Corner 4: Pathogenesis and Etiology, Epidemiology

P-31

Amyloid dysfunction in children with type 1 diabetes

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Introduction: The beta cell mass changes dramatically in the presence of some pro-apoptotic beta cell defects. In type 1 diabetic patients, amyloid dysfunction may have this pathogenic effect. Toxic amylin oligomer can induce beta cell apoptosis and proamylin/amylin transfer contribute to the formation of amyloid deposits.

Objectives: The aim of the study was to assess the concentrations and interactions between proamylin (proIAPP) and amylin (IAPP) in patients with T1D and in the control group.

Methods: The study included patients with T1D (n=156) in age 6 - 18 years and age matched healthy controls (n=30). Concentrations of proIAPP and IAPP were measured in sera using immunoenzymatic tests.

Results: Concentrations of tested markers were statistically significantly higher in the T1D group compared to the control group (155 vs. 57.6 and 75.0 vs. 33.5 pg/mL for proIAPP and IAPP, respectively). There was no difference in proIAPP (99.6 and 92.6 pg/mL, p= 0.513) and IAPP (60.1 and 65.0 pg/mL, p= 0.697) concentration between children with newly diagnosed T1D and children with T1D treated for at least 3 years. The ratio of the hormone precursor to its mature form (proIAPP/IAPP) was statistically significantly higher in the group of T1D patients compared to control group (2.97 ± 13.4 pg/ml vs. 1.67 ± 0.37 pg/ml).

Conclusions: We believe that the elevated levels of proamylin and amylin found in type 1 diabetes may be a marker of beta cell dysfunction. It is advisable to continue this research.

P-32

Type 1 diabetes phenotypes: is there any biomarker to predict disease progression?

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Introduction: Type 1 Diabetes (T1D) is a heterogeneous disease, with distinct presentations, insulin needs and glycemic control.

Objectives: We aimed to describe T1D clinical characteristics and correlate them with pancreatic antibodies (Abs) and its' evolution along time.

Methods: A cross-sectional study was done at a Pediatric Hospital, from 10/05/2023-13/10/2023. T1D under functional insulin therapy, without chronic complications/medications/other AI disease. Demographics, clinical characteristics, pancreatic Abs, insulin and C-peptide were collected.

Results: 57 T1D were included, 53% males, 46% prepubertal, mean age 9.68±3.07 years(y), 4.76±1.27y at diagnosis, 4.93±2.0y T1D duration, weight 0.53±0.87SD and BMI 0.23±0.98SD. At diagnosis, 23/57 had Diabetic KetoAcidosis (DKA) (9 mild, 8 moderate, 6 severe). The number of positive-Abs was correlated with DKA (X^2=0.265,p=0.049), which severity was associated with higher A1c (r=0.300,p=0.006), lower titers of insulin (r=-0.335,p=0.015) and C-peptide (r=-0.354,p=0.005). AAI titer had a negative correlation with age at diagnosis (r=0.503,p<0.001), C-peptide (r=-0.416,p<0.001) and A1c (r=0.224,p<0.001). IA-A2 and GAD were associated with lower A1c (r=-0.444,p=0.035; r=-0.254,p=0.043). At last follow-up, insulin daily-dose (IDD) was 0.80±0.15U/kg/day, glucose 178±26mg/dL, variability coeficient 39±5%, Time in Range (TIR) 54±16%, A1c 7.3±0.8%. Higher BMI was associated with increased A1c (K=0.267,p=0.004). The number of positive Abs and C-peptide declined with time (r=-0.267,p=0.007; r=-0.509,p<0.001), except AAI (r=0.217, p=0.041). Longer T1D duration was associated with higher IDD (r=0.344,p=0.009).

Conclusions: Auto-Abs showed a weak correlation with DKA at diagnosis. IA-A2 and GAD were associated with lower A1c; AAI with younger age, lower C-peptide and insulin. Abs declined over time, but AAI increased. Additional measures are necessary to further understand and predict T1D phenotypes, implement personalyzed diabetes management and to improve lifelong expectancy.

P-33

Profil of vitamin D in children patients with newly diagnosed type 1 diabetes mellitus

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Introduction: Vitamin D (VD) is commonly recognized as necessary for phosphocalcic metabolism, but also in either glucose homeostasis and insulin sensitivity. VD deficiency is defined by a low serum 25 hydroxy vitamin D (25-OHD) concentration: < 30 ng/ml.

Objectives: We aimed to evaluate the relationship between serum 25-OHD concentration and newly diagnosed type 1 diabetic children

Methods: This is a retrospective, descriptive study including a total of 300 children and adolescents newly diagnosed T1DM, followed in the Department of Endocrinology-Diabetology and Nutrition,From 2014 to 2023. All the patients in our study received a clinical examination, biological evaluation included HbA1c and serum 25-OHD concentration. Statistical analysis was performed using SPSS version 21.

Results: The mean age of our study group was 10 ± 6 years old, with a sex ratio (M/F): 0,97. The mean of HbA1c was 11±6 %. The serum 25-OHD concentration was 19±16 ng/ml. Ninety-five percent of the patients had VD deficiency: 70% were insufficient (10-30 ng/ml) and 30 % were in severe deficiency (<10 ng/ml). Thirty-seven percent of the patients were in ketoacidosis on admission, and 94% were vitamin D deficient.

However, a statistically significant was found between the occurrence of ketoacidosis at diagnosis of T1DM and lower serum 25 OHD concentration. All patients in our group with VD deficiency were treated. No macro-and-microvascular complications were detected. The insulin therapy, education, and vitamin D supplementation had a positive impact on glycemic control: The mean HbA1c after 3 months decreased to 9±2 %.

Conclusions: The vitamin D participates not only in calcium metabolism but has been proven its impact on metabolic control in type 1 diabetic patients.

P-34

Clinical characteristics in autoantibody negative children at T1D diagnosis in Sweden

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Introduction: The aetiology and pathogenesis of type 1 diabetes (T1D) are still partly unknown, and recent findings support the notion of disease heterogeneity. Autoantibodies have long been recognized as biomarkers of the trigger of islet autoimmunity, but their role in the pathogenesis is not fully understood.

Objectives: The aim of this study was to characterize patients (<18 years) who developed T1D with (Ab+) and without (Ab-) autoantibodies by analysing clinical differences at the time of clinical diagnosis.

Methods: Data were collected at diagnosis of T1D in 3,647 children (<18 years) from the national Better Diabetes Diagnosis (BDD) cohort in Sweden and compared for Ab+ and Ab-. Variables at diagnosis included sex, age, family history of T1D or type 2 diabetes (T2D) among parents and grandparents, level of C-peptide, presence of diabetes ketoacidosis (DKA), Body Mass Index (BMI), Human Leukocyte Antigens (HLA) and HbA1c. Children with other types of diabetes than T1D were excluded.

Results: In total 65.6% of Ab- children were males compared with 55.1% among Ab+ children (p=0.001). Ab- children had higher C-peptide (0.38 vs 0.28 nmol/L, p<0.001), had less often high-risk HLA (64% vs 73%, p<0.01) and DKA (9.6% vs 17.1%, p<0.01) and had a higher BMI (17.8 vs 17.2 kg/m^2, p=0.02) than the Ab+ children. No differences were found for HbA1c, age or family history of neither T1D nor T2D.

Conclusions: Differences at onset of T1D were found between the Ab+ and Ab- children. These results may suggest differences in the pathogenesis between different subtypes even when the preceding pattern of islet autoantibody positivity is not known.

P-35

Is there an association between ambient temperature and diabetic ketoacidosis at type 1 diabetes onset in children and adolescents?

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Introduction: Environmental studies have shown an association between extreme temperatures and diabetes-related hospital admissions.

Objectives: We investigated the potential association between daily mean temperature and diabetic ketoacidosis (DKA) at type 1 diabetes onset in children and adolescents in Germany.

Methods: Children and adolescents ≤18 years of age at type 1 diabetes onset documented in German centers of the diabetes prospective follow-up registry (DPV) between 2020 and 2023 were studied. Meteorological data from 78 measurement stations between 2020 and 2023 were linked to individuals based on their five-digit postcode areas of residence. Mean daily temperature was categorized into four quartiles (Q1: <5 °C, Q2: 5-<9.9 °C, Q3: 9.9-<15.8 °C, Q4: ≥15.8 °C) to account for the non-linear relationship between temperature and acute complications. Odds ratios from logistic regression models were implemented to compare the chance of DKA at onset on days with high to low temperature quartile groups (Q4 vs Q1), adjusting for sex, age at onset, migratory background and weekday. In addition, the analysis was stratified by age at onset groups <6 years, 6-<12 years and 12-18 years.

Results: 14,100 children and adolescents with type 1 diabetes onset in 2020-2023 were included (55.8% males, mean age at onset 9.2 years (SD 4.4), daily mean temperature 10.2 °C (SD 7.0)). The chance of DKA at onset was higher on days with temperatures ≥15.8 °C compared to days with temperatures <5°C (OR 1.15 (95% confidence interval: 1.04-1.27), frequency 32.0% (30.5-33.6) vs 29.1% (27.6-30.7)). The association was strongest in children <6 years of age (temperature Q4 vs Q1: OR 1.30 (1.06-1.59)).

Conclusions: Results of the DPV registry show a higher chance of DKA at childhood type 1 diabetes onset with high compared to low daily mean temperatures, especially in children <6 years of age. These results may be useful to guide preventive actions for DKA at type 1 diabetes onset during warm periods.

P-36

Prevalence of retinopathy in people living with type 1 diabetes 15 years after diagnosis as child or adolescent by decade: a cross-sectional, real-world observational study

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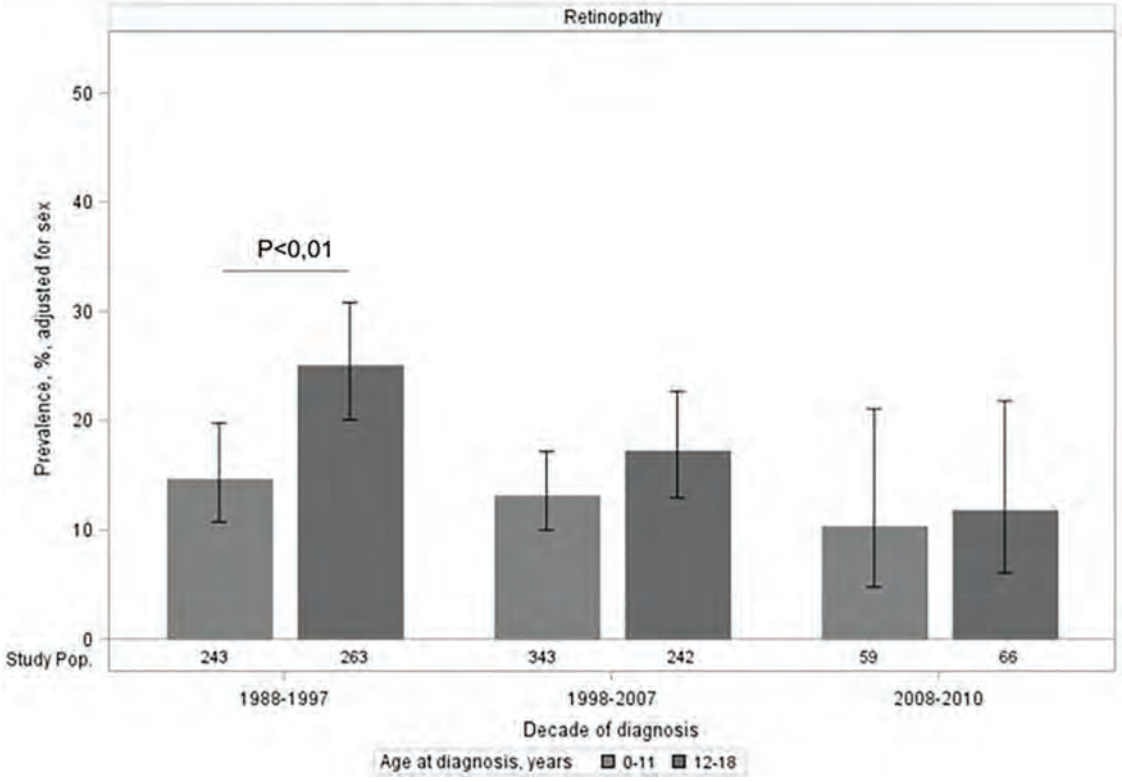
Introduction: New insulin analogs, new glucose lowering therapies, advanced insulin pump systems and glucose measurement methods have changed diabetes care over the past decades.

Objectives: The aim of this study was to investigate the prevalence of retinopathy (RET) in people living with type 1 diabetes (T1D) ±15 years after diagnosis as child or adolescent, and to investigate the impact of the decade of diagnosis using the data from the national Initiative for Quality improvement and Epidemiology in Diabetes (IQED).

Methods: We studied the prevalence of RET 15 years after diagnosis (range 12-17 years) in people with T1D who were diagnosed in three decades: 1988-1997, 1998-2007 and 2008-2010. All were younger than 19 years at clinical diagnosis. The prevalence of RET (based on the patient's most recently available data, non-proliferative retinopathy included) was analyzed using Generalized Estimating Equations. Model predictions are presented with their CI. Statistical comparisons were adjusted using the Tukey method.

Figure. Prevalence of retinopathy by age at diagnosis, per decade of diagnosis



Results: Median [IQR] age at read-out was 27 [23-30] years in the 1988-1997 group, 26 [23-29] years in the 1998-2007 group and 25 [22-28] years in the 2008-2010 group. Median age at diagnosis [IQR] was 12 [9-15] years in the 1988-1997 group, 11 [8-14] years in the 1998-2007 group and 13 [9-16] years in the 2008-2010 group. The distribution of men and women was comparable. Prevalence of RET, adjusted for age at diagnosis and sex, was 19 [16-22] % in the 1988-1997 group, and decreased to 15 [12-18] % in the 1998-2007 group and 10 [6-16] % ($p<0.05$) in the 2008-2010 group. The prevalence of RET by age at diagnosis is shown in Figure.

Conclusions: Decade of diagnosis impacted the prevalence of RET in people living with T1D 15 years after diagnosis, with a decrease in prevalence for the people diagnosed after 1998 and especially in those diagnosed between the age of 12-18 years.

P-37

Overweight and obesity in children and adolescents with type 1 diabetes in Belgium: a 13-year period observational real-world study

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Introduction: Childhood obesity and overweight have become a global issue that needs to be tackled effectively.

Objectives: We investigated how overweight and obesity evolved between 2008-2021 in children with type 1 diabetes (T1D) compared to the general population. We studied differences in sociodemographic and clinical characteristics between normal weight, overweight and obese children with T1D.

Methods: Data were cross-sectionally collected from all Belgian pediatric diabetes centers (N=16). Youth (<19 years) were classified as having normal weight, overweight or obesity using the Cole-IOTF classification. Data from the general population (1997-2018) were obtained from the nation Health Information Survey* and comparison with youth with T1D was performed with Chi-square. Children characteristics are shown in table.

Results: From 2008 to 2021 the prevalence of overweight (17.2% vs 21.3%, p<0.0001) and obesity (5.7% vs 6.8%, p=0.0048) in youth with T1D increased. In 2018, youth with T1D showed a higher prevalence of overweight compared to their non-diabetic pears (21.2% vs. 13.4%, p<0.0001), although the rates of obesity were similar (5.9% vs. 7.3%). Girls, children with 2 parents of non-Caucasian ethnicity and older children had a higher prevalence of overweight and obesity. Youth with overweight or obesity had higher HbA1c, increased cardiovascular risks and were less treated with insulin pump compared to normal weight children with T1D. Youth with obesity presented more psychosocial distress than those with normal weight or overweight.

Conclusions: There is a continuous increase over the past 13 years of overweight and obesity in youth with T1D, a trend also noticed in the general population. Specific subpopulations presented additional elevated prevalence of overweight and obesity. This higher prevalence of overweight and obesity increases the risk of long-term complications, demonstrating the need for additional weight management interventions in this population.

Table 1 Characteristics of Belgian children and adolescents with T1D in 2021, stratified by weight categories[§]

	Normal weight (N = 2520)	Overweight (N = 777)	Obese (N = 249)	Adjustement for
Male sex, n (%)	1400 (55.8%)	331 (42.9%) £	115 (46.6%) £	
Age, years, median [IQR]	13.5 [10.3-16.0]	14.0 [11.0-16.2] £	14.8 [12.0-16.6] £,$	
At least one parent of Caucasian ethnicity, n/N (%)	1797/2477 (72.5%)	456/767 (59.4%) £	124/245 (50.6%) £	
Mean HbA1c • mmol/mol [± SD] • % [± SD]	59 [±9] 7.5 [± 1.3]	62 [±9] £ 7.8 [± 1.3] £	64 [±9] £ 8.0 [± 1.3] £	Age, sex, diabetes duration
Presence of psychosocial distress n/N (%),**	655/2509 (26.11%)	237/772 (30.7%)	96/247 (38.9%) £,$	Age, sex, diabetes duration
Insulin scheme, n/N (%):				
• ≤2 injections per day	49/2463 (1.9%)	7/757 (0.9%) £	9/243 (3.7%) £,$	Age, sex, diabetes duration
• 3 injections per day	248/2463 (10.1%)	115/757 (15.2%) £	43/243 (17.7%) £	
• ≥4 per day (basal-bolus regimen)	1400/2463 (56.8%)	439/757 (58.0%)	150/243 (61.7%)	
• Insulin pump	766/2463 (31.1%)	196/757 (25.9%) £	41/243 (16.9%) £	
Cardiovascular risks *:**				
• No risk, n/N (%)	1940/2509 (77.3%)	514/772 (66.6%) £	118/247 (47.8%) £,$	Age, sex, diabetes duration
• One risk present, n/N (%)	531/2509 (21.2%)	219/772 (28.4%) £	100/247 (40.5%) £,$	
• Two risks present, n/N (%)	38/2509 (1.5%)	39/772 (5.1%) £	29/248 (11.7%) £	

£ $p < 0.05$ vs. Normal BMI
$ $p < 0.05$ vs. Overweight
§ Children were classified as having normal BMI, overweight or obesity according to the age- and sex-specific BMI thresholds proposed by Cole et al (Cole IOTF).
* Health Interview Survey (HIS) is a national survey launched in 1997 and repeated every 4-5 years. The HIS collects information on a wide range of health topics and is coordinated by Sciensano (Institute of public Health of Belgium).
** Presence of psychosocial distress was determined by the diabetes team, which have a holistic view of the patient state (no validated tool).
*** Cardiovascular risks are defined as: having dyslipidemia (the child is on lipid lowering medication or low density lipoprotein ≥ 130 mg/dL or HDL ≤ 40 mg/dL or triglycerides ≥ 150 mg/dL) or hypertension (≥95th percentile for age, sex, and height for children between 2-18 years); n = number of events; N= Only known for the indicated study population; IQR = interquartile range; SD = standard deviation.
The evolution of weight over time and its association with clinical characteristics were analyzed using Generalized Estimating Equations, adjusted as indicated. Statistical significance was adjusted using Tukey.

P-38

Not all diabetic ketoacidosis in infant is type 1: a case report permanent neonatal diabetes

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Introduction: Neonatal diabetes is a monogenic type of diabetes mellitus. It arises at the first 6 months of age and can be classified as permanent or transient. There are limited cases of neonates with DKA who have heterozygous mutations in *INS* and PKHD1 genes, especially in Saudi Arabia. We present a case of neonatal diabetes with diabetic ketoacidosis (DKA) born to consanguineous parents in Saudi Arabia. This study aims to highlight the importance of the genetic mutations associated with neonatal diabetes and identify the clinical manifestation features of neonatal diabetes.

Objectives: Neonatal diabetes is a monogenic type of diabetes mellitus. It arises at the first 6 months of age and can be classified as permanent or transient. There are limited cases of neonates with DKA who have heterozygous mutations in *INS* and PKHD1 genes, especially in Saudi Arabia. We present a case of neonatal diabetes with diabetic ketoacidosis (DKA) born to consanguineous parents in Saudi Arabia. This study aims to highlight the importance of the genetic mutations associated with neonatal diabetes and identify the clinical manifestation features of neonatal diabetes.

Methods: Case report study

Results: WES Showed *INS* and *PKHD1*gene mutation

Conclusions: Genetic testing for neonates soon after birth is suggested for the early detection and classification of neonatal diabetes, especially among children with a family history of neonatal diabetes.

P-39

Geographic information system mapping and relationship with glycemic control in type 1 diabetes in western India

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Introduction: Type 1 Diabetes(T1D) is an autoimmune disorder which also involves environmental triggers. Geographic information system(GIS) mapping may provide insights into the distribution/associations of T1D.

Objectives:

- To explore the geographic mapping of children and youth with T1D
- To compare glycemic control and co-morbidities in children/youth with T1D based on geographic mapping(Urban v/s Peri-urban) and distance from place of residence of the individual to our tertiary care unit

Methods: Design: Cross-sectional; Participants: 402 children and youth(187 boys) with T1D. Place of residence(coordinates) of each were geocoded in GIS and study population was divided into two groups, Urban and Peri-urban using ArcGIS Pro. Geographic coordinates were linked to sociodemographic and biochemical data and spatial regression was performed. Association between glycemic control and distance to our unit was studied.

Results: Mean age was 13.2±4.7 years;196 children/youth were Urban, 206 Peri-urban(**Table 1).** There was significant difference in HbA1c between groups(p=0.004) with poorer glycemic control in the Peri-Urban**(Figure 1)** and higher prevalence of hypovitaminosis D and hypothyroidism in Urban areas. There was significant correlation between glycemic control(HbA1c) and distance to our tertiary care unit(r=0.103, p=0.039). Individuals with an HbA1c ≥9.5 were residing significantly farther away from our unit(58.9±73.8 km) as compared to those with HbA1c <9.5 (44.5±62.1 km)(p<0.05).

Conclusions: Children and youth with T1D when grouped using GIS mapping had differences in glycemic control and comorbidities;peri-urban participants and those residing further away from our unit had poorer glycemic control. Future efforts could be aimed at identifying centers equipped in managing T1D that are in close vicinity for optimizing glycemic control.

Table 1. Comparison of Urban/Peri-Urban population

Parameter	Urban (n=196)	Peri-urban (n=206)	Level of Significance (p-value)
Age (years)	13.2 ± 4.7	13.2 ± 4.7	0.94
Gender (Male)	94 (48%)	93 (45.1%)	0.56
Disease duration (years)	5.6 ± 3.9	6.1 ± 3.9	0.80
Insulin requirement (IU/kg/day)	1.1 ± 0.3	1.1 ± 0.4	0.48
HbA1c(%)	9.9 ± 1.9	10.5 ± 2.5	**0.004**
Vitamin D sufficiency	78 (39.8%)	109 (52.9%)	**0.008**
Nephropathy	21 (10.7%)	17 (8.3%)	0.41
Dyslipidemia	112 (57.1%)	131 (63.6%)	0.18
Hypothyroidism	29 (14.8%)	15 (7.3%)	**0.016**

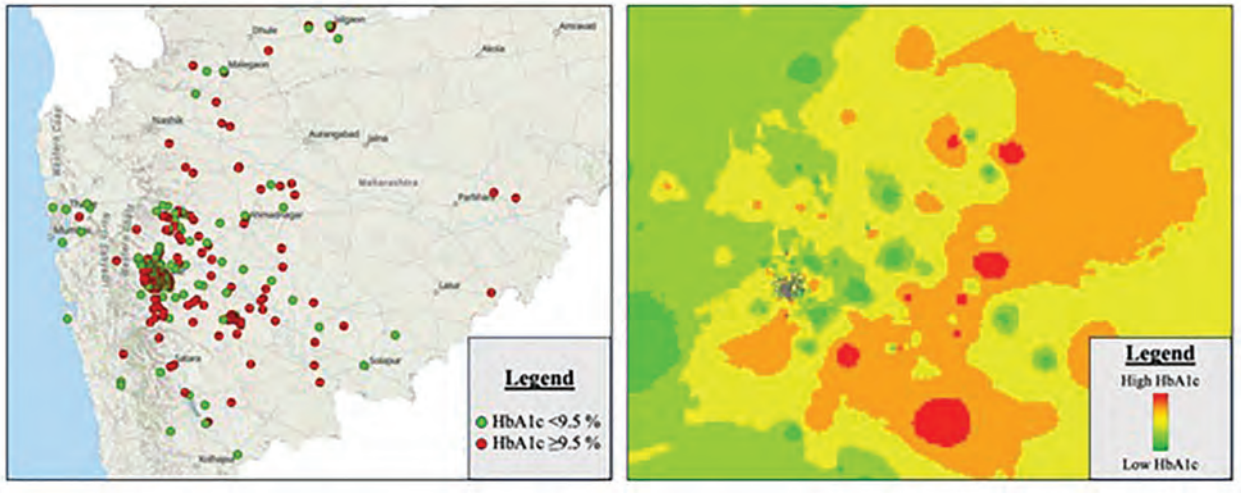

Figure 1. GIS mapping based on HbA1c level

P-40

High frequency of diabetic ketoacidosis in polish children with new-onset type 1 diabetes over the years 2019-2022

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Introduction: Many countries, Poland included, experienced an increased frequency of diabetic ketoacidosis (DKA) related to new-onset type 1 diabetes (T1D) during the COVID-19 pandemic, however, data on the follow-up periods are scarce.

Objectives: To assess the frequency of DKA in new-onset T1D in Poland during the follow-up of COVID-19 pandemic

Methods: All Polish pediatric diabetes reference centres were invited to participate in a multicentre retrospective study. We listed all new-onset T1D cases diagnosed between 2019-2022, together with demographics, date and criteria of T1D diagnosis, blood gases at admission, blood or urine ketones. We excluded duplicated records, patients older than 18 y.o., those without Polish citizenship or living outside regions with full reporting. Afterwards, the analysis included only those with T1D diagnosed based on random blood glucose and symptoms, and those with available blood gases data. DKA was defined following either ISPAD-2018 (pH<7.3 or HCO3<15) or 2022 criteria (pH<7.3 or HCO3<18).

Results: We received records for N=5800 new-onset T1D cases from 14 centres encompassing 13 out of 16 of Poland`s macroregions. The analysis included N=4999 (86.2%) diagnosed based on symptoms and random glucose with complete DKA-defining data. Among those, N=2390 (47.8%) and N=2777 (55.6%) presented with DKA according to ISPAD-2018/2022 criteria. DKA frequency changed significantly over the years (ISPAD-2018/2020 definition - 2019:41.3%/48.7%, 2020:52.3%/60.5%, 2021: 49.8%/57.5%, 2022:46.6%/54.2%, p<0.0001), with decrease between 2020 and 2022 significant in post-hoc comparison (-5.7%, p=0.0041/-6.4%, p=0.0013). Region-wise, mean DKA frequency did not change significantly between 2020 and 2022 (ISPAD-2018/2022: -4.1±12.6%/4.9±11.8%, p=0.2626/p=0.1557).

Conclusions: DKA frequency in children with new-onset T1D decreased slightly in 2022 compared with 2020, however, it remains alarmingly high and demands action targeting social awareness and/or healthcare organization.

Wednesday, October 16th, 2024

Poster Corner 5: Psychological and Psychosocial aspects of diabetes

P-41

Effects of neighborhood characteristics on the health of adolescents and young adults with type 1 diabetes

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Introduction: While risks and assets at multiple levels affect the health of adolescents and young adults (AYAs) with T1D, most studies have assessed such factors at the level of the individual, family or health care system. Recent calls for more focus on health equity in T1D highlight the need to test the effects of community-level factors as well.

Objectives: The study aim was to use social-ecological theory to test associations between individual risk factors (diabetes distress and self-efficacy for diabetes care), health system risk factors (communication with diabetes care providers), community risk

factors (neighborhood violence) and health outcomes (diabetes management, DM, and glycemic control) in a diverse sample of AYAs with T1D.

Methods: 85 participants were recruited from across the US through medical clinics, social media and diabetes non-profit organizations. Social-ecological variables and DM were measured by questionnaire self-report. HbA1c was measured by laboratory assay. 69% of participants were female, and 53% were from minoritized backgrounds. Mean HbA1c =9.7 % and 52% used insulin pumps.

Results: Hierarchical linear regression tested the effects of socio-ecological variables on health. Covariates were age and insulin delivery method. The final model predicting DM accounted for 20% of the variance [$F(6, 84)=3.2$, $p=.008$]. Only diabetes distress ($\beta=.24$ $p=.05$) was significantly associated with suboptimal DM. The final model predicting HbA1c accounted for 35% of the variance [$F(6, 84)=7.0$, $p=.001$]. Insulin pump use ($\beta=.41$ $p=.001$), younger age ($\beta=.28$ $p=.005$) and lower neighborhood violence ($\beta=.23$ $p=.02$) were each significantly associated with lower HbA1c.

Conclusions: While individual level risk factors were associated with diabetes management, both individual and community-level risk factors were associated with glycemic control. Clinic-based screening of AYAs with T1D to identify and address the needs of those at highest risk based on neighborhood characteristics could improve diabetes health.

P-42

Title: promoting child-centred psychosocial care for young children (aged 3-7 years) with type 1 diabetes: development of a play-based communication tool for clinical practice

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Introduction: Traditional communication approaches may not always be suitable for engaging young children, especially in the context of diabetes management. Effective child-centred communication may encourage young children's participation in diabetes consultations and facilitate their ability to express their perspectives.

Objectives: To develop and adapt a narrative and play-based communication tool to support young children's participation in diabetes consultations and enhance the delivery of child-centred care.

Methods: Building upon our own previously published theoretical and empirical knowledge, the study employed a Design-Based Research approach (DBR) to gain insights into the needs, preferences, and experiences of the target group in order to develop tangible tools for clinical practice. Participatory workshops were conducted in two diabetes centres in Denmark with young children ($n=6$), their families (mothers $n=10$ and fathers $n=8$), and healthcare professionals ($n=11$). Subsequently, the prototype tools were tested and adapted with young children ($n=6$) in a clinical setting.

Results: A narrative and play-based toolbox was designed, comprising specific play-based scenarios relating to 1) young children's everyday life, 2) experience of type 1 diabetes management and 3) visits to the outpatient clinic. These play-based scenarios utilize a story-stem method that allow young children to 'play out' their experiences and communicate on their terms. Preliminary qualitative analysis indicates that through play and storytelling, the tools create a space for active participation, effectively engaging young children in consultations and facilitating their ability to express their perspectives.

Conclusions: The developed narrative and play-based communication tool demonstrate positive results in promoting child-centred psychosocial care for young children with Type 1 diabetes.

P-43

Abstract Withdrawn

P-44

Automated insulin delivery (AID) systems in the real world of pediatric care: adolescents' and parents' reported outcomes after one year of use (AID-a study)

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Introduction: The single-center longitudinal study (AID-A) evaluates changes in daily life and diabetes distress experienced by adolescents and parents of children/teens after one year of AID system use.

Objectives: Parents of 111 children/teens (46% female, mean age: 12.1±3.8 years; mean duration of diabetes: 6.1±4.0 years) and 63 teens (> 12 years) were invited by mail to complete a questionnaire on their experiences with an AID system.

Methods: The questionnaire consisted of established diabetes-related distress instruments (P-PAID-C parents of children; P-PAID-T parents of teens, PAID-T teens) and the AID-A-change questionnaire. This consists of 16 items including the parents' as well as the child's/teen's sleep, stress, fear of hypoglycemia, and others from the perspective of parents or teen using a 5-point Likert scale (-2 =negative to +2 =positive).

Results: The questionnaires were returned by 72 parents (65%) and 43 teens (68%). In the AID-A-questionnaire (scale of sum score: -32 (negative) to +32 (positive)), teens and parents reported considerable improvements in everyday life for themselves and their parents or children/teens (mean sum score parents: 14.4±7.2; teens: 10.4±5.4). Sleep, stress and hypoglycemic anxiety had improved most and more pronounced in parents than in children/teens. The mean sum score of PAID-T (34.6±23.0) and of parents of teens (44.3±14.5) were in the range of a representative German sample (PAID-T 34.05±13.86; P-PAID-T 45.9±15.7). The cut-off for severe distress was reached by 11 of 43 parents of teens. The mean sum score of P-PAID-C (42.8±13.7) was lower compared to the representative German sample of parents of children with T1D (51.1±15.3). While the main stress factors for adolescents were stigmatization and integration, for parents it was the emotional worry about their child's future.

Conclusions: AID system use reduces the everyday burden on parents in particular, but also on children and teens. However, emotional and social challenges remain and cannot be solved technically alone.

P-45

Comparing completion and positivity rates for health-related social needs (HRSN) between individuals with type 1 diabetes (T1D) who attended and missed standard of care diabetes clinic appointments

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Introduction: Screening for and addressing HRSN for individuals with diabetes is recommended by the American Diabetes Association (ADA). Unmet social needs may lead to missed appointments.

Objectives: Our objective was to compare HRSN screening completion and positivity rates between individuals with T1D who attend and miss their diabetes clinic visits.

Methods: We implemented HRSN screening for all individuals with T1D scheduled for a standard of care diabetes appointment at a Midwestern diabetes center. Screenings were delivered by text or email using a secure REDCap link 5 days prior to clinic appointments. The primary outcomes were HRSN screening completion and positivity rates between those who attended and missed their clinic appointment; groups were compared using Wilcoxon signed-rank tests with $p<0.05$ as the significance threshold.

Results: Between 9/2021 and 2/2024, there were 17,123 T1D visits attended and 2,015 T1D missed appointments. Individuals attending their appointment had higher HRSN screening completion rates compared to those missing their appointment [Median (IQR): 63% (59%,69%) vs. 9.6% (5.9%,12.8%); $p<0.0001$]. For those who completed HRSN screening, individuals attending their appointment had lower positive rate for any social needs compared to those missing appointments [10.1% (9.0%,11.2%) vs. 20% (10%,33%); $p=0.0019$]; no differences in positivity rate for food or transportation insecurity were found (Table 1).

Table 1. HRSN screening completion and positivity rates for individuals who attend and miss their diabetes clinic visit.

	%Attended Appointment	%Missed Appointment	p-value
HRSN taken[a)]	63.2 (59.1,68.5)	9.6 (5.9,12.8)	<0.0001
Positive for any social needs[b)]	10.1 (9.0,11.2)	20 (10,33.3)	0.0019
Positive for food insecurity[b)]	6.9 (5.9,7.8)	10 (0,22.2)	0.0667
Positive for transportation insecurity[b)]	1.3 (1.0,1.9)	0 (0,0)	0.3818

Median and Interquartile Range (IQR) provided.

a) Denominator is for those who attended (n=17,123) or missed (n=2,015) T1D visit, respectively.

b) Denominator is for those who took the HRSN and attended (n=10,622) or missed (n=198) T1D visit, respectively.

Conclusions: Individuals missing routine clinic appointments are nearly twice as likely to have an unmet health-related social need. While many clinics deliver HRSN screenings at the point of care, our findings indicate it is important to deliver screenings by methods that can recurrently reach all individuals, including those who miss clinical visits.

P-47

The promoting resilience in stress management for parents (PRISM-P) intervention: a pilot randomised controlled trial in parents of young children with type 1 diabetes

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Introduction: Parents of children with type 1 diabetes (T1D) are vulnerable to experiencing elevated stress due to their responsibilities as caregivers. These stressors are particularly relevant to parents of young children who require significant adult supervision to manage their condition. Despite this, there are limited interventions designed to enhance resilience in this population of parents.

Objectives: This pilot randomised controlled trial aimed to examine the acceptability, appropriateness, and feasibility of the Promoting Resilience in Stress Management for Parents (PRISM-P) intervention in parents of young children with T1D.

Methods: Parents of children (aged 11 years and younger) with T1D participated in this study (N = 30). Participants were randomly assigned (1:1) to a waitlist control or intervention group, with the intervention group participating in three one-on-one sessions via telemedicine with a trained coach. Intervention acceptability and appropriateness were assessed through a survey and semi-structured interview. Feasibility was defined by a minimum study enrolment rate of 50% and a minimum retention rate of 70%. Validated instruments to assess psychosocial wellbeing were completed at baseline, 6 weeks post-baseline, and 12 weeks post-baseline as secondary outcomes.

Results: The enrolment rate for the study was 27% and the retention rate was 87%. Mixed methods findings provided support for the acceptability and appropriateness of PRISM-P, and there were improvements in psychosocial outcomes across timepoints.

Conclusions: PRISM-P was deemed an acceptable and appropriate intervention. Despite initially modest enrolment rates, participant completion and intervention satisfaction were high. Further, changes in psychosocial outcomes provided preliminary support for the efficacy of PRISM-P. To improve enrolment rates, future large-scale trials should employ additional recruitment strategies.

P-48

Social needs, insulin access, and gender is linked to diabetes self-management via diabetes distress: a cross-sectional mediation analysis

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Introduction: Limited evidence exists to support the hypothesis that the relationship between structural and contextual factors and diabetes self-management is mediated by poor psychosocial health.

Objectives: To analyze if the association between unmet social needs, insulin accessibility issues, and gender on diabetes self-management (DSM) among young adults with type 1 diabetes is mediated by diabetes distress (DD) and diabetes empowerment (DE).

Methods: Using baseline data from the Resilient Empowered Active Living Telehealth (REAL-T) study (N=198; mean age 24.4 ± 3.7, A1c 9.2 ± 1.6, 61.1% female, 4% non-binary, 40.9% Hispanic/Latinx, 44.5% Caucasian/white, 48.5% low socioeconomic status), we examined relationships among structural (unmet social needs and insulin accessibility issues), contextual (gender and ethnicity), and psychosocial (DD, DE, and autonomous motivation) factors on DSM. After specifying mediation models, we tested the direct and indirect effects of significant structural and contextual factors on DSM through psychosocial factors.

Results: Greater unmet social needs and issues with insulin accessibility, and female or other gender versus male gender, were associated with poorer DSM (all $p<0.05$). Lower DD and greater DE were also associated with better DSM ($p<0.05$). After accounting for DS, we did not observe significant direct effects of unmet social needs, insulin accessibility issues, and gender on DSM. However, unmet social needs had a direct effect on DSM when including DE in the multivariable regression ($p=.002$). Mediation results indicated that DD significantly mediated all proposed pathways and DE mediated the association between unmet social needs and DSM.

Conclusions: The proposed model indicates that structural and contextual factors affect diabetes self-management through psychosocial pathways. Increased tailored psychosocial support and policy adjustments are crucial to address the needs of groups impacted by these factors.

P-49

Abstract Withdrawn

P-50

Elevated sleep disturbances and fear of nighttime hypoglycemia in families of youth with type 1 diabetes

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Introduction: Caregivers of youth with type 1 diabetes (T1D) report significant worry their child will experience hypoglycemia at night. Qualitative data suggest that caregivers who fear nighttime hypoglycemia also experience lower sleep quality, greater sleep disruptions, and symptoms of sleep deprivation. Our research group recently created new questionnaire items that comprehensively assess fears of *nighttime* hypoglycemia (FoNH) in caregivers of youth with T1D.

Objectives: The current study examined differences between FoNH scores for caregivers who are above and below the cut-off for clinically elevated sleep disturbances.

Methods: We recruited 165 caregivers of youth with T1D, and 123 completed all study measures. We measured sleep quality via the Pittsburg Sleep Quality Scale (PSQS) and FoNH via the Nighttime Worry scale we recently added to the Hypoglycemia Fear Survey for Parents. These items demonstrate strong reliability and validity. A cut-off score of 5 on the PSQS suggests clinically elevated sleep disturbances. We conducted mean comparisons in SPSS.

Results: Caregivers were mainly mothers (89%) with an average age of 41.8 $\pm$ 6.5 years. Their youth had an average age of 13.4 $\pm$ 2.6 years, an average HbA1c of 7.8 $\pm$ 1.4%, and 49% were female. The average PSQS score was 7.6 $\pm$ 4.0 (range 1-17), with 67% of caregivers above the cut-off for clinically elevated sleep disturbances. The average Nighttime Worry score was 49.7 $\pm$ 13.8 (range 24-80). Caregivers with PSQS scores above the cut-off for elevated sleep disturbances reported significantly higher FoNH (M= 53.5) than caregivers with PSQS scores below the cut-off (M= 42.5), $t(121)= 4.5$, $p< 0.05$.

Conclusions: The current study suggests that caregivers of youth with T1D report significantly higher FoNH if they indicate clinically elevated sleep disturbances. Additional research is needed to identify how nighttime caregiving responsibilities (e.g., checking glucose levels and providing treatment) interact with caregiver sleep disturbances and FoNH.

P-550

Experiences and perspectives related to autoantibody screening of people at risk for type 1 diabetes

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Introduction: Disease-modifying treatments for autoimmune type 1 diabetes (aT1D) rely on autoantibody (AAb) screening and early intervention in presymptomatic stages.

Objectives: This report examined the experiences and perspectives around AAb screening of people at risk for developing aT1D as well as caregivers (CGs) and health care providers (HCPs).

Methods: Qualitative interviews were conducted with adults at risk for aT1D, CGs, and HCPs. Family history (FH) of aT1D or other autoimmune (AI) conditions were considered risk factors. Interview recordings were analyzed for key themes and categories. Social media listening (SML) captured chatter across multiple platforms in the USA and Europe based on key words, hashtags, and URLs. SML reflected perspectives of people with aT1D, CGs, and people being tested for AAbs or considering screening. Machine learning analytics, natural language processing, thematic and qualitative analysis, and manual trawling were used to process and interpret the data.

Results: Interviews were conducted with 35 adults with aT1D FH, 19 adults with an AI condition other than aT1D, 27 CGs of children with aT1D FH, and 78 HCPs (Table). HCPs included PCPs (n=14), pediatricians (n=6), endocrinologists (n=23), pediatric endocrinologists (n=14), diabetologists (n=17), and pediatric diabetologists (n=4). Interview and SML data indicated that aT1D is typically diagnosed in stage 3, often with a diabetic ketoacidosis event, and AAb testing happens late in the trajectory of the disease. Potential areas for intervention included improving patient and HCP education, increasing access to AAb screening, and encouraging more AAb screening for people at risk.

Conclusions: Awareness of aT1D and AAb screening is a significant factor in determining the experiences and perspectives of people at risk for developing aT1D. The data may inform development of education, lexicon, and awareness campaigns to promote earlier detection of aT1D in the presymptomatic phase.

Table. Summary of themes from qualitative interviews

	Common Themes in journey to AAb screening	Driver(s) of AAb screening
Adult with FH of aT1D (n=35)	Reduced concern about aT1D with increasing age	HCP
Adult with other AI condition (n=19)	Low awareness of aT1D risk and of AAb screening	HCP; abnormal blood glucose test
CG of child with FH of aT1D (n=27)	Fast action to AAb screening due to higher awareness from self-education and prior experiences with aT1D	CG
HCPs (n=78)	**Awareness surrounding AAb screening** Some had low awareness of presymptomatic aT1D, screening protocols, interpretation of AAb panel results, and re-screening procedures	

Wednesday, October 16th, 2024

Poster Corner 6: General Diabetes Care

P-51

Vaccination Compliance among pediatric patients with type 1 diabetes mellitus: insights from a tertiary hospital

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Introduction: Type 1 Diabetes Mellitus (T1DM) is a prevalent chronic condition among children known for its heightened susceptibility to infectious diseases, particularly pneumococcal pneumonia and influenza. Given the persistent challenges posed by infectious diseases, vaccination plays a critical role in safeguarding this population.

Objectives: This study aims to assess adherence to both national vaccination guidelines and supplementary vaccinations in pediatric patients with T1DM.

Methods: Medical records of pediatric patients diagnosed with T1DM and receiving care at a Pediatric Endocrinology clinic within a tertiary hospital were retrospectively analyzed, including vaccination records, demographic details and glycemic control parameters.

Results: The study cohort comprised 182 participants, primarily utilizing insulin pumps (79.7%), with a male preponderance (58.2%), and a median age at diagnosis of 6 years, exhibiting a median follow-up duration of 5 years. Median of the most recent A1c was 7.7 %. Vaccination coverage for pneumococcal strains was robust, with 97.3% of patients immunized against either pn7 or pn13 (7.9% also receiving the 23-valent variant). Meningococcus C and *Hemophilus influenza* b achieved 100% coverage. Additionally, measles-mumps-rubella and diphtheria-tetanus-pertussis displayed coverage rates of 99.5% and 98.9%, respectively. Concerning supplementary vaccinations, 67.6% of patients received influenza vaccination, and 77.5% had received at least one dose of the COVID-19 vaccine. Vaccination rates for MenB were 33.5%, 19.8% for hepatitis A, 19.2% for meningococcus ACWY, and 8.5% for chickenpox.

Conclusions: While vaccination coverage for routine childhood immunizations among individuals with T1DM appears satisfactory, the uptake of supplementary vaccinations, most importantly for influenza and COVID-19, remains subpar. This underscores the need for targeted interventions to enhance vaccination rates in this vulnerable population, aligning with international guidelines.

P-52

Transition readiness interventions improve some diabetes outcomes and engagement of young people following transition to adult services: an NHS England transition pilot

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Introduction: Transition from paediatric to adult diabetes services is a critical period influencing health outcomes. Ensuring a smooth transition process has been a significant challenge, often

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associated with a high rates of disengagement and DKA admissions, and clinic non-attendance once the young person is transferred to adult services.

Objectives: This study aims to evaluate impact of transition readiness interventions on the following outcomes after transitioning to adult services- HbA1c, clinic attendance rates and hospital admission at 6 to 12 months following transfer.

Methods: As part of an NHS England Transition pilot site, we implemented the following transition readiness initiatives from the age of 17-18 years such as peer-to-peer transition education evenings, face-to-face psychologically- informed co-produced plans for self-care and optimised patient-professional concordance, transition readiness checklist prior to the transition to adult services

Results: We included 14 patients (6 males) transitioning to adult diabetes services in the year 2023. Outcomes were reviewed in the 6 to 12 months prior to transition compared to 6 to 12 months after transition to adult services. Mean HbA1c was 65 vs 67 mmol/L, did not attend clinic rate was 28% vs 28%, DKA admissions were 21% vs 7% and those going on hybrid closed loop were 30% vs 57%.

Conclusions: The pilot program shows that transition readiness interventions did not improve or worsen HbA1c or clinic attendance among transitioning youths. DKA admission were improved and more young people were ready to accept the offer of hybrid closed loops after transition. Further research should address quality of life measures and how well transition readiness predicts positive health outcomes after the transfer of care.

P-53

Psychosocial complexity and limited preparation for transition to adult services for young people living with type-1 diabetes results in care fragmentation: a multi-method study

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Introduction: Type 1 diabetes (T1D) is a chronic, incurable autoimmune condition, typically diagnosed in childhood and managed in paediatric services until ages 16–18 years, when young people (YP) transition to adult services. YP may encounter barriers to accessing adult healthcare services, including a lack of age appropriate health information and limited referral pathways. International guidelines suggest that YP and their clinical teams need to prepare and plan for transition while supporting YP to maintain glycemic control during this vulnerable life stage.

Objectives: We conducted a multi-methods study to understand the level of care continuity at transition to adult services for Australian YP living with T1D.

Methods: Interviews and surveys were conducted with YP living with T1D along with a survey of service leaders across Australia in 2023. The surveys were made available online and participants were recruited via diabetes related organisations and networks.

Results: YP aged 14 – 25 years (n=226) from across Australia completed the survey. Approximately half (111, 49%) had transitioned to adult services and of these, only 21(23%) felt that they had been well prepared for transition, 9(8%) said transition had never been mentioned, and only 22(24%) had a written transition plan. YP reported significant psychosocial complexity in addition to their T1D. Many had been referred to psychological services for depression (45%) and anxiety (37%). The survey of 32 service leaders confirmed a lack of comprehensive preparation for transition: only 8(25%) services provided structured transition preparation programs, and only 3(9%) followed up on the YP and their retention in the adult service.

Conclusions: Preparation and planning for YP transitioning to adult services is sub-optimal and inconsistent in Australia, putting young people at risk of hypoglycemia and disengagement with health services. Improving care continuity and enhancing psychosocial support requires further research to inform new interdisciplinary models of care.

P-54

Addressing data management in type 1 diabetes care in Kenya

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Introduction: In Kenya, challenges in T1D data management hinder effective care and advocacy. Manual methods prevail, lacking standardization. Efforts are underway for a nationwide system to improve data capture and reporting, aiming to enhance care delivery and policy-making.

Objectives: This study aims to describe and address challenges in data capture and reporting for Type 1 diabetes (T1D) in Kenya, with a focus on implementing a nationwide solution.

Methods: The study evaluates data management in the Changing Diabetes in Children (CDiC) project currently operational in 47 health facilities, encompassing approximately 5,259 children and young adults receiving treatment for T1D in these centers. T1D. A recent data review exercise conducted by the Diabetes Management and Information Centre (DMI) highlighted the prevalent use of physical folders and manual counts for reporting T1D indicators such as enrollment numbers, treatment regimens, and complications. The absence of an integrated longitudinal data system poses a significant challenge. Statistical analysis involves qualitative assessment of data collection methods and challenges faced.

Results: The analysis reveals that 46 out of 47 facilities rely on manual processes for data capture and reporting, leading to inefficiencies in data analysis and utilization of the data for practice improvement. The absence of a standardized integrated longitudinal data system exacerbates these challenges, impeding care delivery and advocacy efforts for T1D management.

Conclusions: The findings underscore the urgent need for an longitudinal data system to enhance T1D data capture and reporting in Kenya. Collaborative efforts among stakeholders are crucial for implementing a nationwide data system, which will enable comprehensive data collection and reporting, for improvement in care and ultimately guiding the Kenya Ministry of Health in better planning and resource allocation for T1D care.

P-55

Gender – specific differences in glycemic control in patients with type 1 diabetes using continuous glucose monitoring aged up to 25 years: results from the DPV database

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Introduction: Understanding the nuances of glycemic control during puberty among youths with type 1 diabetes is crucial for optimizing diabetes management.

Objectives: The aim of this study was to investigate gender-specific differences in glycemic control among youths with type 1 diabetes during puberty.

Methods: Based on data obtained from the Diabetes Prospective Follow-up Registry (DPV) for the period from 2019 to 2023, glycemic control was analyzed using linear regression modeling (adjusted for diabetes duration and immigrant background) for 5,390 patients, aged up to 25 years, with a diabetes duration of at least 1 year and availability of CGM data for a minimum of 3 months. Puberty development was divided into three groups: pre-puberty (n=1,661), puberty (from Tanner stage 2; n=1,596), and post-puberty (males from the age of 17 years, females from the age of 16 years; n=2,133).

Results: 55% were male, the median diabetes duration was 4.9 years [IQR 2.5-8.4]. The median coefficient of variation for glucose was higher in prepubertal (34.7 [IQR 32.0-37.2] vs. 33.4 [IQR 31.2-35.8]; p=0.0002) and pubertal males (33.5 [IQR 30.1-37.1] vs. 32.7 [IQR 30.1-35.8]; p=0.004) compared to females, but it equalized during post-puberty (33.8 [IQR 30.2-37.4] vs. 33.6 [IQR 30.0-37.1]; p=0.59). Additionally, the median insulin dose per kilogram of body weight was significantly higher in prepubertal (0.70 [IQR 0.57-0.86] vs. 0.68 [IQR 0.56-0.82]; p=0.01) and pubertal females (0.84 [IQR 0.66-1.04] vs. 0.81 [IQR 0.65-1.02]; p=0.007) compared to males, with no significant difference observed during post-puberty (0.89 [IQR 0.72-1.08] vs. 0.88 [IQR 0.71-1.07]; p=0.94). However, time in range, time below range, time above range and HbA1c levels did not differ significantly.

Conclusions: This study demonstrates equal metabolic control in a subgroup of females and males with available CGM profiles. Further analyses are required to clarify the reason for this difference from previous studies that reported poorer glycemic control in women.

P-56

Factors that influence metabolic control in type I diabetic children- a study in a tertiary hospital

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Introduction: Several factors may influence metabolic control.

Objectives: The aim of this study was to study the influence of multiple factors that may play a role in the metabolic control of type 1 diabetic children.

Methods: We analyzed all the type 1 diabetic children followed in diabetes clinic of a tertiary hospital in Portugal, during 2023. We consult the clinical individual processes for demographic data, time and circumstances of the diagnosis, type of insulin treatment and the use of continuous glycose monitoring (CGM). For measuring metabolic control, we use hemoglobin A1C value (HbA1C) in the last appointment. We compare HbA1C results between groups. For the statistical analysis SPSS and a significance value of p<0,05.

Female	Male	
A1C= 7,67	A1C= 7,74	P=0,707
Insulin pump (IP)	Multiple administrations	
A1C= 7,68	A1C= 7,81	P=0,520
IP no automatic	Automatic system	
A1C=7,71%	A1C=7,46%	P=0,330
CGM	No CGM	
A1C= 7,57	A1C= 9,06	**P=0,001**
Ketoacidosis at diagnosis	No ketoacidosis	
A1C= 7,71	A1C= 7,6	P=0,516

Table 1- Results between groups

Results: There were a total of 269 patients, 154(57,2%) were male. The average age was 13,4±3,7 years. The mean age at diagnosis was 7,2±4 years -39% presenting with ketoacidosis at diagnosis. 243 (90,3%) had a continuous glycose monitoring system and 211 (78,4%) use an insulin pump (26 of them with automatic integrated systems). The mean of HbA1C values of all the patients were 7,7±1,3%. There was 1 admission for ketoacidosis. The results between groups are shown in table 1. There were no differences between gender, ketoacidosis at diagnosis or type of insulin treatment.

In the subgroup of patients treated with automatic systems the mean HbA1C was 7,46% vs 7,71% with no automatic systems (p=0,33). The HbA1C was higher in the group that did not use CGM. We correlate HbA1C values with current age and age of disease presentation with no correlation between variables. When comparing time of disease with HbA1C value there was a positive correlation (correlation coefficient: 0,188, p=0,002)

Conclusions: The continuous glycose monitoring contributed to a lower HbA1C in our sample. Children with longer disease duration tended to have higher values of HbA1C, which shows the importance of continuous reeducation programs and close follow up of these patients

P-57

Time in euglycemic range (time in tight target) in very young children with type 1 diabetes treated with aHCL: 12-month follow-up from onset

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Introduction: Advanced Hybrid Closed-Loop (AHCL) therapy represents a sophisticated approach to Type 1 Diabetes (T1D) management, providing precise glycemic control through automated insulin delivery. The evaluation of Time in Tight Range (TITR), reflecting the duration spent within euglycemic levels, holds paramount importance in assessing the efficacy of this therapy, particularly in pediatric cohorts.

Objectives: We conducted an analysis of TITR in pediatric patients aged below 8 years undergoing AHCL therapy (Tandem T:Slim Control IQ with Dexcom G6) from the onset of T1D.

Methods: Data retrieval was performed at both 1 month and 1-year intervals post-initiation. Additionally, other key glycemic parameters including Glucose Management Indicator (GMI), hemoglobin A1c (HbA1c), Time Above Range (TAR - duration spent with glucose levels > 250 mg/dl), and Time Below Range (TBR - duration spent with glucose levels <54 mg/dl) were examined.

Results: Our study encompassed 59 patients, mean age of 4.2 years ± 1.9. At 1 month, the mean TITR was 51.28% ± 13.9. At 1 year, it stood at 47.6% ± 14.4. Glycemic metrics observed at 1-month post-initiation included GMI (6.8% ± 0.4), mean glucose (147.6 mg/dl ± 20.5), TAR (6.4% ± 5.6), and TBR (0.8% ± 1.2). Similarly, at 1-year post-initiation, the corresponding metrics were: GMI (6.8% ± 0.5), mean glucose (155 mg/dl ± 23.1), TAR (9.2% ± 9.4), and TBR (0.9% ± 1.2).

Conclusions: Our findings underscore the effectiveness of AHCL therapy employing the Tandem Control IQ and Dexcom G6 in maintaining optimal TITR percentages in pediatric patients under 8 years of age over one year. Additionally, the stability and efficacy of glycemic control were corroborated by additional glycemic parameters. Further studies are warranted to validate these findings and elucidate the long-term impact on the overall health of pediatric T1D patients.

P-58

Enhancing health equity in black teens with type 1 diabetes: a culturally tailored mhealth intervention informed by parental feedback

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Introduction: Adolescence poses risks for Type 1 diabetes (T1D) teens due to challenging transitions in diabetes management, impacting glycemic control. Health disparities among Black T1D adolescents are acknowledged, with parents experiencing heightened stress. Family-based interventions are vital for optimal adolescent T1D health.

Objectives: Our prior intervention for Black teen T1D parents improved outcomes but had limited reach in clinic settings. Our current project aims to culturally tailor this intervention into a mobile version through community engagement. Feedback sought enhancements in parenting components via video demonstrations and text reminders.

Methods: Black teen parents formed a Community Advisory Board (CAB) from two Endocrinology Clinics. CAB meetings occurred four times (October 2023 to February 2024) for 2 hours each, involving a pediatric psychologist, multi-site coordinator, and research assistant, to review and gather feedback.

Results: CAB members suggested revisions to: 1) to increase the cultural competence of the mHealth avatar's appearance and voice, 2) video content addressing flexibility for teen schedules, puberty/adolescence, extended family involvement, and clarification/education of diabetes in the Black community, and 3) frequency of text message reminders.

Conclusions: Direct feedback from the caregivers of Black teens with T1D increased the cultural competence of parenting intervention to improve daily diabetes care. This feedback can assist with cultural adaptation for mHealth interventions to reach a larger population. Future goals include obtaining input

regarding optimal strategies for recruitment and retention of families of Black youth with T1D in clinical trials. We also aim to collaborate on areas of research (e.g., education about diabetes in the Black community) identified as a priority by the caregivers.

P-59

Only 50% of parents confident they have adequate knowledge to manage their child's type 1 diabetes: need for greater involvement of families with clinical teams, education, tools and supports

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Introduction: Type 1 diabetes (T1D) requires constant monitoring and insulin dose adjustment to achieve and maintain safe blood glucose levels. Families of children with T1D rely on consistent, high quality support from healthcare professionals and educational resources to help them navigate the constant demands of managing T1D. To what extent Australian families of children living with T1D are integrated with their clinical teams has not been studied before.

Objectives: The aim of this study was to map the current experiences of accessing health services among Australian families.

Methods: A mixed methods study design, using surveys and interviews, was used to collect data from Australian families of children living with T1D. Survey data were analyzed using SPSS descriptive statistics and interviews were thematically analyzed using NVivo.

Results: A total of 525 survey responses and 17 interviews were completed by parents of children with T1D across all Australian states. The majority of families were scheduled for clinic visits every 3 months (378, 76%) and received care in a paediatric hospital (393, 75%). Most families felt very involved in discussions about T1D with their healthcare professionals (376, 77%) and reported being offered a range of sources of information, such as support groups and apps. However, only 51% (n=248) of parents reported feeling confident about their knowledge and management of T1D. Parents expressed a need for additional support in T1D-specific areas such as psychological support for both their children and families, better support with major transitions of care (e.g., from paediatric to adult health services), improved access to educational resources (e.g., around nutrition) and increased access to care (e.g., after hours care).

Conclusions: Parents reported being satisfied with their overall experience with T1D services. However, they strongly expressed the need for additional support in specific areas such as psychological support, educational resources and better access to care and support.

P-60

Feasibility of sleep screening for adolescents with type 1 diabetes in a clinical setting

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Introduction: Poor sleep negatively impacts health and is particularly true for those with type 1 diabetes (T1D).

Objectives: The objective is to develop a clinically efficient sleep screening tool for adolescents with T1D.

Methods: Adolescents aged 11-17 years were enrolled from a pediatric T1D clinic. The PROMIS sleep disturbances (SD) and sleep-related impairment (SRI) 4 item measures were used as an initial screen for sleep problems. If the T-score on either PROMIS measure was ≥55 a novel 7-item sleep screening survey was given to identify specific causes of sleep disruption. Feasibility was assessed through a separate questionnaire to evaluate the efficiency and completeness of conducting sleep screening in the clinical setting and was completed by all participants.

Results: 38 adolescents (mean age 15.2 yrs, 47% male, 66% pump users, 91% continuous glucose monitor users) were enrolled. Mean T-scores were 54.3±9 (range 38.8 – 76.9) for the PROMIS SD and 54.1±8.3 (range 38.3-76.3) for the PROMIS SRI. 24 adolescents (63.2%) scored ≥55 on at least one PROMIS measures, with all 24 completing the novel survey. The top reported categories for insufficient sleep were "diabetes issues related to blood glucose" (n=11), "mood and emotion" (n=11) and "school/family/friends/sleeping environment or activities/exercise" (n=10). All 38 adolescents thought it would be feasible to do the sleep screening during a clinic visit and 32 (84%) felt it would be helpful to talk about sleep with their provider.

Conclusions: Adolescents with T1D have significant sleep disruptions from both diabetes and psychosocial concerns. These adolescents overwhelmingly felt sleep screening is not only feasible to add to routine diabetes visits but would be helpful to guide discussion about sleep with their provider. Implementation of sleep screening, as well as discussions about sleep, should be considered during routine diabetes visits with adolescents.

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Wednesday, October 16th, 2024

Poster Corner 7: Outcomes and Care Models

P-61

Ten years of improving glycemic control in pediatric diabetes care in Norway: do we need a different approach for the girls?

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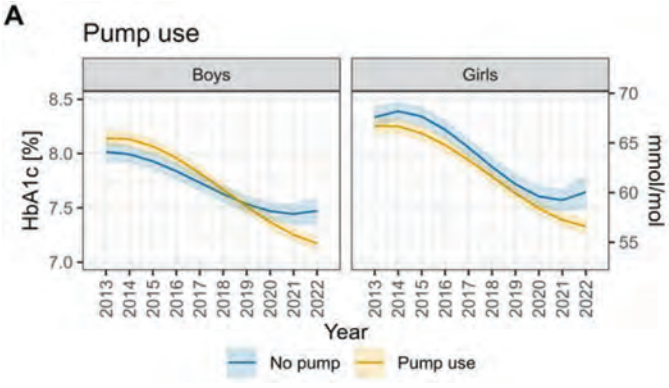
Introduction: In Norway, great efforts have been made to improve pediatric diabetes care. Besides the early adoption of new diabetes technology, Norway focused also on standardised patient education, precise insulin dose calculation and systematic quality improvement.

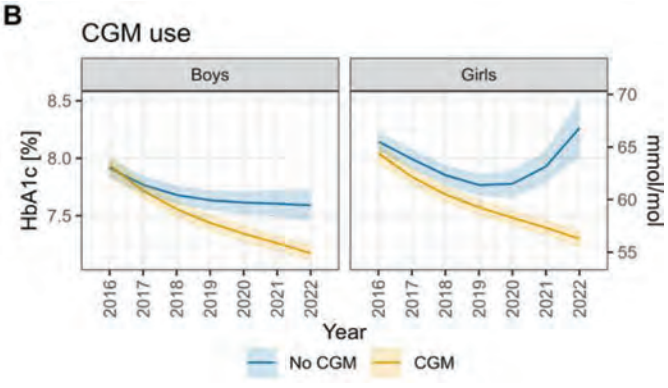
Objectives: To evaluate how HbA1c, the incidence of acute complications, and use of diabetes technology changed at the national level from 2013 to 2022, and how glycemic control was associated with use of diabetes technology, carbohydrate counting, or the participation in a quality improvement project.

Methods: This is a longitudinal observational study, based on annual data from the Norwegian Childhood Diabetes Registry from 2013 to 2022. We stratified our analyses for gender. The outcome measure was HbA1c. Predictor variables in the adjusted linear mixed-effects model were (1) the use of diabetes technology, (2) the use of carbohydrate counting for meal bolusing, and (3) whether the patient's diabetes team participated in a quality improvement project.

Results: Mean HbA1c decreased from 66.6 mmol/mol (2013) to 55.4 mmol/mol (2021), and the proportion of youth reaching an HbA1c of 53 mmol/mol increased from 13% (2013) to 43% (2022). Insulin pump use increased from 65% (2013) to 91% (2022). CGM use increased from 34% (first recorded in 2016) to 97% (2022). Girls had steadily higher mean HbA1c than boys. However, the association between HbA1c and insulin pump and CGM use developed differently for girls and boys (figure A,B).

Conclusions: Differences between boys and girls regarding glycemic outcome and the use of insulin pumps and CGM suggest the necessity for a more gender specific approach in future diabetes care.





P-62

Assessing the long-term effects of comprehensive health care for people with type 1 diabetes: a 14-year follow-up study

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Introduction: The majority of people with type 1 diabetes live in developing countries and lack access to standardized care, including essential life-saving medicines. Insufficient healthcare facilities and poverty pose significant barriers to effectively managing individuals with Diabetes in Pakistan

Objectives: To observe the implementation of diabetes healthcare through the development of a standardized and comprehensive model at a tertiary care hospital in Karachi - Pakistan

Methods: This longitudinal follow-up study was conducted as part of the 'Insulin My Life' collaborative project initiated in February 2010 and ongoing to date. All individuals with type 1 diabetes who visited the outpatient department of the Baqai Institute of Diabetology and Endocrinology were included after providing informed consent. A specialized electronic database was created to record demographic, biochemical, and medical information. Participants received insulin, pens, syringes, glucometers, glucose measuring strips, lancets, HbA1c testing (twice a year), and access to a 24-hour telephonic and WhatsApp helpline service, all provided free of charge as part of standardized and sustained support for daily diabetes self-care management

Results: Out of 1511 participants, 792 (52.4%) were male, with the mean age and duration of diabetes was 13.37 ± 7.32 yr and 3.51 ± 5.63 yr, respectively. However, the pairwise comparison of HbA1c levels from the baseline visit to the last visit showed a significant decline ($p < 0.05$) for all age groups: < 5 yr [11.13 vs 8.2 (%)], 6-12 yr [11.24 vs 7.52 (%)], 13-18 yr [11.84 vs 9.1 (%)], and ≥ 19 yr [10.64 vs 9.5 (%)]. No significant change was found in the frequency of microvascular complications

Conclusions: The provision of standardized and comprehensive diabetes health care, along with the free accessibility of insulin and medical supplies is a feasible, acceptable way to achieve significant improvement in glycemic levels and optimize management without affecting the frequency of microvascular complications

P-63

HbA1c, mean glucose and time in tight range in a Swedish pediatric clinic

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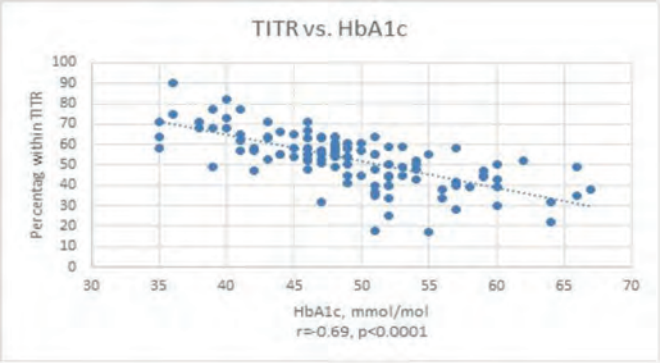
Introduction: HbA1c has since long been the gold standard to evaluate the level of metabolic control. Increasing emphasis has recently been placed on CGM (continuous glucose monitoring), especially Time in Range (TIR) over the past 2 weeks. In Sweden, we have in pediatric care used the more physiologic Time In Tight Range (TITR, 3.9-7.8 mmol/l, 70-140 mg/dl). TIR 70% equals approximately TITR 50%.

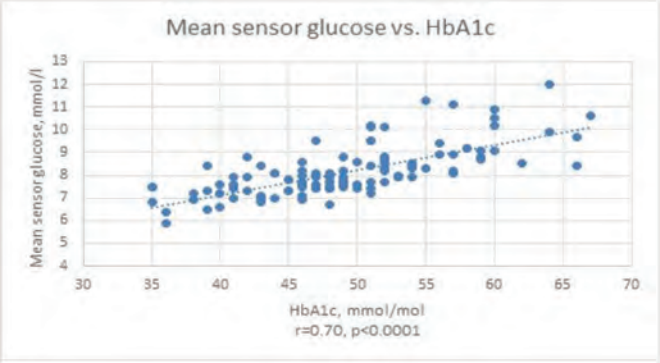
Objectives: The aim of this study was to investigate how HbA1c relates to TITR and mean glucose in a Swedish pediatric clinic.

Methods: Data is collected at every visit. We used the last available data for each patient (n=117). The clinic data was downloaded from the National Swedish Diabetes Register.

Results: The mean HbA1c was 49.1 mmol/mol (SD 6.9, range 35-67) (6.6%, SD 18, 5.4-8.3), mean sensor glucose was 8.1 mmol/l (SD 1.1, range 5.9-12) (146 mg/dl, SD 18, 106-216) and the mean TITR was 53.0% (SD 12.9, range 17-90%). There was a significant negative correlation between HbA1c and TITR and a significant positive correlation between HbA1c and mean glucose (figure). For a given individual with HbA1c of approximately 50 mmol/mol (6.7%), % TITR varied between 20 and 65% and mean glucose varied between 7 and 10 mmol/l (126-180 mg/dl).

Conclusions: There is a wide range of both mean glucose and TITR for a given HbA1c. Although both are taken at the same time, HbA1c reflects the metabolic control over 2-3 months while TITR only mirrors the past 2 weeks. On the individual level, conditions like infections or sports holidays may affect TITR more than HbA1c. Other possible explanations include a variable amount of readings in hypoglycemia (< 3.9 mmol/l, 70 mg/dl). Also, if the clinic emphasizes the importance of TITR over HbA1c, a bias may be introduced in that the family tries hard to get extra good readings during the 2 weeks preceding the visit. In conclusion, TITR, mean glucose and HbA1c are not fully translatable and thus all provide important information at the clinic visits.





Study visit	Intervention group Mean (SD) HbA1c (%)	Control group Mean (SD) HbA1c (%)	p*
Baseline	11.6 (2.4)	11.4 (2.8)	0.76
3-months	10.4 (2.6)	10.8 (2.7)	0.23
6-months	10.3 (2.6)	10.5 (2.7)	0.33
9-months	9.1 (2.4)	10.4 (2.6)	<0.001
12-months	8.1 (1.5)	10.7 (2.7)	<0.001

clinical and glycaemic measures including HbA1c were collected at baseline, and then 3-monthly over 12 months follow-up.

Results: Data are presented for all 130 patients in the intervention group and 128 patients in the control group who completed 12-months study follow-up, as 2 youth in the control group died from DKA during the study period. There was no difference in the proportion of females (60(46%) vs 61(47%)), mean age at T1D diagnosis (13.4 (4.0) vs 13.8 (4.4)) or mean age at study baseline (17.3(4.2) vs 17.4(4.8) years) between the intervention and control groups respectively. An initial decrease in mean HbA1c was observed in both groups, followed by a continued decrease in the intervention group only (Table). A clinically significant reduction in mean HbA1c from 11.6% to 8.1% was observed in the intervention group at 12-months.

Conclusions: A clinically significant decrease in mean HbA1c by 3.5% in 12 months demonstrate that the merit of long-acting basal insulins for people living with T1D in less-resources settings needs to be assessed and discussed further.

P-64

A randomised control intervention study of adding long-acting basal insulin in the treatment of youth with type 1 diabetes in Mali

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Introduction: Data on the impact of long-acting basal insulins in low-resource settings are limited.

Objectives: To evaluate the impact on glycaemic control of switching the insulin regimen in youth with type 1 diabetes (T1D) attending Hôpital du Mali in Bamako from multiple daily injections of intermediate-acting human insulin via needle and syringe, to a long-acting biosimilar glargine insulin delivered by re-usable pens.

Methods: 260 youth aged <25 years, diagnosed with T1D for ≥12 months who had no prior use of analog insulin and were willing to perform at least two self-monitoring blood glucose (SMBG) checks daily were recruited. Following enrolment, youth were randomized into either the intervention (switch to long-acting biosimilar glargine insulin) or control (continue current regimen) groups. Both groups continued taking short acting insulin boluses with meals or as needed via needle and syringe. Demographic,

P-65

Discrepancies between children's and parent's reported diabetes outcomes: the child health ratings inventories (CHRIS) diabetes project

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Introduction: To measure the health outcomes of young children without help from adults we developed and previously tested an animated, computer administered health outcomes measure for children ages 4-12 the Child Health Ratings Inventories (CHRIS) for children with chronic diseases.

	Parent-Reported (n= 54)				
	About Themselves	About Their Child	Child-Reported (n= 54)	Child-Parent Difference	P-value (for the difference)
Overall Score	71.8±15.7	78.1±13.1	73.7 ± 15.0*	-4.3 ± 14.3	0.0297
Physical Score	83.6±19.17	85.6±19.6	72.9 ± 16.0***	-12.7 ± 23.3	p=0.0002
Mental Score	63.9±16.1	72.8±13.9	75.1 ± 17.5	2.3 ± 15.2	p=0.2791
Diabetes Specific	N/A	35.8±15.4	67.2 ±17.1***	31.4 ± 28.5	p<0.000

Objectives: Using the CHRIS measure, we compared parents' reports about their children with diabetes with children's self-reports.

Methods: We conducted a longitudinal observational study for eligible children who spoke English or Spanish and were seen at least once for diabetes care at Children's Hospital of Los Angeles and Children's Hospital of Orange County between November 2021 and January 2024. The CHRIS measures included a 13-item physical health, an 8-item mental health and a 9-item diabetes-specific measure and were scored to range from 0-100 (high score meaning better health) with parallel measures reported by the parent. We also measured parent reports about their own health. HbA1c values were abstracted from medical records. Reliability of CHRIS measures were tested using Cronbach's alpha. Child vs. parent differences were tested using paired t-tests with 95% confidence intervals.

Results: There were 54 child-parent pairs; 58.9% were non-white and 55% were on public insurance. Reliabilities for the child- and parent-reported CHRIS measures all exceeded α=.75, the standard for group comparisons. Child-reported CHRIS measures were significantly correlated with HbA1c (overall health Pearson's r=.31, p=.04). Differences between *child* and *parent*-reported CHRIS measures were statistically significant except for mental health (see table below). Parents' reports about the child were significantly correlated with reports about their own health (physical health r=0.64, p<.0001, mental health r=0.53, p<.0001).

Conclusions: Addressing the basis for the significant discrepancies between child and parent reports during office visits could improve physician-parent-child communication and improve diabetes care.

P-66

Transition between paediatric and adult diabetes healthcare services: an online global survey of the experiences and perceptions of healthcare professionals

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Introduction: Adolescence and young adulthood can be a time of notable and distinctive physiological, psychological, and social change. Transition from paediatric to adult diabetes services should occur in a deliberate, organized and cooperative way.

Objectives: We sought to identify healthcare professionals' experiences and perceptions around transition readiness planning, policies and procedures, and the actual transfer to adult services.

Methods: Data were collected via an online global survey (seven language options), broadly advertised by ISPAD, EASD, team members and partners, via newsletters, websites, e-mails and social media.

Results: Respondents (n=372) were mainly physicians (74.5%), practicing in government funded (59.4%), pediatric (54.0%), metropolitan settings (85.8%) in Europe (44.9%); 37.1% in low and middle-income countries. Few centers used a transition readiness checklist (31.7%), provided written transition information (29.6%), or had a dedicated staff member (23.7%). Similarly, few involved a psychologist (25.8%), had combined (35.2%) or transition/young

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person-only clinics (34.9%), or a structured transition education program (22.6%); 49.8% advised youth to use technology to assist the transfer.

Most (91.9%) respondents reported barriers in offering a good transition experience. Proportionally, more respondents from low and middle-income countries prioritised more funding (p=0.01), a structured protocol (p<0.001) and education (p<0.001).

Conclusions: Healthcare professionals' experiences and perceptions related to transition vary widely. There is a pressing need for an international consensus transition guideline. This guideline needs to be informed by existing literature on transition practices and outcomes, and determination of the experiences and perceptions of youth living with diabetes, their immediate family members and/or other caregivers.

P-67

Team clinic virtual peer groups (VPG) reduce depressive affect and increase resilience in adolescents with type 1 diabetes (T1D)

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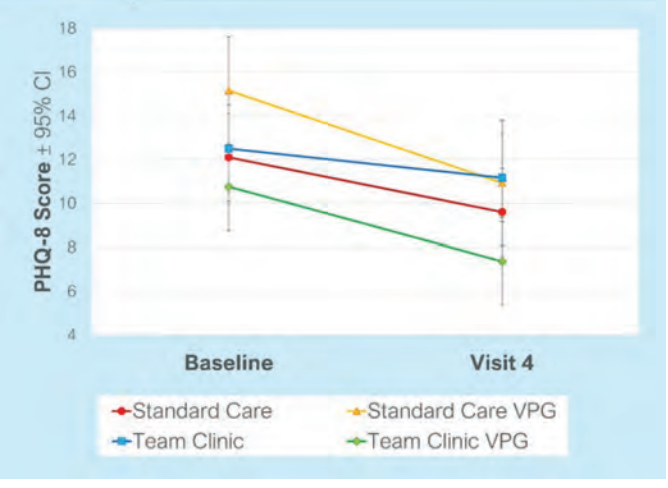
Introduction: Adolescents living with T1D experience psychosocial challenges related to their diabetes. VPG and person-centered care models have improved diabetes-related outcomes in adolescents.

Objectives: To determine the psychosocial benefits of Team Clinic, a person-centered T1D care model utilizing VPG, for adolescents with T1D and their caregivers.

Methods: A 15-month pragmatic trial was conducted in an urban, outpatient clinic in a children's hospital. Seventy-nine English-speaking adolescents (ages 10-17) and their caregivers were recruited to be in either Standard Care or Team Clinic (based on clinician's assigned group) and then randomized to VPG or no groups. Team Clinic clinicians were trained to provide person-centered care and focused on the adolescent's care needs. Baseline and end of study surveys assessed PHQ-8 depressive affect in adolescents and their caregivers, familial conflict, T1D care responsibility, and T1D-related strength and resilience (D-STAR). Changes in psychosocial measures were assessed using linear mixed models controlling for age and gender.



Results: Participants identified as 49% female, 42% male, and 9% gender-diverse; and reflected the demographic composition of the clinic (34% Latinx, 8% Black, 8% Asian, 20% non-Latinx white). Adolescents in Team Clinic with VPG reported significant improvements in T1D-related resilience (+8.03, P=0.005). In addition, both adolescents who participated in VPG and their caregivers reported significant reductions in depressive affect at study end (Adolescents: Standard Care VPG -4.22, P=0.005; Team Clinic VPG -3.39, P=0.03, see Figure; Caregivers: Standard Care VPG -3.33, P=0.01; Team Clinic VPG -3.34; P=0.02).

Conclusions: Team Clinic can serve as an alternative care model that addresses the needs of this unique population and improves psychosocial outcomes. Future work will examine the impact of Team Clinic on other clinical outcomes.

P-68

Percent within time in tight range correlates to pump usage: report from the Swedish national diabetes register

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Introduction: Pump usage is widespread among Swedish children and adolescents with diabetes. However, there is a considerable variation in pump usage between clinics. Over many years, mean HbA1c in pump and injection users has been at almost the

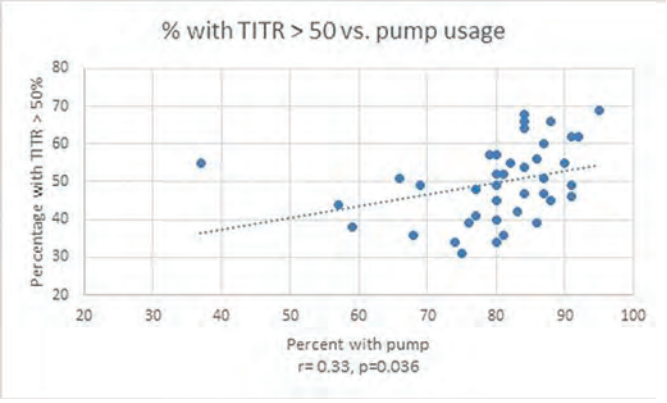
same level In Sweden. In pediatric care, we have used the more physiologic Time In Tight Range (TITR, 3.9-7.8 mmol/l, 70-140 mg/dl). TIR 70% equals ~ TITR 50%.

Objectives: The aim of this study was to investigate how pump usage relates to TITR and HbA1c in Swedish pediatric clinics.

Methods: The Swedish National Diabetes Register (NDR) collects pediatric data every ~3 months and has > 95% coverage up to age 18 years. We used online data ("Knappen" at ndr.registercentrum.se), extracting the latest available center HbA1c and CGM data that included ≥ 70% of the time, capturing percentage of patients with TITR ≥ 50% (TITR50).

Results: The national mean HbA1c was in March 2024 52.4±0.2 mmol/mol (range 45.8-56.5) (6.6%, 6.4-7.4). For pump users it was 52.1±0.2 mmol/mol (range between clinics 45.4-56.5) (6.9, 6.3-7.4) and for injections 53.7±0.6 (range 47.5-61.7) (7.1%, 6.5-7.8). Pump usage varied from 37 to 95% between clinics while the remainder of patients used multiple daily injections. There was a significant positive correlation between clinic pump usage and TITR50 (figure), but not with HbA1c. However, there was a wide variation in pump usage between clinics that managed to have percentage with TITR above 50%. NDR does not display online data on time below or above range, which is a limitation.

Conclusions: Although both are taken at the same time, HbA1c reflects the metabolic control over 2-3 months while TITR only mirrors the past 2 weeks. The significant correlation between percentage of clinic pump use and time above TITR50 indicates that although mean glucose and HbA1c may be at similar levels, injection users seem to have more values below and above 3.9-7.8 mmol/l. Both HbA1c and TITR are valuable for evaluation at clinic visits.



P-69

Hub and spokes model of care for children& adolescent with type 1 diabetes- feasibility to sustainability

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Introduction: The study aims at developing a cost effective, sustainable and expansible model to deliver a standard of care to children with Type 1 diabetes

Objectives: To develop a model of comprehensive care which is expansible and sustainable, achieving a better control of Diabetes

Methods: Endocrinology and Diabetes research Trust (EDRT) started two decades back and PRIMER Academy of Medical Sciences (PAMS) started a decade back are registered as not for profit organisations at Bengaluru,India. A centre of excellence was established in the hub for providing a comprehensive care. The hub delivereds treatment products including insulin, pens, syringes, glucose meters & strips to satellite centers.Between them, both hubs have 58 satellite centres across India for care of children & adolescent with diabetes.The satellite centres includes 17 medical colleges, 16 hospitals & 15 clinics managed by 9 diabetologists,19 adult endocrinologists,8 paediatric endocrinologists,18 paediatricians and 8 physicians. consultation and investigations done free of charge

Results: 3146 children including 1504 boys and 1642 girls in the age group of 1 to 25 years were included. The mean A1c was 12.6% at the time of initiation and at the and of 2023 mean A1c was 9.84%. There were 22 deaths in the last 10 years and 61 children with Diabetes were lost for follow-up. In the follow-up, 200 children were admitted to hospital, 100 for Diabetes Ketoacidosis, few for hypoglycaemia, infections, convulsions etc with episodes 500 documented hypoglycaemia needing assistance

Conclusions: 1. The hub and spokes model of Diabetes care to children & adolescent with diabetes is ideal for developing countries in Asia and a model which is sustainable over decades and expandable. 2. A hub with centre of excellence providing all standard of care for children with diabetes supporting satellite centres which provides care at a reasonable distance is a model which will cater to large number of children at an affordable cost including travel cost and saves time as well.

P-70

Is a transdisciplinary care model acceptable to adolescents with type 1 diabetes (T1D) and their caregivers?

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Introduction: Transdisciplinary Care (TC) models involve co-delivery of care by providers of diverse disciplines who have received specialized cross-discipline training.

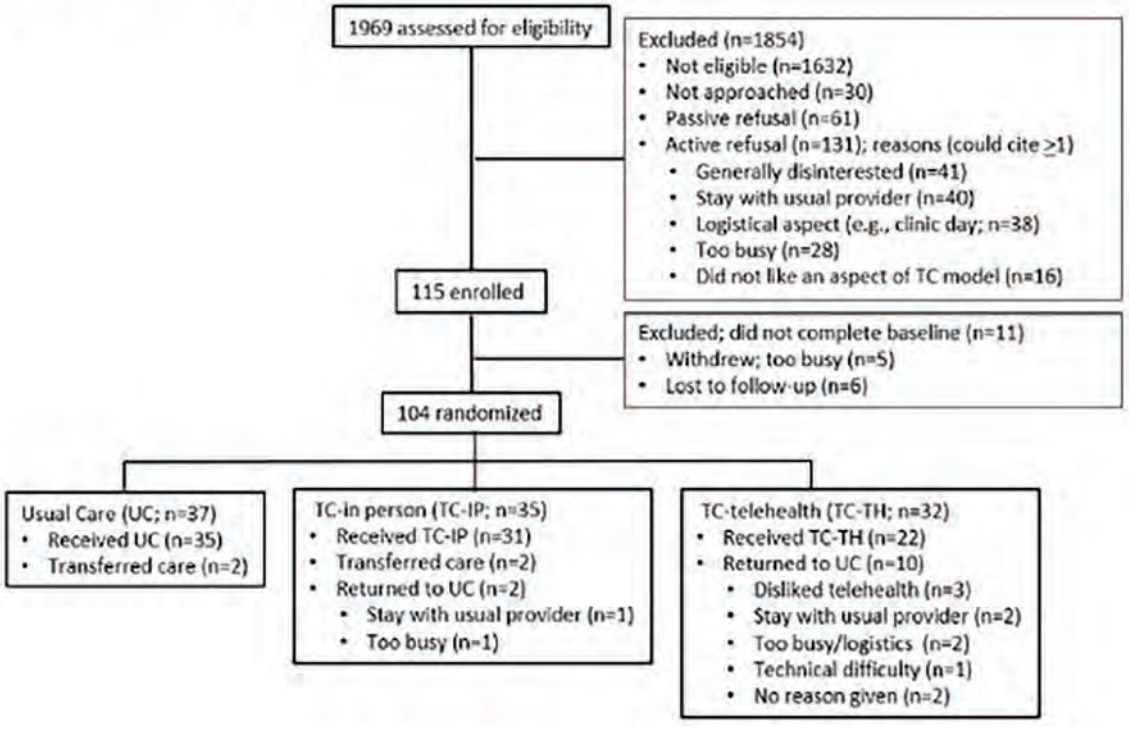
Objectives: We aimed to learn whether a novel TC model with an advanced practice nurse, dietitian, and psychologist is acceptable to families of adolescents with T1D for routine care.

Methods: Adolescents (English-speaking, aged 11-16, diagnosed with T1D for ≥ 1 year, HbA1C 7.5% to 10.0%) and their caregivers were recruited for a one-year pilot randomized clinical trial with three arms: TC delivered in person (TC-IP), TC via telehealth (TC-TH), or Usual Care. Acceptability was evaluated by rates of enrollment and attrition, reasons for refusal and attrition, and study exit interviews for those receiving TC.

Results: As shown in the Figure, 37.5% (n=115) of eligible families enrolled. Only 9.8% refused due to dislike of some aspect of TC. After randomization, 2 families (5.7%) withdrew from TC-IP and 10 (31.3%) withdrew from TC-TH. Of these 12, 50% never attended a TC visit (5 related to personal preferences; 1 due to technical difficulties). Of those withdrawing after attending ≥ 1 TC visit, 3 did not like their assigned telehealth format, 2 had logistical/scheduling issues, and 1 gave no reason. In the exit interviews, parents and adolescents reported liking the collaborative, comprehensive team approach in TC and seeing providers together. The length of the TC visits (~2 hours) was noted as a minor drawback. Some adolescents in TC-IP noted that the room felt crowded with so many people. Opinions of telehealth varied with some finding it convenient and others concerned it compromised care. The majority indicated that they would continue with TC if possible.

Conclusions: Many families of adolescents with T1D find transdisciplinary care acceptable. Addressing logistical issues (e.g., access to preferred providers, flexibility in clinic days, choice of telehealth or in-person) may further improve acceptability.

Figure: Participant Flow



Wednesday, October 16th, 2024

Poster Corner 8: New insulins, Adjunctive Therapies, Other pharmacologic agents, novel advances and intervention

P-71

Impact of GLP-1 agonists on body mass index (BMI) and total daily dose (TDD) in youth with type 1 diabetes

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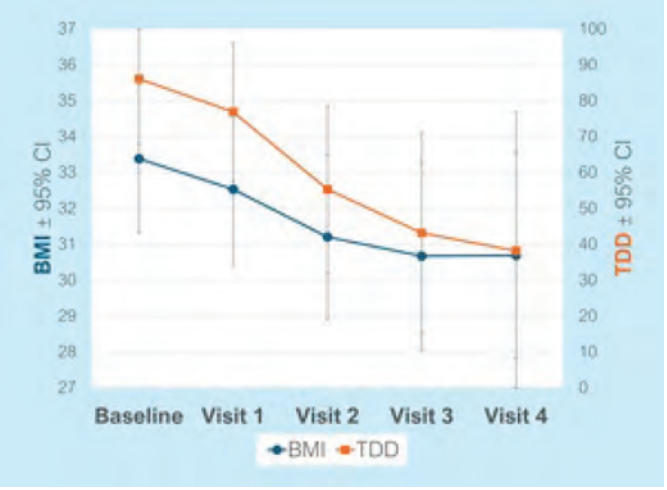
Introduction: Several GLP-1s have been approved for adolescents with type 2 diabetes (T2D) or obesity, but not for type 1 diabetes (T1D). The potential glycemic and weight benefits of GLP-1s in adolescents and young adults (AYA) living with T1D and obesity is unknown.

Objectives: This retrospective analysis reviews AYA living with T1D who were prescribed a GLP-1 at a hospital-based diabetes outpatient clinic and examines the effect on hemoglobin A1c (HbA1c) and body mass index (BMI), as well as time in range (TIR) and total daily insulin dose (TDD) if using diabetes technology.

Methods: The electronic medical record of AYA living with T1D who were prescribed a GLP-1 in 2019 was reviewed. Visits occurred on average every four months. Changes in BMI, TDD, TIR and other metrics were examined using liner mixed models controlling for age and sex.



Results: The study sample included 21 female and 8 male patients, ages 10-23, from diverse backgrounds (38% Latina/o/x, 28% White, and 10% Black). Twenty patients used a continuous glucose monitor (CGM) and 18 used an insulin pump. For all patients who used GLP-1, BMI was reduced on average by –0.85+/-1.28 kg/m^2 per visit (linear trend P=0.004; see Figure); similarly, BMI Z scores were reduced on average by –0.09 SD per visit (linear trend P<0.001). After 1 year (Visit 3), patients' BMI reduced on average by –2.71 kg/m^2 (to 30.67 kg/m^2; P=0.003), or –0.36 SD (to 1.59 BMI Z; P=0.01). Among pump users, TDD decreased from an average of 86 units/day at baseline to 43 units/day at Visit 3 (linear trend P=0.001; see Figure). Seven participants experienced side effects (e.g., nausea). Changes in HbA1c, TIR, and other CGM metrics were not significant.

Conclusions: GLP-1 agonists are effective for reducing BMI and TDD for patients living with T1D and obesity. Further analysis is needed to determine if GLP-1 dose, medication, and level of adherence affects glycemia, BMI, and TDD outcomes.

P-73

GLP-1 agonist therapy in adolescents and young adults with type 1 diabetes

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Introduction: GLP-1 agonist (GLP-1) therapy improves metabolic measures (MetM) in youth with type 2 diabetes. Little is known about the effects of GLP-1 use in adolescents and young adults (AYA) with type 1 diabetes (T1D).

Objectives: Our objective was to determine whether GLP-1 therapy improved MetM in AYA with T1D and elevated BMI.

Methods: We conducted a retrospective chart review of all AYA with T1D prescribed a GLP-1 over a 2-year period (2021–23) at our center. Nine of 16 AYAs with T1D and elevated BMI prescribed a GLP-1 had started treatment. Demographic and clinical information were recorded at baseline and the most recent visits. The % change from baseline for each MetM was calculated for each AYA individually and the group.

Results: GLP-1s used included liraglutide, semaglutide, and tirzepatide. Baseline cohort (n=9) was 66.7% female, race: 7 NHW, 1 NHB, 1 multiracial, 78% privately insured, 100% used CSII and CGM; median (IQR) age 17.8 years (15.5, 20.3), T1D duration 10.9 years (9,11), HbA1c 7.3% (7.2, 8.4), BMI 30.3 kg/m^2 (28.6, 31.7), and weight 81.1 kg, (77.3, 90.8). Median treatment time was 14 months (8,18). GLP-1s were well tolerated (33% GI complaints) and most AYAs had improved MetM across all domains (Figure 1). Median time in range (TIR, 70-180 m/dl) improved by 15.1% (7.7,17.7). There was no clinically significant increase in time below range in the majority with median 0.0% (0,0).

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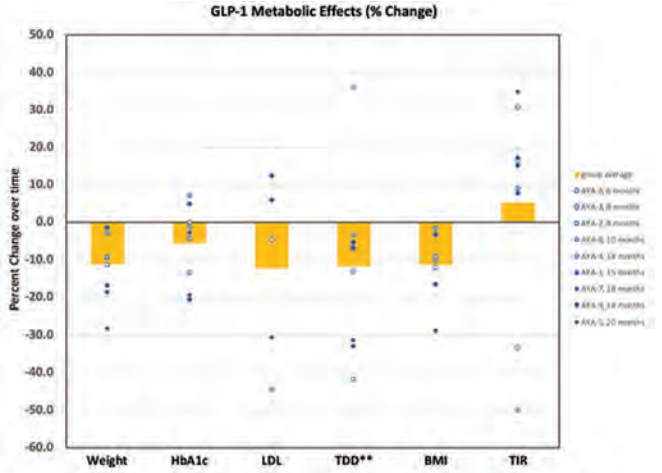

Figure 1: Separate outcomes shown for each AYA (plotted individually); bar graph indicates average % change from baseline for the group
* AYA ID, duration of GLP-1 agonist treatment at the time of data collection
** Total daily dose of insulin per kg of body weight
^ Time in range 70-180 mg/dl

Conclusions: GLP-1 use among AYA with T1D was well-tolerated and associated with improved metabolic measures in a real-world setting. Randomized controlled trials assessing long-term clinical efficacy are warranted.

P-75

Does the use of insulin faster aspart vs. aspart lead to the prolonged glycemic time in range in children with type 1 diabetes who use continuous glucose monitoring?

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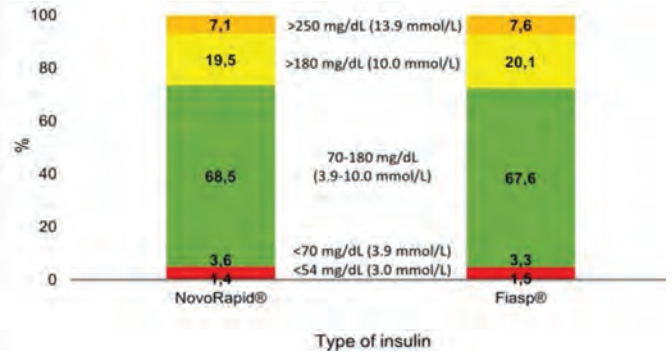
Introduction: Ultrafast-acting faster aspart (FA) insulin is the most recently developed form of fast-acting insulin aspart (IA).

Objectives: This study aimed to assess whether the implementation of insulin FA in children with type 1 diabetes treated with continuous subcutaneous insulin infusion (CSII) and using Real Time Continuous Glucose Monitoring (RT-CGM) systems leads to prolonged time in range (TIR) compared to IA.

Methods: A cross-over, open-label, randomized study included children 6-17 years of age with a history of type 1 diabetes ≥1 year treated with a CSII ≥3 months and using RT-CGM for at least 1 month with HbA1c < 8%. The study duration time for every participant was 10 weeks: 2 weeks run -in period and 8 weeks intervention time (4 weeks insulin aspart Novo Rapid®, Novo Nordisk, 4 weeks insulin faster aspart, Fiasp®, Novo Nordisk in random order). All participants were connected to the same RT-CGM -Dexcom G6 system. The study participants attended 3 visits in Pediatric Diabetology Clinic and 4 telephone consultations.



Results: Study group included 77 Caucasian descent participants with male predominance (66.2%). TIR level for aspart was 68.51% (SD = 12.28%) while for faster aspart it was 67.64% (SD = 12.06%), the difference was not statistically significant, MD = -0.87% CI_{95} [-2.60; 0.86], p = 0.322. The main study outcomes present Figure 1.

Conclusions: Insulin faster aspart does not lead to prolonged TIR and does not reduce the incidence of hyperglycemia and hypoglycemia in comparison to insulin aspart in children treated with an insulin pump and using RT-CGM systems. Other factors like diet, lifestyle and involvement in the diabetes treatment may play a more important role in the diabetes management than the type of using insulin in this group of patients.

P-76

A population preventive study of early detection of type 1 diabetes in asymptomatic children in the north-east region of Poland

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Introduction: The population study of early detection of type 1 diabetes (T1D) in asymptomatic children in the Podlaskie region of Poland is an extension of the Pre-d1abetes Study conducted by our clinic between 2019 and 2023 in collaboration with 14 Polish diabetes centres. A total of 1288 patients aged between 7 months and 18 years were studied with positive family of T1D. Positive

3-screen ELISA values were observed in 112 patients (8.69%). During analysis of individual antibody types, 76 children with multiple (two or more) antibodies were identified, constituting a pre-diabetes group (5.9%).

Objectives: The aim of the study was to identify high-risk patients for development of T1D among healthy pre-school and primary school children age 1-9 years in North-East of Poland.

Methods: Blood samples collected were frozen at -20 C. A 3 screen RSR ELISA (Cardiff, UK) was used. In cases of a positive screen, were analysed specific antibodies: anti-GAD, anti-ZnT8, anti-IA2 and IAA (anti-insulin) by ELISA and RIA methods.

Results: Eight counties were selected for the pilot study with Podlaskie voivodeship. 3.000 children were screened, with a positive result in 85 (3.46%) of subjects. In addition, 0.44% had two and 0.65% two or more antibodies, giving the highest risk of developing DT1 among the tested children. Positive results of the study will allow for appropriate education of families to early symptoms of T1D, implementation of diets with a low glycemic index, regular physical activity and the inclusion of the children to Diabetes Clinic for follow-up. The research was the first in Poland and unique in Europe.

Conclusions: In summary, a population studies using the 3 Screen ELISA (RSR Ltd) test can recognize pre-clinical T1D before development of carbohydrate abnormalities. Patient follow up with early education and multidirectional diabetes care should prevent occurrence of ketoacidosis associated with severe clinical manifestations. This opens the possibility of therapeutic interventions in innovative clinical programs.

P-77

Surveying families on their knowledge and opinions regarding type 1 diabetes (T1D) antibody screening and teplizumab (Tzield) infusions

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Introduction: Until recently, there was no treatment proven to delay progression to Stage 3 T1D. In November 2022, the Food and Drug Administration (FDA) approved teplizumab for the delay in progression to clinical T1D in patients 8 years and older at high risk.

Objectives: This study evaluated caregiver knowledge and opinions on autoantibody screening and teplizumab infusions, given that there is limited data in this area.

Methods: Participants were recruited via email from a large academic pediatric endocrinology center. Participants completed an online survey.

Results: A total of 85 caregivers participated in the survey (Table 1). 12 participants did not complete the entire questionnaire. 78 (94%) participants had 1 child with T1D, 5 participants (6%) had 2 or more children with T1D. 70 (82%) participants were aware that family members of those with T1D are at higher risk of developing T1D. 71 (84%) participants were aware that risk for T1D can be predicted by a blood draw to check for diabetes antibodies. 59 (82%) caregivers were interested in screening their other children for autoantibodies. 29 (40%) participants heard of teplizumab prior to this survey. 49 (67%) of participants said that learning about teplizumab increased their interest in screening. 55 (75%) caregivers reported that if they had a child at high risk for T1D they would be interested in teplizumab.

Conclusions: Among caregivers of children with T1D, there is substantial interest in screening their other children for T1D associated autoantibodies. Most participants reported that learning about teplizumab increased their interest in screening and that they would be interested in teplizumab if they had a child found to be at high risk for T1D. These findings indicate that a lack of knowledge about teplizumab remains, and increased awareness may lead to increased antibody screening and treatment with teplizumab.

Table 1: Survey Respondent Demographics	Caregiver Respondents (n=85)	Children of Respondents (n=89)
Age (years) %(n)*		
18-30	2% (2)	
31-40	25% (21)	
41-50	53% (45)	13.2 + 4.8
51-60	18% (15)	
>61	2% (2)	
Gender %(n)		
Male	15% (13)	54% (48)
Female	85% (72)	45% (40)
Nonbinary	0% (0)	1% (1)
Race/Ethnicity %(n)		
Non-Hispanic White	58% (49)	53% (47)
Non-Hispanic Black	28% (24)	29% (25)
Latinx	6% (5)	9% (8)
Other	5% (4)	7% (6)
Prefer not to answer	4% (3)	2% (2)
Insurance status %(n)		
Private	80% (68)	80% (71)
Public	15% (13)	18% (16)
Not insured	2% (2)	1% (1)
Prefer not to answer	2% (2)	1% (1)
Education level %(n)		
Less than college degree	14% (12)	
College degree or more	81% (69)	
Prefer not to answer	5% (4)	
Household income		
Less than $100,000	27% (23)	
100,000 or more	65% (55)	
Prefer not to answer	8% (7)	

P-78

Abstract Withdrawn

P-79

Study of Ocimum gratissimum aqueous extract on kidney function in diabetic nephropathy rat model of type 2 diabetic mellitus

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Introduction: Diabetic nephropathy is not only a common and severe microvascular complication of diabetes mellitus but also the leading cause of renal failure. T

Objectives: he present study aimed to investigate the antidiabetic and renoprotective effects of aqueous extract of leaves of *Ocimum gratissimum* (OGE) in a rat model of type 2 diabetic mellitus.

Methods: Male Sprague-Dawley rats with type 2 diabetes induced by a high-fat diet (HFD)/streptozotocin (STZ) were treated with OGE at dosages of 0.5% and 1% (w/w) daily for 4 weeks. At the end of the experimental period, serum glucose levels, insulin levels, Bcl-2, tumour necrosis factor (TNF)-α, transforming growth factor 1β, interleukin 1β and caspase-9 gene expression were assessed. Furthermore, antioxidant enzyme and thiobarbituric acid reactive substances (TBARS) and 4-hydroxynonenal (4HNE) levels were determined in the kidney with histopathological examination molecular mechanism underlying the functioning of OGE, mouse glomerular mesangial cells (MES-13) treated with high glucose (HG, 25 mM glucose) were chosen as a model for an examination of the signal transduction pathway of OGE.

Results: The results revealed that OGE improved diabetic kidney injury by reducing blood glucose, serum creatinine, and blood urea nitrogen levels. Treatment with OGE significantly reduced the TBARS and 4HNE levels and increased serum insulin levels; expression of renal superoxide dismutase, catalase, and glutathione peroxidase activities; and glutathione content. In addition, treatment with OGE attenuated Bcl-2, tumour necrosis factor (TNF)-α, transforming growth factor 1β, interleukin 1β and caspase-9 gene expression with antioxidant enzyme expression in MES-13 cells.

Conclusions: The results reveal that OGE protects the oxidant/antioxidant balance and decreases proinflammatory cytokines and apoptosis in kidney of rats with underlying pathology.

P-267

Case report: using daily glucagon-like peptide 1 agonist (GLP1-RA) in an overweight adolescent with type 1 diabetes (T1D) and rheumatoid arthritis

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Introduction: Obesity in young people with T1D remains a major health concern, and a barrier to glycemic control. Using GLP1-RA in addition to insulin therapy in adults with T1D has shown promising results in few studies by promoting weight loss and improving glycaemic control. There is no enough data to show the effectiveness of GLP1-RA in pediatrics with T1D.

Objectives: Reporting effect of GLP1-RA on weight loss & glycaemic control in an overweight adolescent with T1D.

Methods: A 16 yo female diagnosed at age of 12 yo with T1DM, rheumatoid arthritis, was gaining weight rapidly after the diagnosis. She was managed with multiple daily injections of insulin (Basal/Bolus) and continuous glucose monitoring (CGM). Despite attempts of lifestyle modification and intense input from Multiple Disciplinary Team, her weight escalated rapidly [from 68.2 kg, BMI 25.2 to 84.5 kg, BMI 29.8 in an 18-month period]. Challenges in diet and lack of physical activity due to treating rheumatoid arthritis with corticosteroids contributed to the weight gain. Hence, Liraglutide was titrated to the maximum dose with close monitoring using CGM.

Results: Following this, weight loss was noted, as her weight dropped to 77 kg. Over12 months period, her insulin consumption has reduced dramatically from TDD, Basal, Bolus 90, 30, 60 at baseline and at 12 months she stopped all boluses and managed with 40 units of Basal insulin. Her glycaemic control has improved dramatically, the HbA1c dropped from 10% to 8.4% and finally 6.5%, Time in Range increased from 22% to 36% and finally 94%.

Conclusions: This case shows that using daily injectable GLP-1 RA therapy in overweight adolescent patient with T1DM reduced weight and improved insulin sensitivity resulting in better glycemic control is promising. However, further long-term studies are necessary to assess the safety and efficacy to establish the long-term benefits of GLP1-RA as adjunctive to insulin therapy in obese adolescents with T1DM.

	Baseline	6 months	12 months
Weight (kg)	84.4	81	77
BMI (kg/m^2)	29.8	28.36	27.17
TDD units (Basal/Bolus)	90 (30/60)		40 (zero)
HbA1c (%)	10	8.6	6.5
TIR (%)	22	36	94

P-296

Type 1 diabetes screening in a pediatric population – lessons learned on a daily practice perspective

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Introduction: With the advances in preventive therapies and promising research on Type 1 Diabetes (T1D), there is an increasing need for screenings to identify the population at risk (stage 1).

Objectives: We aimed to evaluate caregivers' acceptability of T1D's screening in healthy pediatric population, determine positivity rate and compare clinical parameters.

Methods: A case control study was done at a Pediatric Hospital, from 10/05/2023-13/10/2023. Population included: T1D group(D); Genetic related group(G): co-living brothers/sisters of T1D; Control group(C): healthy children followed at outpatients clinics, without chronic conditions/medications. Demographics and clinical characteristics, biochemistry, auto-immune screenings, insulin and C peptide were collected. Healthy groups' caregivers were submitted to a structured interview to evaluate the wish to participate in screening.

Results: 104 children were included (D n=57, G n=28, C n=19), similar regarding age, sex and puberty. In group G 92% agreed with T1D' screening and 100% in group C (proposed, simultaneously with global health screening desired). Only 1/47(2.1%) healthy child had a positive screening: 6.4y brother, triple positive (islets, GAD and insulin), with decreased C-peptide and A1c 5.3%. Other 2 children from group C had single positive ZnT8, normal C-peptide, A1c 5.3%. Groups G-C were only distinct on LDL-cholesterol (G99±21, C89±19mg/dL, p=0.032). Group D was significantly different only from group C: BMI (D+0.32±1.01SD, C-0.18±1.11SD, G+0.19±0.94SD, F=4.317,p=0.016), total-cholesterol (D164±26, C146±19mg/dL, G159±26, F=3.702,p=0.026) and HDL-cholesterol (D58±12, C50±6mg/dL, G54±11, F=3.984,p=0.022).

Conclusions: T1D screening was highly accepted on genetic related children and positive results were similar to literature. Genetic group showed an intermediatte pattern on BMI and cholesterol. Establishing larger population screening will identify children at risk and help select those who might benefit from preventive/ immunomodulatory treatments.

P-551

FABULINUS — A randomized, controlled trial with FrexalimAB, to assess endogenous insulin secretion in new onset Stage 3 type 1 diabetes in adUlts and adolescentS

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Introduction: Type 1 diabetes (T1D) is caused by autoimmune destruction of pancreatic β-cells. The CD40/CD40L immune checkpoint leads to activation of both innate and adaptive immune cells. Frexalimab is the first monoclonal antibody against CD40L to be studied in T1D.

Objectives: The study goal is to demonstrate the efficacy and safety of different doses of frexalimab on endogenous insulin secretion in participants with newly diagnosed T1D.

Methods: FABULINUS (NCT06111586) is a 52-week randomized (2:1), double-blind, placebo-controlled phase 2b study with a 52-week blinded extension conducted in the US and Europe. It consists of 2 parts: Part A evaluates the safety of the highest dose of frexalimab in adults (18 - 35 years). In Part B, which is based on 3-month safety data from Part A, adolescents, and young adults (12 - 21 years) are treated with 3 sequentially escalated doses of frexalimab or placebo. Study entry criteria include diagnosis of Stage 3 T1D according to American Diabetes Association standards, initiation of insulin therapy ≤ 90 days prior to screening and random C-peptide levels ≥0.2 nmol/L. Change from baseline to Week 52 in the mean 2h stimulated AUC C-peptide concentration is used as a primary efficacy endpoint. Secondary endpoints include time in range (TIR, 70-180 mg/dL blood glucose), insulin dose, glycated hemoglobin A1c (HbA1c), remission, and safety.

Results: The study design of FABULINUS ensures the stepwise assessment of anti-CD40L antibodies in adults and then adolescents with type 1 diabetes.

Conclusions: FABULINUS is an innovative combined proof-of-concept and dose-finding study tailored to specific clinical development requirements for ß-cell preservation in T1D.

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Thursday, October 17th, 2024

Poster Corner 1: Diabetes-Associated Diseases

P-80

Are we meeting the ISPAD 2022 clinical practice consensus guidelines regarding management of children with type 1 diabetes and celiac disease?

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Introduction: Type 1 diabetes (T1D) is occasionally associated with celiac disease (CD).

Objectives: This study aimed to evaluate the worldwide practices and attitudes of physicians, members of the International Society of Pediatric and Adolescent Diabetes (ISPAD), regarding diagnosing and managing CD in children with T1D.

Methods: Physicians dealing with T1D were invited to an online 30-item survey. It was conducted between July and December 2023 and disseminated through social media channels by the JENIOUS and YES groups (early-career groups of ISPAD and European Society for Pediatric Endocrinology respectively).

Results: A total of 180 physicians responded, and we analyzed the responses of participants who described themselves as ISPAD members (85), to address the objective. The majority of respondents were female (67.1%), from high-income countries (50.6%), employed within public healthcare systems, either exclusively or in combination with private practice (90.6%). Almost half (48.2%) stated that sustaining optimal glycemic control is likely more challenging in children with both CD and T1D, compared to those with only T1D, and 77.6% agreed that more specific guidelines to manage these concurrent conditions are needed. Participants reported they follow ISPAD recommendations regarding the first CD screening tool choice, but they are inconsistent in choosing further work up steps as shown in Table 1. Majority (65.9%) agreed that forming a multidisciplinary clinic where endocrinologists and gastroenterologists jointly conduct patients' consultations, would enhance the follow-up care for patients with two coexisting diseases.

Conclusions: Our results indicate a diverse range of practices among physicians who are ISPAD members in diagnosing and managing CD in children with T1D. The adoption of the existing ISPAD guidelines regarding the treatment of children with T1D and CD seems suboptimal and highlights the need to take further actions on this topic.

Table 1.

Survey item/question	n (%)
Frequency of screening for celiac disease in patients with T1D	
*At diagnosis of T1D and then annually	54 (63.5%)
At diagnosis of T1D and every 2-5 years thereafter, sooner if symptomatic or first-degree relatives with CD	21 (24.7%)
Not at diagnosis, but thereafter every 2-5 years	1 (1.2%)
Only in the presence of gastrointestinal or extra-intestinal symptoms compatible with CD	5 (5.9%)
I can´t screen for CD because it's not available in my center	3 (3.5%)
Other	1 (1.2%)
First-line screening for CD in patients with T1D (option to tick all that apply)	
HLA	13 (15.3%)
*tTG IgA	82 (96.5%)
*Total IgA	72 (84.7%)
EmA	22 (25.9%)
Duodenal biopsy	4 (4.7%)
Gliadin peptides	6 (7.1%)
Management of an asymptomatic T1D patient with a tTG-IgA value > 10 times the upper normal limit	
I start the gluten-free diet without repeating the serologic test and without doing the biopsy.	9 (10.6%)
*I repeat the tTG-IgA test along with the EmA test, in case of positivity I make the diagnosis of CD.	20 (23.5%)
I repeat the tTG-IgA test along with the EmA test, in case of positivity I propose biopsy.	14 (16.5%)
I perform the biopsy without repeating the test.	2 (2.4%)
I refer to pediatric gastroenterologist for further work-up.	37 (43.6%)
Other	0 (0.0%)
Management of an asymptomatic T1D patient with a tTG-IgA value 3 to 10 times the upper normal limit	
I start the GFD without repeating the serologic test and without doing the biopsy.	0 (0.0%)
I perform the biopsy without repeating the test.	7 (8.2%)
*I repeat the tTG-IgA test along with the EmA test: if values are positive and exceed 10 times the UNL, start GFD	20 (23.5%)
I repeat the tTG-IgA test along with the EmA test: if values are positive and exceed 10 I propose biopsy	14 (16.5%)
I repeat the tTG-IgA test along with the EmA test: and still between 3 and 10 times UNL duodenal atrophy	23 (27.1%)
*Other (refer to gastroenterologist, etc…)	18 (21.2%)
Practice on the follow-up of children with coexisting T1D and CD at your diabetes center	
They have more frequent check-ups than other patients with T1D.	16 (18.8%)
They have the same follow-up program as other patients with T1D.	65 (76.5%)
Other	4 (4.7%)

P-81

Type 1 diabetes and neurodevelopmental and neurological disorders in children and adolescents in central Poland

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Introduction: Type 1 diabetes (T1D) is extremely heterogenous and may have common pathogenesis with concomitant disorders.

Objectives: To evaluate the prevalence of autism spectrum disorder (ASD),epilepsy and/or other neurological deficits among children with T1D and to carefully examine this special group of patients including T1D treatment outcomes.

Methods: The study included children aged 1-16 with T1D from a single pediatric diabetes centre, from Lodzkie region, central Poland (2.47 mln inhabitants).Children with both T1D and diagnoses such as ASD, epilepsy and other neurological disorders were identified by a retrospective medical records revision. of all patients.The prevalence of ASD and epilepsy in T1D group was compared to the general prevalence among Polish peers at the same age from the official electronic base. Statistical analysis was performed with Statistica package.

Results: The final cohort comprised of 669 patients (349 boys[52%] and 320 girls) with T1D, mean age 11,23±3,43 years. Twenty nine children (4,3%) had at least one neurological disorder: 8 had ASD (1.2%), 12 epilepsy (1.8%), and 20 (3%) other. Nine patients had ≥1 neurological diagnosis.

The prevalence of ASD among children with T1D was similar to the overall population ≤16 y.o. in Poland: 1.2 % vs. 1.15% (OR=1.044, 95% CI 0.52-2.096, p=0.9032), but slightly higher for epilepsy: 1.8% vs. 1.3% (OR=0.138, 95% CI=0.0784 -0.2456, p<0.0001). ASD was diagnosed only in boys (p=0.0065), and more boys than girls (67% vs. 33%) suffered from epilepsy (p=0.1076). Metabolic control in children with ASD was similar to those with T1D only, but significantly worse for other neurological disorders (HbA1c 7,88±1,55% vs. 7,24±1,02 %, p= 0.0014 in whole group, 7,56±0,97% vs. 7,24±1,02%, p=0.0029 for epilepsy).

Conclusions: Our data show that among children with T1D there is unique group of patients, especially boys, with single or multiple neurological disorders and possibly common genetic background.

P-82

Prevalence of anti-parietal cell antibodies positivity in children and adolescents with type 1 diabetes in Modena (Italy)

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Introduction: Autoimmune gastritis (AIG) has been described as one of the autoimmune comorbidities of type 1 diabetes (T1D). It is characterized by gradual atrophy of the gastric mucosa and the presence of serum autoantibodies against parietal cells (APCA).

Objectives: Our study aims to assess the prevalence of APCA positivity in children and adolescents with T1D followed up at Modena Paediatric Diabetes Outpatient Clinic.

Methods: We investigated the prevalence of APCA positivity and the presence of autoimmune comorbidities, symptoms suggestive of AIG (dyspepsia, abdominal pain, early postprandial satiety), anaemia, mean corpuscular volume (MCV) alterations and autoantibodies against β-cells at T1D onset (IAA, GAD, ICA).

Results: The study enrolled 146 children and adolescents with T1D (M/F 79/67, mean age 14.52 ±3.55 years; T1D duration 8.36±4.01 years). APCA positivity was detected in 5.5% of subjects, all of whom were over 5 years old and had been diagnosed with T1D for more than 4 years. Study participants were divided into two groups based on their APCA status. No differences were found in terms of gender, ethnicity, MCV alterations or age at T1D onset. APCA-positive subjects had a higher prevalence of symptoms ($p<0.001, X^2$ 15,74, df1), thyroid autoimmunity ($p=0.002, X^2$ 9.56, df1) and combination of IAA+GAD autoantibodies at T1D onset ($p<0.001, X^2$ 13.03, df1). Additionally, they exhibited a trend towards a higher prevalence of anaemia (p=0.054), IAA (p=0.059) and GAD (p=0.053) autoantibodies at diagnosis, although not statistically significant.

Conclusions: The observed prevalence of APCA positivity was 5.5%, consistent with the findings from few available previous studies. As the disease progresses, children with T1D tend to develop APCA positivity. Thyroid autoimmunity, symptoms, and positivity for IAA+GAD autoantibodies at T1D onset seem to be risk factors.

		AIG symptoms		Thyroid autoimmunity		IAA + GAD	
		POS	NEG	POS	NEG	POS	NEG
APCA	POS	25.0%	75.0%	62.5%	37.5%	28.6%	71.4%
	NEG	1.4%	98.6%	17.5%	82.5%	2.3%	97.7%

P-83

Association of body mass index, sex and age with islet-cell autoantibodies and endocrine autoimmunity in 28,725 children and adolescents with type 1 diabetes: a multicentre DPV-registry study

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Introduction: Type 1 diabetes mellitus (T1D) is clearly associated with other autoimmune diseases, often with a sex preference. At the same time, an increased risk of islet-cell autoimmunity is postulated as a function of body mass index (BMI).

Objectives: We hypothesize that BMI under consideration of sex and age will influence (accompanying) autoimmunity in children and adolescents with T1D.

Methods: The study population consisted of 28,725 T1D children and adolescents >0.5 and <18 years registered in the DPV database (396 contributing centres) with diabetes onset between 2010 and 2019, including three years of follow-up. Rates of thyroid-antibodies (ab) [thyroid-peroxidase-, thyroglobulin-, thyrotropin-receptor-ab], transglutaminase (TGA)-ab, anti-adrenal-ab and islet-ab [IA2-, ZnT8-, GAD-, insulin-ab] were assessed during the first three years of T1D, insulin-ab at diabetes onset only. Logistic regression models with age and sex as confounders and BMI-SDS (German reference KIGGS) /-categories [<20, 20-80, >80 Percentile (P)] three months after T1D onset as influencing factors tested for association with endocrine autoimmunity and islet-ab, excluding persons with a migrant history.

Results: The included children and adolescents had a mean age of 10.1 years, a mean duration of T1D of 1.3 years and a mean BMI-SDS of 0.3. For more population characteristics, see table. Higher BMI-SDS was associated with IA2- ($p<0.01$), ZnT8- and insulin-ab ($p<0.05$ each), as was a BMI-category >80 P with IA2-ab ($p<0.05$). Higher BMI-SDS/-categories led to a higher number of islet-ab ($p<0.001$/ $p<0.01$ respectively). Divided by sex, an association of BMI-SDS/-categories and the number of positive islet-ab in males only was seen ($p<0.001$/ $p<0.05$). Female sex favoured islet-ab per se ($p<0.05$), GAD-ab ($p<0.0001$), and the number of islet-ab ($p<0.0001$) but was negatively associated with IA2 ($p<0.05$). Older age was associated with IA2-, ZnT8-, GAD- and the number of islet-ab; younger age led to insulin-ab positivity (all $p<0.001$). Thyroid autoimmunity and TGA-ab were negatively influenced by age and female sex (all $p<0.0001$). TGA-ab but not thyroid-ab were associated with lower BMI-SDS/-categories ($p=0.0001$/ $p<0.05$). Adrenal-ab showed no association with BMI-SDS/-categories, age or sex.

Conclusions: Higher BMI, but also age and sex, are linked to islet-cell and endocrine autoimmunity in T1D children and adolescents. This knowledge could aid in future risk stratification for autoimmunity and offer an approach to influencing it.

					Age					
	Females		Males		<6		6 - ≤ 12		12 - ≤ 18	
Variable	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
Age (y)	13241	9.8	15484	10.3	5685	4.2	12260	9.2	10780	14.2
T1D duration (y)	13241	1.3	15484	1.3	5685	1.2	12260	1.3	10780	1.3
BMI-SDS (KIGGS)	13169	0.3	15396	0.2	5673	0.6	12188	0.2	10704	0.1
IAI+ (%)	8232	91.5	9714	90.0	3660	89.8	7685	91.1	6601	90.7
Thyroid-ab + (%)	10666	14.1	12497	7.0	4573	5.4	9894	9.8	8696	13.2
Anti-adrenal-ab + (%)	1210	8.5	1375	8.4	502	7.3	1129	8.6	954	8.8
Transglutaminase ab + (%)	10043	10.7	11685	7.6	4336	14.7	9282	9.0	8110	6.0

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P-84

Outcomes of triple therapy (elexacaftor/tezacaftor/ivacaftor) in Cystic fibrosis-related diabetes: a real-life case study from a Brazilian reference center

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Introduction: CFRD affects metabolic and pulmonary functions. The emergence of CFTR modulators, notably Elexacaftor/Tezacaftor/Ivacaftor (ETI), has transformed treatment options. Assessing their real-world efficacy is vital for enhancing patient management.

Objectives: Describing the evolution in a real-life scenario of two CFRD patients using CFTR modulators through ETI in a single reference center.

Methods: Progression of weight, height, BMI, pulmonary function test (FEV1), HbA1C, total daily insulin dose (*TDI) in IU/kg, fat-free mass (FFM) and fat mass (FM)* by dual-energy X-ray absorptiometry (*DEXA*) over a 3-month follow-up period. The study was conducted at a reference center in Brazil. Participants had CFRD and were F508del homozygous. Baseline data (T0) were collected before ETI, between March and May 2023. The study was approved by the Ethics Committees.

Results: The first case concerns a 14yo girl. CFRD was diagnosed at age of 9. Her weight (38.2 kg), height (146cm) and BMI (17.9 kg/m^2) maintained after ETI. FEV1 improved 15.14% (77.03%-92.17%). FM improved 1.8% (30.6%-32.4%) and FFM decreased 1.63% (65.3%-63.67%). HbA1C reduced 0.7% (5.6%-4.9%) and TDI remained the same. The second case concerns a 15yo boy. CFRD was diagnosed at age of 12. There was an increase of 4.3kg (46.3-50.6kg) and 1cm (162-163cm). BMI increased 1.4 kg/m^2 (17.64-19.04kg/m^2). FEV1 improved 9.12 % (84.38-93.5%). FM decreased 1.66% (17.41%-15.75%) and FFM improved 1.87% (78.28%-80.15%). HbA1C increased 0.4% (5.9%-6.23%) and TDI decreased 0.07 UI/kg (0.12-0.05 UI/kg).

Conclusions: ETI improved FEV1, BMI, and glycemic outcomes. Despite stable weight and height in one patient, DEXA scans indicated body mass differences. Interestingly, while body composition varied between patients, the second demonstrated better functional fitness. Although the first patient's TDI remained stable, HbA1c levels decreased post-ETI. Conversely, due to hypoglycemia, the second patient required TDI reduction.

P-85

Two Pakistani families with a DEND syndrome

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Introduction: DEND syndrome is severe form of neonatal diabetes mellitus characterized by triad of developmental delay, epilepsy and neonatal diabetes.It is caused by mutations in the K-ATP channel encoded by KCNJ11 or SUR1 sulphonyl urea receptor 1 encoded by ABCC8 gene.Its Incidence is <1/1000,000 and until now very few cases have been reported worldwide.

Objectives: We report two cases from two different Pakistani Families who have similar presentation of DEND syndrome and responded well to oral sulphonylureas.

Methods: We have two patients admitted to our ward. First patient was 5 months old male patient presented with fever cough and breathing difficulty. He was a globally delayed child and had fits since birth, he was microcephalic Serum ketones were positive. His BSRS was high, presented with DKA in ER. HbA1C was 8.5%. The patient was started on DKA protocol, anti-epileptics started. The patient got improved and discharged on long acting insulin (Insulin detemir). He again presented with severe DKA after 20 days of discharge. This time he was extremely sick with poor pulses and perfusion. Anti Insulin and Anti GAD antibodies were sent which were negative. Genetics have been sent. He was started oral sulfonyl urea drugs. His BSRs improved and he was discharged afterwards. Second patient was 3 months old female patient presented with focal fits, fever and breathing difficulty for the last 5 days. On examination she was microcephalic and had not achieved neck holding yet. Her BSR was high and ABGs showed severe metabolic acidosis. HbA1c was 14.5%. Anti-Insulin and anti-GAD antibodies were negative. Genetics have been sent and was also started oral Sulphonyl urea drugs.

Results: Genetic report has been sent which came out to be DEND syndrome

Conclusions: Any patient presented with the triad of Developmentally delayed, Epilepsy and Neonatal Diabetes Mellitus should be considered for DEND syndrome. Genetics should be sent and oral sulphonyl ureas should be started as soon as possible

Written informed consent was obtained from the guardians of the individuals depicted for publication of this image.

P-86

Coeliac disease and diabetes in children and young people: epidemiological, clinical and metabolic aspects

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Introduction: Celiac disease and diabetes are two autoimmune diseases resulting from the interaction of genetic, immunological and environmental factors.

Objectives: Our work aims to determine the prevalence of Celiac disease (CD) in Type 1 diabetic (T1D) patients and to study the impact of early detection Gluten-free diet (DFG) on metabolic control and prognosis in children and young diabetics.

Methods: 49 DT1 of 3,000 patients had celiac disease a few years (1-6 years) after the diagnosis of diabetes, except for one patient who had CD prior to the diagnosis of T1D.

Results: The prevalence of CD is 1.6% (50/3000) in the T1D population. 14 boys and 10 girls DT1 with an average age of 14.4 years. Age of diagnosis of T1D is 4 years. Diagnosis of CD has a median of 8.5 years. Average age of onset of CD after the diagnosis of T1D is 2.5 years. 54.5% have a moderate stature delay (-1DS, -2DS) and 4.5% have a severe stature delay (-4DS). 62.5% show normal growth after (DFG) follow-up. The major signs are common in celiac T1D: abdominal pain (57.5%), transit disorder (47.5%), abdominal swelling (45%) and cut anal mucosa (32.5%). Anti-endomysial, anti-transglutaminase and Anti-gliadin antibodies were positive in (34%, 82.6% and in 8.9 %) respectvively. Histological examination showed total villous atrophy (VTA) 56.4% (22/49), subtotal villous atrophy (AVST) in 10.3% (4/49), partial villus atrophy (VAS) in 28, 2% (11/49). 93% (40/43) patients comply with the DFG. The metabolic control of HbA1c that was found in patients improved by 7.9% before DFG and by 7.8% (range: 6-10, 3%) after taking the DFG.

Conclusions: In Morocco, the CD and DT1 combination is not uncommon, Gluten intolerant must be satisfied with the DFG. Strict adherence to this regimen results in reduced symptoms, recovery of the intestinal mucosa and also prevents the development of complications related to celiac disease such as cancer.

P-87

Autoimmune diseases and comorbidities in children and adolescents with diabetes mellitus type 1

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Introduction: Type 1 diabetes (T1DM) is one of the most common chronic diseases of childhood and adolescence accompanied by others autoimmune disorders.

Objectives: The aim of the study was to identify the autoimmune comorbidities in children and adolescents with T1DM, their frequency and the possible risk factors for their occurrence.

Methods: This retrospective study included children and adolescents with T1DM up to 18 years of age, in whom the diagnosis of T1DM had been documented in the last decade. Demographic, clinical and biochemical data were collected from records of patients followed up in our Unit.

Results: A total of 267 records were studied and 203/267 met the criteria and were included in the study. Among the participants, 33% had another autoimmune disease. Risk factors for the manifestation of these auto-immunities were female gender (p= 0.021), family history of autoimmunity (p= 0.042) and positive T1DM autoantibodies (p= 0.009). Autoimmune diseases recorded were Hashimoto's thyroiditis (27.6%), celiac disease (5.9%), Graves' disease (1.5%) and autoimmune gastritis (0.5%). Hashimoto's thyroiditis was more common among girls (p=0.021) and patients with a family history of Hashimoto's among first-degree relatives (p=0.012). Celiac disease was not associated with gender or age at T1DM diagnosis. HLA-DRB1*03*07, HLA-DRB1*03*16, HLA-DRB1*04* and HLA-DQB1*02* genotypes were positively correlated with celiac disease.

Conclusions: The present study showed the increased frequency of autoimmune diseases in children and adolescents with T1DM. The occurrence of these comorbidities was not associated with age, so continuous and longitudinal monitoring of these is crucial. Further studies with larger numbers of patients are needed to determine the risk factors responsible for autoimmune diseases in children and adolescents with T1DM.

P-88

Combined autoimmune-autoinflammatory diseases: case presentation and the search for mutual pathophysiological mechanism

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Introduction: Childhood autoimmune disorders involve the immune system attacking its own tissues, while autoinflammatory disorders result from innate immune system dysregulation, leading to varied symptoms, requiring extensive diagnosis and multidisciplinary management.

Objectives: To present a rare clinical case of a child with several autoimmune-autoinflammatory disorders and to find out mutual pathophysiological factors.

Methods: A unique clinical case of a combination of autoimmune and autoinflammatory disorders: the initial manifestation of hip pain, coupled with progressive symptoms over several years and findings in multiple magnetic resonance imaging scans, culminated in the diagnosis of chronic recurrent multifocal osteomyelitis (CRMO). Subsequently, the patient was diagnosed with type 1 diabetes (T1D), celiac disease, and juvenile idiopathic arthritis (JIA). The treatment was challenging, marked by unsuccessful attempts with nonsteroidal anti-inflammatory drugs, and biphosphonates. A stable clinical status was ultimately achieved with methotrexate, together with insulin therapy and the implementation of a gluten-free diet for celiac disease.

Results: The combined pathology likely results from genetic predisposition interacting with environmental and immunologic factors, such as infant nutrition and viral infections, leading to dysregulation of the immune system; specifically, increased release of IL-1ß and TNF-α contributes to CRMO and T1D pathogenesis, while undiagnosed celiac disease may initiate "leaky gut" syndrome, allowing gliadin fragments to induce an immune response and activate CD4+ T lymphocytes, ultimately resulting in increased pro-inflammatory cytokines, activation of B lymphocytes producing autoantibodies, and CD8 lymphocyte activation contributing to pancreatic beta cell destruction.

Conclusions: Our case showed that the combination of autoimmune and autoinflammatory diseases, brought not only a challenging diagnostic process, but also complicated treatment.

P-89

Type I diabetes mellitus and cardiovascular risk in pediatric age

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Introduction: Cardiovascular disease (CVD) is the leading cause of mortality in patients with type 1 diabetes (T1DM). While CVD complications are seen predominantly in adulthood, the atherosclerotic process begins in childhood and is accelerated in patients with T1DM.

Objectives: The main goal of this study was to describe the prevalence and evolution of major CVD risk factors in children and adolescents with T1DM.

Methods: Single center, ambispective (retrospective until 2023 and prospective from 2023), cross-sectional, and analytical study. The variables analyzed were: age at diagnosis, duration of the disease, lipid profile (including triglyceride/HDL index), glycated hemoglobin (HbA1c) and BMI, after 1 (t1), 3 (t2), 6 (t3) and 9 (t4) years of disease.

Results: The study includes 70 patients, aged between 4 and 19 (Md=15 years) and disease progression of 2 to 15 years (Md=4.5 years). The HbA1c value was lower than 7.5% in 73% of patients in t1, 55% in t2, 54% in t3 and 62% in t4. LDL-cholesterol values decreased progressively, 22% of patients with values > 110 mg/dL in t1 and 10% in t2; the triglyceride/HDL index was lower than 1.7 in 91% of patients in t1, in t2 in 95%, 88% in t3 and 85% in t4. These changes in the lipid profile did not show statistical significance when correlated with the HbA1c value. Regarding BMI, in t2, 15% had a BMI > P95 (33% with HbA1c > 7.5%); 15% had a BMI 90-95 (overweight), 66% with HbA1c > 7,5%; in t1, t3 and t4, no statistical difference was observed.

Conclusions: Dyslipidemia and obesity in pediatric patients with T1DM are common comorbidities. As the disease progressed, there was a decrease in glycemic control and an increase in triglyceride/HDL index. Instead, the percentage of obese/overweight patients decreased over time. Patients with dyslipidemia must be treated according to established indications and BMI values should be reduced in order to improve outcomes and prevent further CVD.

Thursday, October 17th, 2024

Poster Corner 2: Automated Insulin Delivery, Closed Loop

P-90

Real-world outcomes with the Omnipod® 5 automated insulin delivery (AID) system for >4,700 children, adolescents, and young adults with high HbA1c (>9%, >75mmol/mol) at Baseline

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Introduction: Baseline HbA1c is an important factor to consider when optimizing outcomes with AID, as user needs and expectations vary. The Omnipod 5 AID System was associated with improvements in glycemic outcomes in children and adolescents with T1D regardless of baseline glycemia in two single-arm pivotal clinical trials.

Objectives: This study aimed to evaluate glycemic outcomes with the Omnipod 5 System for pediatric and young adult users in the United States (US) with self-reported, sub-optimal HbA1c >9% (>75mmol/mol) prior to starting on the system in a real-world setting.

Methods: A retrospective analysis of continuous glucose monitoring (CGM) and insulin data from Omnipod 5 users in the US with ≥90 days of data available in the cloud-based data management system was conducted. Users were included if they had T1D, were aged 2 to <26 years and using ≥5 units of insulin per day, had sufficient CGM data (≥75% of days with ≥220 readings), and self-reported baseline HbA1c >9% (>75mmol/mol).

Table. Real-world outcomes with the Omnipod 5 AID System for pediatric and young adult users with self-reported HbA1c >9% (>75mmol/mol) at baseline

	All users with baseline HbA1c >9% (>75mmol/mol)	Users with baseline HbA1c >9% (>75mmol/mol); 110mg/dL (6.1mmol/L) Target[2]	Users with baseline HbA1c >9% (>75mmol/mol); Optimized Use[3]
Estimated baseline TIR (%)[1]	<34%	<34%	<34%
N	4,723	1,840	663
Age (y)	15 [10, 20]	16 [12, 21]	14 [11, 21]
GMI (%)	8.14 [7.67, 8.70]	8.02 [7.54, 8.62]	7.53 [7.07, 7.89]
TIR, 70-180mg/dL (3.9-10.0mmol/L) (%)	46.5 [36.7, 56.1]	49.3 [38.7, 59.1]	59.2 [51.4, 71.0]
TBR, <70mg/dL (<3.9mmol/L) (%)	0.70 [0.31, 1.38]	0.80 [0.38, 1.49]	0.79 [0.40, 1.44]
Cumulative time at 110mg/dL (6.1mmol/L) target (%)	42.4	88.9	87.9
Time in Automated Mode (%)	85.2 [67.6, 94.3]	84.1 [64.6, 94.3]	95.7 [91.7, 98.3]
Total daily dose (U)	45.7 [29.9, 60.8]	51.4 [37.3, 66.5]	52.8 [31.4, 73.0]
Boluses per day	3.4 [2.4, 4.5]	3.1 [2.2, 4.2]	4.3 [3.6, 5.6]
Proportion of insulin from boluses (%)	37.2 [30.6, 44.4]	36.5 [30.3, 43.3]	41.8 [35.9, 49.2]
Days on device	323 [194, 440]	319 [199, 436]	317 [187, 447]

Data are median [interquartile range] unless otherwise indicated. GMI: glucose management indicator; TIR: time in range; TBR: time below range

[1]Beck, et al. The Relationships Between Time in Range, Hyperglycemia Metrics, and HbA1c. JDST, 2019 13(4): 614–626

[2]Mean target over time of 110-115mg/dL (6.1-6.4mmol/L)

[3]Mean target over time of 110-115mg/dL (6.1-6.4mmol/L), ≥85% time in Automated Mode, bolus ≥3 times per day

Results: Data from 4,723 users with self-reported HbA1c >9% (>75mmol/mol) with a median 323 days of device wear were available at the time of analysis. Outcomes are shown in the Table, with results reported as median [IQR]. Users achieved a GMI of 8.14%, time in range (TIR: 70-180mg/dL, 3.9-10.0mmol/L) of 46.5%, and a time below range (TBR: <70mg/dL, <3.9mmol/L) of 0.70%, while bolusing 3.4 x/d, corresponding to an estimated HbA1c decrease of >0.86 (>9mmol/mol). Those with optimized Omnipod 5 System use, including an average glucose target of 110mg/dL (6.1mmol/L), bolusing ≥3 x/d, with ≥85% time in Automated Mode, achieved a TIR of 59.2% and a GMI of 7.53%, indicating >1.47% (>16mmol/mol) estimated decrease in HbA1c, with 47.2% of users achieving a GMI <7.5%.

Conclusions: In this cohort of >4,700 pediatric and young adult users with high baseline HbA1c, clinically meaningful improvements in glycemic outcomes were noted with real-world use of the Omnipod 5 System.

Table. Actual CGM value at time of pump interaction vs perceived blood glucose

Reason for pump interaction (survey)	Mean glucose (mg/dL)	SD (mg/dL)
I thought glucose was too high	165	52.4
I thought glucose was too low	183	67.6

P-91

Perceptions of hyper and hypoglycemia symptoms vs actual CGM values in adolescents and young adults with type 1 diabetes

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Introduction: Effective use of diabetes technology requires considerable user interaction. Our study explored the reasons adolescents and young adults (AYA) with type 1 diabetes (T1D) interacted with their insulin pumps. Suspected hyper and hypoglycemia were common triggers prompting pump interaction.

Objectives: We sought to determine the accuracy of these perceptions when compared to glucose values using the Dexcom G6 continuous glucose monitor (CGM).

Methods: Twenty AYA with T1D using the Tandem t:slim X2 with Control-IQ technology were enrolled from our clinic (median age 17y, IQR 16–20.25, 50% male, 55% non-Hispanic white). For two weeks, participants indicated their reason for pump interaction in a multiple-choice survey each time they interacted directly with their pump or through the t:connect Mobile App. Users initiated surveys by clicking a link on their phone immediately after interacting with their pump. In addition, CGM data were obtained from Tandem's t:connect software.

Results: Collectively, participants completed 987 surveys accounting for 42% of pump interactions (table). When citing reasons for pump interaction, there were 157 responses indicating "I thought glucose was too high" and 89 responses indicating "I thought glucose was too low." Only 37% of suspected highs were accompanied by a glucose value ≥ 180 mg/dL, and no suspected lows were accompanied by a glucose ≤ 70 mg/dL. On the contrary, 42% of these "perceived low glucose" instances were accompanied by a glucose ≥ 180 mg/dL.

Conclusions: Perceived hyper and hypoglycemia were not reliable indicators of glucose status for our study participants, underscoring the value of CGM for monitoring and regulating blood glucose. Further research is needed to understand the role of comprehensive situational awareness in blood glucose management and its impact on glycemic outcomes for AYA with T1D using automated insulin delivery systems.

P-92

Safety and glycemic outcomes among youth with new onset type 1 diabetes using a tubeless automated insulin delivery system

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Introduction: Automated insulin delivery (AID) systems aim to safely improve glycemic outcomes while alleviating the burden of complex diabetes management, which may be especially beneficial for newly diagnosed youth with type 1 diabetes (T1D) and their families.

Objectives: The purpose of this study was to evaluate glycemic outcomes and safety (DKA, severe hypoglycemia) in youth who started the tubeless Omnipod 5 AID system soon after T1D diagnosis.

Methods: Youth (<18 years old) with T1D at a large, U.S. diabetes center who initiated Omnipod 5 AID system within the first 3 months following diagnosis were eligible for retrospective analysis. Glycemic outcomes and insulin data from the initial 3 months of AID system use were obtained from Glooko, and episodes of DKA or severe hypoglycemia were obtained from electronic health records. Results reported as mean ± S.D., median [interquartile range].

Results: Among 77 users who initiated Omnipod 5 AID system within 3 months of T1D diagnosis, 51.9% were female, age 9.4 ± 4.0 years, and AID system was initiated 47 ± 19 days after diagnosis. Over the initial 3 months of Omnipod 5 use in the new onset period, users achieved a GMI of 7.1 ± 0.6% with 71.9 ± 14.7% time in range (70-180mg/dL, 3.9-10.0mmol/L) and minimal hypoglycemia (TBR level 1: 54-69 mg/dL, 3.0-3.9mmol/L of 0.6 ± 0.6%, TBR level 2: <54 mg/dL, <3.0 mmol/L of 0.0 ± 0.2%). Outcomes by age group (<6 years, 6 to <12 years, and 12 to <18 years) are shown in the Table. There were no reported episodes of DKA or severe hypoglycemia during the first 3-months of Omnipod 5 use.

Conclusions: Omnipod 5 AID system use in the new onset T1D period appears to be safe and effective, providing real-world evidence supporting the early adoption of AID systems soon after T1D diagnosis. Future studies should assess whether early adoption of AID systems impacts long-term glycemic control in T1D.

Age Group	<6 years, N=17	6 to <12 years, N=38	12 to <18 years, N=22	All Ages (0+ to <18 years), N=77
Age at T1D diagnosis, years	3.7 ± 1.2, 3.5 [2.9, 5.0]	9.3 ± 1.7, 9.4 [8.0, 10.7]	14.1 ± 1.5, 13.8 [12.9, 15.4]	9.4 ± 4.0, 9.5 [6.6, 12.2]
GMI, %	7.7 ± 0.6, 7.5 [7.3, 7.8]	7.0 ± 0.4, 7.1 [6.7, 7.3]	6.8 ± 0.4, 6.8 [6.4, 7.0]	7.1 ± 0.6, 7.1 [6.7, 7.4]
Users meeting ISPAD GMI/A1c target <7%, N (%)	3 (17.6)	17 (44.7)	17 (77.3)	37 (48.1)
Time in glucose ranges	Level 2 TBR	Level 2 TBR	Level 2 TBR	Level 2 TBR
Level 2 Time Below Range (TBR) <54 mg/dL (<3.0 mmol/L)	0.1 ± 0.2, 0.0 [0.0, 0.0]	0.0 ± 0.2, 0.0 [0.0, 0.0]	0.0 ± 0.0, 0.0 [0.0, 0.0]	0.0 ± 0.2, 0.0 [0.0, 0.0]
Level 1 TBR 54-69 mg/dL (3.0-3.9 mmol/L)	Level 1 TBR 0.6 ± 0.6, 1.0 [0.0, 1.0]	Level 1 TBR 0.6 ± 0.6, 1.0 [0.0, 1.0]	Level 1 TBR 0.5 ± 0.5, 0.0 [0.0, 1.0]	Level 1 TBR 0.6 ± 0.6, 1.0 [0.0, 1.0]
Time in Range (TIR) 70-180 mg/dL (3.9-10.0mmol/L)	TIR 56.4 ± 12.9, 56.0 [52.0, 64.0]	TIR 73.7 ± 11.9, 71.5 [66.0, 80.0]	TIR 81.0 ± 10.9, 81.5 [75.0, 90.8]	TIR 71.9 ± 14.7, 73.0 [64.0, 82.0]
Level 1 Time Above Range (TAR) 181-250 mg/dL (10.1-13.9 mmol/L)	Level 1 TAR 25.1 ± 3.9, 25.0 [23.0, 28.0]	Level 1 TAR 18.8 ± 7.2, 21.0 [16.0, 24.0]	Level 1 TAR 14.6 ± 7.0, 15.0 [8.3, 19.0]	Level 1 TAR 19.0 ± 7.5, 21.0 [14.0, 25.0]
Level 2 TAR >250 mg/dL (>13.9 mmol/L)	Level 2 TAR 17.8 ± 10.6, 16.0 [11.0, 20.0]	Level 2 TAR 6.9 ± 5.7, 6.5 [3.0, 9.0]	Level 2 TAR 4.0 ± 5.0, 2.0 [1.0, 4.8]	Level 2 TAR 8.4 ± 8.5, 7.0 [2.0, 12.0]
Total daily dose, U/d	7.7 ± 2.8, 7.1 [6.0, 9.4]	15.2 ± 10.5, 11.4 [7.9, 18.8]	28.2 ± 17.5, 25.3 [14.7, 36.9]	17.3 ± 14.0, 11.7 [7.6, 24.1]
Boluses per day	5.9 ± 3.7, 5.4 [3.6, 6.0]	4.9 ± 1.9, 4.5 [3.5, 5.5]	4.9 ± 1.7, 4.6 [3.7, 6.0]	5.1 ± 2.4, 4.7 [3.6, 5.7]
Proportion of insulin from boluses, %	54.6 ± 7.7, 55.0 [49.0, 59.0]	51.7 ± 11.8, 52.0 [42.3, 57.8]	53.1 ± 9.7, 54.5 [49.3, 57.8]	52.7 ± 10.4, 54.0 [46.0, 58.0]
Time in Automated Mode, %	89.3 ± 16.7, 93.0 [90.0, 98.0]	93.3 ± 10.5, 97.0 [92.0, 98.0	96.6 ± 5.0, 98.0 [96.0, 99.8]	93.4 ± 11.2, 97.0 [92.0, 99.0]

P-93

Clinical outcomes with MiniMed^{tm} 780g advanced hybrid closed-loop therapy in children <7 years with type 1 diabetes

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Introduction: Advanced hybrid closed-loop (AHCL) therapy with the Medtronic MiniMed™ 780G system improves glycemia; however, the clinical outcomes in younger children remain less established.

Objectives: The evaluation of the use of the Medtronic Minimed^{TM} 780G in children under 7 years old was aimed.

Methods: Children under 7 years old with type 1 diabetes mellitus (T1D) using MiniMed™ 780G AHCL and a control group of similar age and gender using MiniMed™ 640G (Predictive Low Glucose Suspend System - PLGS), and T1D patients on multiple-dose insulin (MDI) with continuous glucose monitoring system (CGM) were included. CGM metrics and HbA1c were retrospectively evaluated at baseline, 3, 6, and 12 months. Time in SmartGuard^{TM}, active insulin time, and total daily insulin dose (TDI) in children using AHCL were retrospectively evaluated among themselves at baseline, 3, 6, and 12 months.

Results: Mean age at initiation was 5.25 ± 1.22 years. TDI was initially 4,5-17,6 U/day (min-max). Glucose management indicator (GMI) and HbA1c values were significantly lower at 3, 6, and

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Table 1: Comparison between Minimed™ 780G and Minimed™ 640G and CGM+multi-dose SC insulin users.

	0-month				3-month				6-month				12-month			
	Minimed™ 780G	Minimed™ 640G	CGM+multi-dose SC insulin	p*	Minimed™ 780G	Minimed™ 640G	CGM+multi-dose SC insulin	p*	Minimed™ 780G	Minimed™ 640G	CGM+multi-dose SC insulin	p*	Minimed™ 780G	Minimed™ 640G	CGM+multi-dose SC insulin	p*
TAR (%)	23,7±12,7	32,4±12,7	33,6±19,8	0,107	18,4±7,3	36,5±17,9	34,3±15,5	**0,018***	20±5,9	39±18,7	36,6±19,4	**0,017***	21,2±8,9	31,3±10,7	37,2±19,4	**0,04***
180-250	17,6±7	25,6±10,5	21,6±9,5	0,137	15,9±5,1	28,1±14,4	25,5±7,6	**0,017***	17,2±6,1	28,7±13,7	25,1±11,3	0,052	18,1±5,4	23,5±6,8	20,7±6,6	0,154
>250	4,7±6,8	6,8±5,3	12,3±11,7	0,110	3,6±2,7	8,4±5,8	8,6±8,8	0,118	6,8±11,5	10,3±7,7	11,5±11,7	0,563	3,6±3,4	7,82±4,22	16,5±18,5	**0,032***
TIR (%)	70±16	63,8±13,8	64,7±19,7	0,239	76,7±7,1	59,6±17,5	63,6±15,1	**0,026***	72,5±15,6	57,3±17,9	60,5±19,1	0,120	75,9±7,7	64,7±9,7	59,1±18,7	**0,019***
TBR (%)	4,7±3,1	3,8±2,4	1,6±1,1	0,061	4,8±2,9	3,7±2,8	2,4±2,3	0,178	3,6±2,4	3,7±2,6	3±2,2	0,746	5,5±2,1	4±3,1	3,7±3	0,944
54-70	2,8±2,4	3,1±1,9	2,4±2,5	0,752	3,3±2	3,1±2,3	2,3±2,1	0,513	2,9±1,8	3±1,8	2,9±2,2	0,992	2,5±1,3	3,2±1,9	3,6±2,9	0,484
40-54	0,5±0,7	0,7±0,8	0	**0,027***	1,3±2,1	0,6±0,9	0,1±0,3	0,134	0,6±0,8	0,7±0,9	0,1±0,3	0,099	0,5±0,5	0,8±1,5	0,2±0,4	0,289
CV (%)	36,1±5,6	36,4±5,3	36,3±5,5	0,975	37,1±4,4	35,4±5,7	34,8±5,1	0,698	36,5±3,6	36,5±5,4	35,8±5,5	0,923	34,3±2,1	37±3,8	39,7±4,9	**0,008***
GMI (%)	7,3±1,2	6,4±2,2	5,2±3,4	0,147	6,6±0,2	7,1±6,4	6,4±2,4	0,472	6,6±0,2	7,3±0,5	6,6±2,3	0,462	6,7±0,4	6,1±2,1	6,5±2,2	0,632
HbA1c (%)	8,8±1,7	7,5±1,1	7,5±1,3	0,220	6,6±0,5	7,2±0,8	7,2±1,3	0,684	6,7±0,4	7,3±0,7	7,6±1,6	0,182	6,5±0,4	7,4±0,5	7,6±1,3	**0,015***

CGM: Continuous Glucose Monitoring; **TAR:** Time Above Range; **TIR:** Time In Range; **TBR:** Time Below Range; **CV:** Coefficient of Variation; **GMI:** Glucose Management Indicator; **SC:** Subcutaneous; **TDI:** Total Daily Insulin Dose, **carb:** carbohydrate, **SG:** Sensor glucose; **BG:** Blood Glucose

*: p<0.05: Statistically significant

12 months compared to baseline. (p <0.001, respectively) When AHCL was compared to MDI+CGM and PLGS, Time Above Range (TAR) was significantly lower at the 3rd, 6th, and 12th months, while HbA1c and Coefficient of variation (CV) values were significantly lower at the 12th months in the AHCL group. Time In Range (TIR) value was significantly higher in the 3rd and 12th months. No cases of ketoacidosis or severe hypoglycemic events were observed in any of the children during the monitoring period. **(Table 1)**

Conclusions: The absence of significantly higher levels of hypo- and hyperglycemia compared to other groups at any period, along with a significant increase in TIR at the 3rd and 12th months, coupled with a significant decrease in HbA1c and CV, indicates that AHCL is both reliable and effective in children under 7 years old.

P-94

Real-world performance of the MiniMed™ 780g safe meal Bolus feature in children

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Introduction: The Safe Meal Bolus (SMB) feature of the MiniMed™ 780G (MM780G) reduces the meal bolus amount, calculated primarily using carb-count, when post-prandial (PP) hypoglycemia (hypo) is predicted.

Objectives: In this study, we evaluated SMB safety and effectiveness in reducing PP hypo without resulting PP hyperglycemia in children.

Methods: We examined 6 months of CareLink™ data for 916 U.S. MM780G users aged 7-17 years who consumed 36,385 meals when mealtime glucose was 100-120 mg/dL. In this range, the algorithm bolus calculation is determined by the entered carbs and insulin-to-carb ratio and correction bolus is not required. The 4-hr PP sensor glucose (SG) for groups with different SMB reductions was analyzed: 0% (n=908; 29,823 meals), 1-33% (n=761; 6,012 meals), 34-66% (n=89; 333 meals), 67-100% (n=63; 113 meals).

Results: The rate of decline in pre-prandial SG is a key contributor to the model that determines the percentage of bolus reduction. The blue trace in the Figure shows the meals with rapidly declining pre-prandial SG and an elevated risk of hypo, these meals observed a high (67-100%) reduction in meal bolus. The lower reduction groups in yellow (0%), green (1-33%) and red (34-66%) showed a slower pre-prandial SG decline rate and posed a lower risk of imminent hypo. For meals with 0%, 1-33%, 34-66% and 67-100% reductions, the rate of change of SG at mealtime (mg/dL/minute) was 0.0±0.3%, 0.0±0.4%, -0.7±0.7% and -1.4±0.7%, respectively. The corresponding PP glycemic outcomes were clinically similar from the no-reduction to high-reduction groups: time below range 70 mg/dL of 2.1±2.7% to 2.6±5.6%, time above range 180 mg/dL of 31.5±14.7% to 31.6±25.1% and time in range 70-180 mg/dL of 66.4±14.2% to 65.8±25.0%.

Conclusions: Children using the MM780G system with rapidly declining SG may be at increased risk of PP hypo. The SMB reduction can proactively reduce the meal bolus size without an increase in PP hyperglycemia.

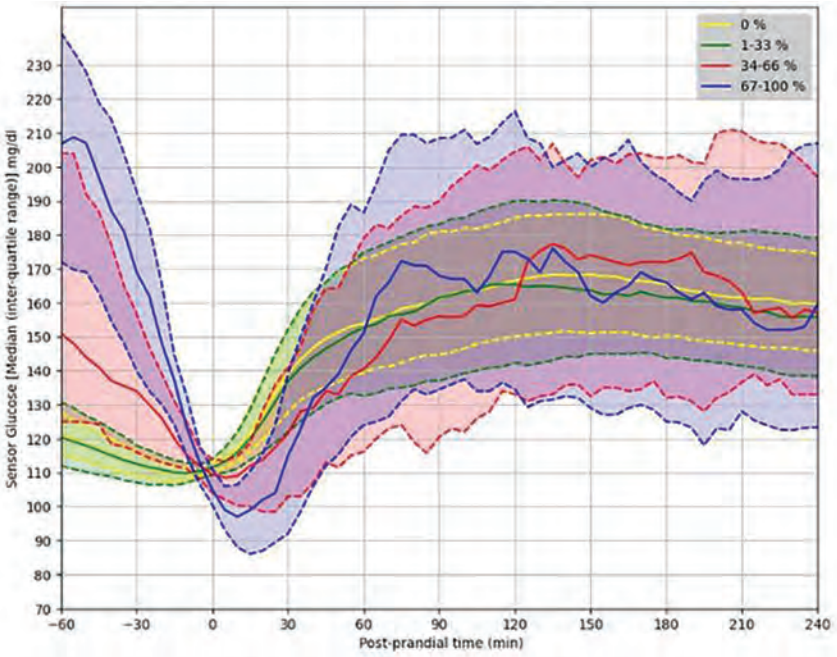

Figure. Per person averaged post-prandial glucose for Safe Meal Bolus grouped by percentage of bolus reductions for pediatric MiniMed™ 780G system users

The SG trends (medians in solid lines, inter-quantile range within dashed lines) are shown for all pediatric SMB reduction groups. The rapidly declining SG for the 67-100% reduction group (blue line) posed an increased risk of hypoglycemia at mealtime (post-prandial time = 0), followed by a return to within-range post-prandial glucose after SMB reduction.

P-95

Can time in range or time in tight range replace HbA1c?

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Introduction: HbA1c has long been the gold standard for monitoring glycemic control; however,with the widespread use of continuous glucose monitoring systems(CGMS), the use of Time in Range(TIR) and Time in Tight Range(TITR) is increasing

Objectives: To investigate the changes in TIR and TITR over three-month period and the correlation of each with HbA1c

Methods: Children and adolescents with T1D using Medtronic Minimed 780G insulin pump therapy were included in the study. The last HbA1c value and CGM reports of the last three months preceding HbA1c were evaluated

Results: Of the 110 patients evaluated,81 patients who were using the system for at least 6 months were included.HbA1c and CGM metrics are given in Table1. Repeated measures analysis of variance of TIR and TITR in 6 bi-weekly CGM reports, no significant difference in the change of TIR and TITR over time (TIR, p:0.692; TITR, p:0.728). TIR(r:varied between 0.753 and 0.876, p<0.001) and TITR(r:varied between 0.81 and 0.866, p<0.001) were strongly correlated both within themselves and with their means. HbA1c was strongly negatively correlated with both mean TIR(r:-0.597,p<0.001) and mean TITR(r:-0.796,p<0.001). This parallelism continued when well-controlled(<7%) and poorly controlled (>7%) groups when evaluated separately(p<0.001). Overall means of TIR and TITR showed parallelism with HbA1C. When HbA1c was 7%,TIR ranged from 68% to 87% and TITR ranged from 43% to 66%. HbA1c ranged between 6.6% and 9.6% in the area where TIR was approximately 70%, and between 6.8% and 9.4% in the area where TITR was approximately 50% (Fig1). We observed that both sensor usage rate (TIR, p<0.001; TITR, p=0.05) and autobolus rate(TIR, p<0.001; TITR, p=0.033) affected the average TIR and TITR

Conclusions: The fact that average of 3-monthTIR and TITR,as well as any TIR and TITR in the last 3 months,correlates well HbA1c supports that TIR and TITR generally give a good idea about glycemic control.However, when the cases are evaluated individually, it maybe thought-provoking that the HbA1c levels of the cases with similar TIR and TITR are different.Larger case studies should be conducted to determine main parameters that affect TIR and TITR,as sensor usage rate,CV,autocorrection bolus rate,are effective on this correlation

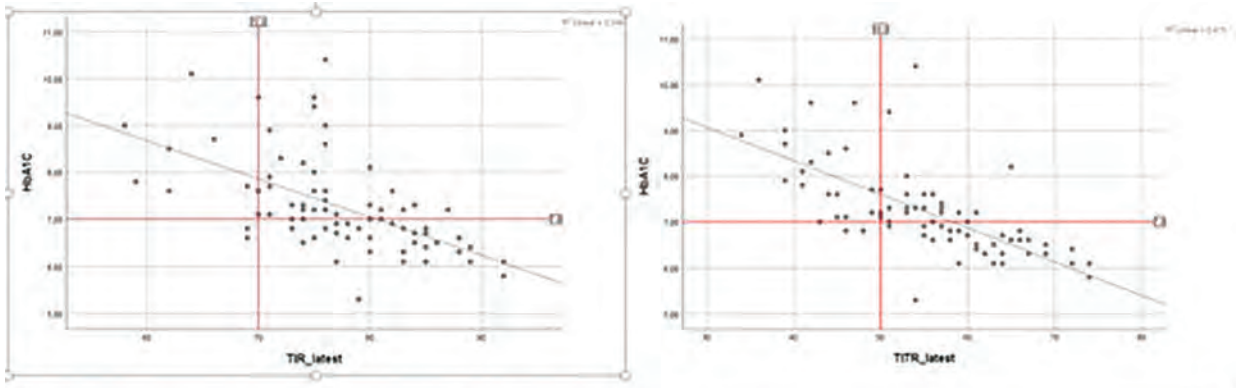

Figure1: Correlation graphs of HbA1C and TIR_{latest}, $TITR_{latest}$

n:81	mean±SD		
HbA1c, (%)	7,26±1,02	n(≤7), 40	n(>7), 41
TIR_{mean}, (%)	76,2±7,7	n(≥70), 68	n(<70), 13
$TITR_{mean}$, (%)	54,6±8,3	n(≥50), 58	n(<50), 23
TIR_{latest}, (%)	76,9±8,6	n(≥70), 66	n(70), 13
$TITR_{latest}$, (%)	55±9,3	n(≥50), 54	n(<50), 24
Sensor use, (%)	88,5±11,4	n(≥85), 65	n(<85), 15
CV, (%)	35,2±4,9	n(≤36), 42	n(>36), 39
Autocorrection bolus, (%)	21,8±7,9	n(≤30), 68	n(>30), 13
TBR, (%)	2,6±1,5	n(≤4), 65	n(>4), 16

P-96

Little loopers – a case series of hybrid closed-loop usage with standard and diluted insulin in very young children with diabetes mellitus

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Introduction: Background: Management of diabetes mellitus in very young children presents challenges due to variable insulin sensitivity, unpredictable carbohydrate intake, and low insulin requirements. A hybrid closed-loop (HCL) system addresses some of these challenges, and can be used with diluted insulin where clinically indicated.

Objectives: Objectives: To describe insulin requirements and glycaemic outcomes in very young children at 1 month, 3 months, and at most recent clinic visit after starting HCL with standard or diluted insulin.

Methods: Methods: Retrospective case series of children aged ≤6 years with diabetes starting CamAPS FX HCL with standard (U100) or diluted (U5 or U10) rapid-acting insulin at a single clinical centre in the UK between September 2020 and April 2022. Data were obtained from electronic patient records and glucose management platforms.

Results: Results: HCL was started for 7 children with diluted insulin (median [IQR] age 1.5 [0.6, 2.8] years, 29% male, HbA1c 83±18 mmol/mol) and 4 with standard insulin (age 4.4 [3.9, 5.4] years, 100% male, HbA1c 62±13 mmol/mol). Ten children had type 1 diabetes, and 1 (diluted group) had IPEX syndrome. HCL was started 0-3 months post-diagnosis in the diluted group, and 6-24 months post-diagnosis in the standard group. At the most recent clinic visit (median [IQR] 7 [3, 9] months after starting HCL in diluted and 10 [8, 11] months in standard group), time in target range (3.9-10.0 mmol/L) was 66.5±6.8% in the diluted and 54.0±5.0% in the standard group. Time in hypoglycaemia (<3.9 mmol/L) was low in both groups. Glucose variability (CV) was 37±4% in the diluted and 43±5% in the standard group. There were no episodes of DKA or severe hypoglycaemia.

Conclusions: Conclusion: HCL with both standard and diluted insulin can be used to safely manage diabetes in very young children with low total insulin needs.

	1 month		3 months		Most recent visit	
	Standard n=4	Diluted n=7	Standard n=4	Diluted n=7	Standard n=4	Diluted n=7
% time with sensor glucose level						
3.9 to 10.0 mmol/L	60.9 ± 8.7	67.7 ± 9.8	62.4 ± 4.5	67.0 ± 10.8	54.0 ± 5.0	66.5 ± 6.8
<3.9 mmol/L	5.6 (3.5, 6.9)	1.9 (0.9, 2.5)	4.0 (2.2, 7.4)	0.9 (0.4, 3.8)	3.7 (2.2, 5.3)	2.6 (1.3, 3.5)
>13.9 mmol/L	12.3 (10.0, 18.8)	6.3 (4.4, 7.8)	10.6 (7.7, 14.0)	4.3 (3.7, 9.6)	17.2 (14.1, 20.5)	7.3 (6.0, 10.9)
Mean sensor glucose (mmol/L)	9.2 ± 0.6	8.7 ± 0.7	9.0 ± 0.5	8.9 ± 0.9	9.9 ± 0.3	8.9 ± 0.5
Glucose SD (mmol/L)	4.2 ± 0.6	3.2 ± 0.5	3.8 ± 0.5	3.1 ± 0.8	4.3 ± 0.5	3.3 ± 0.4
Glucose CV (%)	46 ± 5	36 ± 6	42 ± 4	34 ± 7	43 ± 5	37 ± 4
Total daily insulin (U/day)	11.6 (10.8, 11.6)[c]	2.8 (2.1, 6.6)	12.0 (9.8, 13.2)	3.7 (3.2, 6.9)	14.1 (12.7, 15.3)	6.1 (5.8, 10.6)
Total daily basal (U/day)[a]	5.0 (2.2, 5.0)[c]	1.2 (0.7, 2.2)	4.2 (4.1, 5.7)	1.3 (0.9, 2.4)	6.3 (5.3, 7.3)	2.9 (1.8, 4.2)
Total daily bolus (U/day)[a]	7.4 (6.0, 7.4)[c]	2.1 (1.0, 4.8)	6.8 (5.1, 9.0)	2.5 (1.8, 4.1)	7.9 (6.9, 8.4)	5.2 (4.0, 6.4)
Total daily insulin (U/kg/day)	0.71 (0.47, 0.71)	0.32 (0.27, 0.44)	0.69 (0.47, 0.73)	0.37 (0.32, 0.47)	0.70 (0.60, 0.78)	0.53 (0.48, 0.88)[e]

Table legend: Glycaemic outcomes in very young children with diabetes mellitus started on CamAPS FX hybrid closed-loop (HCL) with either standard or diluted rapid-acting insulin.[d]

Table footnotes:
Data are mean ± SD or median (IQR).
[a]This represents algorithm-driven (automated) insulin delivery.
[b]This represents user-initiated insulin delivery.
[c]Insulin data missing for n=1 child at 1 month post-HCL start.
[d]Based on 28 days of HCL data at each time point.
[e]Weight missing for n=2 children at most recent clinic visit.

P-97

Automated insulin delivery and menstrual-cycle related glycemic variability

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Introduction: Optimizing glycemic control with alleviation of glycemic variability remains the main driving force for advances in diabetes technologies. Menstrual cycles, an important factor influencing glycemic variability, remain a major challenge among females with type 1 diabetes (T1D).

Objectives: The aim of the current study is to identify the glycemic variability across different phases of menstrual cycle and assess efficacy of MiniMed™ 780G System on optimizing glycemic control during the menstrual cycle.

Methods: A single arm randomized controlled trial recruiting 15 adolescent and young adult females with T1D. Only females with regular spontaneous menstruation for at least 2 years, occurring every 25-30 days, were enrolled in the current study. Phases of each menstrual cycle were determined as either follicular phase and luteal phase, based on dates of menses and serum assays of sex steroids The study analyzed continuous glucose monitoring (CGM) metrics during two study periods: Open Loop Period and Advanced Hybrid Closed Loop (AHCL) period; each period included 3 consecutive months. CGM metrics and insulin delivery was assessed during both follicular phase and luteal phase of each cycle.

Results: A total of 45 regular cycle (average duration; 4.5 ± 1 days) were analyzed during 2 periods in the current study. During the 1st period of the study (OLP), There was a significant decrement (-7.6 %) in time in range (TIR; 70-180 mg/dL) during the luteal phase (P< 0.01), time above range (TAR; 181-250 mg/dL) as well was significantly higher during the luteal phase (P <0.01). After initiating the AHCL (AHCL period), the TIR was comparable during both phases of menstrual cycle (P=0.72). Similarly, TAR was comparable during both phases of menstrual cycle (P=0.43) without increasing the time spent below 70 mg/dL (P > 0.05). Regarding insulin delivery, total daily dose (TDD) increased by 14.9 % during the luteal phase (P<0.01). The percent of autocorrection delivered by the algorithm, increase by 57.8 % from a mean of 15.66 % to 24.73 % (P<0.01) during the luteal phase.

Conclusions: Fertile females with T1D experience glycemic variability associated with phases of menstrual cycle. After initiating, AHCL system, the recommended glycemic outcomes were attained, achieving TIR > 70% throughout the menstrual cycle.

P-98

Sustained efficacy of an advanced hybrid closed loop system: findings from a one-year real-world study in children and adolescents with type 1 diabetes

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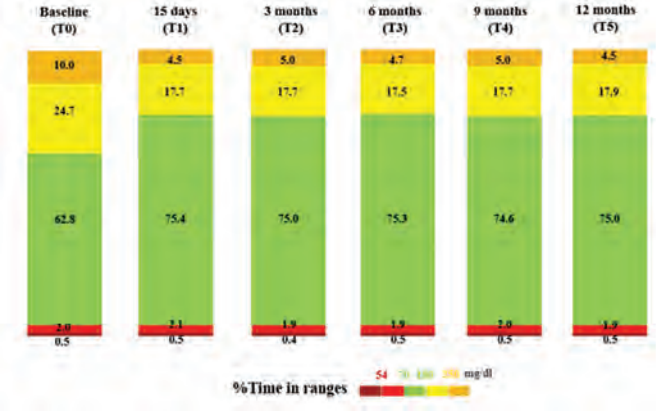
Introduction: Since their introduction, advanced hybrid closed loop (AHCL) systems have increasingly been used in clinical practice. These devices are now recognized as the gold standard for the management of people with type 1 diabetes (T1D) across all age groups. However, there is still little real-world data on the one-year performance of these devices in children and adolescents living with diabetes.

Objectives: The study aimed to investigate glucose metrics and identify potential predictors of glycemic outcomes achievement in children and adolescents during their initial 12 months of MiniMed™ 780G use.

Methods: A multicenter, longitudinal, real-world study enrolled 368 children and adolescents diagnosed with type 1 diabetes starting SmartGuard technology between June 2020 and June 2022. Ambulatory glucose profile data were collected during a 15-day run-in period (baseline), two weeks post-automatic mode activation, and every 3 months thereafter. The study assessed the influence of covariates on glycemic outcomes after 1 year of MiniMed™ 780G use.



	Baseline	15 days	*p-value*	3 months	*p-value*	6 months	*p-value*	9 months	*p-value*	12 months	*p-value*	*p-value*
	(T0)	(T1)	(T0-T1)	(T2)	(T1-T2)	(T3)	(T2-T3)	(T4)	(T3-T4)	(T5)	(T4-T5)	(T0-T5)
Insulin delivery metrics												
TDD (IU/kg/die)	0.82 ± 0.22	0.87 ± 0.26	0.994	0.87 ± 0.24	0.520	0.88 ± 0.26	0.436	0.88 ± 0.24	0.751	0.93 ± 0.40	0.041	0.036
Basal (%)	52.2 ± 5.3	41.5 ± 7.8	< 0.001	40.9 ± 7.4	0.070	40.9 ± 7.4	0.579	41.1 ± 7.7	0.032	40.7 ± 7.3	0.139	< 0.001
Bolus (%)	47.8 ± 4.9	58.1 ± 8.2	< 0.001	58.9 ± 8.1	0.067	59.0 ± 7.6	0.516	59.5 ± 8.3	0.066	59.3 ± 7.4	0.182	< 0.001
Automatic boluses(%)	-	28.0 ± 11.6	-	28.9 ± 11.2	0.018	29.5 ± 11.7	0.325	30.5 ± 12.0	0.012	30.8 ± 12.2	0.625	-
Auto mode use (%)	-	95.0 ± 9.6	-	95.5 ± 7.6	0.064	96.0 ± 6.6	0.555	96.2 ± 6.1	0.352	95.7 ± 8.0	0.280	-
SmartGuard exits	-	1.7 ± 1.8	-	2.0 ± 2.6	0.043	2.2 ± 4.3	0.504	2.2 ± 4.1	0.720	2.1 ± 3.4	0.306	-
Daily boluses (n)	-	4.3 ± 1.3	-	4.6 ± 2.3	0.008	4.7 ± 3.7	0.382	4.7 ± 1.6	0.671	4.7 ± 1.6	0.601	-
Daily CHO intake	-	4.2 ± 2.0	-	4.1 ± 1.8	0.057	4.1 ± 1.8	0.835	4.0 ± 1.9	0.613	3.9 ± 1.7	0.948	-
AHCL settings												
SmartGuard target	-		-		0.118		0.541		0.989		0.038	
100 mg/dl		198 (54.7%)		195		197		196		207 (57.5%)		-
110 mg/dl		72 (19.0%)		(54.3%)		(55.0%)		(54.8%)		83 (20.7%)		
120 mg/dl		98 (26.3%)		97 (22.4%)		99 (23.4%)		98 (23.0%)		74 (22.0%)		
				81 (23.3%)		72 (19.3%)		74 (22.0%)				
Active insulin time		-	-		0.002		0.602		0.070		0.099	
2 hours		204 (55.6%)		174		181		186		202 (55.1%)		-
2-3 hours		147 (40.4%)		(47.4%)		(49.1%)		(50.6%)		156 (42.3%)		
>3 hours		14 (3.9%)		185		176		173		10 (2.6%)		
				(50.3%)		(47.9%)		(47.0%)				
				9 (2.3%)		11 (3.0%)		9 (2.4%)				

Results: Following 15 days of automatic mode use, all glucose metrics demonstrated improvement compared to baseline ($p < 0.001$), except for time below range and coefficient of variation ($p = 0.113$ and $p = 0.330$, respectively). After one year, time in range (TIR) remained significantly higher than baseline (75.3% vs. 62.8%, $p < 0.001$), while mean glycated hemoglobin over the study duration decreased compared to the previous year (6.9 ± 0.6% vs. 7.4 ± 0.9%, $p < 0.001$). Time spent in the tight range (70-140 mg/dL) was 51.1%, and the glycemia risk index was 27.6. All glycemic metrics, insulin data, and device settings for each observational time are detailed in the Figure and Table. Higher TIR levels correlated with a reduced number of automatic correction boluses ($p < 0.001$), fewer SmartGuard exits ($p = 0.021$), and longer time in automatic mode ($p = 0.030$). Notably, individuals with baseline HbA1c > 8% exhibited more significant improvement in TIR levels (from 54.3% to 72.3%).

Conclusions: Our study highlights the effectiveness of Minimed™ 780G in rapidly and sustainably improving glycemic targets among youths with T1D. Our findings also suggest that even children and adolescents who may not fully adhere to their diabetes management can benefit from AHCL systems. The plateauing of glycemic outcomes observed beyond the initial weeks of use emphasizes the need for future investigations into potential factors hindering the achievement of more ambitious goals over time.

P-99

The educational needs of families during the first year with the hybrid closed-loop system in young people with type 1 diabetes: what have we learned from our experiences to support them?

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Introduction: Automated closed-loop insulin delivery systems (HCL) have led to substantial improvements in glycaemic outcomes in people with type 1 diabetes (T1D). With practice, we realised that one of the key elements of optimal management of young T1Ds on HCL is the educational support for the psychosocial needs of young people, their parents and within their families.

Objectives: Identify and understand how to support families' educational skills, particularly in relation to their psychosocial needs, throughout the first year of follow-up with a HCL

Methods: We conducted a multicentre inductive exploratory study combining 35 in-depth individual interviews (T1D youth aged 7-18 years, their parents and their diabetes care team), about their inner experience of HCL over the last 18 months and 6 Focus Group interviews with 45 youth (aged 11 and over) and parents (of children aged over 6) in order to triangulate the results on needs and to describe precisely how to respond over time and for each audience.

Results: A total of six common psychosocial needs were identified: (1) to feel safe, (2) to feel supported, (3) to live a life less burdened by diabetes, (4) to gain autonomy and (5) to find one's place in the reorganisation of the family with the HCL, 6) learning to let go. We have highlighted the specific nature of these needs depending on the audience and the timeframe with HCL The 6-month period appears to be a pivotal time in the psychosocial needs. Finally, the means of supporting them are based on the posture of carers, learning methods and diabetes education adapted to HCL treatment and based on an overall framework of self-care and psychosocial skills.

Conclusions: Our study has provided us with emerging and unique material to support youth, parents and families at key moments, in a timely and tailored manner for optimal use of HCL in the first year.

Thursday, October 17th, 2024

Poster Corner 3: Childhood Obesity and Type 2 Diabetes

P-100

Metabolic and bariatric surgery in adolescents - efficacy and outcome predictors: a prospective, observational study

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Introduction: The increasing prevalence of obesity means that more adolescents are undergoing metabolic and bariatric surgery (MBS). There are few studies of pre-operative predictors of MBS outcomes in adolescents.

Objectives: The aims of this study were to quantify changes in weight loss and biochemical parameters over time in adolescents undergoing bariatric surgery and identify preoperative predictors of postoperative weight loss.

Methods: This study includes 73 adolescents (12-19 years) living with obesity who underwent laparoscopic sleeve gastrectomy or gastric bypass between March 2020 and November 2022 at Sheikh Shakhbout Medical City, Abu Dhabi, UAE. Absolute and relative changes in anthropometric measures of weight and lipid, HbA1c, and liver function (ALT, AST) parameters were evaluated up to 30 months postoperatively. Differences in anthropometric measures over time were assessed using a mixed residual maximal likelihood model with Tukey's multiple comparison test, and univariable and multivariable logistic regression were used to identify predictors of a >35.0% reduction in BMI z-score from baseline to 12 months.

Results: Seventy-three adolescents (65.8% female, mean age (SD) 17.6 (1.83) years) were included in the study. Most patients (87.7%) underwent laparoscopic sleeve gastrectomy. All anthropometric measures of weight (weight, weight z-score, BMI, BMI z-score) significantly decreased over 30 months of follow-up (all $p<0.001$), with a -4.2%, -14.6%, -23.7%, -35.1%, -39.6%, -40.9%, and -53.8% relative change in BMI z-score at 2 weeks and 3, 6, 12, 18, 24, and 30 months, respectively. The mean (SD) BMI z-score at 30 months was 1.17 (0.8), and all patients had persistent reductions in BMI z-scores compared with baseline. There was a significant increase ($p=0.02$) in HDL cholesterol and a significant decrease in triglycerides ($p=0.0001$) and ALT ($p=0.0004$) after surgery. A higher preoperative BMI was associated with a reduced odds (OR 0.89, 95%CI 0.79-0.97, $p=0.03$) of a >35% reduction in BMI z-score at 12 months by multivariable logistic regression analysis. A baseline BMI of >52.6 kg/m^2 had a sensitivity of 100% and specificity of 40.6% for detecting a >35.0% postoperative change in BMI z-score.

Conclusions: MBS results in sustained weight loss in adolescents. A high preoperative BMI predicts resistance to optimal weight loss after surgery and argues against delaying surgery once eligibility thresholds are met. These data pave the way for identifying subpopulations of adolescents undergoing MBS who require additional interventions to optimize outcomes.

P-101

Abstract Withdrawn

P-102

Sustaining adolescent obesity management through telemedicine: insights from a retrospective study

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Introduction: Telehealth interventions have become pivotal in managing adolescent obesity during the COVID-19 pandemic. This study aims to assess the effectiveness and sustainability of

transitioning adolescents to digital interventions within the KiCK pediatric obesity outpatient program.

Objectives: To assess telehealth interventions' impact on managing adolescent obesity during the COVID-19 pandemic and their sustainability through follow-up observations

Methods: Data from 117 adolescents (aged 8 to 17 years, BMI z score >2.0) were analyzed. Metabolic parameters, BMI SDS, physical fitness, and well-being were assessed. Statistical analysis included paired t-tests. Follow-up observations were conducted 12 to 18 months later on 82 patients, comparing results with the pre-pandemic cohort and their 1-year follow-up

Results: During the pandemic, telehealth interventions led to significant improvements in BMI SDS, HOMA index, triglycerides, 6-minute walk test, and well-being ($p < 0.05$). Post-pandemic, reductions in weight SDS, BMI SDS, HOMA index, and cholesterol persisted. Follow-up revealed sustainability trends: around 1/3 experienced further BMI SDS increase, 1/3 had consistent BMI SDS, and 1/3 showed further BMI SDS reduction. Girls had less benefit. Significant disparities emerged between COVID-19 and pre-COVID-19 cohorts in metabolic parameters, cholesterol, and GPT levels ($p < 0.001$). The COVID-19 cohort reported elevated consumption of obesity-promoting foods and diminished cognitive hunger control ($p = 0.002$) and increased distractibility potential ($p = 0.001$) during eating. Health-related quality of life (HrQoL) was notably lower in the COVID-19 cohort ($p = 0.001$).

Conclusions: Telehealth interventions catalyzed sustained enhancements in metabolic parameters, physical fitness, and well-being during lockdowns. Follow-up highlighted their enduring impact, underscoring the importance of continuing telehealth interventions post-pandemic.

P-103

Paediatric type 2 diabetes in the republic of Ireland: a concerning increase?

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Introduction: A previous study undertaken in 2015, identified a prevalence of type 2 diabetes (T2DM) in under 16's in the Republic of Ireland of 1.2/100,000, lower than many other European countries. Internationally, there has been a rise in obesity noted in the aftermath of the Covid-19 pandemic.

Objectives: The aim of this study was to establish whether the prevalence of paediatric T2DM in the Republic of Ireland (ROI) has changed since 2015. In addition, we sought information regarding patient demographics, initial presentation, management, outcomes, co-morbidities and complications

Methods: Following ethics committee approval, we conducted a cross-sectional survey of the prevalence of type 2 diabetes in under16s using a standardised proforma which allowed for validation of cases

Results: We identified 32 cases of T2DM, giving a prevalence of 3 per 100,000 (95% CI 2-4.2), representing a significant increase since 2015 (p=0.004). This was due to a relative increase in the prevalence in both the white (p=0.04) and Asian (p=0.02) Asian populations coupled with an expansion in the Asian population under 16. Median age at diagnosis of 12.9 years (8-14.7). Median HbA1c at diagnosis was 82mmol/mol (range: 44-141mmol/mol) and current median HbA1c was 46mmol/mol (range: 34-141mmol/mol). Sixteen participants (50%) achieved a HbA1c target of less than 48mmol/mol (33% in 2015 study) and 20 (67%) achieved HbA1c less than 53mmol/mol (50% in 2015 study). At diagnosis, 92% were obese and 4% overweight (55% obese in 2015 study). One patient (4%) moved from obese to overweight since diagnosis and another vice versa (3 recategorized in 2015 study). Medication was used in 90% of patients with 10% being managed using dietary measures alone. Compared to the previous study 22% were using GLP-1 analogues. Adherence to recommended microvascular complication screening was poor.

Conclusions: The prevalence of paediatric type 2 diabetes is increasing in line with international trends. A greater proportion of patients in the current study are obese.

P-104

Type 2 diabetes in a pediatric case with SQSTM1 mutation resolved quickly with empagliflozin: is this related to autophagy mechanism?

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Introduction: The SQSTM1 (sequestosome 1) gene encodes the protein p62. It is known that the p62 protein plays a role in apoptosis, the recycling of inflammatory reactions, and the regulation of autophagy. Mutations in this gene have been associated with ALS and Paget's disease of bone.

Objectives: The link between SQSTM1-p62, autophagy, metabolic findings and empagliflozin treatment in a child with type 2 diabetes is discussed.

Methods: A 13-year-old male patient was diagnosed type 2 diabetes in March 2020 during investigation for obesity and acanthosis nigricans. His older sister underwent a WES because of a neurological disease and a SQSTM1 was found. Therefore targeted gene analysis was performed in our case. Follow-up data between March 2020-March 2024 are presented.

Results: At presentation fasting blood sugar of 118 mg/dl, HbA1c of 6.8 %, elevated liver enzymes and uric acid were detected. Genetic analysis revealed a homozygous mutation in the SQSTM1 gene (c.346G>C / p.Glu116Gln /rs756209668). After two years he presented with pre- and postprandial blood sugar levels of 316 and 511 mg/dl. HbA1c was 14.5%, and insulin 11.5 mU/ml. Treatment with empagliflozin-metformin combination was initiated. Since July 2022 his HbA1c is ranging between 5.4-5.9% (last visit March 2024) and other findings improved.

Conclusions: The association between SQSMT1 mutation and diabetes has not been previously reported. SQSMT1-p62 protein accumulation is suggested as a mechanism for autophagic dysfunction, pancreatic dysfunction, development of non-alcoholic steatohepatitis. Knocking-out SQSMT1-p62 in mice resulted with obesity and metabolic syndrome. Empagliflozin provides benefits in diabetes complications and liver steatosis independently of

glycemia due to its regulatory effect on autophagy. The significant effectiveness of treatment in our patient at an advanced stage of diabetes with incipient insulinopenia suggests that the genetic finding may one of the underlying genetic factors of diabetes through the autophagy pathway.

P-105

The development of age and maturity appropriate resources for young people up to the age of 25, who are pregnant or planning pregnancy, and living with type 2 diabetes

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Introduction: The UK National Diabetes Audit reports 122,780 children and young adults under the age of 40 years with type 2 diabetes, of whom 1,560 (around 1.3 per cent) are under the age of 19 years. Recognising an inequality in access to education, DigiBete successfully integrated their youngtype2.org resources to 256 diabetes centres in the UK.

Objectives: This project explored how best to support young people up to 25 living with type 2 diabetes who become pregnant, to help prevent the risks of pre-eclampsia and hypoglycaemia, whilst reducing the risks to the baby, such as heart and spinal defects abnormalities, miscarriage, stillbirth, macrosomia, birth injury, Jaundice and obesity in later life.

Methods: A series of 6 co-design sessions with young adults and a multi-disciplinary team at Leeds Children's Hospital supported the development and filming of targeted educational resources covering Unplanned Pregnancy, Planning A Safe Pregnancy with Diabetes and Pregnant with Diabetes, presented by Professor of Medicine (Diabetes and Maternal Health) Eleanor Scott BM BS MD FRCP.

Results: 3 new topics which includes 13 new video modules have now been co-produced and are freely available globally to any young person living with type 2 diabetes on youngtype2.org. These include:

Unplanned Pregnancy:

1. Early Support
2. Measuring & Monitoring Blood Glucose
3. Safe Medications

Planning for Pregnancy:

1. Getting Ready
2. Monitoring Blood Glucose
3. Safe Medications
4. Weight Management
5. Contraception

A Safe Pregnancy:

1. Early Support
2. Monitoring Blood Glucose
3. Safe Medications
4. Best Foods
5. Scans

Conclusions: The benefits of these comprehensive, open access resources have been recognised and are now being embedded as part of standard care through the adoption of the DigiBete App and the youngtype2.org website in secondary care clinics. DigiBete is now developing a primary care tool kit to support the adoption within GP services, to maximise the investment and reach the widest possible cohort of young people in the UK.

P-106

Abstract Withdrawn

P-107

Increased insulin secretion and decreased insulin sensitivity in south Asian youth without diabetes in the U.S

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Introduction: The mechanisms underlying increased T2DM risk at lower BMI in South Asians (SA) compared to other ancestries are not known, but greater visceral fat (VFAT) for given BMI has been implicated.

Objectives: We examined the relationships of VFAT with insulin sensitivity (Si) and insulin secretory rate (ISR) in SA vs White (W) and African American (AA) adolescents and young adults (AYA).

Methods: SA, W, and AA aged 12-21y, BMI ≥ 80%ile for age and sex or BMI ≥ 23 kg/m^2, without diabetes, underwent DXA for VFAT area and a 3-hr, 10-sample OGTT with Si by Minimal Model, and ISR by parametric deconvolution of C-peptide kinetics (2-compartment model). ISR incremental AUC was calculated. Ancestry groups were compared using Kruskal Wallis or chi2; Spearman correlations tested associations between VFAT and metabolic indices. Linear regression with adjustment for age, sex and inclusion of a VFAT-by-ancestry interaction term examined ancestry differences in Si and ISR.

Results: AYA (n= 51 SA, 39 W, 25 AA) were of similar age (median (IQR); SA 20.3y (18.9, 21.5); W 19.3y (18.3, 21.1); AA 19.0y (18.0, 20.4)), BMIZ (mean ± SD; SA 1.21 ± 0.53; W 1.14 ± 0.57; AA 1.38 ± 0.60), and BMI (SA 27.9 kg/m^2 (25.1, 29.4); W 25.9 (24.6, 29.7); AA 27.3 (25.3, 35.5)), but differed by female sex: SA 52.9%; W 56.4%; AA 88.0% (p=0.009). SA had higher VFAT (97.5 cm^2 (82.0,121.0)) than W (87.2 (64.1,108.0) and AA (75.0 (51.2,102), p= 0.029. One cm^2 increase in VFAT associated with 41% lower Si (p=0.03) and 82% greater increase in ISR (p<0.001) in SA compared to W. Compared to AA, for 1cm^2 VFAT increase, SA had similar Si decrease, but 82% greater ISR increase (p=0.004).

Conclusions: Among AYA of similar BMI, SA had higher VFAT than W and AA. However, for similar increase in VFAT, SA had a greater reduction in Si and higher ISR increase compared to W. SA had a similar reduction in Si compared to AA, but again a greater increase in ISR. The higher T2DM risk in SA may be due to greater hyperinsulinemic compensation, resulting in beta cell exhaustion.

P-108

Greater liver fat is associated with divergent metabolic responses among south Asian, white, and African American youth without diabetes in the U.S

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Introduction: The mechanisms causing increased T2DM at lower BMI in South Asians(SA) are not known, but greater ectopic fat is suspected.

Objectives: To examine the relationships of liver fat with insulin sensitivity(Si) and insulin secretory rate(ISR) in SA vs White(W) and African American(AA) adolescents/young adults(AYA).

Methods: SA, W, and AA, 12-21y, BMI≥80%ile for age/sex or BMI≥23 kg/m^2, without diabetes, had MRI/MRS(3T; spectral data for liver fat fraction), and 3-hr, 10-sample OGTT with Si (Minimal Model); ISR derived by parametric deconvolution of C-peptide kinetics (2-comp model), and ISR incremental AUC. Kruskal Wallis, chi^2, and Spearman correlations compared groups. Mixed effects linear regression adjusting for age, sex and inclusion of liver fat-by-ancestry interaction term examined ancestry differences in Si and ISR.

Results: AYA (n= 33 SA,26 W,16 AA) were similar in age (median(IQR); SA 21y(19,22); W 20y(17,21); AA 19y(17,21)), and BMIZ (mean±SD; SA 1.2±0.5; W 1.1±0.6; AA 1.3±0.5), but differed by %female: SA 52; W 54; AA 94 (p=0.01). Liver fat correlated with ISR (r=0.60, p<0.0001) and Si (r=-0.58, p<0.0001) in the overall group. % Liver fat varied by group: SA(2.0(1.1, 4.9)) vs W (0.8(0.4,1.7) vs AA (0.6(0.2,1.8), p= 0.009. Adjusting for liver fat, age, and sex, SA had 9,396.3 pmol/L higher ISR than W. In SA, 1% liver fat increase associated with 3734.1 pmol/L higher ISR (p<0.0001), with no association in W or AA. 1% liver fat increase associated with lower Si in W (p=0.007), AA (p=0.04), and SA (p=0.001), with a 5.9X lower Si in AA compared to W. Adjusting for liver fat, age, and sex, SA had a lower Si than W (p=0.003).

Conclusions: Among AYA of similar BMI, with greater liver fat, W, AA, and SA had lower Si. Although AA typically accrue less liver fat, if liver fat does increase, AA had substantially decreased Si. For a 1% liver fat increase, SA also had an increase in ISR not detected in W or AA. If confirmed, divergent diabetes mechanisms by ancestry support the need for more personalized management.

P-109

Social, emotional, and cognitive challenges and depressive symptoms in emerging young adults with youth-onset type 2 diabetes

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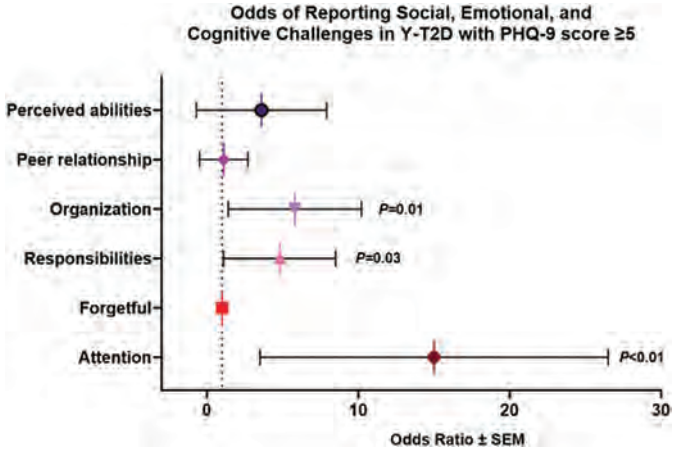
Introduction: Emerging young adults (YA) with youth-onset type 2 diabetes (Y-T2D) and prediabetes may have unique needs, but there is minimal data on daily challenges and mood.

Objectives: We assessed mood and diabetes-related challenges in YA in a multi-disciplinary diabetes transition clinic.

Methods: Emerging YA <25y with diabetes and obesity (87% Y-T2D) evaluated between 2021-2024 completed the Endocrine Society "Self-assessment of Worries, Concerns, and Burdens Related to Diabetes and Transitioning" questionnaire (yes/ no) and the Patient Health Questionnaire (PHQ-9) (0-21; higher score is associated with more depressive symptoms). Participants were characterized into 2 groups: no or minimal symptoms (PHQ-9 score: 0-4) and mild or greater depressive symptoms (PHQ-9 score: ≥5). Logistic regression analyses were performed to evaluate the response to the Self-assessment questionnaire (outcome) by group (exposure).

Results: In 46 YA (20.0±1.8y mean±SD, diabetes duration: 4.5±2.3y, 59% female, 74% Black, BMI: 38.6±8.4 kg/m^2, hemoglobin A1c: 7.6±2.9%), questionnaires were completed within 0.6±1.0y of clinic entry. Average PHQ-9 scores were 5.9±6.5. 48% reported mild or greater depressive symptoms, 33% depressive symptoms that interfered with daily activities, and 15% suicidal ideation within the past two weeks. Depressive scores did not differ by sex or race/ethnicity, and there was no relationship between scores and BMI or hemoglobin A1c. Mild or greater depressive symptoms were associated with higher odds of having organization, responsibilities, and attention challenges (Figure) but were not related to reports of diabetes burdens or transition readiness.



Conclusions: YA with Y-T2D, who reported mild or greater depressive symptoms, reported greater difficulty with daily tasks related to planning and organization. Routine screening for depressive symptoms and daily challenges could help to identify individuals who may benefit from programs targeting executive functioning.

Thursday, October 17th, 2024

Poster Corner 4: Diabetes and COVID, Diabetes in Developing Countries and Migrant Populations

P-110

Investigating the seasonal pattern and incidence of type 1 diabetes pre and post COVID-19 in children and young people in England and Wales

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Introduction: A number of international studies have shown an increase in incidence of Type 1 diabetes since the start of the COVID-19 pandemic. Seasonal variation of incidence of Type 1 diabetes being higher in the winter months compared to the summer months is well established.

Objectives: The National Paediatric Diabetes Audit (NPDA) for England and Wales collects data on incidence and month of diagnosis. This analysis, now four years on from the start of the pandemic, aims to establish whether incidence rates had returned to a pre-pandemic baseline and explore any disruption to the seasonal pattern of new diagnoses.

Methods: Data from the NPDA, collected between April 2013 and March 2023, was analysed. Incidence rates were calculated for each year, and new cases of type 1 diabetes were delineated by calendar month.

Results: Incidence rates of type 1 diabetes for those aged 0-15 years old were stable between 2013/14 to 2019/20 (pre COVID-19). Incidence rose from 25.6 per 100,000 in tween 2019/20, to a high of 32.7 in 2021/22. The regular seasonal pattern of new diagnoses observed prior to the pandemic was disrupted between April 2020-March 2021, with the summer and winter months seeing similar levels of new diagnoses[JW(aVU-P1]. Between April 2021 and March 2023. After this period, the seasonal pattern reverted to normal, but at a higher rate of incidence across the year.

[JW(aVU-P1]Do you want to put the significance in here ie the change in seasonal variation was significant using xxx statistic p<0.000.

Conclusions: The incidence rate of type 1 diabetes in children and young people in England and Wales significantly increased during the COVID-19 pandemic, and the regular seasonal pattern of new diagnoses was disrupted. Data collected from April 2021-March 2023 show that while the regular season pattern of new diagnoses has re-emerged, incidence rates remain higher than levels seen before the pandemic. The cause is unknown yet periods of lockdown may be related.

P-111

Abstract Available in the Online Program

P-112

C-peptide and glutamic acid decarboxylase autoantibodies in the classification of diabetes mellitus in children and young people in Lagos, Nigeria: a cross-sectional study

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Introduction: Classification of childhood diabetes is important so that appropriate individualized therapy can be instituted for optimal treatment outcomes. [ISPAD Guidelines-2022]

Objectives: The study aimed to classify the types of diabetes in children and young people in Lagos, Nigeria by measuring the C-peptide and Glutamic Acid Decarboxylase (GAD) autoantibody levels.

Methods: This was a descriptive cross-sectional study carried out at 3 hospitals in Lagos State: Lagos University Teaching Hospital, Lagos State University Teaching Hospital, and Massey Street Children's Hospital. Eighty-eight (88) children and young people aged 0 to 24 years diagnosed with diabetes were recruited into the study. A semi-structured questionnaire was administered by an interviewer. All participants had physical examinations and blood samples obtained analyzed for C-peptide and GAD autoantibodies by ELISA. The Maturity-Onset Diabetes of the Young (MODY) probability scores of the study participants were also calculated. Analysis of the data collected was done using SPSS software version 26.

Results: A total of 88 participants with a mean age of 12.932 ± 4.528 and a range of 3 years to 24 years were included. There were 45 (51.1%) males and 43 females (48.9%).56.8% had diabetic ketoacidosis (DKA) at diagnosis while 59.1% have had at least one episode of DKA. Seventy-five percent of the study population had low C-peptide levels and 55.7% were positive for GAD autoantibodies. Majority, 89.8%, had MODY probability scores ≤10%.

Conclusions: The prevalence of T1DM differed with the different investigations with a higher proportion of T1DM using C-peptide than GAD autoantibodies. In resource constrained settings like ours, measurement of C-peptide levels can help to a large extent to confirm TIDM. The MODY probability calculator also revealed a very high proportion of individuals with T1DM. The MODY probability calculator was validated in our study, hence can be used to determine patients who may benefit from genetic testing for monogenic diabetes.

P-113

Impact of continuous glucose monitoring and healthcare coverage on the trends of HbA1c and insulin dosage in Latin American children with type 1 diabetes onset over three-year period

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Introduction: Continuous glucose monitoring (CGM) might enhance glycemic outcomes and quality of life for children with type 1 diabetes (T1DM).

Figure 1

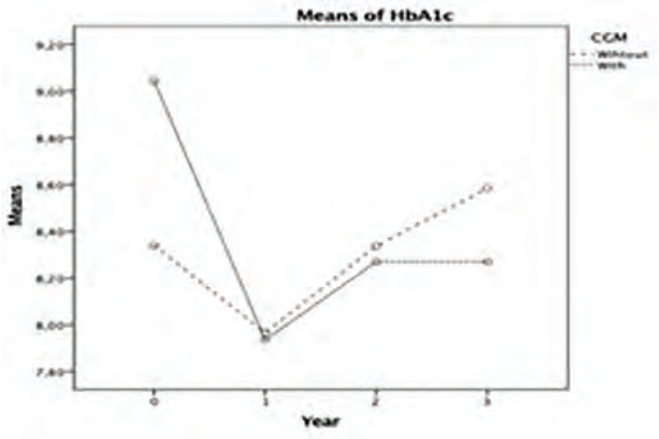


Figure 2

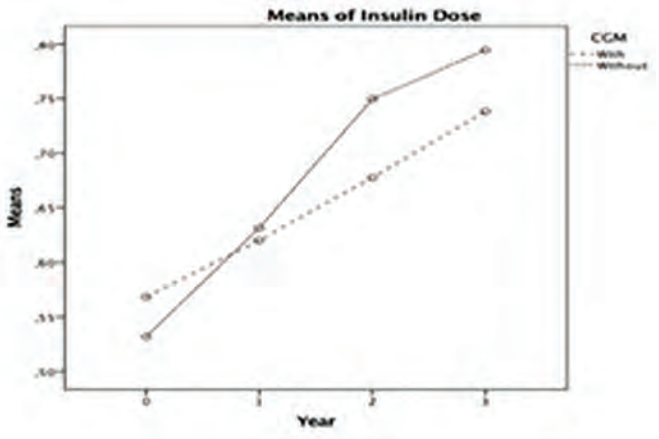


Figure 3

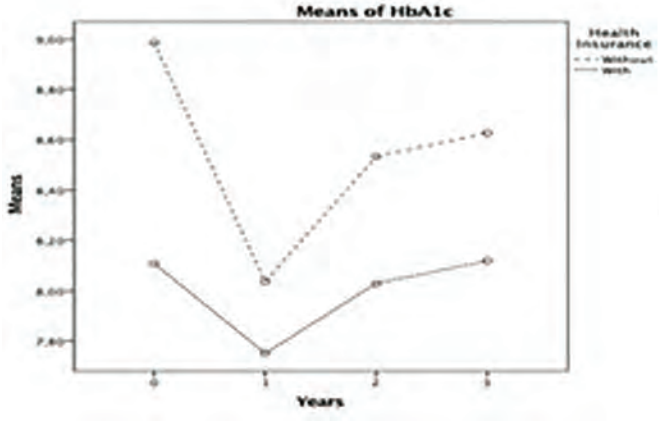
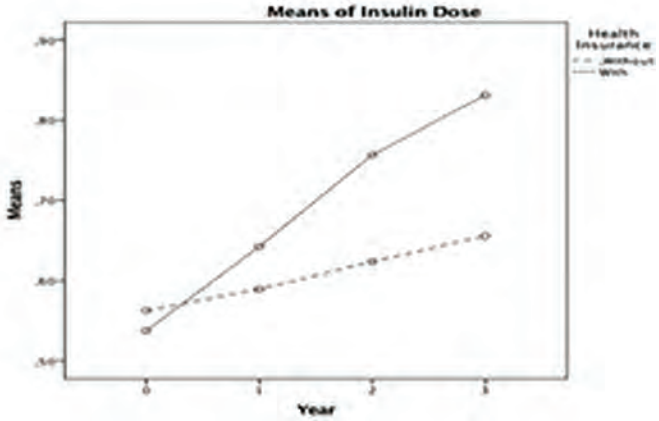


Figure 4



Objectives: To assess the change in HbA1c and insulin dosage over three years, based on CGM supply and insurance coverage (public vs. private) among children with new-onset T1DM from several Latin American centers.

Methods: A retrospective analysis of medical records examined the HbA1c and insulin dose trends in children aged 6 months to 18 years diagnosed with new-onset-T1DM across 19 centers spanning from 2019-2020 through 2023 in five Latin American countries: Argentina, Chile, Paraguay, Peru, and Uruguay. Data on anthropometric measures, insulin dose, access to CGM, health insurance coverage (public vs. private), and Hb A1c (%) were gathered. Profile plots depicting the changes over time for HbA1c and insulin dose curves were generated using the two-way ANOVA method with repeated measures.

Results: A total of 445 children (48.9% F) aged 8.7 ± 3.7 years were included; 39.4% (175) used CGM, and 44.2% (197) had health insurance coverage. Children with CGM did not experience a decrease in HbA1c levels as a marginal effect but reached significance in the interaction with the year (P=0.02) (Fig 1). Furthermore, CGM didn't yield significant results in insulin dose as a marginal effect but reached significance in interaction with the year (P< 0.05) (Fig 2). Children covered by health insurance significantly decreased their HbA1c levels as a marginal effect (P <0.01) but did not in the interaction with the year (Fig 3). In addition, insulin dose increased significantly as a marginal effect (P= 0.04) but only reached significance in the interaction with the year in children who were insured (P<0.01) (Fig 4).

Conclusions: We observed a significant decrease in HbA1c levels and a rise in insulin dosage among Latin American children who had access to CGM and healthcare insurance from the onset of T1DM throughout the three-year follow-up period.

P-114

Time trend of BMI-SDS before, during and after the COVID-19 pandemic: data from the sweet diabetes registry

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Introduction: Excess body weight is a global problem, including children with type 1 diabetes (T1D). The COVID-19 pandemic, resulting in lockdowns and the necessity of on-line patient education could potentially increase the problem – either persistently or temporarily.

Objectives: The aim of this study is to assess the impact of the COVID-19 pandemic on BMI-SDS in the SWEET registry population of children with T1D.

Methods: Patients with T1D were eligible for this cohort study if they had documented BMI values in the three observation periods: pre-COVID, March 2019-Feb 2020 (minimum 2 visits); during-COVID, March 2020-Feb 2022 (minimum 4 visits); and post-COVID March 2022-Nov 2023 (minimum 4 visits). BMI-SDS based on WHO standard was calculated and dynamics over time were compared to predicted BMI-SDS based on the pre-COVID gradient. BMI-SDS correlations with selected variables were calculated as Spearman coefficients.

Results: 3873 patients with T1D were included (1-15 years, T1D ≥ 6 months). Pre-COVID and post-COVID BMI-SDS medians were 0.58 [-0.08-1.28, Q1-Q3] and 0.67 [-0.03-1.43]. Adjusted BMI-SDS differences were 0.022 for pre vs during-COVID, p=0.208 and 0.043 for pre vs post-COVID, p=0.0009. BMI-SDS increased significantly in females (pre vs during-COVID 0.045, p=0.0006; pre vs post-COVID 0.119, p<0.0001) but not in males, and in the younger age group 1-9 years (pre vs during-COVID 0.103, p<0.0001; pre vs post-COVID 0.069, p=0.0014) but not in the older subjects (> 9 years old at inclusion). Post-COVID BMI-SDS correlated positively

with diastolic and systolic blood pressure, triglycerides, LDL-cholesterol and negatively with HDL-cholesterol (Rho respectively: 0.149, 0.227, 0.198, 0.168, -0.176, for each p<0.0001).

Conclusions: Increase in BMI-SDS over time was observed mainly in females and in younger children, suggesting that these groups deserve particularly education programs aimed at life-style modifications and careful screening for cardiovascular risk factors.

P-115

Beyond twice daily insulin in a low income country-exploring children and adolescents' perspectives on transitioning to a multiple daily insulin regimen in Laos

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Introduction: In many low income countries in Southeast Asia, twice daily premix insulin regimen has been the conventional insulin therapy initiated for children and young people (CYP) with type 1 (T1D)diagnosis. In Laos, universal health coverage for diabetes does not include insulin provision and blood glucose testing kits. Before 2016, no Laotian adult or child was known to have survived. Intensive insulin therapy using multiple daily insulin (MDI) regimen is now a standard regimen recommended for all people living with type 1 diabetes (T1D).

Objectives: This study aims to explore the views and perceptions of CYP with T1D in Laos on how transitioning from twice daily insulin regimen to a MDI regimen affected their diabetes management and quality of life.

Methods: A qualitative research methodology was used to explore the barriers, challenges and impact on quality of life managing diabetes at home and school, and during leisure activities within 3 months of the switch to MDI. Written consent was obtained to participate in the interview.

Results: The study involved 15 participants (4 males). Mean age at diagnosis was 10.93 (range 3 to 22 years) and mean age at switch to MDI was 14.73 years. Prior to the switch, issues related to lack of confidence in carb counting and injections at school-time were raised as barriers. After the switch, the majority of respondents viewed the transition to MDI positively, citing benefits such as improved glucose stability, increased food flexibility, less hypo events and an improved sense of well-being. Overall satisfaction was high following the transition.

Conclusions: This study provides valuable insights that will guide future work in supporting the switch from twice daily to MDI regimen in LMICs. By understanding their needs and priorities, we can develop strategies to support healthcare professionals, carers and parents to understand the barriers and align with the CYP's lifestyles and expectations. This will help to improve their well-being and support in managing their diabetes.

P-116

Sustained improvements in glycaemic control using flexible insulin dosing in a low-income setting

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Introduction: The John Hunter Children's Hospital (JHCH) in Australia have developed a diabetes management program (Success With Intensive Insulin Management (SWIIM)). JHCH has achieved an average HbA1c of 6.9% with a population of over 400 young people. The program centres around a flexible insulin regime. The Sher-I-Kashmir Institute of Medical Sciences (SKIMS) in Srinagar, India services 400 children with type 1 diabetes and has developed a partnership with JHCH. The average HbA1c is 10.5% and the average life expectancy is 29 years. Access to blood glucose monitoring and diabetes education is limited.

Objectives: To determine if the SWIIM program improves outcomes for young people with diabetes in a resource-limited setting.

Methods: The SWIIM program was adapted and localised resources produced (SWIIM-Kashmir). Young people aged 0-18 years with type 1 diabetes attending SKIMS were recruited, and baseline data were collected. All participants were provided with blood glucose monitoring strips by the Life For a Child Foundation. Participants were then commenced on the SWIIM-Kashmir program in a rolling manner.

Results: During the study period, 83 participants were commenced on SWIIM-Kashmir. Mean HbA1c was 10.5% ±2.3 (92 mmol/mol ±25) at baseline and improved to 8.5% ± 3 (70 mmol/mol ± 28) over the 12 month study period. In the 52 participants commenced on BGL monitoring alone prior to SWIIM-Kashmir, there was a modest improvement in HbA1c (10.4%, 90 mmol/mol to 9.5%, 80 mmol/mol). Further and sustained reduction in HbA1c was seen after introduction of SWIIM-Kashmir. The proportion of participants with HbA1c < 7.0% increased from 5% at baseline to 36% at 12 months. Nineteen of the 83 patients (22%) had not been reviewed in the previous 6 months at the end of the study period

Conclusions: The SWIIM-Kashmir program resulted in a significant improvement in HbA1c over a 12 month period. We conclude that flexible insulin dosing is feasible in a resource-limited setting.

P-117

Diabetes education academic league: the first year outcomes

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Introduction: Diabetes Academic Leagues are student groups that seek to deepen knowledge on the topic.

Objectives: To describe the first year outcomes of a diabetes education academic league in a developing country.

Methods: The Diabetes Care Academic League (LIAAD) is an interprofessional extension project for nursing students in Alagoas/Brazil. The LIAAD was founded in 2023 by ten students and a coordinating professor. Voluntary students were recruited from various higher education institutions and selected upon tests and interviews. Members meet in person or online once a week for classes and educational activities on diabetes. The advisor, a diabetes specialist nurse, defines the curriculum. The league aims to expand knowledge about diabetes among undergraduate students in an interprofessional way. LIAAD students interact with nutrition, pharmacy, psychology, physical education, and medicine courses. LIAAD activities include scientific research projects and community service.

Results: In one year, 20 LIAAD members had 30 weeks of activities, including three events in health education with the topics of cancer and diabetes, Blue November, and new grad orientation. Members participated in community service health campaigns such as World Women's Day and Back to School. Five research studies were proposed on the themes of Diabetic ketoacidosis in children and adolescents, Eating Disorders in Patients with Type 2 Diabetes, Challenges for the Treatment of Diabetic Retinopathy in the Public Health system, Nutrition principles for people with diabetes, and regular physical activity in type 2 diabetes.Teachers noted the increase in student's knowledge about diabetes, which has contributed to the construction of knowledge in several classes.Students have shown enthusiasm in learning about tangible ways of welcoming people with diabetes in their community.

Conclusions: Our experience demonstrates positive outcomes and feasibility associated with implementing an academic league in diabetes in a developing country.

P-118

Mortality and low c-peptide levels in children and adolescents diagnosed with type 1 diabetes in Cameroon: a case series from the young-onset diabetes in Sub-Saharan Africa (YODA) study

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Introduction: Type 1 diabetes (T1D) mortality rates in sub-Saharan Africa have traditionally been elevated. Over the past two decades, numerous initiatives offering free insulin, have been implemented across many sub-Saharan African countries. Despite these efforts, mortality rates remain relatively high compared to high-income countries, indicating that other factors may be driving mortality.

Objectives: We aimed to establish the number and causes of death within the cohort of children and adolescents recruited within the Young-onset diabetes in sub-Saharan African (YODA) study in Cameroon.

Methods: We conducted a comprehensive review of registered mortality cases among participants enrolled in the Young-onset diabetes in sub-Saharan Africa (YODA) study in Cameroon from 2019 to 2022. Verbal autopsies were conducted where needed to verify the cause of death, consulting healthcare providers and/or family members.

Results: Among the 313 individuals enrolled, 23 deaths were recorded, consisting of 11 females. The median (IQR) age at diagnosis 16 (13-18), ranged [8-27] years, and median BMI 21.5 (18.8-24.9) kg/m^2. The majority of the death cases (18/23, 78.3%) had low C-peptide levels (<200 pmol/L, median 89 (11-198). Notably, 10 death cases (43.5%), were beneficiaries of free insulin treatment through the CDiC programme in Cameroon. Causes of death were hypoglycaemia (7 cases), diabetic ketoacidosis (DKA, 4 cases), infections (4 cases), undefined causes (4 cases), and chronic kidney disease (3 cases). Importantly, all deaths due to hypoglycaemia had markedly low C-peptide levels (<200 pmol/L), indicating severe insulin deficiency. Almost half (11/23, 47.8%) death cases occurred outside of the hospital setting.

Conclusions: The predominance of registered mortality cases attributed to hypoglycaemia, coupled with preceding markedly low C-peptide levels, indicates a potential relationship between mortality and endogenous insulin secretion in children and adolescents with type 1 diabetes in sub-Saharan Africa.

P-119

Linking type 1 diabetes mellitus data to public health action: Kenya experience

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Introduction: The burden of diabetes is 6.1% globally, making it one of the leading causes of death and disability. In Kenya, the prevalence of diabetes is 3.1%. Accurate data on type 1 diabetes prevalence, incidence and associated mortality are crucial to inform public health policy, but these data are usually scarce. Over time, efforts have been made to streamline data systems for Type 1 diabetes in Kenya. This study not only shares Kenya's experience but also underscores its significance in the utilization of Type 1 diabetes data, a crucial step towards effective public health policy.

Objectives: To determine the impact of Type 1 diabetes data on policy development in Kenya.

Methods: We abstracted data for 2023 and 2024 from the national reporting system, changing diabetes in children (CDiC) reporting platform, guidelines, job aids and standard operating procedures, data quality audit reports, and annual reports using a data abstraction form containing the following variables: guidelines and protocols developed, tracking of trends and patterns, and data used for the national guidelines and protocols review.

Results: Through the enhanced Type 1 diabetes surveillance and data collection systems, the Division of NCDs has developed programmatic management of Type 1 diabetes guidelines and protocols, enhanced tracking of Type 1 diabetes trends and patterns, and identified high-burden areas to guide resource allocation, healthcare providers' training, community engagement, screening, and tailored patient management. Equally, this data has been vital in resource mobilization to advance Type 1 diabetes interventions.

Conclusions: Type 1 diabetes data utilization is changing the diabetes landscape through policy formulation, evidence-based guideline and protocol development, identification of high-burden areas, targeted training and resource mobilization. Robust data collection systems and intervention measures for patients and healthcare workers could improve Type 1 diabetes patient management and outcomes.

Thursday, October 17th, 2024

Poster Corner 5: Psychological and Psychosocial aspects of Diabetes

P-121

ROUTE-T1D: a family behavioral intervention to enhance continuous glucose monitor use among racially minoritized youth: medical and demographic correlates of session attendance

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Introduction: Racial oppression and racially discriminatory policies lead to inequitable access to quality healthcare and life necessities, resulting in lower rates of continuous glucose monitor (CGM) use among racially minoritized youth with type 1 diabetes (T1D). ROUTE-T1D is a 3-session, nurse practitioner-led behavioral intervention to promote CGM use specifically among racially minoritized youth with T1D with <75% CGM use.

Objectives: This analysis examines medical and demographic correlates of session attendance.

Methods: Participants included 60 youth ages 10-15 years with <75% CGM use who were randomized to either the immediate intervention (n=31) or delayed intervention (n=29); this study includes the immediate group only. Intervention content focuses on problem solving and positive communication related to CGM use. Medical (caregiver reported or obtained from the electronic health record or Dexcom Clarity) and demographic (caregiver reported) correlates of session attendance (3 vs. $\leq$ 2 sessions attended) were examined using independent samples t-tests or chi-square analyses.

Results: Session attendance was high, with an overall session attendance of 77.4%. Generally, medical/demographic variables were unrelated to session attendance; however, family income of <50k/year was associated with $\leq$2 sessions attended, while >50k/year was associated with 3 sessions attended (χ^2=3.91, p<.05; Table 1).

Conclusions: Our study employed several methods to increase sample diversity (e.g., maintaining the same research staff, immediate compensation, flexible session scheduling, use of telemedicine). Providing additional necessities, such as childcare or reimbursement for missed work hours, may have increased session attendance for families making <50k/year. Future studies will examine strategies to increase accessibility for families making <50k/year, such as increasing the amount of time allowed between sessions.

Table 1. Demographic and Medical Correlates of Session Attendance (n=31)

Session Attendance	
Overall Session Attendance (%)	77.4
3 Sessions Attended, n (%)	20 (64.5)
2 Sessions Attended, n (%)	3 (9.7)
1 Session Attended, n (%)	6 (19.4)
No Sessions Attended, n (%)	2 (6.5)
Demographic Variables	
Child Age (years)^	13.2 ± 1.7
Child Race/Ethnicity	
Black, non-Hispanic, n (%)	33 (55)
Hispanic/Latinx/a/o, n (%)	10 (17)
Middle Eastern/North African, n (%)	2 (3)
Mixed Race, n (%)	10 (17)
White, non-Hispanic, n (%)	5 (8)
Child Gender^	
Female, n (%)	11 (35.5)
Male, n (%)	20 (64.5)
Caregiver Education Level^	
Up to high school, n (%)	14 (45.2)
College degree or more, n (%)	17 (54.8)
Family Income*	
<50k/year, n (%)	13 (41.9)
>50k/year, n (%)	16 (51.6)
Family Structure^	
Two-caregiver household, n (%)	17 (54.8)
Single-caregiver household, n (%)	14 (45.2)
Medical Variables	
Diabetes Duration (years)^	5.2 ± 3.3
HbA1c (%)^	10.7 ± 2.2
% Below HbA1c Target of <7%	0
CGM time-in-range (%)^	30.5
CGM wear-time (%)^	70.6
Mode of Insulin Delivery^	
Pump, n (%)	14 (45.2)
Injection, n (%)	17 (54.8)

Notes. ^=not significant $p>.05$, *=$p<.05$

P-122

Disordered eating screening within a pediatric diabetes clinic

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Introduction: Adolescents with type 1 (T1D) and type 2 diabetes (T2D) are at elevated risk for mood and eating disorders. Depression screening is now standard within pediatric diabetes clinics, yet formal screening for disordered eating is rare. Due to comorbidities, depression screening may identify youth with disordered eating concerns.

Objectives: This study examined how disordered eating symptoms are related to depressive symptoms in adolescents with T1D and T2D.

Methods: In a retrospective analysis of clinical data from outpatient medical visits in patients with T1D and T2D aged 13 to 18 years, body image concerns and extreme weight control behaviors (measures closely associated with disordered eating) were assessed from a self-reported adolescent health questionnaire (AHQ) and depressive symptoms via the Patient Health Questionnaire-9 Adolescent Version (PHQ-9).

Results: Patients with T1D (n = 216) had a median age of 16.1 (IQR 2.1), had diabetes for 7.7 ± 4.08 years, and a median BMI%ile of 83.3 (IQR 30.0); while those with T2D (n = 85) had a median age of 16.1 (IQR 2.0), had diabetes for 2.7 ± 1.29 years, and a median BMI%ile of 99.0 (IQR 2.1). Regarding depressive symptoms, 6.0% (T1D) and 11.8% (T2D) scored at or above threshold (≥ 11) on the PHQ-9. Concerns of body image were reported in 13.0% (T1D) and 42.4% (T2D) and of extreme weight control behaviors in 6.0% (T1D) and 27.1% (T2D). Linear regressions adjusted for relevant background variables including BMI indicated higher PHQ-9 scores were associated with both increased body image concerns (T1D: B = 4.14, p < .001; T2D: B = 3.41, p = .004) and extreme weight control behaviors (T1D: B = 3.49, p = .002; T2D: B = 4.30, p < .001).

Conclusions: These findings highlight concern for disordered eating, especially within T2D, and routine screening is indicated. If clinic constraints limit multiple screenings, follow up disordered eating screening for those with concerning depressive symptoms may be appropriate.

P-123

Investigating associations among demographics, medical variables, caregiver fear of hypoglycemia, and sleep quality among parents of children with type 1 diabetes (T1D)

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Introduction: Parents of young children with T1D often face challenges including detecting hypoglycemia, causing fear of hypoglycemia (FOH), and sleep difficulty.

Objectives: We examined associations among medical/demographic variables, parent sleep quality, and FOH.

Methods: Participants included 123 parents of young children with T1D. Medical/demographic variables were obtained via self-report and medical chart review (Table). Parent sleep and FOH were self-reported on the Pittsburgh Sleep Quality Index (PSQI; clinical cut-off = 5) and Hypoglycemia Fear Scale (HFS). Independent samples t-tests, point biserial correlations, and chi-square tests were used to examine the associations between demographic/medical variables and HFS/PSQI.

Results: PSQI and HFS were positively correlated (r=.252, p=.006). Parents of children using insulin pumps were marginally more likely to have clinically elevated PSQI scores (X^2 =2.963; p=.085). Mothers (vs. other parents) and parents with psychiatric histories had higher PSQI scores (r=-.169, p=.065; r=.264, p=.004). Parents with public insurance had marginally lower PSQI scores (r=.158, p=.085). Parent's gender, education level, and race/

Participant Demographics Table, n=123	n (%)
Parent sex, female	115 (93.5%)
Parent relationship to child	
Mother	115 (93.5%)
Father	8 (6.5%)
Parent race and ethnicity	
Alaskan native/American Indian	1(<1%)
Asian American	10 (8.3%)
Black/African American	15 (12.5%)
Hispanic/Latina/o/x	16 (13.3%)
Multiracial	3 (2.5%)
Non-Hispanic, White	75 (62.5%)
Highest parental education, graduated college	65 (52.8%)
Parent psychological/psychiatric diagnoses	15 (12.2%)
Child's health insurance, public	32 (26%)
Child insulin pump use	72 (58.5%)
Child CGM use	111 (90.2%)
Child severe hypoglycemia experience	3 (2.4%)
Child seizure	2 (1.6%)

ethnicity, and children's pump use, CGM use, and presence of severe hypoglycemia were unrelated to continuous PSQI scores. HFS was unrelated to any demographic/medical variables (p>.05).

Conclusions: Greater clinical elevations in poor sleep quality in parents of children on pumps may be due to alarms or concerns about pump function. Greater responsibility for T1D tasks among mothers compared to other parents may explain their worse sleep quality. Given mixed findings about CGM and insulin pumps in relation to sleep quality and FOH in the field, more research is warranted among parents of young children using newer technologies.

P-124

Stakeholder needs for diabetes technology interventions vary by preferred language

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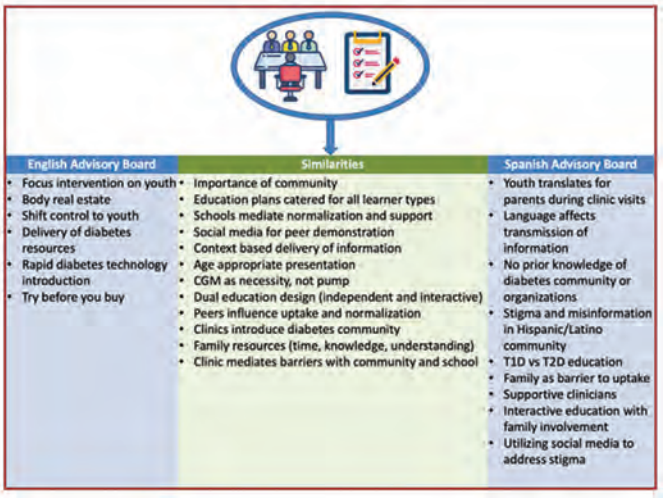
Introduction: Interventions to increase diabetes technology uptake in youth with T1D and public insurance are underexplored. The Building the Evidence to Address Disparities in Type 1 Diabetes (BEAD-T1D) Pilot study engaged minoritized families in a mixed-methods study followed by advisory boards to formulate a pilot intervention to increase diabetes technology uptake.

Objectives: We aimed to understand intervention design factors that minoritized families considered most impactful in diabetes technology uptake with a particular focus on delineating the differences between English and Spanish speaking parents of youth with T1D and public insurance.

Methods: We invited study participants (n=13, age 38±6 yrs, child's age 8±2 yrs, 62% Hispanic, 38% speak Spanish, 69% earn <$50K) to provide recommendations on interventions to increase diabetes technology uptake in marginalized populations. We conducted two virtual advisory board sessions in English (n=8) and Spanish (n=5). Thematic analysis and coding were conducted by a three-member bilingual team.



Results: Needs for diabetes technology uptake stratified by preferred language is presented in the Figure. Irrespective of language preference, parents cited school support and peer learning via social media as necessary supports for technology uptake. Parents with English-language preference cited youth integration into clinical conversations around diabetes technology as a priority. Parents with Spanish-language preference cited community education around diabetes technology as a priority, notably to combat stigma and misinformation.

Conclusions: Understanding individual and systemic drivers impacting diabetes technology uptake in marginalized communities may help clinicians and researchers ensure equitable access to novel devices that improve outcomes in T1D. Further research is needed to understand drivers of disparities in diabetes care on a broader scale, as well as to inform interventions that improve clinical care.

P-125

Parental burnout associated with type 1 diabetes - preliminary results

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Introduction: Managing Type 1 Diabetes (T1D) in youth demands more than medical treatment, encompassing significant lifestyle and routine changes. This can place emotional strain on their caregivers, possibly leading to Parental Burnout (PB), impacting family dynamics negatively.

Objectives: This study aims to assess the prevalence of PB among T1D caregivers, through *Parental Burnout Assessment* (PBA) enquiry and to describe T1D related clinical and sociodemographic factors.

Methods: Observational, cross-sectional, descriptive and analytical study. The PBA includes four subscales: *Emotional Exhaustion*, *Contrast*, *Feelings of Being Fed Up* and *Emotional Distancing*.

Results: Sample included 51 parents, predominantly mothers (84.0%), with a median age of 44 years. Education varied, with 64.7% completing high school or university. Most families were nuclear (68.7%), 74.5% with parents living together, 17.6% single parents and 65.7% with more than one sibling. Among children with T1D, 58.9% were male, with a median age of 14 years. Insulin pump was the primary treatment in 54.9%, disease duration median was 4.3 years and HbA1C level of 7.7%. T1D diagnosis was made at 7.75 years old (median), youngest 10 months and oldest 16.9 years. Overall, 8% of caregivers exhibited moderate to high levels of PB. Subscales results analysis showed higher *Emotional Distancing* in caregivers of girls (p=0.024); *Feelings of Being Fed Up* in cohabiting parents (p=0.036); *Emotional Exhaustion* in families with >1 sibling (p=0.049). Tendency for higher burnout scores in caregivers with higher education was shown (p>0.050).

Conclusions: This study highlights the complexity and impact of T1D on parental burnout, extending beyond disease management. These insights underscore the urgent need for comprehensive support systems for families managing T1D, emphasising the necessity to alleviate the emotional and psychological strain on caregivers. Future plans include expanding the study to other centers to increase sample size and uncover further insights.

P-126

Adverse childhood experiences in children with type 1 diabetes has an impact on glycaemic control, clinic attendance and engagement post-transition to adult care

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Introduction: Adverse Childhood Experiences (ACEs), defined as stressful or traumatic events taking place in childhood, is a potentially important but understudied indicator of outcome in type 1 diabetes (T1D).

Objectives: The aim of the study was to determine if there was an association between documented exposure to ACEs and glycemic control (HbA1c), clinic attendance and loss to follow up in a cohort of adolescents and young adults (AYA) with T1D.

Methods: The medical records of a cohort of 120 AYA with T1D, who participated in a case management trial to support transition to adult care, was retrospectively reviewed and documentation of ACEs was retracted. Outcome data of the original study were re-analysed in the context of exposure to ACEs. Multivariable linear and logistic regression models were used to analyse the independent effect of ACEs when adjusted for the pre-transition variables that were thought to affect post-transition outcomes.

Results: In the cohort, 40.0 % experienced at least one ACE, and 11.7%, 3 or more. There was no association between SES and adversities. Exposure to ACEs was associated with increased HbA1c at the time of transition (β0.3, SE 0.1, p=0.007). The regression analysis indicates that for each additional ACE experience by an individual, HbA1c at transition increased by 0.3% (3.3 mmol/mol). An independent association between ACEs and reduced clinic attendance (β-0.3, SE 0.1, p=0.005) and disengagement (OR 2.0, p=0.019) year 1 was also seen but no association was seen on year 2.

Conclusions: Exposure to adversity was found to have clinically independent and important associations with outcomes. Screening for adversity prior to transition may guide individualized follow-up initiatives to support this vulnerable group.

P-127

Abstract Withdrawn

P-128

Parental psychosocial variables and glycemic control in T1D pediatric age: a systematic review

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Introduction: Type 1 Diabetes (T1D) in young children can be very complex to manage for their parents since they are the main responsible for their diabetes management till the age of 8. Evidence suggests that how well parents adapt to managing their child's T1D not only impacts their own well-being but significantly affects their child's glycemic outcomes.

Objectives: This review aimed to summarize the evidence regarding the relationship between parental psychosocial variables and children's glycemic outcomes. We targeted quantitative studies that examined both I) parental psychosocial variables impact on glycemic outcomes of children with T1D aged 1-10 years and II) impact of children glycemic outcomes on parental psychosocial variables.

Methods: This systematic review was performed following the PRISMA guidelines. The search process was conducted in four distinct databases, EBSCO host, PubMed, SCOPUS, and Web of science, from 2019 to 2024 using crucial key search terms.

Results: In a total of 215 studies, 5 studies were included. We found trough 4 studies that parental psychosocial variables were associated with the children's glycemic outcomes; additionally, 1 study showed association between children glycemic outcomes and parental psychosocial variables

Conclusions: The findings suggest that parental psychosocial variables and glycemic control are two interrelated constructs, highlighting the need to examine the interplay, over time, between these variables using a longitudinal design. In sum, findings suggest that it is crucial to offer psychological interventions to promote parental psychosocial variables due to its potential to impact children's glycemic outcomes

P-302

Efficacy of telehealth self-management support for young adults with type 1 diabetes: the resilient, empowered, active living with diabetes telehealth (REAL-T) study

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Introduction: Young adults (YA) with type 1 diabetes (T1D) experience elevated glucose, acute complications, and distress compared to other age groups, in part due to the complexity of navigating multiple life transitions during this stage. To address these challenges, we developed an intervention to support YAs' self-management and well-being, Resilient, Empowered, Active Living (REAL), delivered by occupational therapists (OTs) via telehealth.

Objectives: We evaluated the REAL-T intervention's impact on glycemia and psychosocial and behavioral outcomes in a randomized controlled trial.

Methods: YAs with T1D aged 18-30 with A1c of ≥7.5% were recruited via clinics and social media advertising, and randomly assigned to the intervention or usual care group. The intervention consisted of lifestyle-based OT focused on diabetes self-care habits and routines, stress management, and self-advocacy. Outcomes included A1c, time in range (TIR), Glycemic Risk Index (GRI), diabetes-related quality of life (ADD-QoL), diabetes distress (DDS), diabetes self-management (DSMQ), diabetes self-efficacy (DES-SF), and overall physical and mental health (SF-12 PCS and MCS). Data were analyzed via ANOVA, controlling for baseline values and education (which differed across groups).

Results: Participants (n=209) were 24.3 years old, 60% female, and 45% non-Hispanic White. The intervention did not significantly impact A1c, DSMQ, or SF-12 MCS (all p>0.10), and marginally improved TIR (LS-mean 4.7%, p=0.06). Intervention participants had improved GRI (LS-mean -6.35, p=0.02), ADD-QoL (LS-mean 0.53, p=0.005), DD (LS-mean -0.28, p=0.026), DES-SF (LS-mean 0.31, p=0.006), and SF-12 PCS (LS-mean 2.06, p=0.046).

Conclusions: REAL-T exhibited mixed effects on health and well-being. Its benefits on physical health, GRI, and psychosocial outcomes demonstrate participants' progress in implementing strategies to live well with T1D. Future analyses will investigate whether the observed effects persist after treatment and whether a delayed impact on A1c is evident.

P-307

Perception of psychosocial constraints experienced by type 1 diabetic children in ivory coast

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Introduction: The discovery of type 1 diabetes leads to great upheavals and numerous psychosocial constraints (Lavenne, N. 2016). Unfortunately, they are undervalued in African and particularly in Ivory Coast.

Objectives: The aim of the present study was to evaluate the level of intensity of psychosocial constraints experienced by diabetic children.

Methods: This descriptive and analytical study carried out at the CDiC center of the Diabetes Clinic of the Treichville University Hospital in Abidjan (Ivory Coast) from March to August 2023, involved 65 children aged 12 and 18 years old, diabetic for at least one year, treated with injections of human insulin. They were questioned, with parental consent, about their perception of the following psychosocial constraints: multiple daily injections, frequent hospital visits, dietary restrictions, hypoglycemia, and stigmatization. Using a numerical scale, the children had to assess the level of intensity: 0 to 3: not very restrictive, from 3 to 6 restrictive, and from 7 to 10: very restrictive. The statistical analysis was done with the XLSAT2022.1.2 software.

Results: *Epidemiological data* The study population consisted of 34 girls and 31 boys. The average age was 15.48 ±1.84 years with an average duration of diabetes of 4 ±1.94 years.

Assessment of the intensity of psychosocial constraints experienced by TD1 children The results showed that dietary restrictions are very restrictive in 61% of cases (p=0,009). Hypoglycemia and multiple injections are restrictive in 58% of cases (*p*=0,08). However frequent hospital visits are not very restrictive in 84% of cases (p= 0,0001).

Conclusions: Dietary restrictions were experienced by children as very restrictive, because parents impose a harsh diet on children deeming certain foods "dangerous" for diabetes.

Thursday, October 17th, 2024

Poster Corner 6: Chronic Complications

P-130

Rare case of complex regional pain syndrome in a sweet girl

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Introduction: Complex regional Pain syndrome (CRPS) is recognised in adults with Type 2 Diabetes Mellitus, but not reported in children with Type 1 Diabetes Mellitus. Complex regional pain syndrome (CRPS) is a primary pain syndrome, a debilitating disorder of unknown aetiology associated with dysatonomia. CRPS has significant negative impact on child's family, education and sports. and it will be disproportionate to the severity of the injury

Objectives: Here we present a 14 year old sweet girl who was diabetic since 4 years of age who presented with excruciating pain in her right elbow and forearm for past one week with history of minor trauma. It was aggrevated by movement and relieved by warm compressions and there was no relief with analgesics. She had also noted that right forearm was swollen, warm and angry looking during the intense pain episodes and pain prevented her from attending school and participating in her regular activities,

Methods: On examination her right elbow was flexed with forearm in mid pronation. Nonpitting oedema extending from elbow to proximal wrist crease with dusky appearance of the limb with increased of perfusion index compared to the other arm. She had allodynia and hyperalgesia with decreased range of movements of the elbow and wrist. Rest of her examination was normal

Results: Diagnosis of CRPS was made based on Budapest Criteria as evidenced by sensory, trophic and sudomotor changes which were unexplainable with another diagnosis. Optimal multidisciplinary management programme like desensitisation therapy and cognitive behavioral therapy was initiated along with tricyclic antidepressants. She had complete recovery gradually over two weeks

Conclusions: Paediatric enodcrinologists should be aware of this rare complication, to prevent unnecessary investigations and overuse of analgesic. Early diagnosis is important for optimal management of this condition, to acheive complete recovery and to prevent negative impact is achieved without any development of chronicity.

P-131

Relationship of limited joint mobility (LJM) and growth impairment in Indian children and adolescents with type 1 diabetes (T1D)

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Introduction: Traditional 'prayer/table top' sign shows involvement of small joints of hand; data on Indian children and adolescents with T1D is lacking.

Objectives:

1. To determine the prevalence of LJM using Rosenbloom's staging and assess relationship with growth and puberty
2. To compare joint mobility in children with T1D and healthy controls

Methods: Design: Observational cross-sectional. Subjects: 130 children and youth from 10 to 21 years of age, presented at the T1D clinic at a tertiary center in Western Maharashtra, India. Controls: Age-gender matched 66 healthy children. Anthropometry was measured using standard protocols. Range of motion (ROM) on passive extension of small joints of bilateral hands, bilateral wrist/elbow extension and ankle dorsiflexion were assessed with goniometer. Involvement of lateral flexion of cervical/thoracolumbar spine or obvious hand deformity were considered as severe LJM using Rosenbloom's staging.

Results: Amongst 130 subjects with diabetes (mean age 15.7 ± 3.4, boys 54), 38 (29.1%) were found to have LJM with mild, moderate, severe staging as 11.5%, 13.8% and 3.8%, respectively. Subjects with LJM had significantly lower height Z scores compared to those without stiff joints ($p = 0.026$). Amongst 55 pubertal, 43 (78.2%) and amongst 75 post-pubertal children, 49 (65.3%) had LJM. The relative risk of developing LJM given that subject had entered puberty was 1.901; thus, puberty posed 90.1% higher risk of developing LJM. Six children had their HbA1c < 7. There was significant difference in LJM prevalence with HbA1c > 9.5% (43.9% children) versus HbA1c < 9.5% (p-value < 0.05). Student's T test showed significant difference in restricted passive extension of distal and proximal interphalangeal joints of hand in comparison with healthy children (Table).

Conclusions: Almost a third of subjects with T1D had LJM; interphalangeal joints of hand were significantly restricted in comparison with healthy controls. Subjects with LJM were also shorter. Poor glycemic control and puberty increased risk of LJM.

Joints of hand	Rt. mean ROM for T1D	Rt. mean ROM for control	Lt. mean ROM for T1D	Lt. mean ROM for control	Abbreviations
1st interphalangeal	38.2*	46.5*	39.8*	46.8*	
2nd distal interphalangeal	23.2*	31*	24.2*	32.9*	
3rd distal interphalangeal	23*	30.9*	23*	30.9*	
4th distal interphalangeal	23.7*	32.0*	24.8*	32.0*	*Significantly different at p-value < 0.05, ROM: Range of motion (in degrees), Rt: Right, Lt: Left
5th distal interphalangeal	23.9*	32.7*	25.1*	33.7*	
2nd proximal interphalangeal	33.7*	39.1*	35	38.2	
3rd proximal interphalangeal	34*	39.4*	33.8*	38.3*	
4th proximal interphalangeal	33.6*	38.6*	33.6*	38.6*	
5th proximal interphalangeal	34.3	37.8	33.9*	37.7*	

P-132

Comprehensive lipid and metabolite profiling of youth with childhood onset type 1 diabetes compared to healthy controls: results from the 5-year follow-up of the Norwegian ACD study

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Introduction: Persons with type 1 Diabetes (T1D) have increased risk of early, accelerated atherosclerosis and premature cardiovascular disease. What drives this accelerated atherosclerotic process in T1D is not quite clear, although dyslipidemia and hyperglycemia seem to play an important role.

Objectives: As far as we know, a comprehensive lipid profiling has not been performed in youth with T1D. Therefore, we aimed to characterize the lipid-related and metabolic alterations related to hyperglycemia in youth with childhood onset T1D compared to healthy controls.

Methods: We used data and biobank from the 5-year follow-up of the prospective population based Norwegian Atherosclerosis in Childhood Diabetes (ACD) study. Plasma metabolites were measured using a high-throughput nuclear magnetic resonance (NMR) spectroscopy platform. The differences between T1D youth and healthy controls were compared using regression models.

Results: 366 subjects, with the mean (SD) age of 18.6 (2.9) years, were included in the analysis, 242 (66%) of which had T1D and 122 (34%) healthy controls. Compared to healthy subjects, the T1D youth had much higher levels of atherogenic apoB- and apoA1-containing lipoprotein subclasses and higher lipids and lipid species within especially the LDL and HDL subclasses. For example, they had a markedly higher triglyceride levels in their LDL particles. Most plasma fatty acids were also higher in T1D subjects, together with lactate, pyruvate, glycerol and ketone bodies, while glutamine, histidine, creatinine and albumin were lower. Most of these metabolic alterations were linked to either glucose or HbA1c level, or both. Interestingly, while branched-chain amino acids were similar in T1D and healthy subjects, they associated strongly with glucose among T1D subjects only.

Conclusions: We found, in this young Norwegian cohort, that youth with T1D had more atherogenic lipid profile compared to healthy control subjects, that was highly associated with short- or long-term glycemic control.

P-133

HbA1c control in type 1 diabetes with retinopathy and effects of COVID on national diabetic retinopathy screening programme

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Introduction: Diabetic Retinopathy (DR) is the most common microvascular complication of diabetes mellitus (DM), leading to visual impairment and blindness. In the UK, annual screening for retinopathy is recommended for patients with type 1 diabetes (T1DM) from age 12. The National Paediatric Diabetes Audit of England and Wales (NPDA) 2021/2022 reported 11.4% of children and young people aged 12-24 years to have an abnormal retinopathy screening result. Mean HbA1c outcomes improved from 2020/2021 to 2021/2022 despite the challenges of Covid-19, affecting many health services.

Early detection and intervention can improve DR outcomes.

Objectives: To compare HbA1c outcomes in those patients with retinopathy against those without retinopathy and assess the potential impact of the Covid-19 pandemic on access to retinopathy surveillance.

Methods: Review of the regional retinopathy surveillance database to access the screening reports of paediatric T1DM patients under the University Hospitals Birmingham Paediatric Service. Retinopathy screening reports are stored from 2015 to the present.

Patients aged 12 by the 1st April 2024 were included.

Demographic information, date of diagnosis, result of both initial (post diagnosis) screening and recent screening with contiguous HbA1c were collected and analysed.

Results: Of 353 patients with T1DM, 200 were included. Initial screening, post diagnosis revealed 4 (2%) abnormal results, all with stage R1 (Background retinopathy) observed and 19 (9.5%) patients had abnormal results on their most recent screening visit.

Mean HbA1c in patients with a normal retinopathy result was 63 mmol/mol, compared to 73 mmol/mol with abnormal result.

The mean time between diagnosis and initial diabetic screening was 52.1 weeks.

Conclusions: Mean HbA1c was 10 mmol/mol greater in the group with an abnormal diabetic retinopathy screening report. The association between increased HbA1c and retinopathy is supported by the literature.

The Covid-19 pandemic did not appear to impact access to retinopathy surveillance.

P-134

Early increase in carotid intima-media thickness in females with childhood onset type 1 diabetes compared to healthy peers: the Norwegian atherosclerosis in childhood diabetes study (ACD)

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Introduction: Persons with type 1 Diabetes (T1D) have early, accelerated atherosclerosis and increased mortality from premature cardiovascular disease (CVD) where women with T1D seem to be particularly at risk.

Objectives: To evaluate early progression of atherosclerosis, over a 10-year period, in childhood onset T1D compared to healthy controls.

Methods: The ACD study is prospective population-based study, with follow-up every 5th year. The cohort consists of 329 children with T1D and 173 healthy controls of similar age. Carotid artery Intima Media Thickness (cIMT) was measured using standardized methods at all time points, as well as traditional CVD risk factors and various biochemical markers of inflammation and atherosclerosis. Linear mixed effect models with cIMT as the outcome were used.

Results: At baseline the mean age was 13.7 (SD=2.8) years, disease duration 5.6 (SD=3.4) years and HbA1c 68 (SD=13.1) mmol/mol in the T1D group. Over the 10-year period women with T1D showed significant increase in weight, BMI, waist circumference, DBP, total cholesterol, LDL, and apoB while T1D male showed significant changes in DBP and u-ACR compared to controls. At the 10-year follow-up the cross-sectional mean cIMT was significantly higher in T1D women compared to female controls, while this was not the case for men. Women with T1D showed also significantly higher increase in mean cIMT over time than female controls, with significant mean between-group difference in mean cIMT, both unadjusted and adjusted for age, BMI, SBP, total cholesterol, HDL cholesterol, u-ACR, triglycerides and HbA1c (0.019, 95%CI: 0.004-0.035, ρ=0.013 vs 0.019, 95%CI: 0.001-0.035, ρ=0.035).

Conclusions: Young women with T1D, in our cohort, increased significantly more in their cIMT, over 10-years period, compared to female controls. They had significantly higher mean cIMT at the 10-year follow-up, with values similar to that found in men, which indicates that women with T1D lose their cardioprotective features early and after short disease duration.

P-135

Serum sclerostin and among children and adolescents with type 1 diabetes: relation to diabetic angiopathy

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Introduction: Sclerostin plays a role critical role in the Wnt signaling pathway. Increasing evidence suggests that Wnt signaling pathways are implicated in various mechanisms related to atherosclerosis and vascular aging. The association between sclerostin and diabetic angiopathy among children and adolescents with type 1 diabetes (T1D) has not been yet discovered.

Objectives: Aim: The aim of the current study is to assess the association between sclerostin and diabetic angiopathy among a children and adolescents with T1D.

Methods: A total of 50 participants with T1D and 25 healthy controls were enrolled in the current study. Participants with T1D were equally divided into a normoalbuminuric and a microalbuminuric group according to urinary albumin excretion rate (UAER). Serum sclerostin level was measured using enzyme-linked immunoassay and Carotid intima-media thickness (CIMT), an index of atherosclerosis, was assessed using high resolution carotid ultrasound.

Results: The plasma Sclerostin levels were significantly higher among participants with microalbuminuria (median: 90.83 ng/ml) compared with participants with normoalbuminuria (33.29 ng/ml) and healthy control (13.5 ng/ml) (P< 0.001). Similarly, CIMT levels were significantly higher in participants with microalbuminuria (P<0.001). Furthermore, a significant positive correlation was found between sclerostin levels, duration of disease(r=0.5,P=0.004, HbA1C (r=0.7, P<0.001), UAER(r=0.8, P<0.001) and CIMT(r=0.7, P< 0.001).The accuracy of serum sclerostin in detection of microalbuminuria among participants with T1D, using ROC, showed that a cut off value above 60.01 ng/ml could differentiate normo- and microalbumiuria with a sensitivity of 88 % and specificity of 100 % (AUC 0.989).

Conclusions: Serum sclerostin levels could serve as a potential biomarker of diabetic angiopathy among patients with T1D. Further studies are needed to better understand the involvement of sclerostin in vascular complications of T1D and the possibility of a novel therapeutic target.

P-136

Longitudinal trends in muscle function of Indian children and youth with type-1 diabetes: a 5-year follow up from a single center

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Introduction: Poor glycemic control in type 1 diabetes mellitus (T1D) is associated with various complications, of which, progressive deterioration of muscle function (MF), which in turn leads to sarcopenia and osteoporosis is overlooked. Early onset of compromised MF with increased duration of illness may potentially accelerate sarcopenia in children with T1D as a primary complication in contrast to secondary complication following neuropathy.

Objectives: 1) To characterize the MF of children and adolescents with respect to diabetes duration 2) To describe longitudinal changes in MF over a 5-year period in patients with T1D

Methods: This longitudinal 5-year follow-up study included 283 patients with T1D aged 4-21 years. Demographic data, anthropometry, laboratory measurements and MF using Jumping Mechanography were performed using standard protocols at baseline and endline. *P*-value<0.05 was considered significant.

Results: The mean age, duration of illness, glycemic control and vitamin D levels of subjects at baseline were 12.7±3.3 years, 4.6±3.5 years, 10.4±2.2% and 17.6±9.4 ng/ml respectively. Subjects with disease duration less than 5 years (group A) at baseline had higher Esslinger Fitness Index (EFI: 76.9±17.2 vs 71.9±14.4) and EFI-SDS (-1.5±1 vs -1.9±1) as compared to subjects with higher disease duration. There was a statistically significant difference in the change in MF after controlling for baseline dietary calcium intake, glycemic control and vitamin D levels ($F(4,212) = 2.382$, $p<0.05$, Wilks' $\lambda=0.957$, partial $\dot{\eta}^2=0.043$) between groups A and B (with duration of diabetes less than and greater than 5 years at baseline). Glycemic control at baseline also had a significant effect ($p<0.05$). The duration of illness effects were driven by Pmax/body weight and EFI.

Conclusions: The deterioration of MF in T1D, due to increase in disease duration was chiefly mediated by reduction in Pmax/body weight and EFI which may be prevented by improving glycemic control.

P-138

Bladder dysfunction in adolescents with type 1 diabetes

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Introduction: It is increasingly significant that adults with diabetes experience lower urinary tract symptoms, however, there has been limited research in younger individuals with type 1 diabetes (T1D).

Objectives: To investigate bladder function using non-invasive urodynamics as a potential indicator of autonomic neuropathy in adolescents with T1D. This involved examining the association between urinary flow disturbances, reported symptoms, and results from other autonomic tests.

Methods: Cross-sectional study enrolling 49 adolescents with T1D and 18 control subjects. All participants underwent uroflowmetry and ultrasound scanning, completed the Composite Autonomic Symptom Score (COMPASS)-31 questionnaire, and were instructed to record their morning urine volume and voiding frequencies and report them back. Cardiovascular reflex tests (CARTs) and the quantitative sudomotor axon reflex test (QSART) were performed.

Results: The group with T1D had higher maximal urine flow, mean urine flow, acceleration, and voided morning urine compared to the control group (p-values < 0.05). There was no significant difference in percentages of abnormal uroflowmetry curves (33% vs 11%, p=0.12) and reported nocturia (34% vs 17%, p=0.39) between the two groups. Using gender-and-age-specific cut-off for post-void residual volume indicating suspicion of lower urinary tract dysfunction, only three adolescents with T1D had abnormal post-voided residual volumes, and none in the control group. Nocturnal urination twice per night was only observed in adolescents with T1D. Seven of the 16 with T1D and abnormal uroflowmetry reported difficulty fully emptying their bladder, while only two reported losing control of their bladder function, one of whom also reported difficulty passing urine as per the COMPASS-31 questionnaire. However, overall, there were no associations between uroflow parameters, symptoms, and autonomic tests (p-values > 0.05).

Conclusions: In conclusion, adolescents with T1D, as well as healthy adolescents, frequently experience urological symptoms. Although urological abnormalities were not significantly more frequent in adolescents with diabetes in this study, the focus on nocturia and risk for bladder dysfunction seems relevant, even in adolescents without any other tests indicating autonomic dysfunction.

P-139

Adipokines polymorphism among children with type 1 diabetes; role in peripheral artery disease

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Introduction: Macrovascular complications represent the leading cause of mortality in type 1 diabetes mellitus (T1DM), however; most pediatric T1DM studies focus on microvascular complications undermining the importance of macrovascular complications. The prevalence of subtle macrovascular affection including peripheral artery disease (PAD) among children with T1DM and its genetic predictors remains to be unraveled.

Objectives: To assess the prevalence of these variants among children with T1DM in comparison to healthy controls and their potential association with macrovascular complications namely PAD and hyperlipidemia among this vulnerable cohort.

Methods: Fifty children with T1DM and 50 matched healthy controls underwent thorough assessment including diabetes duration, insulin therapy, history of chronic microvascular complications, and anthropometric measures. Adiponectin rs1501299 and Chemerin rs17173608 genes polymorphisms were analyzed by real time-PCR (ThermoFisher® kit). Fasting lipids, glycated hemoglobin (HbA1c), and ankle-brachial index (ABI) were assessed. Cochran–Armitage trend test was used to decide the risk allele and evaluate the association between the candidate variant and PAD using a case-control design.

Results: Children with T1DM were found to have significantly higher ABI (p=0.011) than controls. Chemerin gene polymorphism was detected in 41 children with T1DM (82.0%), while adiponectin gene polymorphism was detected in 19 children (38.0%). Children with T1DM having abnormal ABI had significantly higher chemerin G (p=0.017) and adiponectin T (p=0.022) alleles than those with normal ABI. Cholesterol and ABI were independently associated with chemerin and adiponectin gene polymorphism by multivariable regression analysis.

Conclusions: Children with T1DM having PAD have adipokines genes polymorphisms. Hence, chemerin and adiponectin genes could be used as risk biomarkers for hyperlipidemia and PAD among children with T1DM.

Thursday, October 17th, 2024

Poster Corner 7: Lifestyle, Nutrition and Exercise

P-140

Physical activity in children and young adults with type 1 diabetes

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Introduction: Children and young adults (CYA) with type 1 diabetes (T1D) are at increased risk of early cardiovascular disease (CVD) and physical activity (PA) should be a major component of T1D therapy.

Objectives: The purpose of this Quality Improvement (QI) initiative was to increase documentation of PA in the electronic health record (EHR) and assess for associations between PA reported and clinical measures.

Methods: Plan-Do-Study-Act cycles were performed to increase documentation of PA in the EHR at a single pediatric diabetes center (PDC) by using the "Physical Activity Vital Sign (PAVS)" screen. The PAVS has three questions: average number of days, minutes, and intensity of PA, and was initially administered via MyChart. Low rates of completion led to screening via tablet at visit check-in, and then to administration by interview and entry by Medical Assistants. Using American Diabetes Association recommendations for PA, CYAs were labeled as "at goal" or "not at goal". A1c, HDL, LDL, BP (for CYA ≥13y), and technology use were compared between the two groups. Independent sample t-tests or Mann-Whitney U tests were used for continuous variables, and Fisher's exact or Pearson's Chi-squared tests were used for categorical variables.

Results: Analysis of PAVS and clinical data collected between January 2020 - July 2022 in CYA ages 6-25y showed: n=304 subjects (217<18 y), 52% male, 55% non-Hispanic White, average (avg) age 14y. Avg: A1c 7.8%, sys BP 117mm/Hg, dia BP 68mm/Hg, HDL 61mg/dl, LDL 92mg/dl. Only 22% were "at goal" and this group had lower LDL levels (p<0.05). No other differences were found.

Conclusions: Before this QI project, PA levels at this PDC were not recorded. During this QI, self-reported PA levels were documented and reviewed. Most CYA with T1D were not reaching PA goals. Interventions to increase PA in CYA are necessary. Ongoing efforts include: modifying provider chart notes to include PA screening and counseling and ensuring accurate self-report.

P-141

Is there an association between the start of cigarette smoking and the course of glycemic control in young people with type 1 diabetes?

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Introduction: Cigarette smoking at any time is associated with high HbA1c, but the temporal interaction is less clear.

Objectives: To evaluate the association between the start of smoking and the HbA1c course in young people with T1D.

Methods: We included individuals with T1D aged 11-25 years documented from 2010-2023 in the DPV-registry. For individuals who started smoking, 3 periods were defined: 1 year before start of smoking (baseline), first year after start of smoking (FU1), second to third year after start of smoking (FU2). These individuals were matched 1:1 by sex, migration background, baseline age, diabetes duration and treatment year, to a control group who never smoked. A second approach was carried out with further matching variables: HbA1c, BMI-SDS and insulin dosage at baseline. Repeated measurements linear regression was used to compare HbA1c between groups in all 3 periods and the HbA1c trend.

Results: 656 individuals who started smoking were matched to 656 controls. 57% were male, 21% had a migration background and median [Q1; Q3] baseline age was 15 [14; 16] years. In all three periods pump and sensor use was comparable between both groups. Mean (with 95%CI) HbA1c was higher in the smoking group than in controls at baseline (8.8 [8.7-8.9] % vs. 7.7 [7.5-7.8] %, p<0.001), at FU1 (9.1 [9.0-9.2] % vs. 7.8 [7.8-7.9] %, p<0.001) and at FU2 (9.4 [9.3-9.5] % vs. 7.9 [7.8-8.0] %, p<0.001). The HbA1c trend was steeper in the smoking group (increase per period: 0.31 [0.22-0.39] %, p<0.001) than in controls (0.13 [0.05-0.22] %, p=0.003) and the interaction of period*group was significant (p=0.004). The second approach showed that matched controls with similar HbA1c at baseline, had no further HbA1c increase (trend: 0.02 [-0.08-0.11] %, p=0.736).

Conclusions: Young people with T1D who smoke have higher HbA1c even before they start smoking and yet a steeper increase in HbA1c than individuals who never smoke. This elevation of already high HbA1c is not seen in individuals who do not smoke, but have similar demographics.

P-142

Glucose variability and glycaemic responses to food composition at breakfast in children and young people with type 1 diabetes

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Introduction: Children & Young People (CYPs) with type 1 diabetes (T1D) often experience glucose variability (GV) and also postprandial hyperglycaemia after breakfast.

Objectives: To describe GV and also postprandial glycaemia following breakfast in CYPs with T1D.

Methods: An observational study of CYPs with T1D (>1yr duration) asked to share CGM and submit questionnaires for 7-days about their breakfast meal and 4-hour postprandial period. Up to 90 days of CGM data was analysed for the GV and for the 7-day recording period. Statistical analysis included *t*-tests and linear mixed models.

Results: 89 CYPs (mean age 10.1±3.8 yrs.) shared CGM data of which 74 submitted questionnaires. Mean diurnal CV% was significantly higher than nocturnal CV% (38.1% vs. 36.4%, $p<0.001$). 36% met the CV% target (≤36%). Data on 387 breakfast meals was analysed. Mean postprandial glucose (PPG) was 9.2±2.7mmol/l. Pre-prandial glucose and mean PPG were significantly higher for MDI users (9.5±2.9; 10.2±3.2mmol/l) than pump users (7.4±2.3; 8.8±2.5) ($p<0.01$). Pre-prandial glucose was significantly associated with mean PPG (R^2 Marginal=0.23, $P<0.001$). Breakfast cereals were the dominant choice of carbohydrate. Ingested meals containing only breakfast cereals resulted in significantly higher glucose excursion at 30 ($p<0.001$), 60 ($p<0.001$) and 90 minutes ($p=0.02$) when compared with meals which included a protein food (Figure 1).

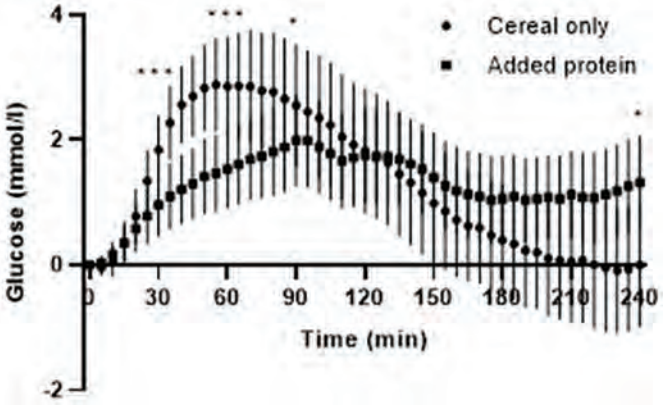

Fig. 1. Mean glucose excursions after ingestion of breakfast which included breakfast cereals only vs. ones which included a protein food

Conclusions: Most CYPs did not meet the target for CV% and GV was higher in the diurnal period. Postprandial hyperglycaemia after breakfast was associated with pre-prandial glucose and was significantly higher after consumption of breakfast cereals. Using insulin pumps, avoiding breakfast cereal on its own and including a protein food may reduce postprandial hyperglycaemia after breakfast.

P-143

The breakfast rise education and knowledge study (the BREAK study)

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Introduction: Children & Young People (CYPs) with Type 1 diabetes (T1D) often experience postprandial hyperglycaemia after breakfast.

Objectives: To investigate the impact of glycaemic load (GL) and protein intake on postprandial glycaemia after breakfast, in CYPs with T1D using CGM.

Methods: A randomised crossover intervention of 25 CYPs aged 5-17 yrs. with T1D (>1yr duration). Participants were asked to test the following meals twice: high GL (HGL), HGL with 10g added protein (HGLP) and medium GL (MGL). Control meals were usual breakfast. Peak excursion, area under curve (AUC), time in range (TIR), time above range (TAR) and time in tight range (TITR) were calculated over a 3-hour postprandial period. Statistical analysis included paired *t*-tests and linear mixed models.

Results: At 30 and 60min ingestion of the HGL meal resulted in a significantly higher glucose excursion compared with all other meals ($p \leq 0.01$) and remained significantly higher than HGLP at 90 and 120min ($p<0.01$) (Figure 1). Peak excursion (6.6mmol/l±2.6 vs. 4.2±1.9, $p<0.01$), AUC (628±376 vs. 305±215, $p<0.01$) and TAR (82±56 vs.44±47, $p=0.01$) were significantly higher, and TIR (94±55 vs. 132±46, $p=0.01$) and TITR were significantly lower (59±45 vs. 100±44, $p<0.01$), after ingestion of HGL meal compared with HGLP. TITR was significantly higher after ingestion of HGLP than MGL meals (101±42 vs. 72±42, $p=0.01$). Analysis of meals managed with Hybrid Closed Loops (HCL) found the glucose response to be comparable.

Conclusions: The highest glucose response was from the HGL meals, this also occurred for those using HCL. A high GL breakfast meal causes significantly less postprandial hyperglycaemia when 10g of protein is added to the meal. Dietitians should recommend an addition of 10g protein to a traditional breakfast cereal meal to reduce postprandial hyperglycaemia in CYPs with T1D.

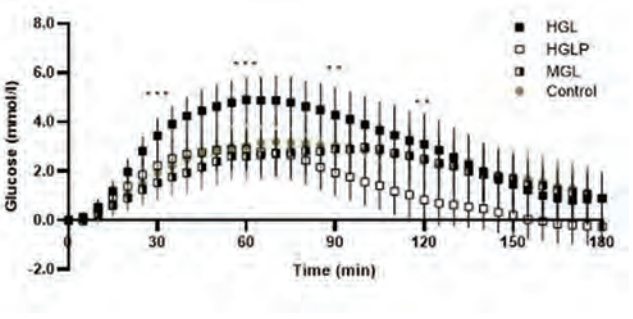

Fig. 1. Mean glucose excursion *indicates significant difference

P-144

Knowledge of carbohydrate counting and insulin dose calculations in adolescents with type 1 diabetes mellitus - which priorities?

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Introduction: Carbohydrate counting is an essential practice in the daily life of adolescents with type 1 diabetes mellitus (T1DM) for achieving adequate metabolic control.

Objectives: To evaluate knowledge about carbohydrate counting and insulin dosage calculation in adolescents with T1DM, after a Summer Camp (SC) for adolescents with T1DM, in which educational interventions were carried out in a practical and informal context.

Methods: Application of PedCarbQuiz to SC participants (n=14) at the end (after 3 days). Sociodemographic and clinical parameters of the samples were collected. For statistical analysis, Microsoft Office Excel was used, using mean, standard deviation, median, minimum and maximum.

Results: The sample consisted of 14 adolescents with T1DM, mostly female (n=9; 64.3%). Adolescents had an average of 5 years of diabetes duration. From the adolescentes, 57% were treated with insulin pump treatment, and the remainder were treated with multiple insulin administrations. Of the patients, 85.7% used bolus calculators. The average score obtained on PedCarbQuiz was 59.6 points (76.47%), with a minimum score of 43 points (55.13%) and a maximum score of 68.5 (87.82%). In domain 1 (CC and nutritional labelling) of PedCarbQuiz the sample demonstrated better results (median =1), while in domain 2 (calculation of insulin dose) the results were worse (median = 0.75).

Conclusions: The results show that the sample correctly identifies foods that have carbohydrate in their composition, as well as knowing how to read/interpret nutritional labelling. However, regarding the calculation of the insulin dose, the sample demonstrated higher difficulty. The PedCarbQuiz is a useful tool in monitoring and optimizing key competencies related to carbohydrate count for the treatment of 1TDM, and to plan nutritional education/intervention strategies in nutrition appointments.

P-145

HIIT and resistance training in a cohort of T1DM adolescents: a real-world diabetes camp experience

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Introduction: Correctly managing type one diabetes requires physical activity. However, fear of hypoglycemia and limited family resources can prevent children and adolescents from participating.

Objectives: To assess the difference between High-Intensity Interval Training (HIIT) and Resistance Training (RT) on CGM metrics in a real-world setting such as a diabetes camp for adolescents with T1DM.

Methods: 26 adolescents with type 1 diabetes (13 males and 13 females) participated in a diabetes winter camp using the same Continuous Glucose Monitoring (CGM) technology, Dexcom G7. To assess their daily Metabolic Equivalents (MET), they were offered the International Physical Activity Questionnaire - Adolescents (IPAQ-A), resulting in a mean of daily METs of 710 (SD 168). On the second day, half of the participants engaged in a 45-minute High-Intensity Interval Training (HIIT) session in the morning and a 45-minute Resistance Training (RT) session in the afternoon; the other half had an opposite schedule. Twenty-two participants wore a heart rate monitor.

Results: Based on the analysis of CGM values, no significant difference was observed between HIIT and RT (p-value >0.05). However, there was a noticeable trend in the results. HIIT caused a reduction in glucose levels, whereas RT led to an increase. The mean change from baseline glucose during HIIT was -18.5 mg/dL, while during RT was +8.7 mg/dL. There was no correlation between HbA1c, daily METs, and the type of treatment. Moreover, Heart Rate Variability (HRV) before exercise did not have any correlation with HbA1c or METs.

General characteristics	n=26
Males n	13
Age, years (SD)	14,7 (1,4)
BMI, kg/m^2 (SD)	20,6 (2,9)
HbA1c, % (SD)	7,2 (1,2)
MDI, n (%)	10 (39)
CSII, n (%)	16 (61)
HRV pre-exercise, ms	59,0

Conclusions: Diabetes camps offer a great chance for young people with type 1 diabetes to learn how to manage physical activity. Even though they are not statistically significant (due to the small sample size and study design), these results could be of interest to personalize physical activity in adolescents with type 1 diabetes.

P-146

Qualitative feedback to drive development of an adolescent weight management program for type 1 diabetes

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Introduction: The prevalence of obesity among youth with type 1 diabetes (T1D) has exponentially increased. There is a dearth of evidence-based interventions specific to weight management for youth with T1D.

Objectives: This study collected qualitative data from adolescents with T1D and comorbid overweight/obesity and their parents to inform the refinement of a weight management program specific to adolescents with T1D.

Methods: Participants completed individual semi-structured interviews to provide feedback on planned session topics,

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handouts, and activities for a modified weight management program for adolescents with T1D. Interviews were audio recorded, transcribed verbatim, and de-identified. A deductive framework matrix analysis approach was used. All data were analyzed by two independent coders; they met to discuss divergence in coding/summaries and came to 100% agreement.

Results: Participants included adolescents with T1D (*n*=8; *mean(sd)* age=14.9(1.5) years; 62.5% female; *mean* BMI=94th percentile) and their parents (*n*=8; 87.5% female). Codes included general program reactions, content changes, parental involvement suggestions, and messaging suggestions. Overall, participants gravitated towards focus on T1D management rather than weight. Of parents, 88% wanted additional support. Of adolescents, 25% wanted less parental involvement in the program. Participants reported that the focus on mental health, social support, exercise, and managing blood glucose would drive program interest. Parents suggested adding content related to adolescent transition to independent T1D management, and 62.5% of parents expressed concern regarding the language used around *fear of hypoglycemia* and *weight*.

Conclusions: Results identified that emphasis around T1D management, mental health, and social support are crucial components for an adapted weight management program specific to adolescents with T1D. Further, message delivery needs to be thoughtful with regards to topics like weight and fear of hypoglycemia.

P-147

Education practices of dietitians across Australia and New Zealand around the management of dietary fat and protein in type 1 diabetes and the utility of continuous glucose monitoring: a survey evaluation

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Introduction: International guidelines recommend that all children and adolescents with type 1 diabetes (T1D) receive education on the glycaemic impact of fat and protein from diagnosis and that the insulin strategy be adjusted using the continuous glucose monitoring (CGM) trace as a guide.

Objectives: To evaluate whether the current practices of dietitians in Australia and New Zealand around education on the glycaemic impact and management of dietary fat and protein are in-line with international T1D guidelines.

Methods: An anonymous, online survey of T1D dietitians working in paediatric centres across Australia and New Zealand was undertaken between March and April, 2023. The Australian and New Zealand Society for Paediatric Endocrinology and Diabetes disseminated the survey.

Results: A dietitian representative from all eligible centres responded on behalf of the team (n=14 Australia, n=6 New Zealand). No centres had a policy/procedure for providing education on the glycaemic impact of fat and protein, yet all respondents believed this to be the role of the dietitian with 25% (n=5) educating all families, and 15% (n=3) at diagnosis; only 1 centre did both. Barriers to education provision included lack of policy/procedure (47%, n=7), consumer resources (40%, n=6) and time (33%, n=5). While only 50% (n=10) of respondents always adjusted the insulin strategy to manage fat and protein excursions, 90% (n=18) routinely used CGM to guide adjustments. Key reasons for not adjusting were, they were unsure of the best strategy (40%, n=4), or they perceived the family was already overwhelmed (100%, n=10) and/or lacked interest (60%, n=6).

Conclusions: Paediatric tertiary centres in Australia and New Zealand require training on methods to incorporate fat and protein guidance into routine practice and consumer-focused resources to facilitate education. Further research regarding effective strategies for improving the provision of this guideline recommended care is needed.

P-148

Short-term low-carbohydrate diet leads to increased time in range in children with type 1 diabetes

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Introduction: Low-carbohydrate diet (LCD) is a popular yet controversial topic among children with type 1 diabetes (CwD) and their caregivers.

Objectives: We aimed to investigate whether a short period of tightly controlled LCD leads to better type 1 diabetes (T1D) control without increasing the risk of hypoglycemia.

Methods: Thirty-five CwD (20 female, 15 male; 20 insulin pumps, 15 insulin pens) were recruited into this randomized study with cross-over design. Their average age was 14.5±2.9 years, duration of T1D was 5.4±3.8 years and their baseline HbA1c 48.9±9.4 mmol/mol. The subject were randomized to either 5 weeks of LCD ready-made food box delivery (95±3g carbohydrates per day) followed by isocaloric recommended carbohydrate diet (RCD) ready-made food box delivery (193±18g carbohydrates per day) or vice

versa. Data were analyzed with two-sample t-tests. The outcomes were standard continuous glucose monitoring parameters and anthropologic data.

Results: A total of 34/35 subjects completed the study. Their time in range was significantly higher in the LCD period than in the RCD period (77.1% vs. 73.8%, *P*=0.02). Time in level 1 and 2 hyperglycemia was significantly lower in the LCD period (12.6% vs. 15.1%, *P*=0.004 and 3.0% vs. 4.7%, *P*=0.004, respectively). Times in level 1 and 2 hypoglycemia did not differ significantly between the periods (5.1% vs. 4.7%, *P*=0.63 and 1.8% vs. 2.1%, *P*=0.48, respectively). Average glycemia was significantly lower during the LCD (7.4 vs. 7.7 mmol/L, *P*=0.02) while the standard deviation of glycemia did not differ (2.8 vs. 2.9 mmol/L, *P*=0.43). The subjects' body weight and BMI were significantly lower during the LCD (62.0 vs. 63.0 kg and 22.4 vs. 22.8 kg/m^2, both *P* <0.001). No episode of severe hypoglycemia nor diabetic ketoacidosis was observed in any of the periods.

Conclusions: Short-term LCD led to increased time in range without increasing time in hypoglycemia in children with type 1 diabetes.

P-149

Dietary patterns and adherence in children with type 1 diabetes: a hospital based cross-sectional study from India

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Introduction: Medical nutrition therapy is essential for managing children with Type 1 diabetes (T1D). It remains unclear to what extent the dietary intake of children with T1D adheres to the recommendations

Objectives: We assessed calorie intake, macronutrient distribution and dietary adherence to International Society for Pediatric and Adolescents diabetes (ISPAD) recommendations in children with T1D.

Methods: This cross-sectional hospital based study was conducted on 75 children with T1D > 1 year and under regular follow-up. Dietary assessment was done by the 24-hour dietary recall method. For defining "adherence to dietary guidelines," the ISPAD 2018 recommendations were followed, and the participants who fulfilled **all** the criteria for macronutrient intake as per ISPAD 2018 were considered as "Adherent" to dietary guidelines

Results: 75 (57% boys) children with T1D and with mean (SD) age of 9.9 (3.3) years were enrolled in the study. Complete adherence to ISPAD 2018 dietary recommendation was observed in 40% of participants. 68% of children had an energy deficit >10% of the estimated average requirement (ICMR 2020). The mean (SD) % calorie intake from carbohydrate, fat and protein was 51.93 (6.08), 32.42 (5.66) and 15.95 (2.45), respectively. More than one third of children had ≥10% energy intake from saturated fats and trans fatty acids. Children found "adherent" to all dietary recommendations had significantly lower energy intake from carbohydrates [50.26 (2.11) % vs. 53.18(7.39) %); table 1. The mean (SD) HbA1c (%) was significantly lower in the "Adherent" [6.83(0.85)], than in the "Non-adherent" group [9.14(1.21)].

Conclusions: The diet of a large proportion of Indian children with T1D tends to vary from the ISPAD recommendations. Informed dietary counseling for these children will help improve their glycemic control

Table I: Comparison of dietary variables in "Adherent" and "Non-Adherent" groups

Dietary variables		Adherent N=30	Non-Adherent N=45	p value
Proportion of energy from carbohydrate Mean (SD)%		50.26(2.11)	53.18 (7.39)	**0.010***
Proportion of energy from fat Mean (SD)%		33.44(1.90)	31.74 (7.10)	0.133
Proportion of energy from protein Mean (SD)%		16.74(1.68)	15.42 (2.75)	**0.012***
Proportion of energy from Sucrose Mean (SD)%		3.05 (1.87)	2.63 (1.57)	0.29
Fiber Intake	Adequate (n)	23	38	0.397
	Less than Adequate (n)	7	7	
Energy obtained from SFA	>10% (n)	3	29	**<0.00001***
	<10% (n)	27	16	
HbA1c (%) Mean (SD)		6.83(1.21)	9.14(1.56)	**<0.00001***

Thursday, October 17th, 2024

Poster Corner 8: Diabetes Education

P-150

Pathways: health in schools for children with type one diabetes and a healthy eating

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Introduction: When a child with diabetes attends school, teachers and non-teaching staff must be informed about the most relevant aspects of the disease thus promoting actions that can prevent acute and chronic complications, allow adequate integration, avoiding discrimination.

With the aim that the entire educational community can function in a safe and informed environment, the "Kids Program" has been developed in different countries around the world as an educational tool to optimize the support of children and adolescents with Type 1 Diabetes in the school environment, as well as providing information on alarm guidelines regarding the onset of diabetes and the benefits of a healthy lifestyle.In Argentina the "Kids Program" has been developed since 2020.

Objectives: Facilitate a safe and inclusive environment in Schools for children and adolescents with diabetes through the development of the KIDS educational program.

Methods: The educational program was developed in schools attended by children with DM1 from 6 to 12 years old.

A self-administered questionnaire was conducted with questions related to knowledge about diabetes and healthy eating guidelines both before and 30 days after the implementation of the program. To analyze the results, a descriptive statistics method was used, identifying the frequency of correct answers to the questionnaire, before and after the educational intervention. The Descriptive Analysis tools of Excel, Infostat and R software were used.

Results: The results obtained from the surveys show that the participants manage to identify signs and symptoms of hyperglycemia, hypoglycemia and the initial actions that caregivers must take in these situations in the school environment in more than 70%.

Conclusions: The Kids educational program, implemented in 33 schools in Argentina, showed a positive impact on the knowledge indicators of caregivers of children and adolescents with diabetes.

P-151

Assessing the environmental impact of type 1 diabetes (DM1) management education: a study on waste reduction practices

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Introduction: The International Diabetes Federation reports 1.52M under-20s with DM1. Treatment advances generate waste, posing environmental, economic, and health challenges.

Objectives: Training at our Pediatric Endocrinology Unit aims to address waste mismanagement.

Methods: Project stages: Understanding proper waste separation at home by healthcare professionals; Administering a questionnaire to DM1 pediatric population; Conducting training sessions on waste separation; Re-assessing post-campaign to gauge impact; Analyzing results via SPSS.

Results: The study focused on 47 children/adolescents with DM1. Initially, most participants lacked adequate knowledge of waste disposal practices. Post-intervention, 78.7% of participants demonstrated awareness and proper waste sorting practices. Notably, 96% disposed of their sharp objects in group IV, 87% disposed of their plastics in the plastic bin, and 85% disposed of their paper or cardboard properly. The intervention led to a significant reduction in monthly waste, including a decrease of 3762g of plastic, 4092g of paper, and 1950g of drill cutters.

Conclusions: Paper and plastic accumulate in landfills and drill cutters can contain harmful substances, which can contaminate the environment and pose risks for the workers who handle this waste. Recycling helps to reduce the amount of waste sent to landfills, thus avoiding soil and water contamination. The production of materials from recycled raw materials consumes less energy and emits fewer greenhouse gases, reducing the carbon footprint. It can also help reduce the costs of production of new materials and the costs associated with disposing of this waste, such as landfill fees and transportation costs. This study underscores the impact of mismanaged waste from DM1 treatment. Our training program encourage patients to separate their waste and rase awareness of the advantages of this type of intervention: social, economic, environmental, and public health promotion.

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P-152

Gamellito adventures: video games as a tool for children to learn about T1D

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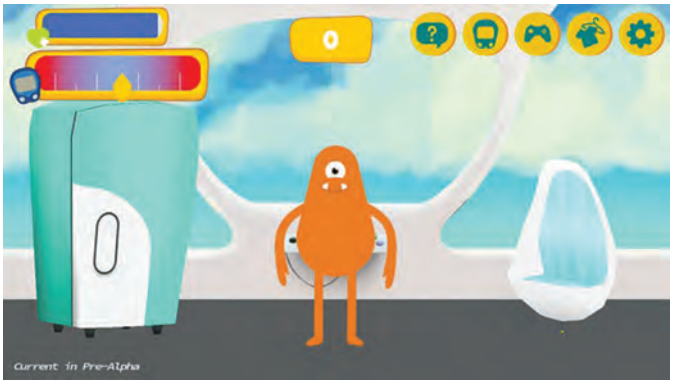
Introduction: Gamellito Adventures is a digital game for tablets and cell phones developed based on challenges in our practice of caring for children and adolescents with T1D.

Objectives: Develop and evaluate educational solutions that spark interest in self-care and at the same time are light and fun

Methods: The game (Figure 1) went through several stages of testing and adjustments with the healthcare team, computer science and design developers, as well as a group of children with T1D. It has the format of a virtual pet, who requests help, which encourages the child to take an active role in the face of possible learning. The player can measure the Gamellito's blood glucose level and, based on the result, take the necessary measures, such as feeding it or applying insulin, choosing the application sites.

Results: The game was used with 56 children between 7 and 12 years old of both sexes and made learning easier and more fun, enabling acceptance and empathy. As a clinical tool, the game motivated and aroused children's interest in learning more, asking questions and expressing feelings about their condition as T1D.

Conclusions: The game sparked a lot of motivation for diabetes education, because this generation that has a growing interest in digital products. The child can benefit from the experience with the game through simulation and generalization, without having to test and experiment with attitudes on themselves. It is recommended that the use of materials be mediated by a health professional or by parents and teachers, so that knowledge is the result of interaction with the child and not a solitary activity. More studies with games should be carried out to evaluate advantages and disadvantages of their use.



P-153

Exploring the structured insulin pump therapy (IPT) pathway for children and adolescents with T1D at sidra medicine (Qatar): a six- years review

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Introduction: With an increase in the demand for IPT among patients with T1D, the peds diabetes team at Sidra Medicine developed a comprehensive IPT pathway that ensures all eligible patients are educated and onboarded to IPT through a structured and robust and efficient process.

Objectives: To explore the IPT process from the implementation to the present day, by gathering feedback from patients, families and healthcare providers (HCPs).

Methods: The IPT process has 3 main steps:

1- Patient Choice Pump Introduction Sessions: Sidra's diabetes educators introduced patients and families to different insulin pump options, discussing their advantages and disadvantages to allow for the families of patients to make more informed decisions.

2- HCPs assessment and evaluation

a) Pre-Pump Clinic: Patients would undergo a brief pump trial where cannula or POD insertion was performed to assess their comfort and readiness for insulin pump therapy.
b) Carbohydrate Counting Assessment: Dietitians evaluated patients' carb counting skills using 5-day food diaries to ensure that they have a proper understanding of nutritional value.

3- **Education Delivery -Pump Schools:** Tailored training sessions were conducted for patients & parents to learn about the pump operation and troubleshooting common issues. Training sessions occurred 3-4 days per week, with 1-2 additional reinforcement days in the following week. Following completion of the training sessions, outpatient appointments were scheduled with patients and families in a designated pump clinic.

Results: From 2018 to 2024, a total of 491 patients with T1D successfully completed the IPT pathway. The pathway was evaluated, and changes made in response to user and HCPs feedback. As a result, the current pathway is now in its 4th iteration.

Conclusions: This iterative approach highlights our dedication to conducting effective and patient centered care, ensuing that the IPT pathway remains adaptable to changing needs and experiences of patients, families and HCPs.

P-154

A low-cost intensive structured virtual training program can be a game changer for limited resource settings: analysing costs of the pediatric diabetes educator program IDEAL (ISPAE diabetes education and learning)

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Introduction: Trained pediatric diabetes educators are urgently needed to improve T1D care in LMICs

Objectives: Assess costs of IDEAL: an intensive, structured, virtual, 47h, 12-wk program teaching basic & advanced T1D care skills since Oct 2021

Methods: Training hours & costs of 7 batches (#7 ongoing) analyzed

Results: In 7 batches 194 trainees (86% women) enrolled: 83.1% of them were certified. Total expenses i.e., running costs (Zoom, Google Classroom, backend support) & faculty honoraria were Indian rupees (INR) 1,099,000 ($13175). Mean expenditure per trainee: INR 5665 ($67.9).

Total training hrs: 47/ batch, conducted by 54 faculty over 12 weeks. With 4 faculty per session (3 main, 1 core committee member), faculty hrs spent on training sessions for 7 batches were 1316. An additional 1552 hrs were spent evaluating trainee assignments (16 assignments/trainee, 0.5 hr/ assignment). Total faculty hrs spent were 2868. Total faculty honoraria were INR 712,300, i.e. INR 248.4 ($3) per faculty hr.

Total fees collected were INR 1,365,500 ($16376). Positive balance was INR 266,500, i.e., $3196.

Highlights: (a) Highly cost-effective, (b) Did not seek external industry/pharma support (c) Small fee (not free): trainees take the course more seriously (d) Low cost & no additional costs (travel, stay, leave): facilitated women's participation (e) Strengthened ISPAE with a sharp surge in membership: united stakeholders. Achieved (a) during & post-course networking, visibility, information sharing, problem-solving & awareness of resources pan-India; (b) better patient care (more conversion from pre-mixed to basal-bolus regimens, monitoring, handling psychological issues): several anecdotal successes. Limitations: Pro bono work is unsustainable, but the positive balance will enable regular honoraria in the future

Conclusions: The IDEAL PDE program is cost-effective, sustainable on a shoestring budget, likely saves national health costs, and is IDEAL for limited resource settings like India

P-155

Health literacy in children and adolescents with type 1 diabetes and associations with glycaemic control

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Introduction: Health literacy has gained more attention recently because of its impact on overall health. Generally, poor health literacy is associated with adverse health outcomes. In youth with type 1 diabetes (T1D) few data about health literacy is available.

Objectives: To assess health literacy in children and adolescents with T1D and to explore associations with glycaemic control.

Methods: Children and adolescents with T1D (age 11-15 years) were asked to complete the Quiz to Investigate Health Literacy in Children and Adolescents (QUIGK-J), a standardized instrument to measure generic health literacy (performance-based

Table 1. Work hours and cost balance sheet for training 53 physicians & 141 non-physicians

	per batch	Total 7 batches
No. of hours of training sessions	**47**	**329**
No. of faculty hours spent on session (4 faculty/session)	188	1316
No. of faculty hours spent on evaluating trainees' work	221.7	1552
Total no. of faculty hours spent	405.7	2868
Total costs so far	**INR**	**USD**
Total costs for 7 batches	1,099,000	13177.0
Course running costs (platform, tech support)	386,700	4636.7
Faculty honoraria	712,300	8540.7
Faculty honorarium per hour	248.4	3.0
The mean cost incurred for training one person	5665	67.9
Total fees collected	1,365,500	16373.0
From physician/pediatrician trainees [INR 12000 ($144) per trainee]	636,000	7626.0
From non-physician trainees [INR 5000 ($59.9) per trainee]	729,500	8747.0

assessment with components access, understanding, appraisal, and application, administration time 40 min). Socioeconomic status (SES) and migration background (MG) were assessed. Levels of health literacy, clinical data and outcome parameter HbA1c were analysed. The study was approved by the ethics committee.

Results: Overall, 49 individuals with T1D (mean age 13.5 years, diabetes duration 5.4 years, HbA1c 7.8%, 43% with MG, low SES 63%, medium SES 31%) participated. Most (59%) had average health literacy, 6% had low or very low health literacy, 8% high and 27% very high health literacy. Among those with very high health literacy only 23% had MG whereas MG was present in about 50% in the other health literacy level groups. SES was distributed without differences. Performance within the component application was better in the group without MG than with MG, whereas access, understanding, and appraisal was comparable in youth with and without MG. Mean HbA1c was 7.7+/-1.3% in individuals with very high health literacy and 8.3+/-2.0% in those with average health literacy (p=0.14).

Conclusions: Different levels of health literacy were present in children and adolescents with T1D. More studies are required in order to explore the impact of health literacy on diabetes outcome. Interventions to enhance health literacy together with diabetes education might be beneficial to youth with T1D and poor health literacy.

P-156

Novel diabetes education program for Latinos with T1D: multi-site study

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Introduction: Latino patients with T1D face healthcare inequities due to cultural and language barriers; resulting in higher rates of DKA and suboptimal glycemic metrics. Following a 3-year pilot study at the Barbara Davis Center for Childhood Diabetes (BDC) to identify gaps in care for Latino pediatric populations, a group-based curriculum was formulated and assessed for efficacy.

Objectives: Following this study, our aim was to evaluate the acceptability, appropriateness, and feasibility of this program in various endocrinology clinics catering to latino patients with T1D in diverse geographical locations, demographics, and staff resource scenarios.

Methods: The resources created at the BDC were distributed to 4 endocrinology clinics. 133 Latino patients with T1D and their families/caregivers participated. Patient and family-level outcomes and satisfaction were collected at baseline, 6-months, and 12 months to assess acceptability, appropriateness, and feasibility. Providers, staff, and clinic administration were surveyed at the conclusion of the study to assess the efficacy and sustainability of the program.

Results: Outcomes of the program are currently under evaluation. However, preliminary results show a high attendance (80.38%), and a low cancellation (7.51%) and no-show (13.26%) average across all sites. Although challenges need to be assessed, the preliminary results of this model are promising as feasible and adoptable in diverse clinical settings. We aim to evaluate adoption and retention rates of diabetes technology, along with impact on HbA1c levels and diabetes-related complications, in comparison to baseline results.

Conclusions: We suggest conducting broader studies with diverse Latino populations to ensure the cultural responsiveness of this program across various cultures. Elevated HbA1c levels and increased rates of DKA are noted in other racial/ethnic minorities with T1D, in comparison to NHW with T1D. We propose the development of a program tailored for other groups, as it could yield comparable benefits.

P-157

Reproductive health (RH) and gestational diabetes (GDM) knowledge mediates the intervention effect on self-efficacy for pregnancy planning in dyads of American Indian and Alaska Native (AIAN) female adolescents and young adults (FAYAs) at risk for GDM and their adult female caregivers

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Introduction: AIAN FAYAs are at risk for GDM.

Objectives: This secondary analysis of Stopping GDM trial data explored possible mechanisms of action of a psycho-behavioral educational intervention targeting healthy behaviors to reduce GDM risk from pre-test to 3 months among AIAN FAYAs.

Methods: Dyads of FAYAs and their adult female caregivers were recruited from 5 sites. Each dyad member independently completed questionnaires regarding RH and GDM knowledge, health beliefs, intention to initiate discussion with healthcare providers (HCPs) and their corresponding dyad members as well as FAYA's self-efficacy for pregnancy planning and healthy eating and the health behaviors of healthy eating and physical activity. Between assessments at the baseline visit, intervention participants viewed a 45-minute video, the initial component of the intervention. At the start of the 3-month assessment, the first half of an e-book was given to dyad members of the intervention group. Dyadic mediation analysis was conducted using the Actor-Partner

Interdependence Model extended to Mediation (APIMeM) assuming distinguishable dyad members.

Results: The sample (N=149 dyads; intervention: n=79; control: n=70) included FAYAs (mean age 16.7±3.0 years) and adult female caregivers (mean age 44.1±9.3 years; 81% being mothers of FAYAs). APIMeM revealed a positive actor indirect effect of the intervention for improvement in the FAYA's self-efficacy for pregnancy planning through increases in FAYA's RH and GDM knowledge (3.60, 95%CI=[1.05, 7.08]), while no significant partner indirect effects were observed. No effects were found for changes in health beliefs or intention to communicate for FAYA or adult caregivers as mediators of intervention effects on FAYA's self-efficacy of healthy eating or the health behaviors of healthy eating or physical activity.

Conclusions: These results suggest that enhancing RH and GDM knowledge may improve key downstream outcomes such as RH-related self-efficacy which may impact health behaviors for AIAN FAYAs at risk for GDM.

P-158

Supporting children with type 1 diabetes: a mixed methods evaluation of a hospital-based education programme for school personnel

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Introduction: The management of Type 1 Diabetes (T1D) in childhood is complex since children rely on their parents to coordinate the daily care activities associated with their condition. This poses challenges for parents of primary school children thus the school setting needs to be taken into consideration when planning the management of a child's T1D. In Ireland, children's medical needs in primary school are supported by a Special Needs Assistant (SNA). The children's hospital provides education and training for school personnel through the Diabetes Nurse Specialist.

Objectives: The aim of the study was to evaluate a hospital-based education programme for school personnel.

The objectives were:

1. To determine what works with the workshop and to identify how it can be improved.
2. To describe the experiences of school personnel in supporting children with T1D
3. To identify what additional supports are needed for schools in supporting children with T1D

Methods: The study was a retrospective mixed methods design comprising of two parts: a retrospective review of course attendee feedback questionnaires and telephone interview with school personnel who had attended the education programme and who support children with T1D in the primary school setting.

Results: Following ethical approval programme attendee questionnaires were analysed and results indicated very positive feedback in terms of the programme being informative, practical and easy to understand. Findings from the qualitative interviews highlighted that the main issues associated with providing support to children with T1D were supporting care, outreach education and practical challenges.

Conclusions: This study has identified the growing need of education programmes and supports for school personnel on chronic conditions such as T1D. Feedback from school staff further highlight the lack of consistency around care planning for children with T1D and the varying perceived levels of confidence and competence by school staff in supporting children with this condition.

P-159

Differences in continuous glucose monitoring (CGM) metrics in minoritized children with a new type 1 diabetes (T1D) diagnosis

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Introduction: Research supports early CGM initiation in children with T1D.

Objectives: We sought to assess characteristics, %time of CGM wear, and changes in CGM metrics from baseline to six months in children with a new T1D diagnosis (T1Ddx) participating in a real-world CGM initiation program.

Methods: Children with a new T1Ddx from June 2022 to April 2023 were offered to start on CGM. CGM initiation included provision of brand-specific handouts and attendance in a CGM class, with follow-up visits at 1- and 3-, and 6-months post T1Ddx. Baseline characteristics were collected via electronic health record (EHR) review. Differences between baseline (at 30 days of CGM wear) and 6 months in HbA1c, CGM metrics [mean %time in range70-180mg/dL(TIR),%time>180mg/dL(TAR),%time<70mg/dL (TBR), and %coefficient of variation (CV)], and %time of CGM wear were collected via EHR and CGM software.

Results: Children (N=20) [(Mean±SD) 8.8±3.2 years old, 40% male, 70% POC, 60% publicly insured] had median of 15 days between T1Ddx and first sensor placement. At 30 days of CGM wear, children had: 97% CGM wear time, 66.6±17.8% TIR, 31.9±18.0% TAR, 1.5±0.7% TBR, and 33.4±6.7 CV. At six months of CGM wear, %time CGM remained at 97% and 30% were on automated insulin delivery systems. Both white and POC children had significant decrease in HbA1c with decrease in TIR and increase in TAR. Children with private insurance had increases in TIR (65 vs. 69%, or extra 57.6 minutes a day of TIR) with decreases in TAR (33 vs. 29%, or less 57 minutes per day), while children with public insurance decreased TIR (67 vs. 56%, or 2 hours and 38 minutes per day) with increased TAR (31 vs 42%, or 2 hours and 38 minutes per day). Change in TBR and CV was not significant.

Conclusions: CGM usage did not differ by insurance or race with early CGM initiation. However, glycemic metrics at 6 months differed by insurance. Future studies must investigate tailored strategies for CGM initiation in publicly insured children.

Friday, October 18th, 2024

Poster Corner 1: Pumps and CGM

P-160

Creating diabetes technology education for children and young people: adaptation and transformation of content in a digital portal

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Introduction: Deapp Tech aims to support children and young people with type 1 diabetes by providing an interactive education portal. This will include easy-to-access information on diabetes technology using animated bite-sized videos,

Objectives: We aim to develop an integrated education portal specific for CGMs and insulin pumps. The portal will be designed to make on boarding a selected device easier for children and young people. Giving users more confidence in self-management with diabetes devices also leading to help reduce reliance on diabetes teams.

Methods: We will use our existing structured education framework to scope users, look at the educational content provided by technology partners and then follow an iterative process to adapt, develop, and write scripts. We will work in partnership with clinical staff from the UHL Children's Research and Paediatric Diabetes Teams, technology companies, animators, patients and families. The portal will guide the user through the content, check understanding and support them with on boarding the device. It will also explain the data they see, what it means and how to manage results.

Results: The outcomes and results of the project are pending. We aim to have interim results by the end of September. The results of the project will be displayed on the poster at ISPAD 2024 in collaboration with partners.

Conclusions: We hope to demonstrate that the use of simplified animated educational content will reduce time given by medical staff and allow children and young people to take more ownership of their diabetes management.

P-161

Increasing pump therapy utilization to improve glycemic control in patients with type 1 diabetes

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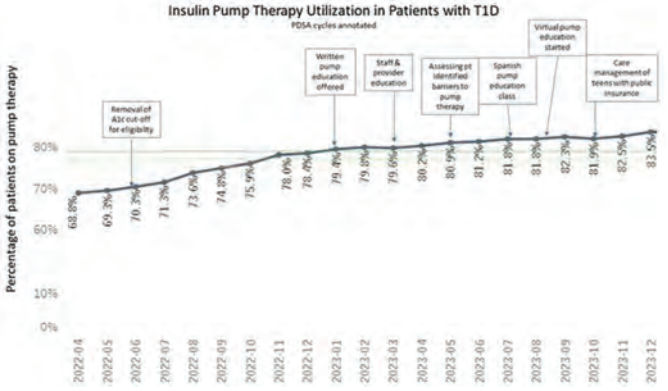
Introduction: Insulin pump therapy is rapidly evolving with automated insulin delivery (AID) advancements. Pump therapy and AID systems are associated with improved glycemic trends, reduced risks of complications and episodes of hypoglycemia, and better quality of life in patients with type 1 diabetes (T1D).

Objectives: To improve glycemic control among our patients, we aimed to increase pump adoption via a quality improvement (QI) initiative.

Methods: This project was conducted in a large, pediatric diabetes center by a multidisciplinary team consisting of clinicians, educators, a social worker, a medical assistant, and a parent advocate. Evaluation of baseline data and clinic processes helped to identify potential barriers to pump adoption. Our team performed iterative testing of interventions including removing clinic-imposed barriers to pump initiation; improving access to pump education by offering virtual and in-person sessions as well as written material; assessing patient barriers to pump therapy; addressing technology access inequities and expanding staff knowledge about AID pump therapy.

Results: At baseline, 70% of our patients with T1D utilized insulin pump therapy and 48% had an A1c <7.5%. After over 12 months of PDSA cycles, the percentage of eligible patients receiving insulin pump adoption education increased from 32% to 65%. The percentage of insulin pump users in our clinic increased to nearly 84%. Notably, over the same period the percent of patients with A1c <7.5% increased from 55% to 61%.

Conclusions: Adapting our pump process to a more patient and family-centered approach increased pump utilization and ultimately, improved glycemic control in our patient population. In addition, our team was able to discover unforeseen barriers to pump adoption and address certain inequities surrounding pump utilization.



P-162

Almost every second child (0-18 years) with T1D in Sweden reaches 50 % time in tight range – an increasing trend

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Introduction: In 2017 Sweden lowered the national HbA1c target for children with T1D to 48mmol/mol (6.5%), corresponding to an average glucose of 8mmol/L (144mg/dL).

The target was communicated to pediatric diabetes clinics and to families. Sweden has a population based National Diabetes Register where data on a group level from all the 42 pediatric clinics treating children with T1D are openly published.

Fig 1a. Proportion of children (0-18 years) with ≥ 50% Time in Tight Range (TITR) 3.9-7.8 mmol/l, 70-140 mg/dl, TITR equals ~70% TIR)

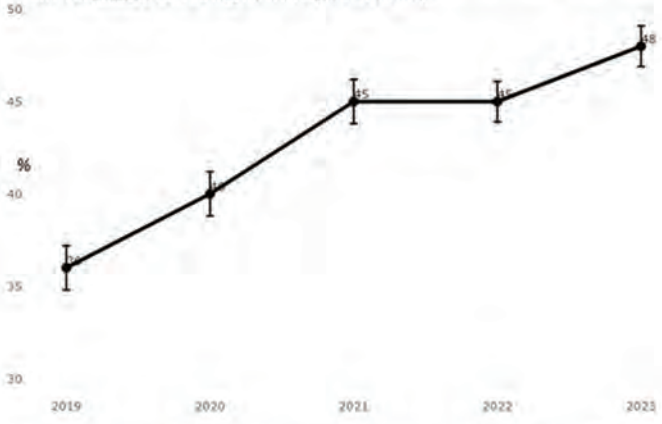

Fig 1b. Proportion of children (0-18 years) with overweight or obesity (BMI ≥25)

Objectives: To investigate the time trend in Time in Tight Range (TITR) and change in CGM as well as in pump use and the proportion of overweight since 2017.

Methods: Population based data were retrieved from NDR. Significance levels were calculated using chi2 test and p <0.01 was considered significant.

Results: 99% (7630/7700) of the children were using a CGM device in 2023, compared with 91.5% (6620/7230) in 2017 and 96% (6890/7190) in 2019. During the same period, the proportion of pump users has increased from 63.5% (4575/7200) in 2017 to 69% (5000/7220) in 2019 and to 82% (6460/7880) in 2023. 48% of these children reached 50% or more TITR in 2023 compared to 30.5% in 2018 and 36% in 2019, p<0.01 (Fig 1a). During the same period the proportion of overweight including obesity is unchanged (Fig 1b).

Conclusions: The percentage of children reaching ≥ 50% TITR has increased by 60% since the national HbA1c target in Sweden was lowered to 48 mmol/mol and by 35% since 2019. Lowering the national HbA1c target, as well as an increased access to modern technology, that facilitates the possibility to reach TITR, are likely factors in achieving these improvements. A glucose control close to normal as well as preventing overweight are important factors to decrease the risk of long-term complications due to T1D.

P-163

Minimum continuous glucose monitor data required to assess glycemic control in youth with type 1 diabetes

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Introduction: 14-day continuous glucose monitor (CGM) data is considered the gold standard for assessment of glycemic control in people with type 1 diabetes (T1D). Studies in adults have shown that 7 days of CGM data provide a reliable assessment of glycemic control, however this is yet to be studied in the pediatric population.

Objectives: To understand the minimum amount of CGM data required to assess glycemic control in the pediatric T1D population.

Methods: Youth ≤21 years of age with T1D utilizing a CGM with >70% wear time were included. CGM data was extracted from cloud-based CGM software for five-time windows (3,5,7,10,14 days) all starting on 3/1/2023. Interclass correlation coefficients (ICCs) comparing 14 days of data to the shorter windows were calculated to assess reliability of the glucose management indicator (GMI) and time in range (TIR) for the shorter windows. Three categories based on 14-day TIR (≥70%, ≤50% & >70% and <50%) were used for sub-analyses.

Results: 1492 youth were included (45.6% female, 74.4% non-Hispanic white, age 14.2±4.3 years, T1D duration 6.3±4.2 years, 86% pump-users). Mean 14-day GMI and TIR were 7.6±0.9% and 57.1±17.8%, respectively. ICC between 14-day GMI and TIR for all time intervals was >0.9. CGM metrics for 7 and 10-days were closest to 14-day, with 93.0% and 77.1% of the subjects within 0.3%-points of 14-day GMI, respectively. Agreement between

Population		3-Day Window	5-Day Window	7-Day Window	10-Day Window
Total Population (n=1492)	GMI difference mean (SD)	0.052 (0.39)	0.024 (0.299)	0.026 (0.242)	0.016 (0.148)
	Subjects within 0.3% 14d GMI (%)	56.6	67.2	77.1	93.0
	Subjects within 5% 14d TIR (%)	52.1	63.5	73.3	91.4
14-day TIR ≥ 70% (n=356)	Subjects within 0.3% 14d GMI (%)	71.9	82.6	90.7	98.6
	Subjects within 5% 14d TIR (%)	65.7	75.6	86.0	96.9
14-day TIR ≥ 50 and < 70% (n=674)	Subjects within 0.3% 14d GMI (%)	57.6	66.8	77.7	95.1
	Subjects within 5% 14d TIR (%)	49.4	61.9	71.1	90.8
14-day TIR between <50% (n=462)	Subjects within 0.3% 14d GMI (%)	43.5	56.1	65.6	85.7
	Subjects within 5% 14d TIR (%)	45.5	56.7	66.9	88.1

14-day CGM metrics and all other time intervals, as defined by GMI ±0.3% and TIR ±5%, was strongest for youth with >70% TIR. When stratified by TIR category, the percent subjects with 7-day GMI ±0.3% of the 14-day GMI differed by up to 25.1% (90.7%, 77.7% 65.6%, highest to lowest). There was a significant difference in percent subjects within set GMI and TIR thresholds of 14-day data based on TIR category for all time intervals ($p \leq 0.001$).

Conclusions: Although 14 days of CGM data is considered the gold standard, assessments of glycemic control based on 7-10 days of data in youth with T1D presenting are moderately reliable. Baseline TIR should be considered when using shorter time windows to assess glycemic control.

P-164

Disparities in insulin pump use established in first year following diagnosis of type 1 diabetes

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Introduction: Disparities in diabetes technology use are prevalent and translate into health equity concerns.

Objectives: To assess differences in time to insulin pump start among youth with Type 1 Diabetes (T1D) based on race/ethnicity and insurance in the year after diagnosis.

Methods: A cohort of youth 2-26 years diagnosed with T1D from 2016-2020 at Boston Children's Hospital was defined by medical record. Time to tech start was determined by review of notes in the year following diagnosis. We conducted time to event analyses using Cox proportional hazards to define differences among groups based upon race/ethnicity and insurance.

Results: Among the 808 patients; 43% were female and mean diagnosis age was 10.7 ± 4.2 years. 70.8% identified as White, 5.3% Black, 8.8% Hispanic, and 15.1% other/unknown; 76.2% had private insurance. For analyses, cohort was limited to 686 patients identified as White, Black, or Hispanic. Among these, 29.9% started a pump within the year following diagnosis. Cox models indicated that Black patients were >80% less likely than White patients to start a pump in year 1 (hazards ratio (HR) 0.17); Hispanic vs White patients were 75% less likely (HR 0.25). Publicly insured patients were >60% less likely than privately insured to start pump therapy in year 1 (HR 0.37). With Black and Hispanic patients combined into a non-White group, publicly insured non-White patients were >80% less likely than privately insured White patients to start a pump in year 1 (HR 0.19). Privately insured non-White patients had a HR of 0.22, and publicly insured White patients had a HR of 0.48 to start a pump in year 1 compared to privately insured White patients. Models were significant with $p<0.01$.

Conclusions: In this cohort of youth diagnosed with T1D from 2016-2020, disparities in time to insulin pump initiation developed in the first year. Non-White and/or publicly insured patients were between 1/5 and 1/3 as likely to start insulin pump therapy in year 1 after diagnosis than White and/or privately insured counterparts.

P-165

Continuing long-acting insulin while utilizing hybrid closed loop (HCL) insulin pump systems in adolescents with poorly controlled type 1 diabetes – a case series

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Introduction: Improved glycemic control is often achieved using hybrid closed loop (HCL) insulin pump systems. Healthcare providers may be hesitant to recommend HCL systems for patients with poorly controlled type 1 diabetes (T1D), particularly in adolescents who are less reliable with their diabetes management and are at increased risk of diabetic ketoacidosis (DKA).

Objectives: To demonstrate our experience using HCL systems while continuing a daily long-acting insulin injection in adolescents with poorly controlled T1D, with the goal of improving glycemic control and reducing DKA risk.

Methods: Three adolescent females with poorly controlled T1D and variable engagement in their diabetes management were transitioned to an HCL system while continuing their once-daily long-acting insulin injection.

Results: Our table below shows the patients' glycemic control for the three months prior to transitioning to an HCL system plus long-acting insulin along with the three months post-transition.

Patient #	Patient Background	Pre-HCL Data	Post-HCL Data
1	16-year-old with complex social situation	A1C > 16.5%	A1C 9.6%
2	17-year-old with mental health concerns	A1C 8.8%, TIR 35%	TIR 68%
3	18-year-old with multiple prior DKA admissions	A1C 15.3%	A1C 12.1%

Patients 1 and 2 had no events of DKA or severe hypoglycemia. Patient 2 maintained a time in range (TIR) near 70% for the following 12 months. Patient 3 did have an episode of DKA three months post-transition, after forgetting her long-acting insulin for multiple days. She was subsequently fully transitioned to the HCL pump (without long-acting insulin) and her quarterly hemoglobin A1Cs for the following 16 months were between 7.5-8.3%.

Conclusions: In our experience, the use of long-acting insulin in combination with HCL systems provided improved glycemic outcomes without increased risk of DKA. This may be a strategy to consider in adolescents with poorly controlled T1D.

P-166

Evaluation of an objective measure of mealtime insulin administration frequency (Bolus) in young adults with type 1 diabetes

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Introduction: Young adults (YA) experience life transitions that, while normative, can create barriers to daily self-care for YA with type 1 diabetes (T1D). Only 17% of YA with T1D meet HbA1c targets, and engagement in T1D self-care is a modifiable behavior that can improve glycemic outcomes. Electronic measures of self-care can be superior to patient-report but have not been examined in YA with T1D.

Objectives: The BOLUS is an objective measure of mealtime insulin use validated for youth with T1D <18yrs. Here, we aimed to validate the BOLUS in YA (18-22yrs) with T1D.

Methods: We extracted HbA1c, insulin pump, and CGM data from the 13 days preceding a routine clinic visit for 348 YA with T1D (Mage=19.37±1.03; 85.3% Non-Hispanic White; MHbA1c=7.71±1.27%). We calculated YA BOLUS scores using published scoring procedures. We used simple correlations to examine relations between BOLUS, HbA1c, and time in, above, and below range (TIR, TAR, TBR, respectively). We used one-sample t-test to examine differences in the BOLUS for YA versus younger youth.

Results: YA mean BOLUS score was 1.17±.82 (range=0-3) and 14.4% had a BOLUS score of 0. YA BOLUS score negatively correlated with HbA1c (-.24, p<.001) and TAR (-.23, p<.001) and positively correlated with TIR (.23, p<.001) and TBR (.12, p=.03). YA mean BOLUS score was significantly lower than the published BOLUS score for younger youth with T1D (Mage=12.7±4.6; Mbolus=2.37±.54), t(347)=-27.45, p<.001.

Conclusions: In YA, higher BOLUS scores associated with lower HbA1c and TAR and greater TIR. However, a surprising finding was the positive association between YA BOLUS scores and TBR, which may suggest YA need educational refreshers on carb counting and exercise management to help prevent hypoglycemia. Notably, YA appear to be bolusing for meals significantly less often than younger youth with T1D and over 14% did not engage in any mealtime boluses, suggesting that YA may benefit from interventions aimed at improving T1D self-care engagement.

P-167

Comparison of the 14-day and 90-day glucose management indicator with HbA1c in children with type 1 diabetes using continuous glucose monitoring

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Introduction: In the era of CGM, Glucose Management Indicator (GMI) has emerged as a useful marker of glycemic control. In everyday practice, clinicians use the GMI presented in the 14-day AGP report, which is considered to provide a representative estimate of glucose values, whereas HbA1c reflects the glycemic status of the previous 90 days. Discordance between HbA1c and GMI is often observed.

Objectives: To study the difference between HbA1c and the 14-day and 90-day derived GMI.

Methods: Data from 41 children (68.4% boys, mean age 8.1±3.99 years, mean diabetes duration 2.14±2.54 years, 58.5% on CSII) using CGMS, were analyzed. The AGP report data from the 14-day and the 90-day period prior to HbA1c measurement were analyzed. The children's Hb at the date of the Hb1Ac measurement was also recorded.

Results: Median±IQR use of sensor was 97±6% and 94.5±12%, for the 14-day and the 90-day period, respectively. Median HbA1c was 6.9±1.5% and median GMI was 6.9±0.8% for both the 14-day and the 90-day period. GMI at both periods and HbA1c were strongly correlated (p<0.001). The absolute difference HbA1c-GMI (ΔHbA1c) was similar for both periods (0.4±0.53%, 0.4±0.43%). A ΔHbA1c of <0.1% was found in 10.3% and 7.69% of participants, of 0.1-0.5% in 51.1% and 59%, of 0.5-1% in 25.6% and

23.1%, of 1-2% in 10.3% and 10.3% and of >2% in just one child, in the 15-day and the 90-day reports, respectively. A clinically relevant ΔHbA1c (≥0.5%) was found in 38.4% of children. ΔHbA1c was not associated with TIR, TBR, TAR or GMI in either report. Interestingly, there was a small but significant negative correlation with HbA1c at 90-days (r=-0.33, p=0.041). As expected, HbA1c was lower in girls. No associations were found between Hb and ΔHbA1c in neither boys nor girls, but all children had normal Hb. All types of sensors performed similarly as to ΔHbA1c.

Conclusions: There was a clinically relevant difference of ≥0.5% of GMI and HbA1c in nearly 1/3 of children with CGM. Lower HbA1c was associated with greater discrepancy, especially at 90 days.

P-168

Increased utilization of insulin pumps and improving health equity among youth with type 1 diabetes: a quality improvement initiative

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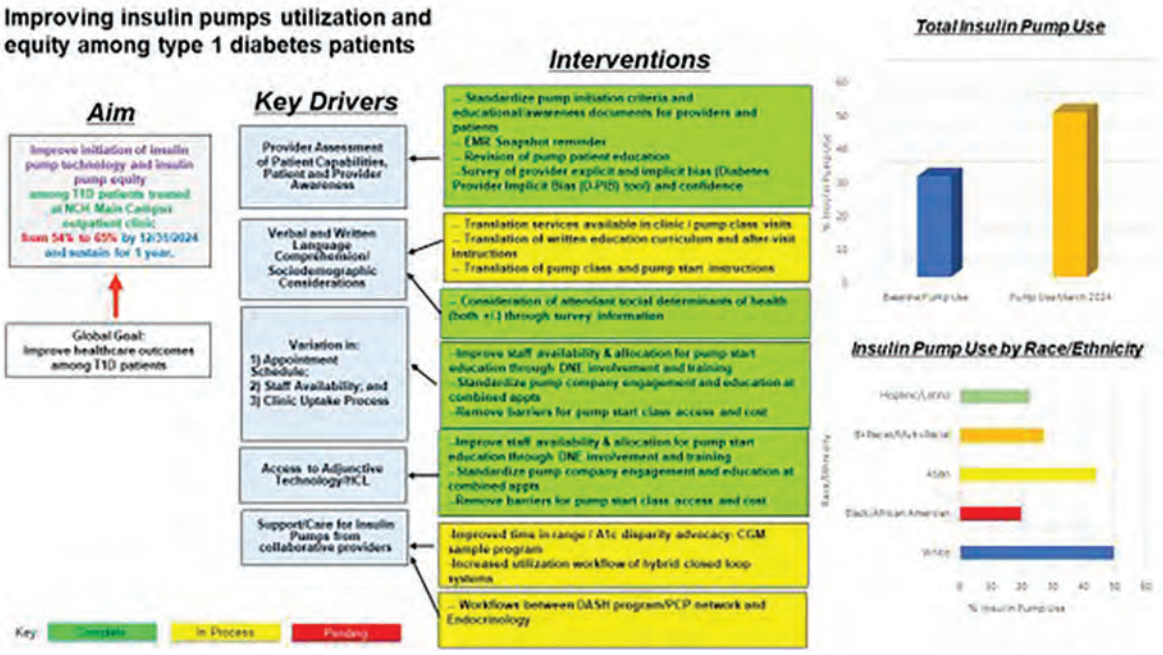
Introduction: Insulin pump use among youth with type 1 diabetes (T1D) has been shown to improve glycemic control and decrease acute complications. Health inequities of insulin pump use among minority youth with T1D exist.

Objectives: This project aims to increase insulin pump utilization and reduce health inequities among youth with T1D at a large tertiary care hospital through innovative quality improvement and equity initiatives.

Methods: Baseline data was collected to identify pump utilization among youth in the outpatient T1D clinic. Pump utilization disparity data was measured among racial/ethnic and insurance groups. Interventions include improving provider/patient awareness of pump use, and family focus groups. Other interventions include addressing social determinants of health through surveys and reducing cost barriers, providing translation services, "on demand" pump classes, and creating innovative inter-disciplinary clinic workflows to enhance pump initiation. This project also established collaborative partnerships with the school based diabetes program and primary care network.

Results: Baseline insulin pump use was utilized in 30% of the patient population. Through these interventions, insulin pump utilization has increased to 49% among total youth with T1D over 12 months. Pump use has been 28% and 26% lower in Blacks and Hispanic youth, 6% lower in Asians, as compared to Whites. 27% of Medicaid patients with T1D are on insulin pump vs. 55% of T1D patients on private insurance.

Conclusions: We observed low rates of insulin pump use in the T1D population, and significant disparities in insulin pump use among minority with T1D. Addressing social determinants of health, addressing patient and provider awareness and barriers, and enhancing innovative, collaborative partnerships can lead to increased insulin pump utilization and improved diabetes care access among a large, racial/ethnic diverse population with T1D.



P-169

Abstract Withdrawn

Friday, October 18th, 2024

Poster Corner 2: Automated Insulin Delivery, Closed Loop

P-170

Barriers to automated insulin delivery system uptake in adolescents with dysregulated type 1 diabetes: a qualitative study

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Introduction: Automated insulin delivery (AID) systems have demonstrated significant benefits in improving glycemic outcomes and quality of life in pediatric populations with type 1 diabetes (T1D). However, only one-third of adolescents (aged 13-17 years) with dysregulated T1D at Steno Diabetes Center Copenhagen are using an AID system.

Objectives: This ongoing study aims to identify barriers to the uptake of AID systems in adolescents with dysregulated T1D.

Methods: An exploratory, qualitative design was employed. Inclusion criteria included a diagnosis of T1D, age between 13-17 years, HbA1c levels of 58-100 mmol/mol, and the use of either an insulin pen, an insulin patch pump, or an AID system. Semi-structured interviews were conducted with adolescents, focusing on their insulin administration preferences, reasons behind their diabetes device choices, and perceptions of different diabetes devices. Initial data collection involved 10 interviews, with recruitment currently ongoing. Interview data were analyzed thematically.

Results: Preliminary findings highlight five primary barriers to AID system adoption. (1) *Identity, body, and social image*: Concerns regarding the visibility of AID pumps, fear of a negative social image, shame, and being perceived as different from peers, ultimately impacting mental health. (2) *Lack of acceptance of diabetes*: Participants reported struggles with fully accepting their diagnosis, impacting diabetes device choices. (3) *Fear of the unknown*: Uncertainty about how to use AID systems due to unfamiliarity with the technology. (4) *Inconvenience*: Challenges related to wearing and managing AID systems, including concerns about device size and tubing. (5) *Lack of information and familiarity*: Limited exposure to peers using AID systems and inadequate communication regarding treatment options.

Conclusions: Addressing the identified barriers through targeted strategies in clinical practice may facilitate a broader use of AID technology when appropriate.

P-171

Evaluation of the efficacy of the CamAPS hybrid closed-loop system in pediatric patients with type 1 diabetes: a 6-month study

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Introduction: The use of advanced hybrid closed-loop systems (AHCL) in children and adolescent patients with type 1 diabetes (T1D) is associated with improved glycemic control.

Objectives: The aim of this study was to retrospectively compare data obtained from continuous glucose monitoring (CGM) in pediatric patients using the CamAPS hybrid closed-loop system 6 months after initiation of AHCL therapy.

Methods: We retrospectively analyzed CGM data from 55 patients (M:F; 23:22), mean age 10 years (1-18) with type 1 diabetes on prior Multiple Daily Injections (MDI) or Predictive Low Glucose Suspend (PLGS) therapy with subsequent conversion to AHCL. We compared glycemic control parameters from CGM (glucose management indicator - GMI, times in glycemic ranges, average glycaemia, standard deviation (SD), coefficient of variation) at baseline and further at 3 and 6 months after the start of therapy.

Results: We demonstrated a significant increase in TIR from 65.4% to 77.7% ($p<0.000001$) resp. 75.6% ($p<0.008$) in 3 and 6 months after starting therapy. The TBR values were not statistically significant in any of the observed periods. The TAR value decreased from 30.1% to 18.2% ($p<0.000001$) and 19.5% ($p<0.0002$) in the monitored periods. The GMI value (initially 52.9 mmol/mol) decreased to 47 mmol/mol ($p<0,0001$) within 3 months after the start of therapy. Significant reductions in mean glucose and SD were also observed. No severe hypoglycemic events or diabetic ketoacidosis were noted in the patients.

Conclusions: The use of the CamAPS system in our group of patients resulted in a significant increase in TIR, a significant decrease in TAR and GMI without an increase in the risk of severe hypoglycaemia. Our results support that the use of AHCL is safe and effective in achieving optimal glycemic control in pediatric patients.

P-172

use of u200 insulin in automated insulin delivery (AID) systems in adolescents with type 1 diabetes (T1D)

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Introduction: Overweight/obese pubertal adolescents with T1D and insulin resistance may face challenges using AID systems due to high insulin doses and decreasing size of insulin pump cartridge volumes.

Objectives: We investigated the real-world safety and effectiveness of U200 in AID systems in adolescents with T1D.

Methods: Youth with T1D using U200 in an AID system (n=25) were included in this single-center retrospective cohort study. Incidence of severe hypoglycemia requiring hospitalization and diabetic ketoacidosis (DKA) were described. Continuous glucose monitoring (CGM) and AID metrics were compared 90 days pre- and post-U200 initiation using Wilcoxon-rank signed tests. Median and IQR are reported.

Results: At U200 initiation, age was 15.4y (14, 16) and T1D duration was 5.4y (2.3, 8.7). A1c, weight, and BMI z-score were 8.3% (7.3, 9.1), 89.1 kg (77.2, 104.9), and 2.1 (1.8, 2.4), respectively. Total daily insulin dose was 102 units (88, 120). 19 (76%) adolescents used AID with U100, 2 (8%) used pumps without CGM integration, and 4 (16%) used injections. 10 (40%) adolescents used U200 in Tandem Control IQ and the remainder used Omnipod 5. One adolescent discontinued pump therapy, and one discontinued AID use. No severe hypoglycemia or DKA events occurred in the 52 weeks pre-U200 or in the follow up period of 28 weeks (17,62). Time in range improved with U200, increasing from 46.8% (36.2, 51.7) to 50.6% (37.1, 57.0) (p=0.008). Time < 70 mg/dl increased from 1.0% (0.2, 1.7) to 1.3% (0.6, 2.6) but time < 54 md/dl was unchanged (0.03% vs. 0.1%, p-value = 0.418). Total daily insulin dose increased from 102 (88,120) to 131 (101,174) units per day (p<0.001). Median days between cartridge changes increased from 2.1 (1.9,2.6) to 3.0 (2.4,3.3) days (p<0.001).

Conclusions: In our cohort of adolescents with T1D, U200 was safely used in AID systems and not associated with increased risk of severe hypoglycemia or DKA. U200 may facilitate use of AID systems in adolescents with high insulin requirements and improve glycemic control.

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Safety and glycemic outcomes of MiniMed™ advanced hybrid closed-loop system in adolescents and adults with type 1 diabetes during Ramadan intermittent fasting: a randomized controlled trial

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Introduction: MiniMedTM 780G is the most advanced insulin pump system approved for the treatment of type 1 diabetes mellitus (T1DM). Hypoglycemic events are a serious complication associated with T1DM management during Ramadan fasting.

Objectives: This prospective study assessed the safety, effectiveness and optimization of advanced hybrid closed loop (AHCL) system on glycemic metrics and the level of hypoglycemia in T1DM patients who wished to fast Ramadan.

Methods: Forty-two T1DM patients (mean age 15.2 ± 3.4 years) using AHCL system were divided into two groups (each n = 21): intervention group who adjusted AHCL settings and control group who kept the same settings as before Ramadan.

Results: The most aggressive system settings among control group consisting of a 100 mg/dL glucose target, active insulin time of 2 h and bolus increment, maintained exceptional glycemia with time in range reaching 82.0 ± 10.2%, time above range >180 mg/dL of 12.1 ± 3.5% without an increase in hypoglycemia (time below range 3.0 ± 0.3%). All of which were non-significant in comparison to the intervention group. Overall time spent in closed loop (SmartGuard) by users averaged 98.7 ± 2.1% in Auto Mode and involved only 1.0 ± 0.7 exits per week indicating confidence in the system's performance. There were no severe hypoglycemic or diabetic ketoacidosis events during the study.

Conclusions: MiniMed™ 780G AHCL system assist in safe fasting with minimal user input and allows for achievement of recommended glycemic targets in people with T1DM during Ramadan fasting. The system demonstrated reduction in hypoglycemia exposure without compromising safety.

P-174

Transitioning to automated insulin delivery systems in children and young people with type 1 diabetes: impact on insulin requirements, anthropometrics, glucose metrics and user behaviour

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Introduction: AID systems improve glycaemic control. However, their impact on user behaviour and anthropometrics in real-world settings is unclear.

Objectives: Evaluate the change in insulin requirement, anthropometrics, glucose metrics and user behaviour in children with T1D transitioning to AID systems.

Methods: Retrospective review of children transitioned from CSII & CGM to an AID system. Data on demographics, glucose metrics and user behaviour were collected at baseline and six months. Data are presented as median (IQR, 25th, 75th). Non-parametric tests were used to compare variables.

Results: 51 CYP (28 male) with a median age of 13 years (11, 16) and diabetes duration of 5 years (2, 9) were included. At six months from baseline, insulin requirements remained stable at 0.9 units/kg (p=0.918), BMI Z-Score reduced by 0.04 (1.34 to 1.30, p<0.05), HbA1c reduced by 3 mmol/mol (p<0.01), time below range (<3.9mmol/L) lowered by 1% (p<0.05), TAR (>10.0 mmol/L) dropped by 25% (p<0.001) and Time in range (TIR, 3.9-10.0 mmol/L) increased by 12% (p<0.001). Meal-time boluses remained stable at approximately 4/day (p=0.375), as did carbohydrates intake at ~180g/day (p=0.466). Meal time boluses were significantly correlated to TIR at baseline (r=0.37, p<0.01) but not at six months (r=0.21, p=0.212).

Conclusions: AID systems enhance glycaemic control without changing user behaviour or increasing insulin requirement. In the context of comparable carbohydrate intake and lowered TBR, reduction in BMI Z-Score suggests fewer hypoglycaemia treatments. The weakened correlation between TIR and meal-time boluses at six months suggests improved glycaemia on AIDs independent of mealtime boluses.

P-175

Glycemic outcomes of children with type 1 diabetes not reaching targets improve during two first years on advanced hybrid closed-loop system – single-center experience on 79 patients

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Introduction: The advanced hybrid close-loop system (aHCL), has been shown to improve glycemic control of patients safely and effectively with type 1 diabetes in short-term follow-up studies.

Objectives: This real-life study investigates the influence of two-year treatment with aHCL on glycemic control in children and adolescents with T1D, who do not reach treatment goals with conventional treatment options.

Methods: This retrospective study included all the patients (n=106) aged 7 to 15.99 years with T1D who initiated the aHCL system between Nov 2020, and Jan 2022, in the Helsinki University Hospital. Of them, 79 had HbA1c levels above 53 mmol/mol and were included in the analyses. Time in range (TIR), HbA1c, mean sensor glucose (SG) value, time below range (TBR), and SG coefficient of variance (CV) were measured at 0, 3, 12, and 24 months.

Results: After the initiation of aHCL, glycemic control improved, and the effect lasted throughout the study period. Between 0 and 3 months, TIR increased (mean 48 [15.5 SD] % to 66.1 [9.3 SD] %), whereas HbA1c and mean SG values decreased (67.4 [11.1 SD] to 60.6 [9.9 SD] mmol/mol; 10.7 [2.0 SD] to 8.8 [0.9 SD] mmol/l; respectively) significantly (p<0.01). These effects were sustainable and improved glycemic control was still visible at 12 and 24 months. Importantly, the changes occurred regardless of the age of the patient.

Conclusions: Glycemic control in patients not reaching treatment goals improved significantly after the initiation of the aHCL system and the favorable effect lasted throughout the follow-up. This supports the concept that aHCL treatment could be an option for all pediatric patients with type 1 diabetes, not only for those who already have good skills in diabetes management.

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Abstract Withdrawn

P-177

Pediatric MiniMed 780g system users who transition from conservative to recommended optimal settings achieve improved glycemic control – a natural experiment

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Introduction: Previous real-world analyses have demonstrated that users of the MiniMed 780G system who consistently employ recommended optimal settings (ROS), defined as Glucose Target (GT) of 100 mg/dL and Active Insulin Time (AIT) of 2 hours, exhibit improved glycemic control compared to those who do not use ROS. However, because populations in both groups did not consist of the same users, it is unclear to what extent improved outcomes can be attributed to the settings alone.

Objectives: In this natural experiment, we present real-world data from pediatric users who initially spent 2 weeks with ROS followed by 2 weeks without, and vice versa.

Methods: MiniMed 780G system users with type 1 diabetes, self-reported to be aged ≤15 years, living in EMEA (Europe, Middle East, Africa) and with at least 10 days of sensor glucose data after automation, were included in the analysis. Data from Aug 2020 to Jun 2022 were examined to identify users that spent 2 weeks with the optimal GT (defined as spending ≥95% of time with GT=100 mg/dL) directly followed by 2 weeks of conservative GT (defined as spending <20% of time with this GT). The same protocol was followed for the optimal AIT of 2 hours. Glycemic metrics were aggregated and compared.

Results: The results are depicted in the Figure. Users transitioning from optimal to conservative GT (N=400) decreased average Time in range (TIR) by 2.0% (74.7%-72.7%), while those starting with conservative GT (N=571) increased TIR by 1.3% (72.4%-73.3%). Similarly, users moving away from optimal AIT

(N=350) decreased average TIR by 2.2% (73.7%-71.5%), while users moving towards optimal AIT (N=664) increased TIR by 1.9% (71.7%-73.6%). Time below range was slightly lower in the conservative setting groups, but still within reassuring levels.

Conclusions: The use of optimal GT and AIT led to a substantial increase in TIR and reduction in mean glucose. The time below 70mg/dL stayed within international targets.

Figure: Real-world data from pediatric MiniMed 780G system users who initially spent 2 weeks with optimal settings followed by 2 weeks without, and vice versa

TIR, time in range/ AIT, active insulin time/ GMI, glucose management indicator/ SG, sensor glucose

P-178

Efficacy and safety of the Omnipod 5 system compared with insulin pump therapy in young adults with type 1 diabetes: sub-analysis of a randomized controlled trial

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Introduction: Despite technology advances, young adults with type 1 diabetes (T1D) face challenges with diabetes self-care and often do not reach glycemic targets. In a recent multicenter, randomized controlled trial (RCT), the Omnipod® 5 Automated Insulin Delivery (AID) System demonstrated safety and superior efficacy compared with insulin pump therapy coupled with continuous glucose monitoring (CGM) in adults with T1D and baseline HbA1c above the recommended target.

Objectives: This exploratory sub-analysis of the RCT evaluated efficacy and safety in the young adults aged 18 to <26 years.

Methods: Across 14 centers in the United States and France, adults with T1D and HbA1c between 7-11% (53-97mmol/mol) currently on pump therapy were randomized (2:1) to use the Omnipod 5 System with Dexcom G6 CGM (intervention arm) or the participant's current insulin pump with Dexcom G6 CGM (control arm, no automation) for 13 weeks following a two-week standard therapy phase. The primary endpoint was percentage time in range (TIR; 70-180mg/dL, 3.9-10.0mmol/L) during the 13-week study period.

Results: A total of 66 participants aged 18 to <26 years were enrolled, with 46 randomized to intervention and 20 randomized to control. After 13 weeks, TIR was higher with Omnipod 5 use compared with standard therapy with an adjusted mean difference (95% CI) of 17.5% (10.5, 24.5; $p<0.0001$), corresponding to +4.2 hours per day in range. Safety was confirmed with Omnipod 5 use versus standard therapy with low time <54mg/dL (<3.0mmol/mol) ($p=0.4435$). Quality of life benefit (DQOL-Brief; $p=0.0001$) with no increase in diabetes distress (T1-DDS; $p>0.05$) was also observed with Omnipod 5 use. See Table for full results.

Table. Exploratory Analysis of Primary and Secondary Endpoints in the Young Adult Cohort of Participants

Outcome	Intervention (N=46)	Control (N=20)	Adjusted Difference (Mean [95% CI])	P-Value
Time in Range (70-180 mg/dL, 3.9-10.0 mmol/L) during 13 weeks (%)	57.7 ± 12.0	40.4 ± 15.2	17.5 [10.5, 24.5]	<0.0001[f]
Time in Range with standard therapy (%)	38.1 ± 12.3	37.4 ± 13.2	-	-
Time <54 mg/dL (<3.0 mmol/L) during 13 weeks (non-inferiority with margin 1%) (%)	0.28 ± 0.26	0.44 ± 0.64	-0.04 [-0.15, 0.07]	0.4435[f,a]
Time >180 mg/dL (>10.0 mmol/L) during 13 weeks (%)	41.0 ± 12.3	57.6 ± 16.3	-16.6 [-23.9, -9.2]	<0.0001[f]
Mean glucose during 13 weeks (mg/dL, mmol/L)	180 ± 23, 10.0 ± 1.3	208 ± 34, 11.6 ± 1.9	-28 [-42, -14], -1.6 [-2.3, -0.8]	0.0001[f]
Change from baseline HbA1c (%, mmol/mol)	-1.30 ± 0.87, -14.2 ± 9.5	-0.64 ± 0.78, -7.0 ± 8.5	0.55 [0.15, 0.95], 6.0 [1.6, 10.4]	0.0078[b]
Time <70 mg/dL (<3.9 mmol/L) during 13 weeks (%)	1.31 ± 0.92	2.02 ± 1.95	-0.40 [-0.93, 0.17]	0.1789[f]
Change from baseline in T1-DDS (lower score represents improvement)	-0.31 ± 0.57	-0.36 ± 0.56	-0.02 [-0.29, 0.24]	0.8724[g]
Change from baseline in HCS (higher score represents improvement)	0.16 ± 0.42	0.00 ± 0.31	0.17 [-0.03, 0.37]	0.0855[h]
Change from baseline in DQOL-Brief (higher score represents improvement)	0.35 ± 0.44	0.02 ± 0.33	0.44 [0.23, 0.65]	0.0001[h]
Proportion meeting MCID[b] for T1-DDS (%)	56.5 [42.2, 70.8]	47.4 [24.9, 69.8]	28.2 [-8.6, 67.8]	0.1392[e]
Proportion meeting MCID[b] for DQOL-Brief (%)	63.0 [49.1, 77.0]	26.3 [6.5, 46.1]	51.3 [22.5, 75.9]	0.0029[e]
Proportion meeting MCID[b] for HCS (%)	87.0 [77.2, 96.7]	73.7 [53.9, 93.5]	10.2 [-3.9, 45.9]	0.1626[e]

Data are mean ± S.D. or mean [95% confidence interval].
Abbreviations: T1-DDS: Type 1 Diabetes Distress Scale; HCS: Hypoglycemia Confidence Scale; DQOL-Brief: Diabetes Quality of Life – Brief; MCID: minimum clinically important difference
[a]Outcome was assessed for non-inferiority with a 1% margin, which was met (upper bound of 95% confidence interval of the adjusted difference was 0.07%, which was less than the pre-specified margin of 1%).
[b]Minimum clinically important difference (MCID) was pre-defined for each questionnaire in the statistical analysis plan.
[f]P-value was determined by a repeated measures linear mixed effects model with treatment group, visit, treatment group by visit interaction, age, sex, duration of diagnosis as fixed effects, and country and site as random effects.
[g]P-value was determined by a robust regression model using M-estimation with Huber weight function with treatment group, age, sex, baseline value of the endpoint, and duration of diagnosis as fixed effects. There is no missing data in this subgroup.
[h]P-value was determined by linear mixed effects model with treatment group, age, sex, duration of diagnosis and baseline value of the endpoint as fixed effects, and country and site as random effects.
[e]P-value was determined by a logistic mixed effects model with treatment group, age, sex, duration of diagnosis and continuous baseline score as fixed effects. Country and site are removed as random effects to allow model convergence.

Conclusions: This RCT provides efficacy data to support that the Omnipod 5 System improves glycemic outcomes compared with insulin pump therapy coupled with CGM in young adults with T1D. These results also highlight the opportunity to optimize glycemic outcomes in young adults with T1D who are often challenged with achieving glycemic targets.

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Safety and efficacy of diluted insulin in a hybrid closed loop system in young children with type 1 diabetes

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Introduction: In young children with Type 1 Diabetes (T1D) insulin requirements are low, leading to very small infusion volumes. These factors can challenge precise continuous subcutaneous insulin delivery when using standard insulin concentration (U100).

Objectives: Here we report our experience of using diluted insulin (U10) in a hybrid closed loop (HCL) system in young children with T1D, including safety and efficacy data as well as the education program for health care professionals and caregivers.

Methods: Ten children (8 females) diagnosed with T1D at a median age of 1.7 [range 0.6-5.1] years were started on HCL CamAPS FX with diluted insulin U10 after a median of 4.5 [2.0-90] days from diagnosis. Extensive educational resources and care plans were designed for safe dilution and HCL use at home and in-hospital. A guideline developed by our team was followed and safety precautions were put in place, including a system starting guide; patient information alerts and labels; specific out-of-hours support. All children were followed up, initially daily, then weekly and subsequently in their clinic appointments approximately every 3 months.

Results: Children were started on HCL with diluted insulin U10 during their initial hospital admission (n= 8) or following discharge in the outpatient clinic (n= 2). Before starting HCL, their total daily insulin dose (TDD) was 6.5±2.7 units and mean HbA1c was 82.2±17.8mmol/mol. During an average follow-up period of 10 months (range 5-12), mean Glucose Management Indicator (GMI) was 58.5±3.3 mmol/mol and time in range (TIR) 62.9±8.4%. Time below range (TBR) remained <4% (Figure 1). Total daily insulin dose remained low (8.7±1.7units). There were no hospital admissions, episodes of severe hypoglycemia or diabetic ketoacidosis.

Conclusions: Our case series indicates that the use of diluted insulin in a HCL system is safe and effective in young children with T1D when supported by extensive education resources and frequent follow up.

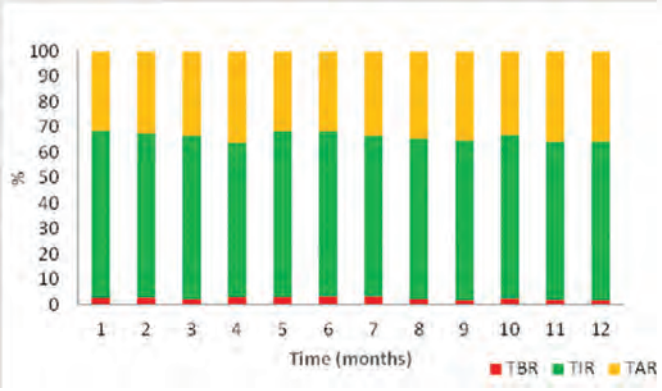

Figure 1

Friday, October 18th, 2024

Poster Corner 3: Childhood Obesity and Type 2 Diabetes

P-180

Malignant hyperthermia and multi-organ failure in a mixed presentation of hyperosmolar hyperglycemic state and diabetic ketoacidosis in new-onset type 2 diabetes

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Introduction: Severe hyperosmolar hyperglycemic state (HHS) at the onset of T2D is associated with high mortality rates (50%-70%).

Objectives: We present a challenging case of new-onset T2D with a mixed HHS-DKA, leading to severe complications.

Methods: Case report

Results: A 16-year-old male with obesity (BMI 38.96 kg/m^2) presented to the ED unresponsive. Initial lab results: metabolic acidosis (pH 6.9, CO2 <5 mmol/L), elevated blood glucose 1105 mg/dL (61.3 mmol/L), serum osmolality 437 (nl 271-296) mOsm/kg, corrected sodium 165, creatinine 2.3 (0.6-1) mg/dL, serum beta-hydroxybutyrate 10.6 (<0.3) mmol/L, HbA1c 9.2%. Fluid resuscitation and IV insulin drip were initiated in the ED. Due to obtundation, intubation followed; 3% saline and mannitol were administered. Refractory hypotension necessitated aggressive inotropic and vasopressor support, stress-dose hydrocortisone, and antimicrobials. Rapid clinical deterioration led to multi-organ dysfunction: severe hepatic dysfunction (ALT 4159 U/L, AST 24230 U/L peaked on day 2), massive rhabdomyolysis (CK 90,188 U/L), and malignant hyperthermia (41.1°C) on day 1, unresponsive to acetaminophen and cooling. Hyperthermia resolved after 5 doses of dantrolene. Cardiogenic shock with severe biventricular dysfunction necessitated extracorporeal membrane oxygenation on day 2. Acute renal failure with anuria required

continuous renal replacement therapy. After a 1.5-month hospital stay, he made a full recovery and was discharged on insulin (0.3 unit/kg/day) with continuing outpatient rehabilitation. Negative autoimmune diabetes antibodies were noted. At 1 month follow-up, HbA1C was 5%, prompting tapering of insulin doses, which was completely discontinued 5 months post-discharge.

Conclusions: We report a case of T2D with life-threatening hyperglycemic crisis and complications including malignant hyperthermia, successfully treated with ECMO and dantrolene. This case highlights the critical role of a multidisciplinary approach and aggressive interventions in achieving optimal outcomes.

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Triglyceride-glucose index as an indicator of insulin resistance and metabolic syndrome among south Indian adolescents with obesity

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Introduction: Insulin Resistance(IR) is the major forerunner of all components of Metabolic Syndrome(MetS).The majority of established methods for determining IR need measuring plasma insulin levels,which is costly and not commonly accessible.Thus, we attempted to study the performance of a cost-effective lipid-based biochemical marker of IR,the triglyceride-glucose(TyG) index, as a predictor of MetS among South Indian adolescents.

Objectives: 1. To investigate the association of TyG index and its adaptations like TyG-BMIz index with the Homeostasis Model Assessment of Insulin Resistance(HOMA-IR)in Indian adolescents with obesity, and to assess whether it could be used as a predictor of IR and MetS.

2. To determine specific cut offs for these indices.

Methods: 165 Obese Adolescents in the age group of 10–18y were included in the study. We measured fasting insulin,blood glucose,and triglyceride levels to calculate HOMA-IR, TyG index=ln [(TG*FPS)/2], and its adaptations.TyG cutoff values for the presence of IR and MetS were obtained using the receiver operating characteristic(ROC)curve.

Results: Our study included 165 subjects(100 were male and 65 were Female).Area under the ROC curve(AUROC) for TyG index was 0.679(p value 0.006) for predicting IR and the AUROC was 0.845(p< 0.001) for predicting metabolic syndrome, which was statistically significant and this AUROC was found to be higher than the AUROC for HOMA-IR, which was 0.704(p<0.001). However,when TyG score was combined with anthropometric variables like BMI-z score, these indices did not have AUROC values higher than that of TyG index.In the present study, we found the TyG cutoff for predicting IR to be 8.43(with a sensitivity of 65.5% and a specificity of 65.2%) and the TyG cutoff for predicting MetS to be 8.687(with a sensitivity of 69.5% and a specificity of 87.1%).

Conclusions: Our study shows that TyG can be a useful instrument for identifying IR and MetS among Indian adolescents in resource limited settings,making it a feasible and inexpensive alternative to HOMA-IR.

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Evaluation of a multidisciplinary pediatric insulin resistance and type 2 diabetes program: the BC children's hospital experience

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Introduction: Canadian surveillance data demonstrates incidence of pediatric Type 2 Diabetes (T2D) has increased by 60% over the last decade, highlighting the need for dedicated care in this population. BC Children's Hospital has provided multidisciplinary care for youth living with insulin resistance (IR), prediabetes and T2D.

Objectives: We sought to assess patient characteristics and outcomes within this specialized program.

Methods: Retrospective review for patients followed between 2014 and 2023. Data collection included: baseline characteristics, clinical variables (presentation, anthropometrics, A1C, complications), health care utilization, and sociodemographic variables.

Results: A total of 106 individuals [diagnoses: 44.3% T2D, 42.5% prediabetes and 13.2% IR] were included: 53.8% females, median age of 14.0 years (12.5 – 151), and self-reported ethnicity was 45.3% Asian, 6.6% indigenous, 48.1% others.

In the prediabetes cohort, initial A1c was 5.8% (5.6-6.1), with average change in the first year -0.2% (-0.5 - -0.1); 64.3% were managed with intensive lifestyle modifications alone, and 35.6% also received metformin.

Among the T2D group, initial A1c was 8.3% (7.0–11.4), and the average change in the first year was -1.8% (-4.1 - -0.6). Glycemic target (A1c <7.0%) was reached in 78% at 12 months and 68% at 24 months. 95.7% were prescribed metformin, 14.9% GLP1 agonist, 53.2% basal insulin, and 31.9% rapid-acting insulin. 73.3% discontinued rapid-acting and 36.4% discontinued basal insulin. Remission was observed in 4 cases.

Based on the multiple deprivation index, 84.9% was classified in the 2 most deprived quintiles for economic dependency, and all the subjects not reaching glycemic target belong to the most deprived quintile.

Conclusions: This suggests that a dedicated multidisciplinary program is beneficial in improving the care of youth living with T2D and IR, with positive outcomes in A1c. Sociodemographic factors, including economic deprivation, could impact in T2D care and achieving adequate glycemic control.

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Effect of crocus sativus l. On glycemic control in adolescents with obesity and pre-diabetes: double-blind placebo controlled clinical trial

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Introduction: Obesity is an epidemy among children and adolescents, while dysglycemia and pre-diabetes are common comorbidities; few therapeutic tools are available to manage dysglycemia in these individuals. Crocus Sativus L. is a spice from a plant, of the Iridaceae family with main metabolites crocin/picrocrocin/safranal. Studies in adults with obesity showed beneficial effects of Crocus in dysglycemia and dyslipidemia.

Objectives: The purpose of the study was to examine the effect of oral Crocus Sativus in glycemic and lipidemic profile of adolescents with obesity and prediabetes.

Methods: Seventy-eight adolescents with obesity and prediabetes were randomized in a double-blinded-controlled-placebo trial with three-groups, one receiving Crocus (n=25,60mg/day), one metformin (n=25,60mg/day) and one placebo (n=24), during a twelve-weeks period and dietary modifications. Glycemic and lipidemic profiles were assessed before and after the intervention by measuring HbA1c%, serum cholesterol/triglycerides/HDL/LDL, insulin levels, performing OGTT and estimating HOMA-IR.

Results: Significant benefits for all adolescents receiving metformin were recorded (lower levels of fasting glucose and insulin, levels of insulin and HOMA-IR during OGTT, lower levels of cholesterol and LDL). Crocus did not induce significant modification in glucose and insulin levels, nor in HbA1c or HOMA-IR. Crocus caused significantly lower glucose levels during OGTT in time 90min (p-value<0.001) and 120min (p-value:0.025) and significant lowering trend of insulin levels ($p\text{-value}_{90min}$:0.049, $p\text{-value}_{120min}$:0.067). Crocus administration lowered triglycerides levels (p-value<0.001) and raised HDL levels (p-value:0.023). After 12 weeks of trial, 44% of adolescents (n=33/75) did not meet the diagnostic criteria of prediabetes.

Conclusions: Crocus Sativus along with healthy diet has statistically significant results in glycemic control of adolescents with obesity and prediabetes.

P-184

Outcomes of young-onset type 2 diabetes mellitus in a single tertiary centre

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Introduction: Young-onset Type 2 Diabetes Mellitus (T2DM) is on the rise globally, however there is a lack of data on the development of diabetes-related complications, particularly in the Asian cohort.

Objectives: To investigate the clinical outcomes of our patients with young-onset T2DM including complications, co-morbidities and predictors of poor glycaemic control.

Methods: A retrospective medical chart review of all patients diagnosed with young-onset T2DM before the age of 18 years (n=109) of a single tertiary hospital in Singapore from 1st January 2005 to 31st August 2021. Multivariable logistic and linear regressions were used to determine the predictors of poor glycaemic control.

Results: There were 109 patients with young-onset T2DM included in the study with a mean age of 14.5 +/- 2.07 years at diagnosis. The mean HbA1c at presentation was 9.2 +/- 2.63 %, which improved in the first year after diagnosis to 6.9 +/- 1.50%. However, the mean HbA1c progressively increased thereafter to 7.3 +/- 1.77% at the second year, 7.4 +/- 1.77% at the third year and 8.0 +/- 1.91% at the fifth year. The prevalence of obesity at baseline was 67.6%. In our cohort, 24 patients (21.8%) had hypertension and 46 patients (41.8%) had dyslipidemia. By the end of the study, 7 patients (6.4%) had complications of diabetic retinopathy and 27 patients (24%) had diabetic nephropathy. The mean duration to development of microvascular complications from diagnosis was 4.6 +/- 4.31 years for diabetic retinopathy and 2.9 +/- 2.53 years for diabetic nephropathy. In our study, the strongest predictors for poor glycaemic control (based on latest HBA1c) were a higher HbA1c at diagnosis (beta-coefficient 0.25, 95% CI 0.11 – 0.39, *P*-value= 0.001) and Malay ethnicity (beta-coefficient of 1.04 (95% CI 0.27 - 1.81, *P*-value= 0.009).

Conclusions: Our study indicates that diabetes-related microvascular complications appear early in young-onset T2DM. A higher HbA1c at diagnosis and Malay ethnicity were significant predictors of poor glycaemic control.

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Igf1 as the new marker of metabolic syndrome in children with obesity

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Introduction: The number of children with obesity has increased significantly in recent years. Obesity is part of the metabolic syndrome, as well as a factor in the development of its components.

Objectives: The metabolic condition beginning in childhood may increase the risk of premature death from cardiovascular disorders, which are the most common causes of death in adults. It is beneficial to diagnose obesity in children because therapeutic intervention can prolong life and put off cardiovascular complications. The aim of the study is analyze of IGF1 and other biochemical factors in obese children and comparison to children with pure glycemic disorder (diabetes mellitus type 1- DM1) and without glycemic disorders.

Methods: The observational study examined 139 patients, aged 2.6 to 18 years, divided into 3 groups: DM1 (52 subjects), obesity (60 subjects), control (27 healthy subjects). In all children were calculated BMI, and assayed cholesterol, LDL, HDL, triglycerides, fasting glucose, glucose and insulin in oral glucose tolerance test, blood pressure and IGF1.

Results: Children with obesity developed the features of the metabolic syndrome - elevated triglycerides, elevated insulin in the 120th minute of an oral glucose tolerance test, compared to children with type 1 diabetes and a control group in whom no such pathology was observed. Triglycerides are higher in obesity (mean 301.8 ± 1433.2 mg/dl) than in diabetes (mean 140 ± 130.8 mg/dl) than in controls (mean 94.7 ± 46.1 mg/dl). Insulin in 120th minute of oral glucose tolerance test in obesity averaged 117.3 ± 29.7 pmol/l. Moreover, IGF1 levels are elevated in obesity, which can accelerate the onset of its complications. IGF1 serum levels in obesity are higher (mean 234 ± 138.0 nmol/L) than in diabetes type 1 (mean 99.0 ± 62.3 nmol/L) and controls (mean 185.7 ± 103.0 nmol/L).

Conclusions: Childhood obesity can already predicate the metabolic syndrome, with its components such as elevated serum triglycerides, insulin resistance, and elevated IGF1 as the new marker.

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Clinical and biological parameters of insulin resistance in obese children in relation to an epidemiological study

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Introduction: Insulin resistance (IR) is common in obese children and adolescents, its prevalence varies according to studies between 33.2 and 51% in prepubertal children and between 65.8% - 70.73% in adolescents.

Objectives: To assess the clinical and paraclinical diagnostic parameters of insulin resistance in a population of obese children.

Methods: A descriptive cross-sectional study carried out on a population of severely obese pupils (92 pupils) recruited following work carried out at the level of primary schools in the city of Batna during the 2018-2019 school year. These children underwent a clinical examination and a biological assessment represented by fasting glycaemia and insulinemia in order to diagnose insulin resistance.

Results: Among the 92 pupils, 13.7% had a high waist circumference (> P90) and 5.9% had Acanthosis Nigricans, 44.5% had a HOMA-IR index > P95 according to the European reference (IDEFICS (2007-2010) with a higher frequency in the 10 to 11 age group, a positive linear correlation between BMI and HOMA-IR was observed.

Conclusions: Our results show the high frequency of insulin resistance in very obese pre-pubertal children, in line with what has been reported in various countries (prevalences vary between 33.2 and 51%). Insulin resistance is asymptomatic and cannot be assessed by clinical signs alone, and can be detected early simply by measuring fasting blood glucose and insulin levels. Insulin resistance is one of the most formidable metabolic complications of obesity, given its early onset in young children with severe obesity, even before puberty, which makes its diagnosis using the HOMA-IR index interpreted with reference to paediatric standards an excellent, inexpensive and reproducible means of screening and monitoring, with a view to intensifying management protocols to slow the progression to type 2 diabetes after puberty.

P-187

An adolescent with 16p11.2 microdeletion syndrome treated with dulaglutide: a case report

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Introduction: The short arm of chromosome 16 is rich in segmental duplications, predisposing this region of the genome to a number of recurrent rearrangements. 16p11.2 microdeletion syndrome has been associated with a highly penetrant form of isolated severe early-onset obesity, as well as, obesity with developmental delay.

Objectives: To report efficacy of Dulaglutide in a case of 16p11.2 microdeletion syndrome (OMIM 613444).

Methods: A 15-year-old male adolescent with severe obesity, type 2 diabetes (T2D) and mild developmental delay was recently diagnosed with 16p11.2 microdeletion syndrome. T2D was poorly controlled by Metformin and Liraglutide (1.8 mg/day). Daily Liraglutide was then switched to Dulaglutide up to 1.5 mg/week.

Results: No adverse event was reported during Dulaglutide treatment. After one month of combined therapy with Metformin (500 mg twice a day) and Dulaglutide (1.5 mg/week) HbA1c remained stable, from 6.6% (49 mmol/mol) to 6.7% (50 mmol/mol) but BMI increased from 36.58 Kg/m^2 to 37.9 Kg/m^2 since Dulaglutide was started.

Conclusions: This is the first case report of Dulaglutide therapy in a patient with 16p11.2 microdeletion. In this short follow-up Dulaglutide has stabilized glucose control, but it hasn't been effective in decreasing weight gain. Other weight loss agents including high dose Liraglutide may be more effective. The results of ongoing phase 3 clinical trials of Setmelanotide, an MC4R agonist in genetic obesity syndromes (ClinicalTrials.gov: NCT05093634) will provide critical information as to whether people with pathogenic mutations in SH2B1 and with 16p11.2 BP2–3 deletions may benefit from treatment with drugs that improve signaling through the leptin-melanocortin pathway.

P-188

Abstract Withdrawn

Friday, October 18th, 2024

Poster Corner 4: Monogenic and other forms of Diabetes

P-189

Tailoring treatment: adjusted recombinant igf-1 therapy and continuous glucose monitoring with custom-fitted sets for a newborn with severe insulin resistance syndrome

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Introduction: Donohue syndrome, or Leprechaunism, is a rare autosomal recessive disorder arises from biallelic mutations in the INSR gene on chromosome 19p13, causing insulin receptor dysfunction. Symptoms include severe hyperinsulinism, fasting hypoglycemia, and postprandial hyperglycemia, with characteristic facial features and growth retardation.

Objectives: We describe a case of Leprechaunism in a newborn treated with synthetic igf1 (mecasermin).

Methods: The term newborn, born to healthy first-degree cousin parents, exhibited typical coarse facial features, dry skin, scant subcutaneous tissue, thin and coarse hair and abnormal glucose levels. The significantly high C-peptide (54.3 ng/mL) and insulin (>1000 mU/L) levels suggested insulin-resistant diabetes. Genetic testing identified two heterozygous INSR gene mutations. Insulin therapy was initiated and the FreeStyle Libre 3 continuous glucose monitoring sensor was placed. The MARD (Mean Absolute Relative

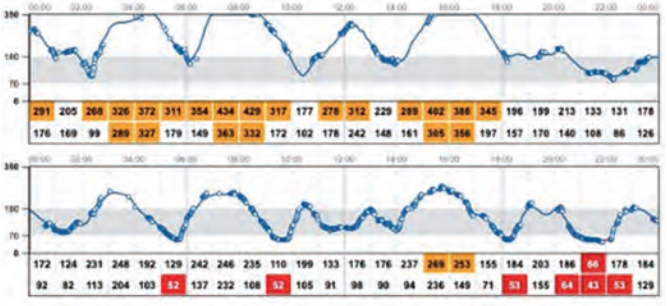

Figure 1. Glucometric with mecasermin basal-bolus.

Difference) between capillary blood glucose with Statstrip® and interstitial glucose was 14.55%, suggesting significant CGM accuracy.

Results: Insulin therapy failed to control blood glucose, prompting mecasermin treatment via an insulin pump (type medtronic 640g). Dosing adjustments improved glucose profiles (*Figure 1)*, reaching a basal rate of 0.1 U/h (2.4 U/day - 240 mcg/day) and pre-meal boluses of up to 5 U six times/day (300 mcg/day).

Conclusions: Leprechaunism prognosis is poor, often resulting in early infancy mortality. Mecasermin therapy may improve survival, though efficacy is uncertain. Our newborn is currently surviving, now 5 months old.

P-190

Obesity as confounding factor for etiologic diagnosis in childhood diabetes: comparison between obese children with type 2 diabetes, HNF1A-MODYand type 1 diabetes

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Introduction: In children/adolescents with diabetes, obesity can be a confounding factor to establish etiologic diagnosis

Objectives: To identify which parameters can help in distinguishing adolescents with type 2 diabetes (T2Dad) from obese patients with maturity onset diabetes of the young (MODYob); obese patients with type 1 diabetes (T1Dob) were included as control group.

Methods: We compared laboratory features at onset of diabetes of individuals with body weight ≥ 95° centile (WHO) and: 1) negativeness to T1D autoantibodies and no parents with diabetes (T2Dad, 31 cases), 2) genetically diagnosed with HNF1A-MODY (MODYob, 7 cases) and 3) positivity to at least 1 T1D autoantibody (T1Dob, 58 cases)

Results: MODYob and and T1Dob were younger (11.7±1.8 SD and 9.6±3.0 years, respectively) than T2Dad (14.3+2.0) at onset of diabetes (.003 and .000, Mann-Whitney test). No difference in BMI z-score was detected between T2Dad (2.0±.34) and MODYob (2.2±.47). However, MODYob had higher HDL-cholesterol (42.29±9.46 vs 33.08±10.3 (.45) and lower C-peptide (1.66±.66 vs 4.3±3.66) (.006) than patients with T2ad (but higher C-peptide than T1Dob: 1.0±.89) (Figure). Maximum C-peptide value value found in MODYob was 2.83 ng/ml. Median of HOMA2-IR (calculated with C-peptide) was 4.4 for T2Dad vs 1.7 for MODYob (0.038, Mann-Withney). No difference was observed in total Cholesterol, Triglycerides (Tg) Tg/HDL-Cholesterol ratio and systolic blood pressure between MODYob and T2ad. Of note, T1Dob had lower C-peptide, Tg and Tg/HDL-cholesterol ratio than MODYob. Compared to T2Dad, T1Dob had significantly lower BMI z-score, systolic blood pressure, C-peptide, and plasma lipids.

Conclusions: C-peptide, HOMA2-IR and HDL-cholesterol are useful parameters to distinguish between obese adolescentes with HNF1A-MODY and T2Dad. Obese adolescents with diabetes, no T1D autoantibodies and C-peptide at diabetes onset below 3 ng/ml should be consiederd good candidates for monogenic diabetes testing. Appropriate etiologic diagnosis may guide precision therapy.

P-191

Insulin receptor mutation in a girl with generalized hypertrichosis, insulin resistance and normal body mass index: a case report

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Introduction: Acanthosis nigricans (AN) is a clinical manifestation of insulin resistance (IR) and is commonly found in people with obesity. AN in people with normal or low BMI is associated with syndromes of IR.

Objectives: To present the case of a girl of 12 8/12 years referred for hypertrichosis and elevated TSH.

Methods: Clinical examination: height: 160cm (75th%), weight: 40.85kg (25th %), BMI: 15.96 kg/m^2 (12th%), Tanner stages: AH III, PH IV, B IV, severe AN in neck and axillae, generalized hypertichosis mainly on face and back. Family history: paternal obesity. Laboratory testing revealed elevated 17-OH-P: 3ng/ml (0.3-2.75), HbA1c: 5.7%, while biochemical and ultrasound liver tests, as well as lipid profile and the ACTH test were normal. The OGTT showed impaired glucose tolerance and significant IR (0': Glucose 64mg/dl, insulin 221 μIU/ml; 120': Glucose 166 mg/dl, insulin 2439 μIU/ml). Treatment with metformin was initiated, with significant improvement in AN and a reduction in fasting insulin (46.94μU/ml).

Results: The differential diagnosis of severe IR with low BMI includes lipodystrophy syndromes, insulin receptor (INSR) gene mutations and INSR antibodies. As the girl did not present signs or tests compatible with lipodystrophy or other autoimmune diseases, we performed genetic testing in a reference centre in France that revealed an heterozygous mutation (c.3470A>G p.His1157Arg) of the INSR gene. The father was also a carrier of the mutation.

Conclusions: Although the definition of IR, especially in adolescents, is difficult, fasting insulin > 22 μU/ml and/or peak insulin in the OGTT test > 200 μU/ml in subjects with normal BMI raises the suspicion of severe IR syndromes. Mutations in the INSR signalling pathways show variable penetrance and range of phenotypes, with the mildest clinical presentation being associated with mutations with dominant inheritance. Dyslipidemia and fatty liver rarely are a feature of these disorders, unlike lipodystrophy syndromes.

P-192

A novel therapy for familial lipodystrophy: a case report of unusual diabetes mellitus

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Introduction: Familial partial lipodystrophy type III (FPL) is a genetic disorder characterized by insulin resistance, diabetes mellitus, hypertriglyceridemia, hepatic steatosis due to PPARγ mutation. Recently a novel therapy is available in Italy.

Objectives: We report the case of a 19 years old patient affected by familial partial lipodystrophy type III (FPL). Despite conventional treatment, the patient exhibited an inadequate response. In Italy, Metreleptin became available for FPL patients in May 2022, meeting specific criteria.

Methods: The patient presented with obesity and mothern history of diabetes mellitus. It was observed a disproportionate insulin-resistance and hepatic steatosis to BMI, altered fat distribution, high levels of triglycerides and negative T1D serology. Next generation sequencing confirmed a heterozygous PPARγ gene mutation. It was started a treatment with metformin, insulin and hypolipidemic agents. However, the patient experienced worsening glycemic control and an episode of acute pancreatitis. Considering the availability criteria, Metreleptin at a dosage of 5 mg/die was introduced and insulin therapy was discontinued. Continuous glucose monitoring (CGM) was evaluated at baseline and after 2 weeks.

Results: The CGM report showed a significant improvement in glycemic trends, an increase in time in range (67% vs 18%) and reduction of average glucose levels (172 mg/dL vs 230 mg/dL), as well as a decrease in the glucose management indicator (GMI) (8.8% vs 7.4%) [fig. 1].

Conclusions: Metreleptin, an innovative drug used for FPL patients, serves as substitute for deficient Leptin in this rare condition. In literature it is demonstrated its efficacy in reducing of HbA1c, transaminases, triglycerides levels, and pancreatitis [1] [2]. This case describes a significative improvements in glucometabolic parameters assessed by CGM after 2 weeks of Metreleptin therapy at the minimum dosage, highlighting its effectivness as an alternative therapy.

P-193

A rare cause of MODY5:a twin case with 17q12 deletion syndrome

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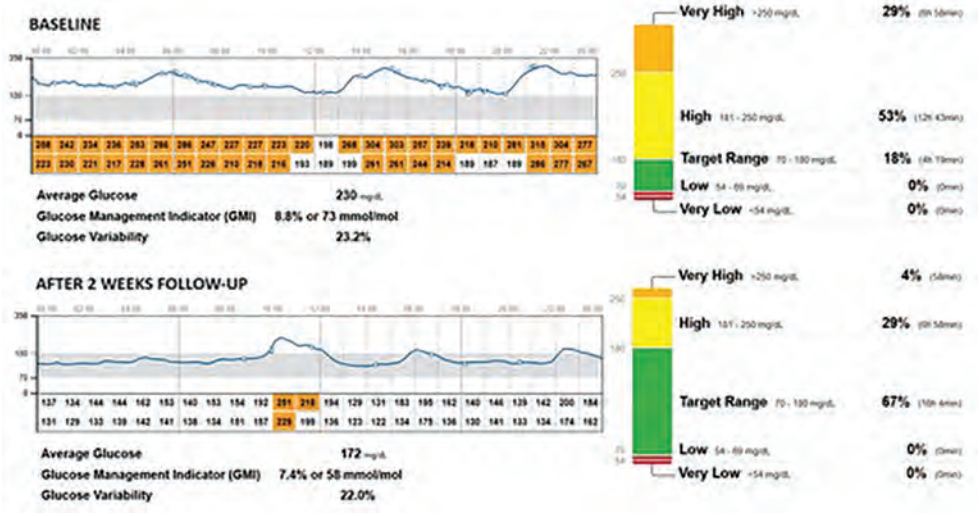
Introduction: HNF1B-MODY represents 2-6% of all MODY cases and more than 50% also have a deletion syndrome of the 17q12 region, containing 7-14 genes including the HNF1B gene.

Objectives: We present twin cases with diabetes diagnosed with 17q12 deletion syndrome.

Methods: Case report.

Results: **Case1:** A 7-year-old male born as a twin at 33 weeks gestation who was diagnosed with diabetes mellitus (DM) at the age of 2.5 years.There was no consanguinity between parents but there was a history of diabetes in the family for three generations. His body weight was 28.3 kg (1.17 SDS), height was 130.5 cm (1.24 SDS), body mass index (BMI) was 16.6 kg/m^2 (0.43 SDS). He had broad forehead, frontal bossing and high-arched eyebrows. On admission, his blood sugar was 435 mg/dL,c-peptide 0.02 ng/mL,



HbA1c 10.6% and was negative for diabetes autoantibodies; ketonemia was present. He had autism spectrum disorder and delayed speech. Microarray analysis was performed and a heterozygous deletion of 1.7Mb at chromosomal location 17q12 including HNF1B, was detected. An abdominal ultrasound showed left kidney agenesis. He was initially treated with basal-bolus insulin regimen (0.8-1.2 U/kg/day). His HbA1c was 6.6%. **Case2:** The other twin of Case 1 was diagnosed with DM at the age of 4.25 years.His body weight was 27.5 kg (1.00 SDS), height was 130.5cm (1.24 SDS), BMI was 16.1 kg/m^2 (0.43 SDS). He had the same dysmorphgıc features. On admission, his blood sugar was 198 mg/dL, c-peptide 1.8 ng/mL, HbA1c 8.3% and negative diabetes autoantibodies. He had delayed speech and autism spectrum disorder.The microarray analysis result was the same. He was initially treated with basal-bolus insulin regimen (0.8-1.2 U/kg/day). Most recent HbA1c was 6.3%.

Conclusions: We believe that chromosome array analysis before molecular genetic analysis may be more appropriate for rapid diagnosis when autism and facial dysmorphism accompany diabetes, as in our cases.

P-195

Treatment strategies in two cases of maturity onset diabetes of the young type 3 (MODY 3)

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Introduction: Maturity Onset Diabetes of the Young (MODY) encompasses rare, non-autoimmune genetic forms of diabetes with autosomal dominant inheritance. MODY 3, the most common subtype, arises from mutations in the HNF1A gene, impacting pancreatic ß-cell function. Novel pharmacological strategies are needed for optimal management.

Objectives: Evaluate GLP-1 receptor agonist therapy in MODY 3 cases.

Methods: We describe two teenagers diagnosed with MODY 3. The boy had preserved basal C-peptide levels at onset, increasing post Mixed Meal Tolerance Test (MMTT), so subcutaneous liraglutide (1.2 mg/day) was initiated. After 18 months, MMTT showed increased C-peptide values alongside proper glycemic control (MMTT C-pep AUC 545.25). The girl, with low C-peptide levels at onset, initiated insulin pump therapy (type Tandem Control IQ). MMTT revealed normal C-peptide values, therefore subcutaneous dulaglutide (0.75 mg/week) was initiated while gradually discontinuing insulin therapy. After six months MMTT showed C-peptide values at the lower limit of normal and blood glucose values at the upper limit (MMTT C-pep AUC 203.85). Dapagliflozin (10 mg/day) was added, and the AHCL Tandem was reintroduced without manual boluses.

Results: Both patients initially responded well to GLP-1 agonists. The boy's Time in Range (TIR) improved from 91% to 99% after 3 months. The girl's TIR increased from 73% to 78% initially, but after 6 months declined to 52%.

Conclusions: GLP-1 receptor agonists are effective for managing glucose profiles in MODY-3 patients, contingent on preserved ß-cell function. Adjunctive therapies may be necessary for low C-peptide levels. Introducing an SGLT-2 inhibitor enhanced glycemic control in the girl's case described.

P-196

An interesting case of monogenic diabetes

V. G, V. H N

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Introduction: Thiamine-responsive megaloblastic anemia, also known as Rogers syndrome, is a rare autosomal recessive genetic disorder characterized by megaloblastic anemia, diabetes mellitus and sensorineural deafness. It is caused by mutations in SLC19A2 gene, which encodes a thiamine transporter protein, responsible for effective utilization of thiamine in various tissues and its defect in pancreatic beta cell is responsible for diabetes mellitus.

Objectives: To study a case of thiamine responsive megaloblastic anemia with diabetes.

Methods: 9 months old girl, first born to a second degree consanguineous marriage presented with progressive pallor and rashes over the body since 4 months. Born of uneventful delivery, exclusively breastfed, developmentally normal except for isolated language delay. Her anthropometry revealed weight(4.85kg) and length(67cm) less than 3rd centile according to WHO chart. Examination revealed severe pallor, multiple petechial spots on the body with hepatomegaly and no startle response to loud sounds.

Results: Investigative work up revealed macrocytic anemia with mild anisocytosis(Hb-3.8 g/dl). Bone marrow aspiration showed erythroid hyperplasia, megaloblastic cells, dyserythropoietic changes. RBS was 430mg/dl with nil urine ketones. Audiogram suggestive of profound bilateral sensorineural hearing loss. Treated with blood transfusion and insulin was started on sliding scale. With the above data, a diagnosis of Roger's syndrome was sort and child was put on high dose of oral thiamine(75 mg daily). Insulin requirement gradually reduced and stopped in a period of 2 weeks. Currently her blood glucose is in the normal range and hemoglobin improved(Hb-11 g/dl). She is planned for cochlear implant.

Conclusions: Treatment focuses on lifelong use of pharmacologic doses(25-75 mg/day) of thiamine in affected individuals. Diabetes is likely due to insulin insufficiency that responds to thiamine supplements. Increasing awareness and understanding of this syndrome is essential for improved care and outcome.

P-197

Is wolfram syndrome a rare diagnosis or an unrecognized diagnosis?

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Introduction: Wolfram syndrome (WS; prevalence 1:770,000) is a rare, usually autosomal recessive disorder. If consanguineous marriage is common prevalence will increase.

Objectives: The diagnostic process and clinical follow-up of pediatric cases of WS, that has a more severe prognosis than type 1 diabetes mellitus (T1DM), are shared.

Methods: Patients who were first diagnosed with T1DM and subsequently diagnosed with WS, difficulties in the diagnostic process, family histories, clinical/laboratory data, and treatments were retrospectively analyzed.

Results: *Initial diagnosis Six cases from five families were confirmed by molecular genetic diagnosis with WS. The prevalence of WS was 1:233 in 1400 diabetic patients followed up in our hospital for 22 years. None had diabetic ketoacidosis at presentation or diabetes-associated autoantibodies. All patient were prepubertal and one patient had severe short stature at WS diagnosis. The median interval was 4.4 (0.4-15) years between the initial presentation and diagnosis of WS. At diagnosis, median HbA1c was 10.85 (7.2-15.1) mmol/mol, c-peptide was 10.85 (7.2-15.1) (ng/mL), and urinary density was 1019 (1007-1030). Demographic and clinical characteristics of the patients at diagnosis are shown in Table 1. Desmopressin was started in two patients. The parents of three cases were second cousins and the others were from the same village. All cases had WFS-1 variants. In two siblings segmentation analysis identified compound heterozygous mutation.

Conclusions: Molecular diagnosis can be confirmed in 34% of patients. In our series, genetic diagnosis was made in all cases, but we believe there are more undiagnosed cases. WS should be considered if T1D or monogenic diabetes mellitus is diagnosed but extrapancreatic findings develop during follow-up. Eye examination at initial presentation and annually and checking urine density at each follow-up visit will help to make the diagnosis earlier

P-198

Epidemiology of monogenic diabetes mellitus in children over the last 20 years in Slovakia

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Introduction: Monogenic diabetes is a heterogeneous group of disorders caused by a single gene mutation.

Objectives: The aim of the study was to describe epidemiology of monogenic diabetes mellitus in children and adolescents in Slovakia over the last 20 years.

Methods: Since 2003, DNA analysis of monogenic forms of DM in Slovakia has been carried out mainly in the Diabgene laboratory. Genetic analyses were performed using Sanger sequencing, MLPA or NGS approaches (whole-exome and/or panel sequencing). Novel variants or variants of unknown pathogenicity were functionally characterized using molecular biology approaches and subsequently classified according to gene-specific rules developed by the MDEP international expert panel. Incidence and

Patient	P1	P2	P3	P4	P5	P6	Median
Age at diagnosis (T1D) (years)	5.2	4.5	10.7	6.0	6.0	3.0	5,9(4,5-10,9)
Age at diagnosis (WS) (years)	6.0	12.5	11.1	12.4	8.4	18	11,4 (6-18)
Gender	Female	Male	Female	Female	Female	Male	
Size SDS	-0,08	-1.78	-1.54	1.31	-0,8	-3.43	-0,9 (-3,43– 1,31)
BMI SDS	0.81	0.03	-1.21	-1.21	-0,26	-2,99	-0,72 (-2,99-0,81)
Follow-up period(months)	60	72	12	132	72	156	84(12-156)
Family history of DM-DI	DM-DI	DM	None	DM-DI	DM-DI	None	
Extra pancreatic finding/age (years) during follow-up	Optic atrophy (5.8)	DI (5.4) Hearing loss (6.6) Optic atrophy (7.5)	Optic atrophy (11.1) Hydronephrosis (11.1)	Optic atrophy (12.2)	Optic atrophy (8.0)	Hydronephrosis(8.0) Cataract (8) Polyneuropathy (8) Hearing loss (12) DI (18)	
Genetic	WFS1 homozygous	WFS1 Homozygous	WFS1 homozygous	WFS1 compoud heterozygous	WFS1 compoud heterozygous	WFS1 homozygous	

prevalence of monogenic diabetes was calculated using demographic data from the Slovak Health Information Centre.

Results: Genetic diagnosis of monogenic diabetes was made in 186 children and adolescents since 2003 in Slovakia. The most common cause was GCK-MODY (n=135), followed by HNF1A-MODY (n=27), HNF4A-MODY (n=6) and HNF1B-MODY (n=4). We have identified 8 children with monogenic permanent neonatal diabetes (PND), with KCNJ11-PND the most common subtype (n=5). Rare causes of monogenic diabetes included INS-PND, ABCC8-PND, mitochondrial diabetes, and Mitchel-Riley syndrome. The incidence of monogenic diabetes was 0.87 cases per 100,000 per year in pediatric population (0-18 years). The prevalence of monogenic diabetes rose since 2003 (0.166 per 100,000) and reached plateau since 2014 (6.68-7.96 per 100,000). Monogenic diabetes accounted for up to 4.8% of all children and adolescents with diabetes mellitus in 2017, but its frequency has since declined to 3.3% in 2022, as the number of children with Type 1 Diabetes has increased significantly in recent years.

Conclusions: Monogenic diabetes mellitus is the second most common type of diabetes (after Type 1 Diabetes) in children and adolescents and its prevalence has not increased significantly since 2014.

Supported by: VEGA 2/0131/21

Friday, October 18th, 2024

Poster Corner 5: Psychological and Psychosocial aspects of Diabetes

P-199

Diabetes management: it is more than annoying! Implementing diabetes distress screening in type 1 diabetes clinic

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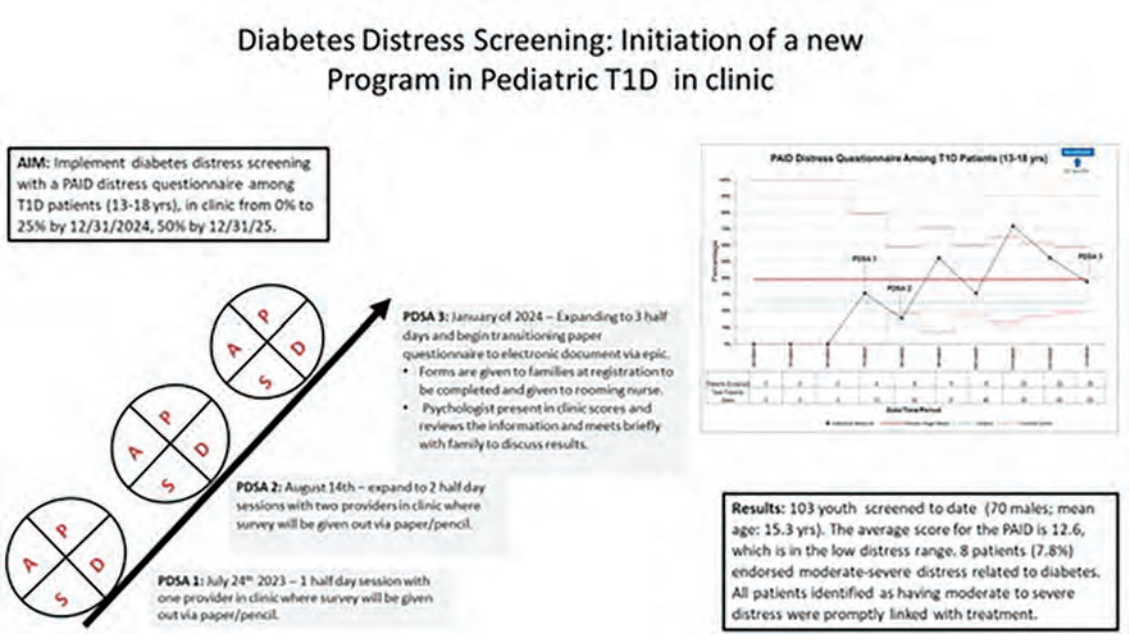
Introduction: Diabetes distress negatively impacts motivation of health care tasks. Increase in diabetes distress during adolescence increases barriers to adherence and adjustment. Current guidelines recommend routine screening to identify and address barriers to adherence. We implemented diabetes distress screening for youth 13-18 yrs on days when a psychologist was present in clinic.



Horm Res Paediatr 2024;97(suppl 2):1–370
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Objectives: Implement diabetes distress screening with a PAID-T (Problem Areas in Diabetes-Teen) distress questionnaire among T1D (Type 1 diabetes) patients (13-18 yrs) in diabetes clinic when psychologists are present in clinic from 0% to 25% by 12/31/2024, 50% by 12/31/25.

Methods: PAID-T forms are given to families at registration to be completed and given to rooming nurse. A Psychologist is present in clinic to score and review the information and meet briefly with family to discuss results.

PDSA 1: Half-day session with one provider in clinic; paper/pencil survey.

PDSA 2: Expand to 2 half day sessions with two providers in clinic; paper/pencil survey.

PDSA 3: Expand to 3 half day clinic sessions; paper/pencil survey. Plan to transition to electronic document in EMR.

Results: 103 youth screened to date (mean age: 15.34 yrs). This represents 39.7% of the eligible population by December. The average score noted as 12.6, which is in the low distress range. 8 patients (7.8%) endorsed moderate to severe distress related to diabetes. All patients identified as having moderate to severe distress were promptly linked with appropriate resources.

Conclusions: Implementation of the PAID-T improves identification of patients who are experiencing negative perceptions of diabetes, coping barriers, and provides an opportunity to assess symptoms of depression and anxiety. The presence of a psychologist in clinic to triage patients experiencing distress may reduce wait-times and expedite assessment and treatment, and likely improve outcomes. We plan to expand psychology presence further in diabetes clinics.

P-201

SDOH: the importance of screening, resource delivery, and follow-up

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Introduction: The significant transition that a family must undergo after a diabetes diagnosis can be particularly difficult for families facing other barriers and disparities. Patients with adverse social determinants of health (SDOH) may endure negative impacts to their diabetes care and management. Assessing and addressing these underlying determinants is critical to improving equitable care.

Objectives: This initiative specifically explores the importance of SDOH screening, resource delivery, and follow-up as an integral part to delivering high quality diabetes care.

Methods: A literature review of SDOH screens was conducted with subsequent edits by the diabetes social workers (SW). The screen targets 10 domains of SDOH and is administered by the SW to caregivers at time of diabetes diagnosis. Caregivers who identify a barrier(s) are provided with a list of tailored resources by the SW. One week after resources are provided, the diabetes health coach (HC) checks in via phone to assess resource utilization and/or if additional help is needed.

Results: 56 SDOH screens have been completed with 17 caregivers identifying a barrier(s). Among the 17 caregivers, 36 total barriers were identified across all domains with 33 subsequent resources provided. Food insecurity and mental health were among the most identified SDOH barriers. The HC assessed resource utilization and/or provided additional assistance to 13 of the 17 caregivers. All 13 caregivers reported successful utilization of the SDOH resource(s).

Conclusions: Health disparities in care must be addressed as early as diagnosis so proper care, resources, and follow-up can be put in place to meet the needs of families and improve diabetes outcomes. The combination of a comprehensive set of SDOH resources and supportive follow-up is necessary to offsetting disparities. Further expansion of this initiative will include periodic screening beyond the time of diagnosis, continued resource follow-up, and impact evaluation on diabetes outcomes.

P-202

Mental disorders among children with type 1 diabetes attending diabetes clinic at Mulago national referral hospital; prevalence and factors associated

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Introduction: In high-resource settings, mental disorders are a recognized problem in children with type 1 diabetes (T1D). They are associated with worse clinical outcomes and poor health related quality of life. Psychological screening and support for these children and their families is recommended but rarely available in low-resource settings.

Objectives: We aimed to determine the prevalence of and factors associated with mental health disorders among children with T1D followed at Mulago Hospital.

Methods: Cross sectional analysis was carried out. A sample size of 130 diabetes clinic patients age 6-17 yrs with T1D duration ≥1 yr was to be enrolled. Mini International Neuropsychiatric Interview for Children and Adolescents (MINIKID) was used for assessment. Modified Poisson regression was used to determine factors associated with mental disorders.

Results: Ninety-seven (74%) of eligible patients have been enrolled. Median age was 13 yrs (IQR 10-15), 51% female. Median T1D duration was 2 yrs (IQR 1-4); HbA1c 12.1% (IQR 10.2-14.5). Twenty six percent were admitted in the past year with DKA. Most were under the care of their parents (86%). Eighteen participants had mental health disorders (18.8%, 95% CI 10.8-26.7). Significantly associated factors included female sex (aPR 1.27 [1.14-1.42], p<0.001) and age 13-17 yrs (aPR 1.21 [1.08-1.37], p=0.001). Of the 18 with disorders, 8(44%) reported suicidal ideations(thoughts). Of the 97 with MINIKID assessments, 5% reported suicidal attempts in the last year and 6% major depression. None discriminatory behaviour towards patient with T1D was associated with suicidal ideations; aPR 0.14 (0.05-0.41), p< 0.001.

Conclusions: The burden of mental disorders among children in this setting is high and suicidality is common. Children with T1D and in particular female adolescents should be routinely screened for mental health disorders and appropriate services provided.

P-203

Implementation of routine quality-of-life screening in a pediatric diabetes clinic in a community-based hospital setting

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Introduction: Youth with type 1 diabetes (T1DM) experience higher rates of depression and anxiety when compared to their healthy peers. These co-morbidities are associated with an increased risk of long-term metabolic complications, poor glycemic control and reduced quality of life (QoL). Clinical practice guidelines recommend the routine use of age appropriate, validated assessment tools to monitor the overall psychological health and QOL for youth with T1DM and their caregivers. However, integration of routine QOL screening in a busy clinical setting can be challenging, with few models in the literature demonstrating feasibility in a community-based setting.

Objectives: The primary aim was to demonstrate feasibility of a quality-of-life screening program in a community pediatric diabetes clinic, with the goal of increasing the percentage of adolescent patients and their caregivers who received mental health screening from 0% to 75% over a one year period using the Type 1 Diabetes and Life (T1DAL) survey.

Methods: Patients with T1D between the ages of 12 to 18 years, as well as their caregivers, were identified at their routine follow up visit from April 1, 2023 to March 31, 2024. Eligible patients were given the option to complete the screening. Survey results were scored and analyzed by the social worker, with interventions provided if concerns were identified.

Results: Of the 344 eligible adolescents and caregivers with T1DM, 285 (82.3%) adolescents and 235 (68.3%) caregivers completed diabetes related QoL screening at least once during the first year. Screening rates increased from <5% to a mean of 76% over the initial 12 months. The use of real time data and automated processes facilitated the successful integration, enabling evolution of the mental health provider role within the multidisciplinary team. Both patients and providers reported good acceptability of the intervention.

Conclusions: A QoL screening program was feasibly implemented within a community-based hospital setting with youth and caregivers with T1DM.

P-204

Provider's perspectives on routine quality-of-life screening in a pediatric diabetes clinic in a community-based hospital setting

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Introduction: The 2022 ISPAD Clinical Psychological Care Practice Guidelines recommend the routine use of age appropriate, validated assessment tools to monitor overall psychological health and quality of life for youth with type 1 diabetes (T1DM) and their caregivers. However, evidence-based health care practices indicate, on average, it takes 17 years to implement into direct clinical care.

Objectives: The primary aim of this project was to describe the perspectives of healthcare providers in a pediatric diabetes clinic on

Table 1. ERIC discrete implementation strategy + Provider quotes relevant to routine T1DAL screening.

Strategy	Definition	Representative quotes from Providers
Identify and prepare champions	Identify and prepare individual who declare themselves to supporting, marketing, and driving through an implementation, overcoming indifference or resistance that intervention my provide in an organization	"This screening is so important for providing comprehensive care aligned with guidelines/recommendations…This screening provides an excellent tool to get this information on top of the discussions being had in clinic and hen can help to focus the conversation if concerns identified before the team enters the room, rather than something brought up by family in the last 5 minutes of the visits"
Provide local technical assistance	Develop and use a system to deliver technical assistance focused on implementation issues using local personal	"Have one point person (admin staff) set the patient up to complete the screening at the beginning of the appointment has been helpful." "Coding redcap to automatically calculate the T1DAL results" "Using separate QR code for patients and parents"
Revise professional roles	Shift and revise roles among professionals who provide care and redesign job characteristics	"The patient reported outcomes (PROs) that have been highlighted in the T1DAL survey have completed changed the SW role. Routine screening and the QoL results provide a platform for engaging adolescents and caregivers in real time conversations, in a meaningful way." "I help ensure that when I see patients during their clinic visits, they are reminded to fill out the screening questionnaire if they haven't already and I make sure they are given appropriate time" "Our team has made adjustments to the delivery of the survey, so it is given to patients as they first arrive in clinic and team members wait until they know it has been completed before starting the visit".

the implementation of quality of life screening using the T1DAL screening (Type 1 Diabetes and Life) tool for youth with T1DM and their caregivers within the context of community-based hospital setting. We aimed to understand perceived barriers and facilitators in the integration of routine psychosocial screening, identifying the strategies associated with successful implementation.

Methods: Questionnaires were administered electronically to all healthcare providers working in the clinic during the implementation of mental health screening using RedCAP.

Results: Questionnaire results from 15 different providers were captured, including pediatric endocrinologists, nurses, dietitians, social workers, and administrative staff. Overall, 86.7% providers agreed that implementing the T1DAL screening with adolescents with T1D and their caregivers is very important in assessing QoL in the context of their clinic visit. 53.3% of providers felt this screening should be preformed annually, while 26.7% of providers felt that it should be completed every six months.

Conclusions: All providers responded favorably to routine QoL screening within the context of a follow-up diabetes appointment. These findings highlight this is an acceptable and feasible intervention. An improved understanding of the strategies leading to successful integration can facilitate the uptake of mental health screening programs for youth with T1DM followed in community pediatric diabetes clinics.

P-205

Understanding the impacts of parental anxiety in the context of caring for a young child with type 1 diabetes: a qualitative study

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Introduction: Children with type 1 diabetes (T1D) and their parents face unique challenges and are at a greater risk of developing anxiety disorders than the general population. Anxiety in children with T1D and their parents has been associated with poorer diabetes outcomes. Despite the increasing recognition of the psychological burden associated with T1D, there remains a gap in understanding how parental anxiety influences the development of anxiety in children with T1D.

Objectives: This qualitative study aimed to understand parents' experiences of raising a young child with T1D. Specifically, this study aimed to understand how anxiety can impact parenting by identifying parenting processes that may contribute to anxiety in these children and understanding parents' support needs.

Methods: Participants (*N=27)* were parents of children aged 10 years and younger with T1D in Western Australia. Parents participated in one-to-one semi-structured interviews via video conferencing with a trained researcher. Data was analysed inductively using reflexive thematic analysis. The analysis centred on lived experiences with anxiety while caring for a child with T1D and emphasised the meaning ascribed to these experiences by parents.

Results: Preliminary findings suggest that parents use strategies such as avoidance of cognitions related to T1D, hypervigilance to signs of ill health, overprotection of child and control of diet to manage their anxiety. These strategies impact their parenting choices and relationship with their child. Parents reported that the uncertainty of T1D caused significant anxiety and that they worried about the impact of their anxiety on their children.

Conclusions: Understanding parents' experiences of anxiety may inform the development of a preventative anxiety intervention that targets parenting approaches in order to reduce rates of anxiety in children with T1D. Addressing parental anxiety in this population has the potential to improve long-term health outcomes for children with T1D and their families.

P-206

Prevalence and factors influencing orthorexia nervosa in adolescents with type1 diabetes: a comparative study

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Introduction: Orthorexia nervosa(ON) denotes an obsession with healthy eating,characterized by excessive and time-consuming preoccupation with healthy nutrition.

Objectives: This study aims to compare the prevalence of ON and its influencing factors in adolescents with type 1 diabetes(T1D) compared to a control group.

Methods: The ORTO-15 scale was administered in person to adolescents with Type1 Diabetes(T1D) and healthy peers at a university hospital's pediatric endocrinology outpatient clinic.This Likert-type scale consists of 15 questions. Scores of "1" indicated orthorexic tendencies, while "4" indicated normal eating behaviors.Participants scoring <=40 were considered orthorexic, >40 were considered normal.

Results: A total of 168 adolescents (92 with diabetes,76 healthy) were included.Mean age and BMI SDS were 16 ± 2.5 and 0.11 ± 1.75, respectively.Mean ORTO-15 scores for T1D patients and the controls were 36±6 and 30±5.Ortorexia was detected in 73% of T1D patients and 93% of the control group.The mean HbA1c in T1D patients was 7.9 ± 1.5, showing a very weak negative correlation (-0.012) with ORTO-15 scores.Significant associations were found between parental education level and orthorexia in the entire group (p=0.012, 0.011 for mothers and fathers, and p=0.002, 0.001 for both parents).In the control group, a negative correlation was found between BMI and orthorexia (p=0.001, r=0.291). Orthorexia was detected in 91% of overweight and obese individuals in the entire group.

Conclusions: The obsession with healthy eating is rapidly increasing among adolescents, with those with T1D also at risk. However, adolescents with T1Dmay benefit from education containing scientific and accurate information on healthy foods and eating habits, enabling them to establish healthier relationships with food compared to adolescents who only receive information from social media and their surroundings.Further studies are needed to comprehensively examine factors influencing healthy eating obsession.

P-207

Building resilience in adolescents with type 1 diabetes – development and evaluation of a digital group coaching approach in a randomized controlled trial

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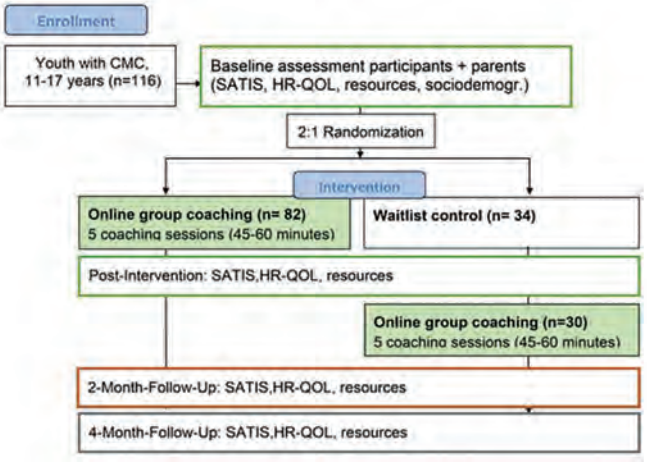
Introduction: Adolescents with type 1 diabetes are significantly more affected by comorbid mental disorders with up to 30% showing symptoms of anxiety or depression. Despite the increasing importance of resilience promotion for preventing such comorbidities, effective evidence-based interventions are still lacking.

Objectives: Here, we investigated the effectiveness of a newly developed resilience coaching program, aiming for relevant increases in life satisfaction and personal resources.

Methods: The program was jointly developed with resilience and media design experts and adolescents. Adolescents with a chronic medical condition (CMC) aged 11-17 years were recruited at a German university hospital. Participants were randomly allocated to either 5 sessions of cognitive behavioral therapy-based online group coaching, or a waitlist control (rf. Fig.). Pre- and post-intervention life satisfaction (SATIS) was measured. Differences between pre- and post-intervention were analyzed by group using paired t-tests. A 2- and 4-month follow-up is ongoing.

Results: 116 adolescents with CMC were recruited, 43% had type 1 diabetes (mean age: 13.4 years, SD: 1.89, 42% male participants). 71% received online group coaching, 29% were in the waitlist control group. Adherence was high with 89% of participants completing at least 3 coaching sessions as per protocol, and 66% completing all 5 sessions. Participants in the intervention group showed a significant increase in life satisfaction ($t(60)=1.67$, $p=0.05$) as compared to the waitlist control ($p=0.31$).

Conclusions: The newly developed online coaching program was very well accepted and showed promise in enhancing the life satisfaction in the target group. The high adherence rate suggests that the digital coaching format effectively meets their needs and preferences. The findings represent an important step towards integration low-threshold mental health support into routine diabetes care.



P-208

Body image perception among adolescents with type 1 diabetes mellitus; relation to glycemic variability, depression and disordered eating behaviour

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Introduction: Distorted body image represents a significant morbidity among adolescents. Continuous-subcutaneous insulin infusion (CSII) improves glycemic control and psychological well-being in those with T1D. However, its relation to body image remains obscure.

Objectives: To compare body image among adolescents with T1D on CSII versus basal-bolus regimen and correlate it with glycemic variability, disordered eating behaviour and depression.

Methods: Sixty adolescents with T1D (30 on CSII and 30 on basal-bolus regimen), aged 12–17 years were studied focusing on diabetes-duration, insulin therapy, exercise, socioeconomic standard, hypoglycemic attacks/week and family history of psychiatric illness. Anthropometric measures, HbA1C, binge eating scale (BES), body image tool, patient health questionnaire-9 (PHQ9) and the Mini-KID depression scale were assessed.

Results: Among the studied adolescents with T1D 14 had poor body-image perception (23.3%), 42 had moderate body-image perception (70%) and 22 had depression (36.7%). Adolescents with T1D on CSII had significantly lower BES ($p = 0.022$), Mini-KID depression ($p = 0.001$) and PHQ9 ($p = 0.02$) than those on basal-bolus regimen. BES was positively correlated to depression ($p < 0.001$), HbA1C ($p = 0.013$) and diabetes-duration ($p = 0.009$) and negatively correlated to body-image ($p = 0.003$).

Conclusions: Distorted body image is a prevalent comorbidity among adolescents with T1D, with higher frequency in those on basal bolus regimen than CSII.

P-311

Frequency and risk factors for depression in adolescents with type 1 diabetes enrolled in changing diabetes in children (CDiC) project in Pakistan

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Introduction: Living with type 1 diabetes (T1DM) can be difficult for children and their parents, particularly in LIMICs, where resources are scarce and out of pocket cost of treatment is so high. Depression is 4th global burden of disease and the leading cause of disability. Unfortunately, Children are not exempted too. More than 1 adolescent is depressive state among 10 and this rate is increasing each year globally.

Objectives:

- To determine the frequency of depression among adolescents with T1DM
- To explore the possible risk factors for causes of depression among them.

Methods: This study was conducted using epidemiologic studies Depression Scale Questionnaire for Children (CES-DC) on 62 children with diabetes at the time of enrolment in CDiC project in Pakistan. The mean age was 13.2 ± 3.0 years and mean duration of diabetes was 5.3 ± 2.5 years. The CES-DC was filled by a certified diabetes educator or doctor while data for possible risk factors were obtained from electronic medical records. Univariate logistic regression models were used to find the association with risk factors. The data was entered and analyzed in SPPS.

Results: In this cohort study, 41 (68.3%) participants had scores ≥ 16 which indicates the depressive symptoms. A higher mean total daily insulin dose (1.27±0.5 unit/kg), a substantially longer duration of diabetes (5.84±3 years), and elevated HbA1c level (9.77±1.65), low family income (< 40,000 PKR), literacy rate and gender bias (preferred boys over girls) were observed in adolescents with depression in this study.

Conclusions: The findings of this study indicate that depression symptoms are common in adolescents with T1DM. Poor literacy rate of family, presence of gender bias, poor glycemic control, frequent insulin injections, limited access to education, low socioeconomic status, and nutritional inconsistency due to low family income are the significant associated risk factors for the depressive state in these teenagers with T1DM which is indeed an alarming state among the study population.

Friday, October 18th, 2024

Poster Corner 6: Acute Complications, Chronic Complications

P-209

Treatment process and complications of diabetic ketoacidosis in childhood

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Introduction: There are different opinions about the optimal treatment for diabetic ketoacidosis (DKA).

Objectives: To analyze the cases with or without bolus-liquid therapy in terms of DKA recovery time and complications.

Methods: Between 2004-2023, 216 DKA episodes from 194 randomly selected patients were classified as mild, moderate and severe.They were defined as not receiving bolus-liquid therapy (Group I) and receiving (Group II).Resolution criteria were pH<7.3,HCO3<18, ketone<1 or anion gap <16. Clinical-laboratory data at the beginning and follow-up of treatment, clinically significant brain injury (CABI), acute kidney injury(AKI), creatinine recovery time (CrRT) and acidosis grade were evaluated according to treatment groups. CABD was defined according to ISPAD 2022 guidelines;(1-diagnostic criteria, 2-major criteria, 1-major+2-minor) AKI was determined according to Kidney Disease Improving Global Outcomes 2012 criteria. Creatinine coefficient (measured creatinine/estimated baseline creatinine) <1.5 was considered as no AKI, 1.5-2 as stage-1, 2-3 as stage-2, >3 as stage-3 AKI. Since pre-admission creatinine values were not known, GFR was accepted as 90 mL/min/1.73m² and estimated basal creatinine was calculated from Schwartz equation. CrRT defined as creatinine coefficient <1.5 in AKI

Results: New diagnosis was 63.9%, median age was 10.7 (IQR:7.2-13.7) years and 16.2% were aged <5, male/female ratio was 1.47. Mild-DKA was 35.2%, moderate-DKA 29.2%, severe-DKA 35.6%. Group I n=151 (70%), Group II n=65 (30%). Groups I and II did not dıffer in terms of degree of DKA at admission (p>0.05). Follow-up and complications findings are summarized in Table 1. ABH was observed in 44% (n=95) at diagnosis/follow-up (Group I; 41.1% (n=62), Group II 50.8%,(n=33); p>0.05). CrRT was 6.0 (IQR 4.0-11.8) hours in Group I and 5.4 (IQR 2.6-7.9)

		Mild DKA (n=76)(%35,2)			Modarete DKA(n=63)(%29,2)			Severe DKA(n=77)(%35,6)	
	No-Bolus (n=64)	Bolus (n=12)	p	No-Bolus (n=43)	Bolus (n=20)	p	No-Bolus (n=44)	Bolus (n=33)	p
Resolution time ,median(IQR)	6,12(4,12-9,15)	9,75(7,4-10,9)	<0,05	8,66(7,7-12,5)	11,75(9,62-15,7)	<0,05	12,37(11-16,93)	16,5(11,25-22,45)	0,11
No-AKI (%)	48(%75)	9(%75)	0,134	23(%53,5)	9(%45)	0,39	18(%40,9)1	14(%42,4)	0,92
Stage 1 AKI(%)	8(%12,5)	2(%16,7)	0,134	16(%37,2)	6(%30)	0,39	12(%27,3)	7(%21,2)	0,92
Stage 2 AKI(%	8(%12,5)	0(%0)	0,134	3(%7)	3(%15)	0,39	11(%25)	10(%30,3)	0,92
Stage 3 AKI(%)	0(%0)	1(%8,3)	0,134	1(%1,6)	2(%3,2)	0,39	3(%6,8)	2(%6,1)	0,92
Creatinine normalization time,median(IQR)	4,6(3,2-9,6)	7(7-7)	0,3	6,15(4-9,19	4(1,35-10,6)	0,36	8,75(4,73-17,87)	5,25(2,69-8,25)	0,03
Clinically significant brain injury (%)	0(%0)	0(%0)	>0,05	0(%0)	1(%5)	0,31	4(%9,1)	5(%15,2)	0,48
GCS decline during treatment (%)	0(%0)	0(%0)	>0,05	0(%0)	1(%5)	0,31	7(%15,9)	4(%12,1)	0,74

hours in Group II (p>0.05). In severe DKA, CrRT was significantly shorter in Group II. While Glasgow coma scale (GCS) <14 at diagnosis was 12% (n=26), worsened GCS was seen in 5.6% (n=12) cases in the follow-up compared to baseline (Group I; 3.2%, n=7, Group II; 2.3%, n=5).

Conclusions: Insulin initiation time was later in Group II and DKA resolution time was correspondingly longer in Group II. Insulin initiation in the treatment of DKA should not be delayed for bolus therapy. DKA is common in AKI. Early closure of fluid deficit in severe DKA accelerates creatinine normalization. Rate of GCS decline was higher in the group that did not receive bolus-fluids. suggesting that cerebral edema is clinically related to the inflammatory processes of DKA, independent of the rate of fluid therapy.

P-210

Endothelial progenitor cells (EPC) and circulating endothelial cells (CEC) at type 1 diabetes onset in children

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Introduction: EPC are already proven to be altered in patients with long-standing T1D and with chronic disease complications. However, data about EPC and CEC levels at the disease onset are limited.

Objectives: The aim of the study was to analyze EPC and CEC at the time of T1D diagnosis in relation to patients' clinical state, remaining insulin secretion and partial remission (PR) occurrence.

Methods: We recruited 45 children with newly-diagnosed T1D, (mean age 10.8 yrs) and 20 healthy peers (mean age 13 yrs) as a control group. EPC and CEC were assessed in PBMC isolated from whole peripheral blood with the use of flow cytometry. Clinical data regarding patients's condition, C-peptide secretion and further PR prevalence were analyzed.

Results: T1D patients presented higher EPC levels than control group (p=0.026), while there was no statistical difference in CEC levels and EPC/CEC ratio. Considering only T1D patients, those with better clinical condition presented lower EPC (p=0.021) and lower EPC/CEC ratio (p=0.0002). Patients with C-peptide secretion within normal range also presented lower EPC/CEC ratio (p=0.027). Higher EPC was observed more frequently in patients with higher glucose level, decreased C-peptide and lower stimulated C-peptide (all p<0,05). Higher EPC were also observed more frequently among patients with only one positive islet-auto-antibody (p=0.022). DKA was related to higher EPC/CEC ratio (p=0.034). Significantly higher CEC were observed only in patients with PR at 6 months after diagnosis (p=0.03). Positive correlations of CEC with age, BMI (at onset, and in following years) were observed. EPC/CEC ratio correlated positively with glucose level and negatively with age, BMI, pH and stimulated C-peptide.

Conclusions: Hyperglycemia and DKA lead to EPC stimulation and EPC/CEC elevation, while CEC seem to be dependent on patient's age and nutrition. EPC's are elevated in patients with poor C-peptide secretion, but there is a need of more detailed investigation to establish the underlying mechanisms.

P-211

Diabetic ketoacidosis at onset is associated with worse outcomes after 1 and 2 years of follow-up: a pediatric registries collaboration pooling 9284 children with diabetes from 9 countries

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Introduction: The prevalence of diabetic ketoacidosis (DKA) at onset of type 1 diabetes (T1D) increased over the past years.

Objectives: We aimed to investigate the association between DKA at the onset of T1D and diabetes-related outcomes after 1 and 2 years of follow-up.

Methods: An international multicenter study that included data from nine countries (Austria, Czechia, Germany, Italy, Luxembourg, New Zealand, Slovenia, Switzerland and USA (Colorado)). A study population included youth (0.5-16.9 years) diagnosed with T1D between January 2019 and December 2020 with available up to 2-year follow-up data. DKA at onset was defined as pH < 7.3 and/or bicarbonate < 15 mmol/L. HbA1c, insulin dose, BMI SDS (WHO reference), pump use, severe hypoglycemia and further DKA episodes were assessed 1 and 2 years after onset. Logistic regression models adjusted for age, sex, pump and CGM use were implemented to test associations between DKA at diagnosis and the outcome values.

Results: A total of 9284 individuals (45.1% females, mean age at onset 9.0 years) were included in the analysis. Overall, 43.1 % presented with DKA at onset. DKA at onset was associated with higher HbA1c at both the first and second year after diagnosis (adjusted HbA1c 7.5 vs. 7.3%, P <0.001; 7.6 vs. 7.4%, P <0.001, respectively). BMI SDS was higher in the DKA group (0.78 vs. 0.61 after one year, P <0.001; 0.78 vs. 0.66 after two years, P <0.001), as were insulin requirements (0.77 vs. 0.71 IU/kg, P <0.001; 0.82 vs. 0.80 IU/kg, P =0.032). Neither severe hypoglycemia (P=0.95 after one year and P=0.98 after two years) nor subsequent DKA (P=0.97 and P=0.19) were different between the groups during the follow up.

Conclusions: Prevalence of DKA at onset remained high and was associated with higher HbA1c levels, BMI, and insulin dose during follow up. However, the differences were minor and their clinical relevance is therefore questionable.

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Urinary netrin-1 among children and adolescents with diabetic ketoacidosis; relation to severity

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Introduction: Although Acute kidney injury secondary to dehydration is a well-recognized complication of diabetic ketoacidosis (DKA), tubular injury attributed to DKA is poorly described.

Objectives: To assess the level of urinary Netrin-1 as a marker of renal tubular injury among children and adolescents with DKA during and after the resolution of the attack.

Methods: Forty children and adolescents with moderate and severe DKA were assessed during the DKA and followed up for 14 days including urine output, protein creatinine ratio and urinary netrin.

Results: Urinary Netrin-1 was significantly higher in the studied children with DKA during tan after the resolution of the DKA (p<0.001). Moreover, it was significantly higher in those who developed proteinuria during DKA (median 2195 ng/ml) than those without proteinuria (median 463.1 ng/ml), p<0.001, however this difference became insignificant at D14 with the decrease in the level in both groups, p=0.327. A significant relation was found between the presence of proteinuria and urinary netrin-1 at presentation which became insignificant at D14.

Conclusions: Urinary netrin could serve as a prognostic marker of renal tubular injury among children and adolscents with DKA.

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Muscle function, bone health & subclinical neuropathy in Indian adolescents with type 1 diabetes: are they inter-related?

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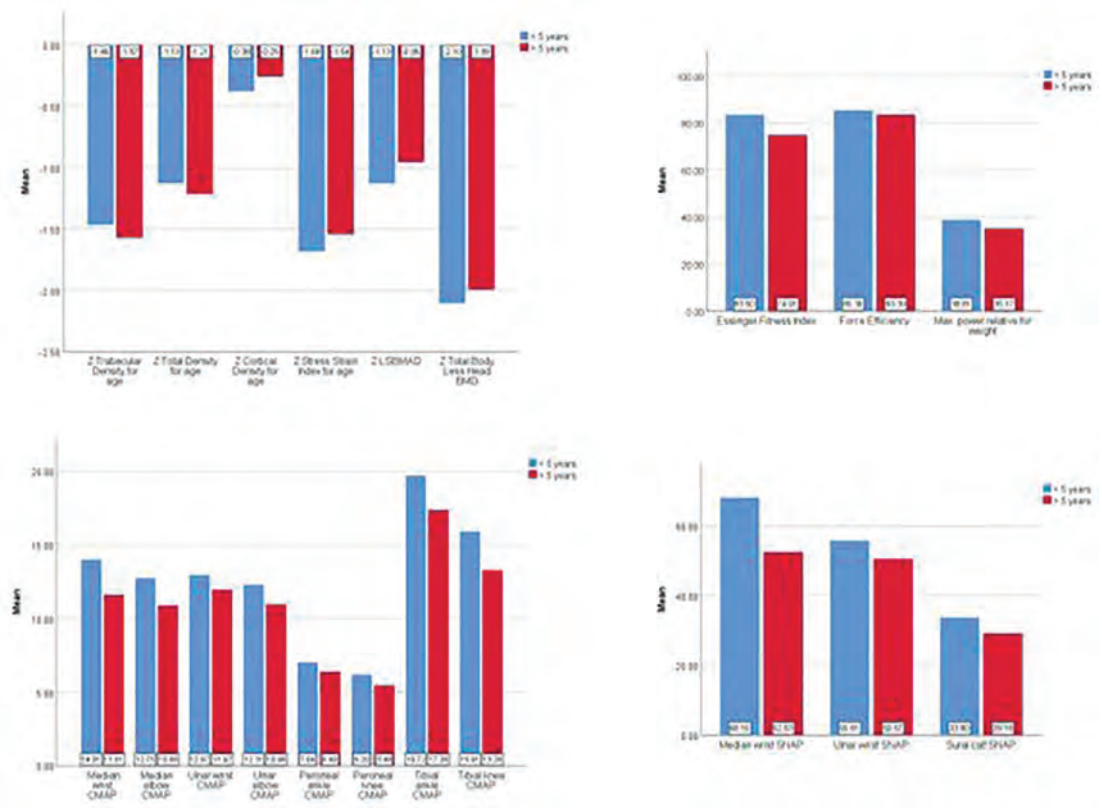
Introduction: The author's previous study noted adverse nerve conduction, muscle function in adolescents with T1D vs controls

Objectives: To compare muscle,bone health,nerve conduction parameters in adolescents with T1D; to identify risk factors & association between nerve, muscle, bone parameters



Methods: Inclusion:T1D duration:2-5yrs(groupA)=60, >5yrs (groupB)=60; age,sex-matched. Exclusion:Illness affecting nerve conduction. Parameters: Clinical, diet, biochemical, 4-limb NCS, jumping mechanography, DXA, pQCT

Results: Age: 15.3±3yrs; 56 girls. Both groups had similar clinical, biochemical, bone parameters; no clinical neuropathy was noted. Eslinger Fitness Index(EFI) SDS, maximum power/weight(Pmax-rel), compound muscle(CMAP) & sensory nerve(SNAP) action potential amplitudes (nerves of all limbs), tibial motor NCV- significantly lower in GroupB. Group A vs B-Subclinical neuropathy prevalence: 21.7%, 31.7%. Upper limb(UL) motor demyelinating: 5%,6.7%; sensory demyelinating:1.7%, 8.3%. UL motor axonal:1.7%, 6.7%; sensory axonal: 0%, 6.7%. Lower limb(LL) motor demyelinating: 8.3%, 15.0%; sensory demyelinating: 3.3%, 6.7%. LL motor axonal: 0%, 5%; sensory axonal: 1.7%, 8.3%; distal symmetric polyneuropathy: 6.6%, 6.6%. HbA1c: Negative correlation with EFI SDS, Pmax-rel,median,ulnar,tibial motor NCV, median sensory NCV, median, ulnar, sural SNAP (r=-0.3, p<0.05). EFI SDS: Positive correlation with peroneal, tibial NCV(r=0.4, 0.3; p<0.01), TBLH BMD SDS, muscle density. Pmax-rel: Positive correlation with TBLH BMD SDS, trabecular, cortical density SDS. Age, male sex, reduced iron intake, HbA1c, hypertension: associated with subclinical neuropathy. Male sex, HbA1c<9.5%, subclinical neuropathy absence: associated with better muscle & bone health; T1D<5 yrs: associated with better muscle function.

Conclusions: Muscle function, NCS parameter worsening exists in T1D>5yrs. A complex interplay exists between glycemic control, nerve conduction, muscle, bone health in T1D. Muscle, bone health are adversely affected by poor glycemic control & subclinical neuropathy.

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Modifiable risk factors for long-term complications in type 1 diabetes: pediatric obesity and dyslipidemia compared to healthy population

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Introduction: Obesity and dyslipidemia are high impact risk factors in Type 1 diabetes' (T1D).

Objectives: We evaluated the prevalence of obesity and dyslypidemia in T1D, compared to healthy population.

Methods: A case-control study was done at a Pediatric Hospital, from 10/05/2023-13/10/2023. Population included: T1D group(D); Genetic related group(G): co-living T1D's brothers/sisters; Control group(C): healthy children, without chronic conditions/medications. Demographics and clinical characteristics, fasting biochemistry, insulin, C-peptide and auto-immune screenings were collected.

Results: 104 children (D n=57, G n=28, C n=19) were included, 51% males, 50% prepubertal, age of 10.0±3.4 years(y). Global weight 0.32±1.03SD, BMI 0.33±1.02SD, 24% overweight/obesity (3% obesity). 18% had dyslipidemia and only 48% normal lipid profile. Sex or puberty were not associated with overweight/obesity or dyslipidemia. T1D had higher weight (0.55±0.92SDvs0.04±1.11, t= 2.558, p=0.012), BMI 0.56±0.99SDvs0.04±1.02SD, t=2.659, p=0.009), total-cholesterol (TC) (164±26vs154±24mg/dL, t=2.035,p=0.044), HDL-cholesterol (58±12vs53±10mg/dL, t=2.400,p=0.018). No association was found between T1D and overweigh/obesity (X^2=5.006,p=0.082) or dyslipidemia (X^2=2.003,p=0.156). Groups G-C were similar. Group D was distinct from C: weight (D0.55±0.92SD, C-0.19±1.35SD, t=2.705,p=0.08), BMI (D0.56±0.99SD, C-0.18±1.11SD, t=2.752,p=0.07), TC (D164±26, C146±19mg/dL, t=2.765,p=0.07), HDL (D58±12, C50±6mg/dL, t=2.647,p=0.01). Group D had 4.9±3.0y disease duration, A1c 7.3±0.8%, glucose 178±26mg/dL, variability coeficient 39±5%, Time in Range(TIR) 54±16%, insulin daily-dose(IDD) 0.80±0.15 U/kg/day. Higher BMI was correlated with higher A1c (r=0.368,p=0.005). Lipids were only correlated with glucose variability (TC r=0.503,p=0.002; HDL r=0.368,p=0.025).

Conclusions: The percentage of obesity and dyslipidemia was high. We highlight that T1D's glycemic control is crucial and reinforce the need to reduce modifiable cardiovascular risk factors in pediatrics.

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Inflammatory markers and its association with insulin resistance in Indian children and young adults with type 1 diabetes

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Introduction: Long term hyperglycaemia in T1D leads to oxidative stress, inflammation, and endothelial damage. Chronic degenerative changes may lead to increased levels of inflammatory markers.

Objectives: The present study is to evaluate inflammatory markers (IM) and its association with insulin sensitivity in Indian children and youth with T1D. It further explores the predictors of insulin resistance in these children and young adults.

Methods: 194 children and youth (11.6 – 17.5 years) with T1D having disease duration of at least 2 years were included in this cross-sectional study. Demographic data and laboratory findings were obtained using standard questionnaires and protocols. High sensitivity CRP (hs-CRP), interleukin (IL-6) and tumour necrosis factor α (TNF- α) were analysed as inflammatory markers. Insulin sensitivity was computed based on the anthropometric and laboratory parameters required for SEARCH.

Results: 14.4% were found to have insulin resistance. Those with insulin resistance were found to have significantly lower glycaemic control, LBM z-score. Also, those with insulin resistance had higher insulin requirement, altered albumin: creatinine ratio (ACR), LDL cholesterol, hypertension. hs-CRP, IL-6 & TNF- α and were higher in those with reduced insulin sensitivity. By linear regression - high hs-CRP, ACR, LDL, hbA1c and fat percent were important predictors of insulin resistance.

Table. Comparison of parameters as per insulin resistance

Parameter	Insulin resistance (n= 28)(eGDR ≤ 5.486)	No insulin resistance (n=166)(eGDR > 5.486)	p-value
Duration of illness	8.6 ± 3.3	6.1 ± 3.6	0.05
Hypertension (%)	11%	4.5%	0.1
hs-CRP	2.65 ± 1.2	1.45 ± 0.9	0.04
IL-6	2.7	1.5	0.05
Albumin: creatinine ratio	23.4	16.3	0.01
LBMZ	0.4	0.72	0.006
Fat-Z	0.2	-0.2	0.004
LDL	114.3	96.5	0.001
Triglyceride	90	82.5	0.001

Conclusions: Insulin resistance in pre-existing T1D may lead to higher inflammatory markers and subsequent microvascular and macrovascular complications. Early screening and timely intervention are required to retard the disease progression, hypertension and avoid end stage renal disease.

P-216

Evaluation of microvascular complications in children and adolescents with type 1 diabetes in Indonesia

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Introduction: The increasing incidence of type 1 diabetes (T1D) in Indonesia requires evaluation of microvascular complications.

Objectives: To determine the prevalence of microvascular complications in children and adolescents with T1D in Indonesia and to identify sociodemographic factors associated with these complications.

Methods: A descriptive observational multicenter study with a cross-sectional design, conducted in November 2023 across 14 provinces in Indonesia. The subjects are children and adolescents (11-25 years), or those who have been diagnosed for more than two years. Out of 293 samples, 285 samples met the inclusion criteria. Samples for nephropathy were obtained through random urine samples, while retinopathy were assessed by direct ophthalmoscopy.

Results: Data from 285 patients with T1D were reviewed and analyzed. Median age of subjects is 14 years, with range 5-21 years. Mostly the subjects were aged 12-14 years (N=117;41.1%) and were female (N=160;56.1%). The subjects were distributed across 14 provinces in Indonesia, with the majority from Central Java (N=38;13%). This study found that six patients had retinopathy. The median of the albumin-to-creatinine ratio (ACR) in T1D was 12.20 mg/g. A total of 72 respondents (25.3%) had an albuminuria, percentages of microalbuminuria (N=55;19.3%) and macroalbuminuria (N=17;6.0%) in the female group (N=34;11.9% and N=13;4.6%) increases more than in male group (N=21;7.4% and N=4;1.4). Microalbuminuria is most prevalent among middle adolescent (N=27;9.5%) while macroalbuminuria in the early adolescent (N=8;2.8%). Prevalences of albuminuria are highest in East Java (18.05%). There is no significant difference in microalbuminuria and macroalbuminuria in different genders (P=0.436; P=0.703) and age groups (P=0.345; P=0.520).

Conclusions: Microalbuminuria is a common complication in T1D especially in middle adolescence and females. We recommend screening for ACR and retinopathy in patients with T1D to early detection and treatment of kidney damage and retinopathy.

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Non-invasive central blood preassure meassurments in children with diabetes type 1 or obesity or hypertension

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Introduction: Type 1 diabetes (T1D), hypertension and obesity in juvenile patients significantly affect the dysfunction of the cardiovascular system. Finding simple diagnostic tools like Non-invasive measurement of Central Blood Pressure together with the determination of Augumentation and Amplification indices would allow rapid identification of vascular lesions and could thus lead to early initiation of treatment.

Objectives: Assesment of vascular stifness in children with diabetes type 1 or hypertension or obesity.

Methods: 100 children matched by age, weight, height and sex with diabetes type 1 or hypertension or obesity were included. Control group consisted 20 patients. 3 measurements were made at 5-minute intervals using the non-invasive cBP301 Centron Diagnostics system connected to the shoulder cuff. Peripheral and central systolic and diastolic pressure as well as vascular stiffness indices Augumentation index(AUG) and Amplification index(AMP) were determined, mean values were calculated. The statistical analysis was performed using Stat12.5 (student's t-test).

Results: In girls and boys with obesity and hypertension, statistically significantly higher central pressure and increased vascular rigidity indices were observed. Clear trend towards adverse variability in vascular stiffness indices were presented in T1D patients sufering < 5 years, regardless of gender - most of them with HbA1c > 7.5%. In obese children, the central pressure value correlated positively with the concentration of total cholesterol.

Conclusions: Indicators of vascular stiffness showed a more favorable trend in children with longer T1D illness, mostly staying on insulin pumps with better metabolic compensation. The values of the examined parameters were higher in the T1D < 5 years group, perhaps as a remnant of ketoacidosis at diagnosis or a higher percentage of patients treated with pens in this group. Obesity and hypertension undoubtedly predispose to an increase in central pressure and may suggest the development of vascular rigidity in juvenile patients.

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Impact of change in HbA1c on nerve conduction and muscle function parameters in type 1 diabetes: a 1 year follow-up study from India

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Introduction: A previous study by our group noted adverse nerve conduction (NCS) & muscle function parameters in Indian adolescents with type1 Diabetes (T1D). Hence we aimed to study whether these changes are reversible on improving glycemic control.

Objectives: To compare change in trends of nerve conduction & muscle function parameters in adolescents with T1D based on change in HbA1c

Methods: Longitudinal observational study. Inclusion:T1D duration>2yr, no clinical neuropathy. Group A:Reduction in HbA1c (n=40), Group B:Increase in HbA1c over 1yr (n=59). Exclusion:Illness affecting nerve conduction.Parameters:Clinical, diet,biochemical,4-limb NCS,jumping mechanography.

Results: Baseline age:15.3±3yrs; no differences in clinical parameters between groups. At 1 yr significant worsening of muscle function(EFI SDS, force efficiency SDS, maximum power/weight) was noted in group B; improvement in maximum power/weight & no changes in other muscle parameters were noted in group A. A significant improvement in compound muscle (CMAP) & sensory nerve (SNAP) action potential amplitudes (in all nerves except sural) was noted in group A. Significant reduction in conduction velocity (NCV) was noted in sensory & motor nerves (all limbs) in group B, with no change in group A. Significant increase in latency was noted in tibial, peroneal motor nerves & median, sural sensory nerves in group B. Reduction in the prevalence of subclinical distal symmetric neuropathy from 7.5% to 2.5% was noted in group A while group B demonstrated increased prevalence from 5% to 8.4%.

Nerve	Reduction in HbA1c (Group A=40)			Increase in HbA1c (Group B=59)		
	Baseline	Endline	P value	Baseline	Endline	P value
Median (Motor)						
Latency (ms)	2.9 (0.4)	3.0 (0.5)	0.346	2.9 (0.4)	3.0 (0.6)	0.242
Amplitude (mV)	10.8 (3.5)	13.4 (4.0)	0.0001	12.7 (4.5)	14.0 (5.6)	0.082
NCV (m/s)	53.9 (7.6)	53.3 (7.6)	0.315	57.3 (5.5)	54.6 (4.7)	0.001
Ulnar (Motor)						
Latency (ms)	2.3 (0.4)	2.4 (0.6)	0.241	2.2 (0.3)	2.3 (0.4)	0.104
Amplitude (mV)	11.8 (2.4)	12.2 (3.0)	0.034	11.5 (3.0)	11.7 (2.6)	0.384
NCV (m/s)	57.7 (6.6)	56.4 (8.9)	0.759	58.3 (5.4)	55.9 (8.3)	0.038
Peroneal (Motor)						
Latency (ms)	3.5 (0.7)	3.6 (0.7)	0.17	3.3 (0.6)	3.7 (0.7)	0.001
Amplitude (mV)	6.4 (3.2)	7.5 (2.4)	0.004	6.4 (2.5)	7.6 (2.9)	0.010
NCV (m/s)	51.7 (3.4)	50.0 (5.5)	0.185	52.5 (4.7)	50.0 (5.4)	0.004
Tibial (Motor)						
Latency (ms)	4.2 (0.9)	4.6 (0.8)	0.097	4.2 (0.8)	4.8 (0.9)	0.0001
Amplitude (mV)	20.2 (4.7)	22.4 (6.6)	0.006	18.9 (6.5)	20.4 (6.0)	0.074
NCV (m/s)	50.7 (5.1)	49.1 (6.2)	0.379	51.6 (5.4)	49.5 (4.9)	0.042
Median (Sensory)						
Latency (ms)	2.3 (0.5)	2.5 (0.5)	0.178	2.3 (0.2)	2.5 (0.3)	0.0001
Amplitude (μV)	59.8 (24.2)	68.9 (23.7)	0.019	60.6 (20.8)	64.0 (21.8)	0.319
NCV (m/s)	53.3 (5.1)	51.6 (7.2)	0.234	56.1 (4.7)	52.4 (5.3)	0.0001
Ulnar (Sensory)						
Latency (ms)	2.0 (0.5)	2.1 (0.3)	0.879	2.0 (0.3)	2.1 (0.3)	0.096
Amplitude (μV)	51.6 (23.7)	58.6 (23.6)	0.045	51.6 (18.8)	51.2 (16.7)	0.580
NCV (m/s)	53.8 (15.5)	54.6 (8.1)	0.717	59.6 (6.3)	58.3 (8.4)	0.049
Sural (Sensory)						
Latency (ms)	2.3 (0.6)	2.4 (0.4)	0.157	2.2 (0.3)	2.5 (0.3)	0.014
Amplitude (μV)	29.4 (13.5)	27.2 (9.2)	0.220	29.7 (11.5)	28.3 (9.2)	0.715
NCV (m/s)	50.7 (10.5)	50.0 (7.7)	0.137	54.7 (6.0)	50.8 (7.2)	0.0001

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Overall subclinical neuropathy prevalence remained static in group A (30%), but increased in groupB (20.3%, 32.1%).

Conclusions: Despite no clinical symptoms, subclinical worsening of nerve conduction & muscle function was observed with deteriorating glycemic control. Our study highlights the need for early screening for subclinical peripheral neuropathy & subsequent aggressive glycemic control.

Friday, October 18th, 2024

Poster Corner 7: Outcomes and Care Models, Diabetes at school, economics and value addition/access to care

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JENIOus-CwD diabetes in schools research project: a worldwide survey on type 1 diabetes (T1D) management in children and adolescents in schools

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Introduction: T1D management in schools is challenging and publications tend to be regional with a small number of participants.

Objectives: To assess the experiences of families of children and adolescents (C/A) with T1D during school time globally.

Methods: Cross-sectional online survey-based study. A 41-question Google Forms survey aimed at families of T1D C/A, supported by ISPAD-JENIOUS and the ISPAD Diabetes in Schools Special Interest Group. The questionnaire was developed in English, translated into 13 languages, and promoted through email and social media. The inclusion criteria were: 1) T1D 2) age below 19 years 3) school attendance. The countries were divided according to the UN geographic regions and the World Bank income classification.

Results: Preliminary data was collected from May/2023 to February/2024. There were 6,556 responses from 54 countries, 50%(n=3,304) from Europe, 37%(n=2483) Americas, 9%(n=595) Asia and 2% (n=165) Africa. High-income countries: 53%, upper-middle-income countries: 39%, lower-middle and low-income countries: 6%. Mean age(SD) was 10.7y(3.81); diabetes duration: 4.3y(3.4); females: 49.1%(n=3,223). Families reducing work hours because of diabetes: 52.8%; in children < 6 years: 63%. 50.4% reported reducing insulin dosage to avoid hypoglycemia, and 16% that the child misses school due to diabetes at least once a month. School support: 54.8% did not have someone at school responsible for diabetes care, and 48.1% did not have a diabetes management plan. Overall, 19.2% are dissatisfied with the school´s support, and 49.4% think it can improve.

Conclusions: This is the largest study conducted worldwide to assess diabetes care in school settings. School personnel have limited knowledge about diabetes, and there is a high incidence of family members reducing work hours to assist their C/AwD at schools due to a lack of support. Our results revealed that there is an urgent need to improve diabetes management support in schools. These results can help develop strategies locally and internationally.

P-220

Management of children and adolescents with type 1 diabetes (T1D) in schools in Brazil: a nationwide survey

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Introduction: T1D management in schools is challenging, and the few local publications have a low number of participants.

Objectives: To assess families' experiences of T1D children and adolescents(C/A) during school time in Brazil.

Methods: A cross-sectional survey on Google Forms promoted online or through presential interviews, conducted from May to September 2023, aimed at families of T1D C/A. Inclusion criteria: 1)living in Brazil, 2)T1D younger than 19y, 3)attending school.

Results: There were 1,294 responses from 488 cities in Brazil. Mean age: 9.35y(+-3.8), diabetes duration: 3.6y(+-3.1).Private/public schools: 53.4/46,6%. 12.4% of children changed schools due to diabetes care at least once. Insulin injection: 19% had a family member going to school to inject insulin and 58% of 11-14y injected insulin without supervision. Families with someone quitting work due to diabetes were 47.8%. When analyzed separately, for children <6yr, the rates rise, with 57% having someone from the family who quit working, 25% having someone from the family going to school to inject insulin, and 28% having the treatment modified due to lack of school support ($p<0.05$). From the total, 42,2% missed classes at least once a month. School´s support: 80% considered that the school personnel had low/no knowledge about diabetes, and 77,9% are unsatisfied or think the school´s support should improve. Only 25% have a diabetes management plan for school, most of them from public schools and regions with higher income rates($P<0.05$).

Conclusions: This is the largest study performed in Brazil assessing diabetes care in schools. School personnel have limited knowledge about diabetes and there is a high incidence of family members reducing work hours to attend their CWD in school due to a lack of assistance. The impact on families of children younger than 6 years is higher than in older groups. The results revealed that there is an urgent need for improvement in diabetes management support in both private and public schools.

P-221

Diabetes and school health (DASH) program: a clinical care coordination program to optimize care and reduce inequities for youth with type 1 diabetes: revelations from pilot to year 3

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Introduction: The Nationwide Children's Hospital (NCH) Diabetes and School Health (DASH) program is a novel health equity strategy and school-based program.

Objectives: The inter-disciplinary approach provides on-site 1:1 clinical care to type 1 diabetes (T1D) students in the school setting, inclusive of education to students/staff, addresses medical/psychosocial concerns, coordinates scheduled delivery of medications/supplies, and facilitates communication among families, school staff and diabetes team.

Methods: The DASH Program, in its 3rd year of operation, has 100 students enrolled from 67 schools in central Ohio. Students were recruited as moderate or high risk based on their Diabetes Composite Score, a novel risk assessment tool developed by NCH (score <13, indicating increased risk). Data was obtained from students, caregivers, and staff, including A1C, acute care utilization, educational mastery, psychosocial, and health equity measures.

Results: Over 1300 school based T1D visits have taken place since DASH inception. In the 3rd year of DASH, 78% of the population identified as an ethnic minority. From the pilot year to 3rd operating year, A1c improved from 12.4% to 10.6%. Regular continuous glucose monitor use increased from 16% to 81% and insulin pump use increased from 7% to 28%. Minority population had lower % utilizing pumps vs injections (18 vs. 81%) compared to Whites (63% vs. 36%). There was greater regular (vs. intermittent) CGM use among minority (78% vs. 21%) and Whites (91% vs. 9%). A1c did not differ significantly between minority and Whites (10.1% vs. 10%).

Conclusions: DASH is a novel school-based health equity program which provides high level clinical care in the school setting inclusive of care coordination, education, and oversight to students at high risk of T1D complications. The program has been effective improving T1D outcomes and increase utilization of diabetes technology, and is an innovative health equity strategy to identify and reduce health disparities among minority populations.

P-222

Remote monitoring and parent engagement for type 1 diabetes (T1D) care in schools

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Introduction: Though school nurses (SN) are the primary school health care providers for children with T1D in the United States, there are gaps in their diabetes device training.

Objectives: We aimed to understand how parents engage with SN in daily decisions for diabetes management in school in the setting of devices, particularly continuous glucose monitors (CGM).

Methods: We conducted semi-structured interviews with parents of school-age children with T1D about their experiences and attitudes toward CGM use in school. Interviews were analyzed by two reviewers using consensus coding.

Results: Parents (n=24) were mainly female (83%) and non-Hispanic white (75%); their children (n=25) were between 6-15 years with a T1D duration of 1-8 years. Most used T1D devices (92% used CGM, 44% insulin pumps, 24% automated insulin delivery systems). Three themes emerged. 1) Most parents engaged in remote monitoring of their child's CGM. For some, this enhanced frequent communication with the SN to facilitate needed interventions. Others elected to bypass the SN and communicate directly with their child for hypo- and hyperglycemia management. Though this practice excluded the SN, parents saw this as less disruptive to class time. 2) Opinions were mixed on whether SN should remotely monitor the CGM. Some parents relied on SN remote monitoring for active co-management, which increased parent reassurance that their child was safe. Others considered it to be potentially intrusive, unnecessary, or burdensome for the SN. 3) Parents were polarized on whether the SN is an extension of their child's medical team. Parents with less favorable school health care experiences or concerns about SN knowledge of devices may want more guidance from the diabetes medical team to SN.

Conclusions: Parent and SN interactions are influenced by use of remote monitoring. Best practices for shared remote monitoring with SN may facilitate efficient bidirectional communication and minimize classroom disruptions.

P-223

Enhancing access to type 1 diabetes care in Kenya

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Introduction: Access to standard care among Type 1 diabetes (T1D) patients remains limited for many affected individuals. Changing Diabetes in Children (CDiC) project is a public private partnership model that aims to provide unmet needs for children and adolescents living with T1D. It partners together with Ministry of Health in integrating T1D care in the health system, considering the socioeconomic and healthcare infrastructure challenges existing in the country.

Objectives: The paper highlights the importance of a multi-faceted approach, integrating both healthcare system reforms and patient-based initiatives.

Methods: County introductory meetings and need assessment. Building capacity to diagnose, treat, and manage T1D through improved infrastructure, trainings, and provision of medications and equipment. Increase awareness about T1D among the patients, caregivers and healthcare providers (HCPs). Develop a return on investment cases for advocacy. Leveraging digital solutions to streamline data capture, surveys and transmission. Review educational materials.

Results: 37 out of 47 counties on-boarded with 46 facilities. 5,300 patients enrolled. 1 centre of excellence in diabetes education and awareness established. 787 HCPs trained. 216 households empowered through camps. The return on investment report disseminated to all the 47 counties health leaders. Advocacy targets national agenda such as diabetes care package and UHC. Engagements to review T1D indicators in the registries and files. In the meantime, CDiC has adopted the Kobo toolbox platform to collect data.

Conclusions: Implementation of these strategies requires collaboration among government agencies at national and county level, HCPs' bodies including training institutions, non-governmental organizations, private and international partners. Despite challenges such as funding constraints and infrastructure limitations may exist, prioritizing universal access to standard T1D care is essential for mitigating its long-term health and socioeconomic impacts in Kenya.

P-224

Improving glycemic outcomes for children and adolescents with type 1 diabetes: a T1DX-QI success story

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Introduction: Clinical outcomes continue to be less than ideal for children and adolescents with type 1 diabetes (T1D). Participation in learning collaboratives can support clinic-clinic benchmarking, improvement projects and use of the real world for system level changes. Targeted quality improvement (QI) projects can have a positive impact on glycemic outcomes.

Objectives: We aim to examine the impact of a single US center participation in a national T1D QI learning collaborative (T1DX-QI) on improving glycemic outcomes. Furthermore, we analyzed the changes in diabetes technology use.

Table.

Period	2018-2020	2021-2023	P-value
n	1450	1448	
Mean Age (SD), years	12.6 (3.8)	13.1 (3.8)	0.3
Male sex, n (%)	782 (53.9)	781 (53.9)	1
CGM user, n (%)	865 (59.7)	1315 (90.8)	<0.001
Insulin pump user, n (%)	422 (29.1)	728 (50.3)	<0.001
Mean HbA1c (SD), %	8.7 (2)	8.1 (1.9)	<0.001
HbA1c <7%, n (%)	253 (17.4)	415 (28.7)	<0.001
HbA1c >9%, n (%)	452 (31.2)	318 (22)	<0.001

Methods: We evaluated glycemic outcomes and diabetes technology use from the single center prior and four years after joining T1DX-QI when robust QI programs were implemented to improve CGM and insulin pump access, increase diabetes clinic visit frequency, and to use care navigation outreach for at-risk patients. We included all patients with available data (n=1,450) aged 2 to18 years with T1D diagnosed for at least 12 months. We compared data from 2018-2020 to 2021-2023 including mean HbA1c, diabetes technology use and the proportion of patients with an HbA1c<7% or >9%.

Results: Baseline data showed mean age of 12.6 ± 3.8 years, male sex was 53.9 %, 45.5 % had public insurance. In the four years after joining the network, CGM use increased from 59.7 % to 90.8 % (p<0.001), insulin pump from 29.1 % to 50.3 % (p<0.001), and mean HbA1c decreased from 8.7± 2% to 8.1± 1.9 % (p<0.001). There was an 11.3 % increase in the percentage of patient who achieved HbA1c<7% (p<0.001) and a 9.2 % decrease in the percentage with HbA1c>9% (p<0.001).

Conclusions: Adopting improvement science and sharing best practices like the T1DX-QI Collaborative can contribute to increased diabetes technology use and to improvement in glycemic outcomes.

P-225

Optimal R&D spending on treatments and therapies for type 1 diabetes

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Introduction: Type 1 Diabetes (T1D) has a substantial global disease burden and optimal therapeutic goals are often not achieved. There is considerable interest in developing new models of care and more effective therapies. However, it is unclear how much to spend on this endeavor.

Objectives: To estimate optimal research and development (R&D) spending on novel therapies for prevention, delaying progression, management, and cure of T1D.

Methods: We develop a mathematical model to calculate the optimal level of T1D R&D. We take a global, societal perspective. Our model parameters are: total economic T1D harm, the probability a T1D R&D project will result in an approved product, development costs of a successful product, fraction of T1D harm reduced by a successful product, and the number of available approaches to address T1D harm. We calibrate these parameters using medical and economic literature, and expert opinion.

Results: Total cumulative optimal spending on T1D R&D is USD 246 billion. This level of spending funds 438 projects to address T1D harm. Social surplus is USD 2.4 trillion, resulting in a benefit-cost ratio equivalent to an 11.5% rate of return (RoR) annually for thirty years. Actual R&D is substantially below our estimated amount. Sensitivity analysis indicates a range for the optimal number of projects (438-791), spending (111-445 billion), social surplus (2.1-11.9 trillion) and RoR (8-19.5%).

Conclusions: Investment in R&D for developing new T1D preventatives, treatments, and methods of care management is far below the optimal level. Our results support more direct government investment in T1D R&D. They also support government efforts to derisk private investment in R&D and to streamline the regulatory approval pathway. Promoting international cooperation in health R&D and public-private partnerships to address needs in low-income countries can help reduce the gap between actual and optimal T1D R&D.

Table. Optimal Spending on Type 1 Diabetes Research and Development

	Number of Projects	Optimal Spending (USD Billions)	Social Surplus (USD Billions)	Rate of Return
Baseline	438	246	2,387	11.5%
More Harm	618	348	11,856	19.5%
Lower Success Probability	705	397	2,172	8.6%
Lower Development Costs	564	111	2,567	16.9%
Less Harm Reduction	786	442	2,105	8.0%
More Approaches	791	445	2,101	8.0%

Note: Baseline parameters: annual harm = USD 90 billion, success probability = 19.6%, R&D cost per success USD 2.87 billion, fraction harm reduction of success = 11.5%, and approaches to treat T1D = 3. One-way sensitivity: more harm = USD 409 billion, lower success probability = 10%, cost per success = USD 1 billion, fraction harm reduction = 5%, and approaches = 7. Monetary values are 2020 USD.

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Developing strategies to address high DKA rates at diagnosis of diabetes

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Introduction: Late diagnosis of type 1 diabetes, leading to diabetic ketoacidosis (DKA) is a significant concern in England and Wales. DKA rates in newly diagnosed children and young people rose from 29.3% in 2015/16 to 38.5% in 2019/20.

Objectives: Reduction in DKA at diagnosis is part of Aim 1 of the National Children & Young People's Diabetes Network (NCYPDN) Delivery Plan 2020-25.

Methods: A working group was created including diabetes professionals, primary care doctors and other stakeholders. Examples of good practice and effective interventions were gathered. New educational tools were developed.

Results: Educational materials for primary care were developed including a short e-learning tool. This is a Power Point presentation which can be emailed directly to user groups or completed online. This is completed in 5-10 minutes and is designed to give a quick update on key learning points to busy primary care staff. A standard lecture slide set was also produced for formal education sessions.

Regional networks were encouraged to ensure systems are in place to understand local DKA rates, and a strategy to improve these.

Examples of good practice included:

- Use of standard letters to primary care following diagnosis – these give either positive or constructive feedback and reinforce correct diagnostic pathways
- Alerts on IT systems when lab samples for HbA1c or glucose are requested – these highlight the importance of point of care testing and same day diagnosis where type 1 is suspected
- Working with primary care networks to ensure blood glucose monitors available in primary care
- Connecting with education to promote awareness of diabetes through school communication channels

Conclusions: Work continues to review the effectiveness of these interventions, plus work on promoting diabetes awareness to the general public. Our educational tools are on our website: www.cypdiabetesnetwork.nhs.uk/national-network/dka-prevention-at-diagnosis/

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Innovative, cost saving care for the most vulnerable with diabetes: can NICH be replicated successfully outside of the United States?

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Introduction: Novel Interventions in Children's Healthcare (aka, NICH) was developed to mitigate and in some instances remove barriers to care in youth living with diabetes who also experience significant social burden. NICH has aligned it's outcomes with the Institute of Healthcare Improvement's (IHI) quintuple aim of reducing costs and medical waste, improving care, improving health, reducing clinician burnout, and reducing health disparities. Data from three sites in the United States (Doernbecher Children's Hospital at Oregon Health & Science University, Stanford Children's Health, and Benioff Children's Hospitals at UCSF) demonstrate that NICH successfully achieves all 5 IHI aims in young people living with diabetes who represent the highest risk, highest needs, and highest cost patients.

Objectives: Objective of this study was to identify the potential challenges and opportunities to disseminating NICH to youth living with diabetes who also experience significant social burden in a healthcare system outside of the United States.

Methods: Methods included the collection of data from three countries regarding the healthcare systems challenges and opportunities to disseminating NICH.

Results: We examined the following variables across three different countries: Incidence/Prevalence of Children with T1D; Diabetes specific operational policy or strategy and/or registry; National guidelines for diabetes care; Insulin availability; Diabetes mortality rates among children living with T1D; Healthcare payment system; Existing services and or gaps for those youth living with T1D; and Funding available for innovative programs that target youth living with T1D.

Conclusions: Based on our review of the data, NICH aligns with the Global Health Framework and is a data driven intervention available for dissemination/implementation with T1D Index's highest- level youth (greatest human burden) on the Global Health Framework. As such there appears to be possibilities for successfully disseminating NICH outside of the United States.

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The effect of health literacy on health and health service use in adolescents with diabetes

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Introduction: Enhanced health literacy boosts engagement in health management, treatment adherence, and complication prevention in chronic diseases, thus cutting healthcare expenses. Research on Type 1 diabetes adolescents' health and diabetes literacy is scarce**.**

Objectives: It aims to investigate the effect of health literacy level on the use of health and health services in adolescents with type 1 diabetes.

Methods: The study includes adolescents aged 12-18 diagnosed with diabetes, who visited the Pediatric Endocrinology Department polyclinic of Trakya University Application and Research Hospital between 10.10.2022.-10.04.2023. A total of 130 adolescents are followed in this clinic. Sampling was not conducted, and T1DM adolescents were approached voluntarily after parental consent. The survey comprises three sections: sociodemographic characteristics and health service-related questions, assessment of health literacy using the Turkish Health Literacy Scale, and evaluation of diabetes knowledge using the Diabetes Knowledge Scale.

Results: Participants aged 11-20 (mean 15.32±2.10); 56.2% female (n=76); 43% mid-adolescent; 60% high school attendees; 45.4% Type 1 diabetes duration 5-10 years; 22.3% wage earners; 50.8% cover strip costs; 16.2% use sensors. Hospitalization within last year 23.8%; average health literacy 35.04±8.64, 41.5% sufficient; 19.2% inadequate diabetes knowledge. Average HbA1c 8.5±2.05%, 53.8% above 8 ml/mol. Hospitalization 13.8%, emergency department visits 15.4%. Higher health literacy is linked to significant HbA1c and hyperglycemia reductions (p=0.032 and p=0.034). Higher literacy also correlated with fewer emergency and outpatient visits last year (p=0.020 and p=0.050).

Conclusions: Raising health literacy among adolescents with Type 1 Diabetes lowers HbA1c, decreases hyperglycemia, and reduces hospitalizations and clinic visits. Designing educational programs for these adolescents can promote this.

Friday, October 18th, 2024

Poster Corner 8: Psychological and Psychosocial aspects of Diabetes, Diabetes in Developing Countries and Migrant Populations, Pumps and CGM, Novel Advances and Interventions, Outcomes and Care Models, Genetics, Imunology and the Enviroment

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Registry of type 1 diabetes in Peruvian population at primary health level

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Introduction: Previous studies have shown that the incidence of type 1 diabetes in Peruvian children and adolescents in Lima is very low (<1/100,000/year/<15 years old). This is attributed to the mixed heritage of the Peruvian population, which includes South Asiatic origins combined with Spanish, Black, and Asiatic influences. The Changing Diabetes in Children (CDiC) program, launched in 2022 and running until 2025, aims to address type 1 diabetes in low-income populations in Lima, operating through seven healthcare centers.

Objectives: To describe epidemiological characteristics of type 1 diabetes in Peruvian children enrolled in the CDiC program from 2022 to 2024

Methods: It describes a case series of 468 individuals with type 1 diabetes, with data collected via the CDiC's virtual epidemiological registration system. The seven centers serve a combined population of about 3 million inhabitants. The centers in South Lima include Juan Pablo II in Villa El Salvador, Manuel Barreto in San Juan de Miraflores, Villa Maria del Triunfo,and San Genaro de Villa in Barranco-Chorrillos. In North Lima, the centers are Santa Luzmila in Comas and Rimac. These centers are at the primary health level and are part of a pilot project under the recently approved Diabetes Law, aiming to establish a national registry of type 1 diabetes patients in Peru.

Results: Among the 468 cases, 249 were female. The age groups most affected were those over 15 years and between 10 and 15 years old. The National Institute of Child Health (INSN), serving as CDiC's national reference center, mirrored this trend.

Conclusions: The registration of type 1 diabetes cases at the primary health level remains low in Lima. With over 30 million inhabitants in Peru and Lima housing 30% of the population, a collaborative effort with the Ministry of Health is crucial to establish a unified registry of type 1 diabetes patients within the framework of the new Diabetes Law.

Table.

CENTER	JUAN PABLO II		MANUEL BARRETO		SAN GENARO DE VILLA		VILLA MARÍA DEL TRIUNFO		RIMAC		SANTA LUZMILA II		INSN		TOTAL GENERAL
AGE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	
<5 YEARS					1	2	1							1	5
5-10 YEARS			1	3	3	4	1		1	3	2	1	8	9	36
10-15 YEARS	2	1	12	6	12	10	2	1	7	6	6	7	32	13	117
>15 YEARS	7	2	19	16	12	11	8	3	20	10	8	18	84	92	310
TOTAL	9	3	32	25	28	27	12	4	28	19	16	26	124	115	468

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The impact of ultrasound guided rotation of injection sites on glycemic outcome and insulin requirements

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Introduction: The benefits of automated insulin delivery (AID) are evident, but insulin infusion remains a weak point. Insulin delivery and absorption vary with subcutaneous tissue properties, impacting glucose levels.

Objectives: The primary aim was to study if ultrasound guidance for placing infusion sets could support better rotation habits and reduce subcutaneous changes. Secondly, to investigate if using new sites impacted glycemic outcomes and insulin requirements.

Methods: Among 38 participants aged 6-18 years, 31 had over 80% continuous glucose monitoring (CGM) usage at three visits, integrated with their AID pump – Medtronic MiniMed 780G or Tandem T:slim X2 - and were included in the analysis. All participants underwent ultrasound examination of the two latest infusion sites at each visit. In the first two weeks participants were using infusion sites as usual. After two weeks, participants were informed of any hyper- or hypoechogenicity found in the subcutis via ultrasound and instructed to avoid the affected areas. Glycemic parameters from CGM and insulin requirements for the previous 2 weeks were compared using a T-test for intention-to-treat analysis.

Results: From Day 1 to Day 28, we observed a 2.4 % point increase in TIR (p=0.005), a 3.3 % point increase in TITR

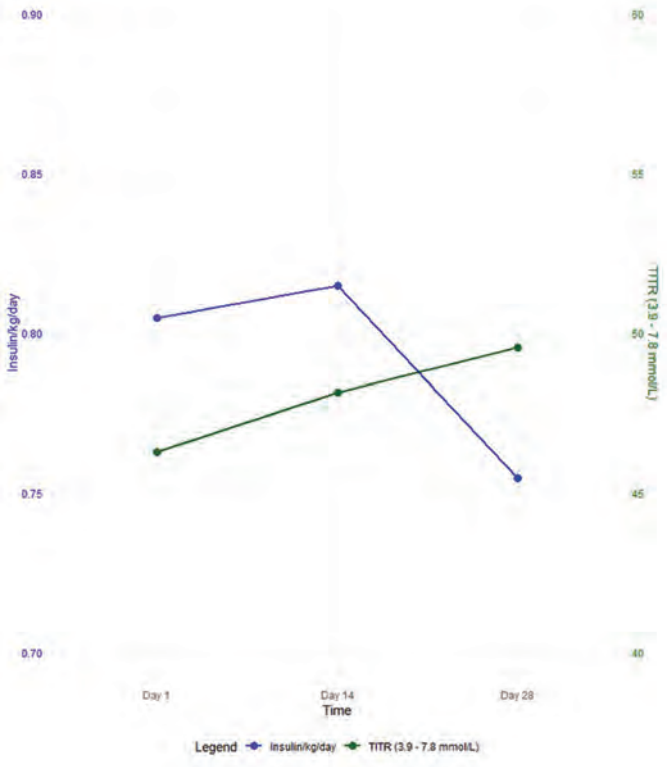

Table.

	Day 1	Day 14	Day 28
Time in range (TIR) (3.9 - 10.0 mmol/L)	68.32 [62.68; 73.97]	69.71 [65.11; 74.31]	70.74 [66.28; 75.20]
Time in tight range (TITR) (3.9 - 7.8 mmol/L)	46.29 [41.03; 51.55]	48.16 [43.50; 52.82]	49.55 [44.97; 54.12]
Mean sensor glucose (mmol/L)	8.85 [8.26; 9.43]	8.67 [8.21; 9.13]	8.55 [8.11; 8.98]
Time above range (TAR) (> 10.0 mmol/L)	29.42 [23.68; 35.16]	27.90 [23.17; 32.63]	26.74 [22.18; 31.30]
Time below range (TBR) (< 3.9 mmol/L)	2.23 [1.56; 2.89]	2.35 [1.70; 3.01]	2.61 [1.99; 3.24]
Insulinunits/kg/day	0.80 [0.71; 0.90]	0.81 [0.74; 0.89]	0.75 [0.68; 0.83]
Number of ultrasound diagnoses - total, latest infusion site	35	31	32
Number of ultrasound diagnoses - total, second latest infusion site	17	18	13
Number of ultrasound diagnoses - hyperechogenicity, latest and second latest infusion site	40	33	30

(p=0.0005), a 0.3 mmol/l decrease in sensor glucose (p=0.0002), a 2.7 % point decrease in TAR (p=0.003), a 0.4 % point increase in TBR (p=0.008), and no significant change in CV (p=0.12). Additionally, there was a reduction of 10 areas of ultrasound-detected hyperechogenicity at the latest two infusion sites. From Day 14 to Day 28, TITR increased by 1.4 % points (p=0.047), and ins/kg/day decreased by 6.9% (p=0.0031).

Conclusions: Using ultrasound as a pedagogical tool to use new and unaffected sites for insulin infusion improved glycemic outcomes and decreased insulin requirements although the number of sites with hyperechogenicity remained high.

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The prevalence of hypophosphatemia in children with T1DM presenting in diabetic ketoacidosis in northern India: an observational study

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Introduction: Diabetic ketoacidosis (DKA) is a severe complication of type-1 diabetes mellitus (T1DM). During the treatment, hypophosphatemia frequently occurs but is often unrecognized, resulting in serious consequences. Notably, no pediatric literature has yet addressed this issue.

Objectives: This study aims to determine the prevalence of hypophosphatemia during hospitalization for DKA.

Methods: This prospective observational study enrolled children aged 1-12 years presenting with DKA. Children with known pre-existing conditions affecting phosphate levels, such as hyperparathyroidism, rickets, Fanconi anemia, chronic diarrhea, and malnutrition, were excluded. Clinical and demographic data were recorded, and patients with DKA and hypophosphatemia were managed as per the ISPAD 2022 Guidelines. Phosphate levels were measured at admission, 12 and 24 hrs, and on days 3 and 5. Hypophosphatemia was defined using age- and gender-based cut-offs.

Results: In a study of fifty-seven children with DKA (median age six years; 56% female), 52.6% (n=30) were newly diagnosed with T1DM. The main precipitating factors were gastroenteritis (36.8%), missed insulin doses (21.1%), and respiratory tract infections (18%). Hypophosphatemia was found in 6 (10.5%) children at admission and in all patients after treatment began, with the lowest levels at 12 hours. The mean phosphate levels at admission were 4.8±0.68 mg/dL, 12h: 1.98±0.40 mg/dL, 24h: 2.15±0.39 mg/dL, Day 3: 2.58±0.41 mg/dL, and Day 5: 2.84±0.63 mg/dL). Severe hypophosphatemia occurred in one patient. Phosphate levels normalized in a median of 8 (3-13) days after starting phosphorus supplementation. A significant negative correlation existed between serum calcium and phosphate levels (r=-0.4619, p=0.040). No adverse events were observed due to hypophosphatemia.

Conclusions: Hypophosphatemia was observed in all children with DKA, with the lowest levels occurring at 12 hours during treatment, but caused no complications. Further research with larger, multi-center studies is warranted.

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The *diabetes body project*: acute effects on eating disorder behaviors, risk factors and symptoms, diabetes distress and quality of life among young women with type 1 diabetes in a multi-national randomized controlled trial

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Introduction: Young women with type 1 diabetes constitute a high-risk group for developing disordered eating behaviors and eating disorders, however effective prevention interventions are lacking.

Objectives: To evaluate acute intervention effects of a novel dissonance-based eating disorder prevention program for young women with type 1 diabetes (*Diabetes Body Project*) in a multi-national randomized controlled trial (Oslo University Hospital, Amsterdam UMC, Stanford University, Joslin Diabetes Center).

Methods: Young women (14-35 years) with type 1 diabetes and body image concerns were randomized to either virtual *Diabetes Body Project* groups consisting of 6 weekly 1-hour sessions or an educational video control condition. Primary outcomes included eating disorder behaviors, risk factors and symptoms. Secondary outcomes included diabetes specific psychological constructs and blood glucose time-in-range. Data was collected at pretest and posttest directly after the intervention.

Results: A total of 293 young women with type 1 diabetes were recruited. Compared to educational controls (n=146), participants in the Diabetes Body Project intervention (n=147) showed significant improvements (all $p < 0.001$) with medium effect sizes for diabetes-specific disordered eating behaviors, body dissatisfaction and diabetes distress (Cohen's *d* ranging from 0.50-0.67), and small effect sizes for thin ideal internalization, eating disorder symptoms, quality of life, negative affect and dietary restraint (Cohen's *d* ranging from 0.36-0.45). No improvements were found for time-in-range.

Conclusions: The *Diabetes Body Project* produced significantly greater acute effects with overall small to medium effect sizes compared to the educational video control condition. As a brief low-cost virtual participant-driven eating disorder prevention intervention, the *Diabetes Body Project* has potential for broad implementation.

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Effect of teplizumab on patient-reported outcomes in stage 3 autoimmune type 1 diabetes

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Introduction: Teplizumab has been associated with improvement in patient- and caregiver-reported outcomes such as diabetes control and treatment satisfaction in newly diagnosed stage 3 type 1 diabetes (T1D).

Objectives: This study builds upon previously reported findings and demonstrates the effect of teplizumab on additional treatment-satisfaction measures.

Methods: PROTECT (NCT03875729) was a double-blind, randomized, placebo-controlled, multicenter trial. Children and adolescents diagnosed with stage 3 T1D within 6 weeks prior to randomization received teplizumab or placebo intravenously for two 12-day courses. Participants and caregivers were asked to complete the Diabetes Treatment Satisfaction Questionnaire status (DTSQs) at baseline and at various timepoints and the DTSQ change (DTSQc) at Week 12. The DTSQs evaluates an individual's absolute satisfaction with treatment and can be administered at multiple time points, whereas the DTSQc evaluates perceived change in treatment satisfaction and is administered at a single time point. The difference in DTSQc scores between groups was analyzed using ANCOVA models that included treatment-group and randomization-stratification factors as fixed effects.

Results: Patient- and caregiver-reported DTSQs scores were previously reported and were similar at baseline between the placebo group and the teplizumab group (Table). The mean patient- and caregiver-reported DTSQc-Treatment Satisfaction Scores and mean caregiver-reported DTSQc-Perceived Diabetes Control Score were significantly greater for the teplizumab group than the placebo group at Week 12 (Table).

Conclusions: Teplizumab resulted in greater reported improvements in treatment satisfaction and perceived diabetes control than placebo for individuals with stage 3 T1D and caregivers.

Table. DTSQ Scores

	DTSQc Teen Assessment at Week 12				DTSQc Parent Assessment at Week 12			
	Mean Baseline DTSQs Placebo (SD) Teplizumab (SD)	Mean (SD) for placebo (n=111)	Mean (SD) for teplizumab (n=217)	Least squares mean difference (95% CI); p-value	Mean Baseline DTSQs Placebo (SD) Teplizumab (SD)	Mean (SD) for placebo (n=111)	Mean (SD) for teplizumab (n=217)	Least squares mean difference (95% CI); p-value
Treatment Satisfaction Score	36.9 (7.06) 36.6 (8.45)	12.8 (7.56)	15.6 (6.84)	2.9 (0.3, 5.5); p=0.031	34.6 (6.94) 35.7 (6.68)	11.6 (7.91)	14.6 (7.12)	3.0 (0.9, 5.1); p=0.006
Perceived Diabetes Control Score	9.1 (1.97) 9.2 (1.87)	2.6 (2.30)	2.9 (2.22)	0.3 (-0.5, 1.2); p=0.447	8.5 (2.01) 8.9 (1.84)	1.6 (2.43)	2.7 (2.23)	1.1 (0.4, 1.7); p=0.002
Perceived Hypoglycemia Score	2.3 (1.45) 2.4 (1.45)	-0.8 (1.57)	-0.3 (1.61)	0.6 (0.0, 1.2); p=0.059	2.3 (1.61) 2.6 (1.41)	-0.3 (1.43)	-0.5 (1.67)	-0.2 (-0.6, 0.3); p=0.445

DTSQs Treatment Satisfaction Score range: 0-48; DTSQc Treatment Satisfaction Score range: -24–24; DTSQs Perceived Diabetes Control Score range: 0-12; DTSQc Perceived Diabetes Control Score range: -6–6; DTSQs Perceived Hypoglycemia Score range: 0-6; DTSQc Perceived Hypoglycemia Score range: -3–3. Higher scores indicate more of the outcome being measured.
CI, confidence interval; DTSQc, Diabetes Treatment Satisfaction Questionnaire change; DTSQs, Diabetes Treatment Satisfaction Questionnaire status; SD, standard deviation.

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No increased risk of islet autoimmunity following SARS-CoV-2 infection in ENDIA children

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Introduction: Increased incidence of type 1 diabetes (T1D) has been reported since the onset of the COVID-19 pandemic. In children genetically at-risk of T1D, SARS-CoV-2 infection has been reported to increase risk of islet autoimmunity (IA) in some longitudinal cohorts (GPPAD), but not others (TEDDY).

Objectives: We performed a study within the Environmental Determinants of Islet Autoimmunity cohort (ENDIA) to determine whether there is a temporal association between SARS-CoV-2 infection and development of IA in Australian children.

Methods: The ENDIA cohort represents 1473 Australian children born between Nov 2012 and Jul 2020 who have a first degree relative with T1D. We conducted a sub-study of 920 children from birth to age 8 years, who attended ≥1 study visit from Mar 2020 to Mar 2023. Plasma samples were tested for SARS-CoV-2 nucleocapsid (N) and spike protein (S) antibodies using the Abbott Alinity platform. Serum was tested for insulin, GAD, IA2 and ZnT8 autoantibodies at study visits using radio-binding assay and ELISA. The frequency of SARS-CoV-2 antibodies was correlated with the presence of IA.

Results: There were 227/920 (24.7%) children with evidence of past SARS-CoV-2 infection on the basis of a positive test for SARS-CoV-2 N antibodies and 119 (12.9%) had SARS-CoV-2 S antibodies only. There were 63 children with new onset of IA, including 14 (22.2%) with SARS-CoV-2 N antibodies. Of these, 4/63 (6.3%) developed IA at the same time (n=2) or within 10 months following (n=2) SARS-CoV-2 N antibody detection. The incidence of IA was 2.3/100 person-years among children without SARS-CoV-2 N antibodies (95% CI 1.9-2.7) and 0.7/100 person-years in those with SARS-CoV-2 N antibodies (95% CI 0.2-1.5).

Conclusions: Our findings are not consistent with increased risk of IA following SARS-CoV-2 infection in children with genetic risk of T1D.

Table 1. ENDIA children tested for COVID-19 from Mar 2020 - Mar 2023

Characteristic	All, n	SARS-CoV-2 N antibody, n (%)
Female	444	118 (26.6)
Male	476	109 (22.9)
Age at baseline (years) ≤2	416	84 (20.2)
>2-4	320	83 (25.9)
>4	184	60 (32.6)
IA at baseline	36	13 (36.1)
No IA at baseline	884	214 (24.2)
New onset of IA	63	14 (22.2)
No new onset of IA	821	200 (24.4)

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Assessing the feasibility of outpatient management for children with type 1 diabetes (T1D) at the university hospital limerick (UHL), Ireland – an analysis of cost of admission care

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Introduction: In Ireland, most children are hospitalised for education at initial T1D diagnosis, regardless of diabetic ketoacidosis (DKA) status. ISPAD 2022 suggests outpatient management for metabolically stable patients is feasible if resources allow. This study assesses the feasibility of such management at the UHL Paediatric Department by quantifying care provided to children/families diagnosed with T1D over the past 8 years.

Objectives: Explore how many children might have avoided a prolonged inpatient stay Estimate bed-days and cost of preventable admissions if ambulatory care had been available at UHL

Methods: The study includes those aged 0-15.99 diagnosed with T1D between June 4 2015, and June 3 2023. Estimated bed day savings were calculated from retrospective data using: days of metabolic stability, no social/family reasons for inpatient education, and distance from hospital. Data was collected retrospectively from clinic charts, including admission length, complications, ICU/PHDU admission, patient address (town only), age at diagnosis, family history of T1D, and any social concerns flagged on admission. Data was collected using Microsoft Excel and analysed using Excel, Minitab and OpenStax.

Results: 182 individuals were included. Eligibility for was assessed for those diagnosed as metabolically stable and those in DKA. Assuming 1-night initial admission for those diagnosed metabolically stable and 3-nights for those in DKA (without PHDU/ICU admission), a total of 535 bed days would have been saved across the study period, averaging 67 bed days annually.

Conclusions: To provide family-centred care, especially in a time of increasing hospital overcrowding, it is crucial to explore

ambulatory care model feasibility. This study demonstrates that such care is feasible in UHL and would result in considerable saving of bed-days, and cutting of admission costs with no projected impact on diabetes care if conducted in the context of adequate resources and with return to usual diabetes care in the event of complications.

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Operationalizing facilitative parenting and its relation to coping with diabetes-related setbacks and blood glucose control

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Introduction: Effective pediatric Type 1 diabetes (T1D) management requires close collaboration between children and parents. Yet, even with consistent parental involvement, diabetes-related distress and sub-optimal health outcomes are common. Authoritative parenting has been associated with better adjustment and blood glucose (BG) control. However, there is a need to operationalize parenting approaches that promote positive coping and resilience in pediatric T1D to inform family-based interventions.

Objectives: Using self-determination theory to define authoritative parenting style along dimensions of autonomy support (AS) vs. control, structure (STR) and involvement (INV) this study aimed to determine associations between facilitative parenting and diabetes outcomes including distress, quality of life, resilience, cognitive appraisals of diabetes setbacks, coping, and BG control.

Methods: Sixty-two children (31 male; M age = 13.7 (2.8) years; M age at diagnosis = 8.1 (3.3) years) with T1D participated. Participants were 66% White, 17% Hispanic and 62% privately insured. Mean HbA1c was 7.8 (1.3), 93% used CGM and 85% insulin pump. Children completed questionnaires assessing predictors (general parenting around diabetes and parenting around diabetes-related setbacks using vignettes) and outcomes at a single time point.

Results: For vignettes, parental AS was associated with children's more active coping, viewing setbacks more as challenges and less as threats, and more frequent BG time in range; parental control had opposite associations and was associated with higher HbA1c. Similar trends were evident in report of general parenting practices; more facilitative parenting (i.e., high on AS, STR and INV) was associated with diabetes-related resilience and better quality of life.

Conclusions: This study operationalizes facilitative parenting style and establishes relations between adaptive parenting and more optimal physical and behavioral health outcomes in pediatric T1D.

Table 1: Parenting, Coping with Diabetes-Related Setbacks, and Diabetes Outcomes

	Cog Appraisal: Challenge	Cog Appraisal: Threat	Coping: Active	Coping: Passive	Child Diabetes-Related Distress	Child Diabetes-Related QoL	Child Diabetes Resilience	HbA1C	TIR
1. P Autonomy Sup (Vignette)	.39**	-.40**	.53***	-.15				-.13	.40*
2. P Control (Vignette)	-.11	.38**	-.16	.24+				.28*	-.33+
3. P Autonomy Support (Gen)					-.13	.12	.01	-.10	.41*
4. P Control (Gen)					.47***	-.34*	-.19	.23	-.28+
5. P Structure (Gen)					-.12	.51***	.55***	.12	.09
6. P Involvement (Gen)					-.04	.46**	.39**	-.11	.30+

N = 62

*+p < .10. *p < .05. **p < .01. ***p < .001.*

Note: Beta values. Controlling for age and years since diagnosis.

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Diabetes distress and psychological adjustment of parents of children and adolescents with type 1 diabetes: the mediating role of resilient coping

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Introduction: Type 1 Diabetes (T1D) can be very complex to manage for both children, adolescents, and parents. In 2022, the prevalence of T1D in Portugal, was 672 children (0-9 years) and 2936 adolescents (10-19 years). High parental diabetes distress, attributed to the daily difficulties of managing their child's T1D, has been founded to be associated with significant levels of anxiety, depression, and stress. However, psychosocial factors, such as coping, may play an important role in influencing this relationship.

Objectives: We aimed to analyze the association between parental diabetes distress and depression and examine the mediating role of resilient coping on this relationship. Children's and parents' sociodemographic were also examined.

Methods: A cross-sectional was conducted involving 140 Portuguese parents of children and adolescents with T1D. Diabetes Distress, Resilient Coping, and Depression were evaluated using validated measures. Correlations and mediations were performed to verify the relationship between sociodemographic factors and parent psychosocial variables.

Results: The sample of children were composed by 56.4% boys and 43.6% girls (M=10.61 years ±SD=4.12) and T1D diagnosis length (M=5.18 years ±SD=3.47). Parental diabetes distress was associated with depression and with resilient coping. Also, resilient coping was linked to depression. Our results evidenced that the impact of diabetes distress on depression is mediated by the parents resilient coping (B=0,01. 95% CI 0.01, 0.04).

Conclusions: Findings suggest that parents reporting diabetes distress may benefit from access to psychological interventions that focus target resilient coping, to reduce levels of depression.

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Stigma in adolescents with type 1 diabetes: consequences and the moderating role of intentional self-regulation

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Introduction: Previous studies indicate that people with Type 1 diabetes are subjected to stigmatization.This may be particularly salient in adolescents who face concurrent challenges such as establishing autonomy and making vocational choices.

Objectives: To verify the association of stigma with mental well-being, self-management competency, and glycemic control in adolescents with Type 1 diabetes and to examine whether intentional self-regulation buffers the negative consequences of stigma.

Methods: This study used a cross-sectional design with a convenience sample. A total of 307 adolescents with type 1 diabetes were recruited from February 2022 to August 2023. Diabetes-specific stigma, intentional self-regulation, mental well-being, and self-management competency were assessed using self-reports measurement tools. Glycaemic control was evaluate by glycated haemoglobin levels. We used simple slopes and Johnson-Neyman analyses to probe significant interactions.

Results: Stigma was negatively associated with mental well-being, self-management competency, and glycemic control after adjusting for sociodemographic variables. Intentional self-regulation moderated the association of stigma with mental well-being and self-management competency. In short, the negative effect of stigma on mental well-being and self-management competency became non-significant in the context of high intentional self-regulation. However, no interaction effect of stigma and intentional self-regulation for predicting glycemic control was found.

Conclusions: Stigma is associated with impaired mental well-being, decreased self-management competency, and elevated glycated hemoglobin among adolescents with type 1 diabetes. Targeted strategies to address stigma are needed.

ePosters on Display

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Mental health and glycemic control disparities among Latinx adolescents with type 1 diabetes

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Introduction: Incidence of type 1 diabetes (T1D) is rising, with greater escalation in racial/ethnic minority groups, especially Latinx, than Non-Hispanic White (NHW) youth. Latinx youth with T1D experience disparities and worse health outcomes compared to their NHW peers. Mental health plays a role in T1D-related health outcomes, yet very little is known about the mental health of Latinx youth with T1D.

Objectives: 1) To describe key psychological constructs in Latinx and NHW youth with T1D and examine between group differences. 2) To examine the relationship among psychological constructs, HbA1c, and race/ethnicity.

Methods: Youth 10-17y ($M \pm SD_{age}$=14.3±1.7y) with T1D participating in an observational study completed validated psychological questionnaires within 6 months of their last HbA1c. Psychological domains assessed are recommended by the American Diabetes Association (ADA) Standards of Care. Independent t-tests and chi-square tests compared Latinx v. NHW youth.

Associations of psychological measures with glycemic control were measured by Pearson correlation, and moderation by race were tested using regressions.

Results: Latinx youth (n=84) with T1D had worse HbA1c (8.5±0.2% v. 7.9±0.1%) and greater depression, disordered eating, family conflict, self-reported barriers to diabetes adherence, and poorer quality of life compared to NHW youth (n=359; *ps*<.05). A greater proportion of Latinx youth had elevated depression (25% v. 16%), disordered eating (30% v. 15%), and anxiety (50% v. 37%) than NHW youth (*ps*<.05). In Latinx youth, but not NHW youth, there was an interaction such that GAD-7 scores (anxiety) were associated with HbA1c (*p*=.04).

Conclusions: In addition to poorer glycemic control, Latinx youth with T1D have worse mental health than NHW youth on most psychological constructs the ADA recommends assessing. Addressing mental health in Latinx adolescents with T1D may play a critical role in achieving glycemic control targets in this historically vulnerable population.

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European action for the diagnosis of early non-clinical type 1 diabetes for disease interception: the EDENT1FI project

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Introduction: The EDENT1FI initiative targets early Type 1 Diabetes (T1D) detection to reduce the risk on diabetic ketoacidosis (DKA) and delay disease progression, enhancing long-term health outcomes and cutting healthcare costs. It aims to refine screening and support early-diagnosed individuals.

Objectives: EDENT1FI, consisting of 28 partners across 12 countries, including academic, industrial, and patient organizations, is dedicated to implementing a general population autoantibody screening for early-stage Type 1 Diabetes (T1D) in 200,000 children. This endeavor aims to identify individuals at an early stage of T1D to initiate timely interventions.

Methods: The screening programme will be executed in Denmark, Sweden, Germany, Italy, Portugal, Czech Republic, Poland, and the United Kingdom. Scheduled from November 1st, 2023, to October 31st, 2028, EDENT1FI operates under the IHI-JU framework, supported by Horizon Europe, The Leona M. and Harry B. Helmsley Charitable Trust, JDRF International, EFPIA, MedTech, and the UKRI Guarantee Fund.

Results: EDENT1FI consists of six work packages (WP). WP1 sets up T1D screening across Europe, aligning with global recommendations and insights from past studies. WP2 explores the psychosocial and economic impacts of screening, plus ethical considerations. WP3 refines T1D monitoring, using innovative tech for early detection. WP4 crafts a disease-modifying approach roadmap, using adaptive trials. WP5 focuses on strong communication strategies, while WP6 ensures robust project management. The Patient Advisory Committee, including T1D individuals or their parents, is key for crucial feedback. Data from early-stage T1D participants across Europe will be pseudonymised and compiled in the EDENT1FI-REGISTRY.

Conclusions: EDENT1FI aims to revolutionize early T1D detection through multidisciplinary expertise and international collaboration, improving outcomes for at-risk children. EDENT1FI is funded by the IHI JU under grant No 101132379.

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Abstract Withdrawn

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Empowering minds and bodies: the impact of outreach programs on mental health and daily management in type 1 diabetes

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Introduction: Type 1 diabetes (T1D) being a lifetime chronic disease, presents a significant daily management burden for patients, potentially having a strong effect on the mental wellbeing. Outreach programs, specially personalized strategies accordingly to the individual's needs and wants, offer a promising approach to address this challenge.

Objectives: This study will: -Assess the effectiveness of outreach programs in improving mental health outcomes among individuals with T1D. -Examine the influence of outreach programs on the daily management of T1D, including adherence to treatment regimens and self-care practices, and to identify any barriers or challenges.

Methods: Qualitative method has been adopted for this study as it has been found to more effective in discussing with the targeted population. Qualitative method gives more space to talk and help the interviewer to observe body language and facial expressions. Hence, Thematic Analysis has been used to identify interesting themes or patterns to describe the concerned problem from the qualitative data.

Results: Participants were positive in their feedback that personalized outreach programs would help in their daily

management and their mental health. The outreach program also encourages them to come to T1Diams NGO for medical, psychological and social assessments regularly. Since, the outreach program is tailored according to the person's needs and wants, they adhere to treatments, hence become aware of their physical and mental condition. Specific strategies used by outreach programs help individuals with Type 1 Diabetes towards self-management behaviors and overall improvement of the person's wellbeing.

Conclusions: Outreach programs play a crucial role in empowering and supporting individuals with T1D to effectively manage both their physical and mental health. By fostering both practical skills and emotional resilience, these programs empower patients to navigate the complexities of their condition and reclaim their sense of wellbeing.

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Fear of death in adolescents with type one diabetes and their parents

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Introduction: Type 1 diabetes (T1D) is associated with a substantially increased risk of premature death compared to the population without T1D. The experiences and perceptions of fear of death have not been well studied in adolescents with T1D and their parents.

Objectives: The purpose of this secondary analysis of existing data was to explore the fears of adolescents with T1D and their parents related to the possibility of death due to T1D.

Methods: A reflexive thematic analysis was used to examine the perceptions related to death of parents and their adolescents with T1D who participated in a primary grounded theory study of interdependence in T1D management. The transcripts of 32 open-ended interviews from 11 adolescents aged 10-18 years with T1D and eight parents were examined using reflexive thematic analysis.

Results: Following coding and creation of initial themes, three final themes were generated from the data through reflexive engagement and included: 1) Facing the Reality of Death, 2) Fearing the Highs and Lows, and 3) Finding a Way through Fears. The participants in this study indicated they see death as a possible consequence when they fail to manage T1D optimally.

Conclusions: Additional investigation is needed to better understand and explore fear of death in adolescents with T1D and any fear parents may have of the death of their adolescent with T1D. Family nurses require awareness of adolescents' and parental fears and perceptions of possible death to actively listen, validate experiences, and effectively intervene with families impacted by T1D. It is important to ensure adolescents with T1D and their parents are offered appropriate resources and psychosocial support as needed. Future research in this area may lead to interventions to support adolescents and their parents in pediatric care settings.

P-137

Prevalence of degenerative complications in overweight and obese patients with type 1 diabetes: a Moroccan single center experience

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Introduction: Overweight and obesity among patients with type 1 diabetes mellitus (T1D) is a serious growing problem, posing both a challenge to achieve optimal glycemic control and an increase in cardiometabolic risk and the occurrence of degenerative complications compared with lean type 1 diabetic patients.

Objectives: The aim of this study is to assess the prevalence of overweight and obesity in T1D patients and to describe degenerative complications among this population.

Methods: This is a retrospective descriptive study including 565 patients with T1D hospitalized in the Endocrinology-Diabetology-Nutrition Department, University Hospital, Morocco. Between 2016 and 2024. Statistical analysis was performed using SPSS version 21 software

Results: The main age in our population was 18,7 ± 11 years with a female predominance (52,9%), 37,7% of patients were hospitalized for uncontrolled diabetes and 36,7% had a diabetes duration of more than 5 years with a mean HBA1c of 10,8 ± 4,6%. The average body mass index (BMI) was 19,6 ± 4,4 kg/m^2, 14,3% of patients were overweight and 4,1 % had obesity including moderate obesity in 3,4% and severe obesity in 0,7%. Microangiopathy complications among overweight and obese patients were found in 32,7% of cases (19,2 % diabetic retinopathy and 13,5% diabetic nephropathy). Thirteen percent had arterial hypertension, 3,8% had ischemic heart disease and 1,9% had ischemic stroke. Six percent had diabetic neuropathy. Metabolic syndrome was observed in 17 % of cases.

Conclusions: The coexistence of T1D and obesity presents a higher cardiometabolic risk and an increased rate of developing chronic complications compared to normal-weight type 1 diabetic patients. Weight control in these patients remains a crucial step in the therapeutic approach.

P-194

Glucocorticoid-induced hyperglycemia leading to early diagnosis of type 1 diabetes (T1D) in an 8-year-old boy with non-classical autoimmune polyendocrine syndrome type 1 (APS1)

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Introduction: Autoimmune polyendocrine syndrome type 1 (APS1) is a rare inherited disorder due to defects in the AIRE gene.

Objectives: To report an 8-year-old boy with glucocorticoid-induced hyperglycemia in the setting of APS1, leading to early diagnosis of T1D.

Methods: He presented at the age of 21 months with hypocalcemic seizures (Ca 6 mg/dL, P 9.3 mg/dL, Mg 2.1 mEq/L, PTH <3 pg/ml), consistent with primary hypoparathyroidism. He is treated with oral calcium and alfacalcidol. Subsequently, he developed vitiligo and autoimmune thyroiditis, raising the clinical suspicion of APS1. Serum cortisol was normal and adrenal antibodies were negative. At the age of 7yrs he suffered normocalcemic seizures. Findings of EEG, brain MRI, and immunoglobulin oligoclonal bands in CSF and blood were suggestive of autoimmune encephalitis. During therapy with methylprednisolone, he developed transient, postprandial hyperglycemia, which did not require insulin. Corticosteroids were weaned off and glucose levels normalized. C-peptide was 1,56 ng/mL (0.78- 5.19), fasting insulin 16.10 μIU/ml (2.60-24.90) and HbA1c 6.3%. Diabetes-associated autoantibodies were found positive at high titers: ICA 1:10, GAD65>250 (<5), IA-2 autoantibodies >400 (<10) and ZnT8 1.867 (<15). After a second administration of corticosteroids, he had fasting and postprandial persistent hyperglycemia and was treated with basal bolus insulin. During steroid tapering, insulin dosing was reduced and finally discontinued. The boy was instructed to have blood glucose measurements to monitor disease progression.

Results: Whole Exome Sequencing revealed a heterozygous p.(Gly306Arg) likely pathogenic variant in the *AIRE* gene suggesting a dominant inheritance pattern and non-classical APS1. Detection of the variant in the unaffected father suggests incomplete penetrance.

Conclusions: Recognition of the clinical and genetic spectrum of APS1 leads to early diagnosis of the syndrome and its atypical features, such as T1D, significantly reducing the morbidity of the disease.

P-200

Helping teenagers with type 1 diabetes and their parents cope with the challenges of diabetes management: a Delphi study

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Introduction: Research indicates adolescence is a period of deteriorating type one diabetes (T1D) management and less controlled blood sugars. It is crucial to maintain, support, and/or establish optimal T1D management during adolescence to ensure the health and longevity of adolescents with T1D. Prematurely shifting the responsibility of diabetes management from parents to adolescents with T1D has been associated with poor diabetes management during adolescence and young adulthood. As the number of adolescents with T1D continue to increase, more research is urgently needed to ensure optimal support particularly throughout the challenging period of adolescence. Farthing et al. (2022), developed a grounded theory 'Managing the Unmanageable through Interdependence', which illustrates the basic social process and related subprocesses used by adolescents with type 1 diabetes (T1D) and their parents to resolve their main concern of maintaining optimal glycemic control and was used as the guiding framework.

Objectives: The overall purpose of this research was to engage parents, adolescents with type one diabetes (T1D), researchers, clinicians, and trainees to share experiences and expertise to inform the identification of priority components of an intervention to enhance healthcare for adolescents with T1D and their parents/caregivers.

Methods: In addition to research team members that include patient partners, the advisory panel includes representatives from the local Health Authority and the local Pediatric Endocrinology, and Diabetes Program. The team members/advisory panel developed an online survey using SurveyMonkey that was delivered in each round of the Delphi study to healthcare stakeholders, adolescents with T1D and their parents, and clinicians to determine consensus and priorities.

Results: The grounded theory, *Managing the Unmanageable through Interdependence*, guided the identification of key strategies.

Conclusions: Key processes related to team development and key processes of the Delphi method will be shared.

P-229

Islet autoantibody positive general population individuals have smaller pancreas volume compared to control individuals

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Introduction: Patients with type 1 diabetes (T1D) have a decline in pancreatic volume (PV) after onset.

Objectives: Previous studies of PV prior to onset have focused on islet autoantibody positive (AAb+) first-degree relatives (FDR) of patients with T1D who have decreased PV. Nothing is known about PV in AAb+ individuals identified from the general population.

Methods: We analyzed 10 individuals who were identified through general population screening to be multiple AAb+, had a recent oral glucose tolerance test (OGTT) and MRI through the Multicenter Assessment of the Pancreas in T1D (MAP-T1D; https://www.map-t1d.com/) study. We compared PV index (PVI) of AAb+ general population individuals to multiple AAb+ FDR (n=78; 40 Stage 1, 26 Stage 2, 12 unknown Stage), individuals with T1D (n=93), and control individuals without T1D (n=90). PVI was normalized for weight which accounts for potential confounding from age or sex.

Results: Most AAb+ general population individuals were male (8/10) and non-Hispanic white (9/10). Most (8/10) were Stage 1, and 2 were Stage 2 T1D. Age at MRI was 15.6 ± 2.8 years with a mean HbA1c 5.3 ± 0.3 %, fasting glucose 87 ± 5 mg/dl and 2-hour OGTT glucose 103 ± 32 mg/dl. AAb+ general population individuals (n=10) had a lower PVI 0.75 ± 0.17 ml/kg compared to control individuals (n=90) 0.96 ± 0.25 ml/kg (p=0.03). The PVI of AAb+ general population individuals was similar to that of AAb+ FDR (n=78) 0.85 ± 0.26 ml/kg (p=0.21). Individuals with T1D (n=93) had a lower PVI 0.60 ± 0.24 ml/kg than AAb+ FDR (p<0.0001) but not Aab+ general population individuals (p=0.14).

Conclusions: AAb+ general population individuals and AAb+ FDR individuals have smaller PVI compared to control individuals without T1D. Individuals with T1D have a smaller PVI than AAb+ FDR. More study on pancreas volume prior to T1D onset may help inform future prediction and prevention studies.

P-230

Mastering Ramadan: empowering children, teens and parents with MiniMed 780g advanced hybrid closed-loop (ACHL) system for safe fasting: Qatar's experience

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Introduction: While children and teens with T1D are commonly advised against fasting during Ramadan due to health risks, many express a desire to fast and can be aided with the help of the 780G (ACHL).However, there is limited information exists on pre-Ramadan educational webinars for this specific group in the GCC region.

Objectives: This study aimed to educate children, teens with T1D, and parents about safe Ramadan fasting while utilizing the 780G. It also aimed to facilitate a question-and-answer session and gather feedback following the pre-Ramadan session conducted via the Teams app.

Methods: Parents, children,and teens with T1D using MiniMed 780G were invited to a pre-Ramadan online session,which was scheduled according to their preferred time after a masked poll was conducted. Physicians,DE,and RD from Sidra Medicine delivered the educational content covering various aspects of managing diabetes during Ramadan,including eligibility for fasting,and relevant insulin pump features whilst enabling patient dietary choices. An educational video demonstrating how to set temporary glucose target on the 780G was shared in a WhatsApp group for 780G patients,along with the carb content in popular Ramadan foods.

Results: A total of 30 participants attended the live session, which lasted for 2 hrs.The team were able to address all the questions raised by the audience.This was the first session conducted for this specific population,families expressed satisfaction with the event and provided positive feedback indicating their readiness for fasting during Ramadan.

Conclusions: This study showed that online session focusing on Ramadan-centered diabetes self-management education can be effectively delivered, providing essential education and support to children and teens with T1D.The audience's response highlighted the necessity for developing a structured pre-Ramadan education session annually and that further qualitative study is needed to explore 780G patients' experiences with fasting Ramadan after receiving pre-Ramadan education.

P-231

Glycemic balance in a cohort of older adolescents and young adults with T1D followed long-term in a pediatric setting. Effect of the COVID years

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Introduction: T1D in adolescents and young adults is susceptible to imbalance and can also be impacted by numerous hazards.

Objectives: This work traces the evolution of the glycemic balance of adolescents and young adults followed in pediatric settings through the COVID years.

Methods: Single-center study. Inclusion: age 15-30 years, onset of T1D < 16 years and seniority > 8 years. The evolution of HbA1c emerges from the years 2013-2023 and from a minimum of 2 annual checks/patient. The current balance is assessed for the year 2023

Results: 120 T1D were selected, including 65 girls. Current age 19.87±3.80, onset of T1D 6.97±3.62 and seniority 12.90±3.98 years. Single 115 times, employed 84 times, they live in Oran 87 times and associate 17 immunopathies, 8 microangiopathies and 8 various chronic conditions. The overall average glycemic balance (HbA1c) for 2013-2024 is 8.12±0.95 and that for 2023 is 8.33±1.41%. The comparison of the annual average of HbA1c for the years 2013-2019 (7.93±1.17%), with that of the years 2020-2024 (8.20±1.25%) does not reach significance (p< 0.075). The target of 7.5% is achieved in 49.27% before COVID and in 38.63% during COVID (p<10-7). The search for predictive factors for 2023 shows a difference for current age (8.72±1.19 vs 8.01±1.43% > and < 18 years, respectively, p<0.01) and seniority of diabetes (8.76±1.35 vs 8.18±1.35%, respectively > and < 10 years, p<0.05) but not for age of onset (8.44±2.00 vs 8.25±1.81%< and> 5 years, respectively, p<0.47). There is a difference in the presence of associated conditions (HbA1c 7.92±1.12) versus their absence (8.47±1.43, p<0.05) and for inactivity (7.91±1. 20) vs occupation (8.50±1.40, p<0.01) and not with sex (p=0.41) or distance (p=0.40.)

Conclusions: This work shows the evolution of HbA1c and the current balance of a cohort impacted by COVID. They must be considered in light of the particular nature of this cohort in exclusive pediatric follow-up.

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Early Sulphonylurea treatment improves non-verbal IQ in *KCNJ11*-related iDEND (developmental delay, epilepsy and neonatal diabetes)

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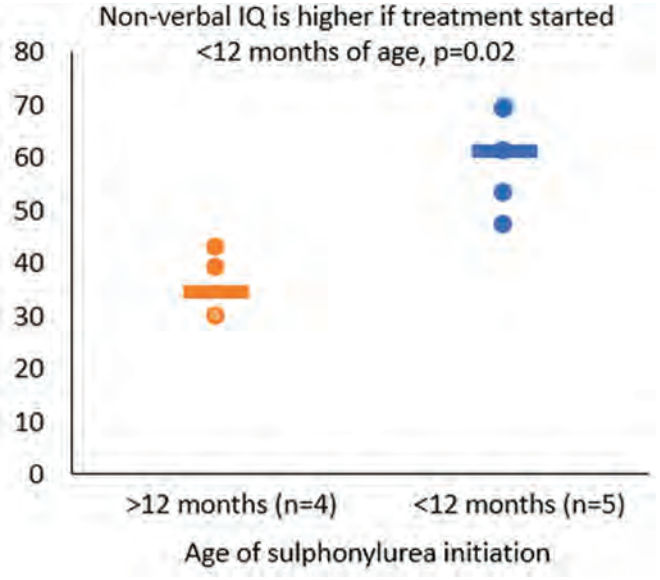
Introduction: Central nervous system (CNS) features in individuals with iDEND (intermediate developmental delay, epilepsy and neonatal diabetes) due to *KCNJ11* mutations may show partial improvement with sulphonylurea treatment, likely due to a direct effect of sulphonylureas on brain K_{ATP} channels. The incomplete CNS response to sulphonylureas contrasts with the excellent beta-cell response. This may relate to the age of initiation of sulphonylureas, with earlier treatment restoring brain K_{ATP} channel function during critical periods of neurodevelopment.

Objectives: Our objective was to use a standardised measure of non-verbal intelligence quotient (NVIQ) to assess the impact of timing of sulphonylurea initiation on cognitive outcomes in the largest group of individuals with *KCNJ11*-related iDEND due to the V59M mutation reported to date.

Methods: We assessed 9 individuals with the *KCNJ11* V59M mutation using the Leiter-3 cognitive battery. Leiter-3 scores were converted to standard scores using age-related normative data. NVIQ was compared between individuals treated with sulphonylureas early (before 12 months of age, n=5) and late (after 12 months of age, n=4), using non-parametric statistics.



Results: Individuals treated with sulphonylureas in the first year of life had higher NVIQ scores than individuals treated later (median (range) NVIQ 61 (47-70) vs 35 (30-43), p=0.02), figure 1. The individual with the highest NVIQ score (70) also had sulphonylurea exposure *in utero* due to treatment of maternal diabetes.

Conclusions: Our data support early genetic diagnosis and initiation of sulphonylurea treatment in individuals with *KCNJ11*-related iDEND, to improve cognitive development. Further research will investigate effects in a larger cohort, assess broader neurodevelopmental outcomes, and explore whether *in utero* sulphonylurea therapy has additional benefits for the CNS.

P-233

School-aged children and the management of type 1 diabetes in the primary school environment: an investigation of how to support children

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Introduction: Type 1 diabetes (T1D) is a common chronic medical condition that affects many children worldwide. Successful management of T1D requires close monitoring of blood glucose levels, the administration of insulin and fine balancing of insulin requirements with food intake and physical activity. There are potentially life-threatening complications associated with having T1D, such as the development of diabetic ketoacidosis (DKA) or hypoglycemia, which must be avoided. Young children with T1D rely on their parents to manage their condition, until they are old enough to understand how to self-care, which poses challenges for parents of school-aged children. This research study seeks to identify how school-aged children with T1D can be supported in the primary school setting, from the perspective of the child with T1D, ensuring that the voice of the child is heard.

Objectives: To investigate how children with T1D can be supported in primary school, from the perspective of the child with T1D, and to inform primary schools and healthcare professionals regarding the needs of children with T1D while in school.

Methods: Case study research was adopted for this project and comprised of qualitative interviews with children (n=33) aged 6-12 years, utilising additional age-appropriate participatory drawing techniques. Ethical approval was obtained from a leading university Faculty Ethics Committee. Braun and Clarke's six-step approach to thematic analysis was used for data-analysis.

Results: Four themes and nine sub-themes emerged. Findings revealed the experiences of children regarding their diabetes care while in school, including where children carry out these activities, who helps them, where they do/do not like to do these activities, and things that work/help.

Conclusions: This study highlights how children with T1D can be supported during the primary school day, with recommendations for an individualised, child-centered approach to the needs of children identified.

P-234

Parental satisfaction and challenges in managing type 1 diabetes in school-aged children: insights from the primary school environment

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Introduction: Managing Type 1 Diabetes (T1D) in childhood presents complex challenges, especially as children rely on parental support until they can manage their condition independently. The primary school setting adds another layer of complexity to T1D management. In Ireland, children's medical needs in primary school are supported by Special Needs Assistants (SNAs).

Objectives: The aim of the study was to examine parental satisfaction and challenges in managing Type 1 Diabetes (T1D) among school-aged children in the primary school environment.

Methods: Online survey was conducted using Qualtrics among 102 parents of children with T1D. The survey assessed demographic characteristics, treatment satisfaction, perceived challenges, and overall satisfaction using 14 Likert scale questions, ranging from 1 (Very Satisfied) to 7 (Very Dissatisfied). Descriptive statistics, reliability analyses, correlation analyses, t-tests, and ANOVA were employed for data analysis.

Results: The majority of participants were female (91.2%), with age range from 24-57 years. The mean age of Children diagnosed with T1D 9.19 years, with the duration of diagnosis 4-7 years. A high reliability level was found in the survey questions (Cronbach's Alpha = .817). Parents expressed overall dissatisfaction with treatment (Mean = 43.8, 95% CI 41.6 – 45.9) and raised concerns regarding school management, diabetes control, and blood sugar fluctuations. Females demonstrated higher satisfaction than males (t = -2.053, p = 0.043). However, the duration of T1D and parental and child age showed no significant association with overall satisfaction.

Conclusions: This study highlights low parental satisfaction with T1D management and suggests areas for improvement. Concerns about diabetes control and blood sugar fluctuations demonstrates the need for enhanced healthcare support at school setting. We recommend to prove tailored interventions to address these concerns and gender differences to improve outcomes for children with T1D in primary school.

P-235

Novel use of vildagliptin in a closed-loop system to prevent glycemic excursions of iftar meal during intermittent fasting of Ramadan in type 1 diabetes mellitus

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Introduction: Ramadan Iftar meal typically causes glucose excursions. Dipeptidyl peptidase-4 inhibitors increase glucagon-like peptide-1 and thus, decrease blood glucose levels with low risk of hypoglycemia.

Objectives: To investigate the efficacy and safety of vildagliptin as an add-on therapy on glucose excursions of Iftar Ramadan meals among adolescents and young adults with type 1 diabetes mellitus (T1DM) using advanced hybrid closed-loop (AHCL) treatment.

Methods: Fifty T1DM patients on MiniMed™ 780G AHCL were randomly assigned either to receive vildagliptin (50 mg tablet) with iftar meal during Ramadan month or not. All participants received pre-meal insulin bolus based on insulin-to-carbohydrate ratio (ICR) for each meal constitution.

Results: Vildagliptin offered blunting of post-meal glucose surges (mean difference -30.3 mg/dL [-1.7 mmol/L] versus -2.9 mg/dL [-0.2 mmol/L] in control group; p<0.001) together with concomitant exceptional euglycemia with time in range (TIR) significantly increased at end of Ramadan in intervention group from 77.8 ± 9.6% to 84.7 ± 8.3% (p=0.016) and time above range (180-250 mg/dL) decreased from 13.6 ± 5.1% to 9.7 ± 3.6% (p=0.003) without increasing hypoglycemia. A significant reduction was observed in automated daily correction boluses and total bolus dose by 23.9% and 16.3% (p=0.015 and p<0.023, respectively) with less aggressive ICR settings within intervention group at end of Ramadan. Coefficient of variation was improved from 37.0 ± 9.4% to 31.8 ± 7.1%; p=0.035). No severe hypoglycemia or diabetic ketoacidosis were reported.

Conclusions: Adjunctive vildagliptin treatment mitigated postprandial hyperglycemia compared with pre-meal bolus alone. Vildagliptin significantly increased TIR while reducing glycemic variability without compromising safety.

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Diabetes self-management smartphone application: could it be an alternative for continuous glucose monitoring in low resource settings?

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Introduction: The "Rightest" app connected to Right test glucose meter via Bluetooth, helps to set blood glucose target, customize measurements and adding notes.The app is provided with ketone alert when blood glucose (BG) is ≥ 240 mg/dl.

Objectives: To assess the role of the rightest app in improving glycemic control as well as quality of life in a 6- month interval of its usage.

Methods: A case- control study included 40 participants with type 1 diabetes, mean age 14.3±1.42 years and diabetes duration of 4.5±3.6 years regularly following up at Diabetes Unit. Rightest app was installed on the participants' smart phone on enrollment and 6 months later. Assessment of the glycemic control was done by HbA1c and time in range results collected from app. Quality of life (PedsQL) and user experience (UEQ) questionnaires were applied at the end of the study.

Results: Using smartphone app yielded a significant reduction in mean BG level (-17.64%,p=0.012)that decreased HbA1c (−10.63%, p= 0.000). Increase of SMBG frequency was observed (p=0.04). This is reflected on a 20 % increment time in range generated by app (p-value=0.002) and lower time above range (>180mg/dl, -18.75%,P=0.001) in intervention group compared to control. However, the number of hypoglycemic events (p=0.71) or DKA (p=0.59) did not differ between groups. PedsQL questionnaire total score has improved (p-value=0.010) in favor of intervention group with good experience with app indicated by UEQ. UEQ revealed pragmatic total score (1.425) was above average while the hedonic total score was good (1.250) and overall score was good(1.338). The higher score of UEQ was inversely correlated with mean BG(r=-0.414, P=0.008) and positively correlated to glycemic control(r=0.644, p=0.002).

Conclusions: Using mobile apps as an alternative for CGM in low resource settings can help improve glycemic control and quality of life for those who don't have access to diabetes technology services because of unavailability or unaffordability.

P-237

Multiple diabetes cases and kidney Anomalies in one family

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Introduction: *HNF1B* (Hepatocyte Nuclear Factor 1 Beta) is an important transcription factor for the development and functionality of various organs, notably the kidneys and pancreas. Mutations in *HNF1B* are associated with various clinical phenotypes, including urogenital tract anomalies, monogenic diabetes (MD), abnormal liver function. Diabetes caused by *HNF1B* defect is very rare, and accounts only <5% of all MD cases.

Objectives: Present a family with multiple diabetes cases and kidney anomalies.

Methods:

Results: We present two siblings, who were followed by pediatric nephrologist because of developmental kidney disease diagnosed antenatally, with no specific treatment. Nevertheless, both children had normal renal function, they were diagnosed with hypomagnesemia and hyperuricemia. In teenage years they were referred to a pediatric endocrinologist after heterozygous variant was found in the *HNF1B* gene (NM_000458.4:c.[701dupA];[701=]), inducing a frameshift mutation (NP_000449.1:p.[(Asn234fs)];[(Asn234=)]). Glucose profile, C-peptide and insulin of both children were within normal ranges, however, HbA1c had tendency to rise during the follow-up period for 6 months. Analysis of the pedigree showed that the father had diabetes requiring insulin therapy diagnosed from young age, his genetic testingi s still ongoing, his aunt was diagnosed with duplex kidneys. Moreover, both maternal grandparents had diabetes of unknown origin and kidney pathologies. There were more distant relatives from both parental sides with kidney problems and diabetes of unknown origin.

Conclusions: The presented case highlights the complexity of *HNF1B* defects. The varying symptoms observed within the family, such as renal and extra-renal pathologies, confirm a complex genetic landscape. In summary, this case proved the crucial role of genetic testing in cases of congenital anomalies (especially kidney cysts) associated with features as impaired renal transport of electrolytes and/or other substances, and various extra-renal features, as diabetes.

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Type 1 diabetes and schooling: a challenge for continuity of care at Yaounde CDiC centers, Cameroon

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Introduction: With the ever-increasing number of newly diagnosed youth, literature predicts that within few years, every school will have at least one teenager living with diabetes. In that case, health personnel must constantly develop mechanisms to maintain their patients safe while in school.

Objectives: To describe the challenges of continuity of care in the provision of health care to school-going adolescents aged between 10 to 19 years old, living with type 1 diabetes in CDiC Clinics in Yaounde.

Methods: The field survey was conducted through a cross-sectional study, from September 2022 to April 2023. Semi-directive interview guides were used to collect data from 50 adolescents on their daily life with type 1 diabetes in school milieu, on continuity of care interventions from seven-nursing staff, and on the provision of care to adolescent patients from four school nurses. All these population numbers were obtained after saturation of their answers. Data were analysed using the text-revision method.

Results: The non-existence of hospital-school platform to train teachers and school nurses, one-to-one talks and personalised school care plans reflect the discontinuity of care. Inadequate knowledge on safe foods and insulin adjustment are among the potential aggravating factors. Inadequate dispositions by school institution to maintain chronic patients in good health and influence of developmental crises from puberty are some contributing factors to those difficulties.

Conclusions: Addressing continuity of care challenges means proposing solutions to manifestations, aggravating and permanent contributory factors of discontinuity of care in school-going patients.

Keywords: School-going, adolescents with type 1 diabetes, discontinuity of care, continuity of care.

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Assessment of self-monitoring blood glucose(SMBG) in type 1 diabetes children & adolescents using diaries at Vihiga county referral hospital(VCRH), Kenya, 2023

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Introduction: According to the WHO (2022), Type 1 diabetes(T1D) is characterized by deficient insulin production and requires daily administration of insulin. In 2017 there were 9 million people with T1D. Little attention has been given on how to optimize SMBG in T1D

Objectives: To:

Assess compliance to SMBG using diaries in T1D cases at VCRH

Evaluate the moods experienced by T1D cases at VCRH

Assess the level of glucose control in T1D cases at VCRH

Methods: In April 2023, 33 T1D cases at VCRH were given diaries, glucometers and strips for home and school SMBG. They were trained together with their guardians and teachers on how to use the diaries. Guardians consented on behalf of their children. In January 2024, 24 filled up diaries were returned. Characteristics like gender, age, period since diagnosis, Random Blood Sugar (RBS), Fasting Blood Sugar (FBS), number of times tested daily, Glycated Hemoglobin (HbA1c) and 8 moods were extracted from the diaries using a structured questionnaire. HbA1c of 8.0% was the cut off for acceptable glycemic control; RBS of 12.0mmol/l and FBS of 8.0mmol/l and below were accepted as good.

Results: 54.16% of cases were male while 45.83% female. 69.23% had done 2 blood glucose tests, 16.67% 3 tests & 14.1% 4 tests per day. Mean age was 17.5 years (SD=4.80); median period since diagnosis was 3 years (IQR 2-4.25). 69.57% recorded a happy mood,16.43% sad, 7.25% sleepy, 4.25% hungry, 0.97% thirsty, 0.97% worried, 0.05% dizzy and 0% sick. Initial mean HbA1c value was 12.48%(SD= 1.90) and 9.82% (SD= 2.23) at endline. 70.83% were within the agreed RBS range while only 33.33% were within the agreed FBS values. At the beginning of the review period, 37.5% had good HbA1c values compared to 54.54% and endline.

Conclusions: Provision of diaries to T1D cases could give an opportunity for SMBG (daily multiple glucose testing and moods). Inclusion of daily moods could inform individualized interventions. Glycemic control could be achieved through structured SMBG which in turn improves quality of life.

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Motivational interviewing: a patient centered approach to improve glucose control among children and adolescents with type 1 diabetes(T1D) at Vihiga county referral hospital(VCRH), Kenya (2022-2024)

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Introduction: Type 1 Diabetes is an endocrine disease characterized with insulin deficiency in young people. Conventional care involves daily injection of insulin. Minimal information from patient feedback is available.

Objectives: To: Characterize T1D cases at VCRH Evaluate the perspectives of T1D cases on the quality of care at VCRH Summarize the challenges in insulin use faced by T1D cases at VCRH Assess glucose control of T1D cases at VCRH

Methods: During periodic review meetings held between October 2022 and January 2024, client interview questionnaires were administered voluntarily to T1D patients at the diabetes outpatient clinic at VCRH. All children were accompanied by their guardians for consenting. 4 patient interviews were conducted to gather their perspectives. We reviewed the filled interview questionnaires. Glycated hemoglobin (HbA1c) values were abstracted from the registers during the same period and collected using structured questionnaire. Data from the interview questionnaires (age, gender, level of education, insurance cover, period since diagnosis, waiting time and challenges with insulin) were extracted and analyzed using Ms Excel for quantitative data and presented using proportions, measures of central tendency and measures of dispersion. Thematic analysis was conducted for qualitative data.

Results: Trends across four data collections points are as tabulated:

Themes derived for reasons as to why they would refer friends/relatives to the facility include: attitude of health care workers, waiting time, excellent services, availability of medication, reminders and access. Challenges included hypoglycemia, pain at injection site, storage, efficacy, access and dosing.

Conclusions: Client interviewing could generate useful information for characterization of T1D cases, evaluation of their perspectives on quality care and challenges while using insulin which gives important insights to client-centered diabetes care and glucose control.

Table.

Key indicators/ Questions	October 2022 (n=17)	January 2023 (n=24)	April 2023 (n=27)	January 2024 (n=36)
Mean age (Years)	16.07 (SD= 5.68)	15.83 (SD = 5.10)	18.12 (SD=5.24)	17.67 (SD=5.18)
Gender of respondents	Male 56.25%, Female 43.75%	Male 45.83%, Female 50.00%	Male 48.15%, Female 51.85%	Male 50.00%, Female 50.00%
Level of education	Primary 58.82% Secondary 23.53% Tertiary 17.65%	Primary 41.67%% Secondary 37.5)% Tertiary 20.83%	Primary 26.92%% Secondary (42.31%) Tertiary 30.77%	Primary 29.41%% Secondary (38.24%) Tertiary (32.35%
Insurance Scheme	NHIF 52.94% Edu Afya 5.89% Other 5.88% None 35.29%	NHIF 52.63% Edu Afya 15.79% Other 21.05% None 10.53%	NHIF 46.15% Edu Afya 7.69% Other 7.69% None 38.46%	NHIF 55.88% Edu Afya 8.82% Other 14.71% None 20.59%
Period since diagnosis (Months)	Median 17 (IQR 7-43)	Median 31 (IQR 12.25-43)	Median 24 (IQR 15-40)	Median 44 (IQR 20-68)
Mean HbA1c Values (%)	12.48 (SD=1.90)	11.85 (SD=1.83)	11.24 (SD=2.14)	9.82 (SD=2.23)
Do you receive all the services you need?	Yes (88.23%)	Yes (82.23%)	Yes (92.75%)	Yes (96.05%)
Period since last clinic visit (Months)	Median 2 (IQR 1-2.5)	Median 2 (IQR 2-3)	Mean 1.70 (SD=0.78)	Mean 2.45 (SD=1.15)
Average waiting time taken in the facility? i.e from entry to exit?	< 2 hours 42.86% 2-4 hours 42.86% hours 6.25% >6 hours 6.25%	< 2 hours 39.13% 2-4 hours 43.48% 4-6 hours 0% >6 hours 19.05%	< 2 hours 52.38% 2-4 hours 14.29% 4-6 hours 28.57%	< 2 hours 43.75% 2-4 hours 37.50% 4-6 hours12.50% >6 hours 6.25%

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Determinants of glycemic control and nutritional status amongst children and adolescents with type 1 diabetes in a rural hospital in Kenya

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Introduction: Diabetic complications, arising from poor glycemic control, are the main causes of morbidity and death in type 1 diabetes. Chronic poor glycemia has been shown to retard growth amongst children and adolescents with type 1 diabetes.

Objectives: To describe the determinants of glycemic control and nutritional status amongst patients aged 25 years and less with type 1 diabetes.

Methods: Hospital based descriptive cross-sectional study carried out in February 2024 in Kajiado county hospital amongst patients with type 1 diabetes aged 25 years and below. Data analysis was by SPSS version 23 and univariate linear regression.

Results: Out of the 46 participants, 60% had poor glycemic control. Adolescents constituted 43.5% while preschoolers were 13%. There was male preponderance. Approximately 39%; 33%; 22% were: not in school, in primary and secondary schools respectively. Majority were on long acting or intermediate acting and short acting insulin at 55% (n=25) and 39% (n=18) respectively. Most, 45.6% (n=21), were undernourished. Most caregivers, 50%, 58%, earned less than 70 dollars a month and stayed more than 40 kilometers from the hospital respectively. Half of patients had national insurance coverage. Older age at diagnosis, large family size, low family income, long disease duration, longer distance from the hospital, illiterate and older caregivers were associated with poor glycemic control. Long duration on basal bolus regimen and secondary school attendance correlated with good glycemic control. Undernutrition was associated with poor glycemic control. Older age at diagnosis, larger family size, longer disease duration, frequent admissions from diabetic ketoacidosis correlated with low body mass index.

Conclusions: The poor glycemic control requires more efforts including social support to address it. Good glycemic control seems feasible in secondary school. However, support is needed to retain more adolescents in school. Promotion of basal bolus regimen may enhance good glycemic control for optimal growth.

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Diabetic retinopathy screening in Laos: an inaugural collaborative effort by the Singapore national eye centre and action4diabetes

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Introduction: Before 2016, no person was known to have survived type 1 diabetes (T1D) in Laos, a LMIC in South-east Asia (SEA) where health coverage does not provide for insulin and blood glucose testing. Action4Diabetes (A4D) has since been providing these treatments for Laotian patients with T1D. As the patients are now surviving and living with T1D, early detection of diabetes-related complications becomes imperative. In March 2024, an inaugural diabetic retinopathy (DR) screening session took place at the National Centre of Ophthalmology in Laos.

Objectives: To report the patient demographics and screening outcomes.

Methods: Patients attending Mahosot Hospital, Vientiane, Laos, were identified to undertake DR screening by SNEC ophthalmologists and healthcare professionals from its Global Ophthalmology Office who were on a volunteering mission trip in Laos. Patient demographics, insulin treatment regimen, and HbA1c were collated together with DR screening and other eye-check outcomes.

Results: 19 patients (10 male; 53%) diagnosed with T1D between March 2016 and September 2023 at median 11.4 years (1–18 years) were DR-screened at median 16.0 years (range 8.2–21.9 years). At diagnosis, 12 patients (63%) were in diabetic ketoacidosis. While all patients received twice-daily pre-mixed 30/70 insulin from diagnosis, 10 patients (53%) had switched to basal-bolus insulin regimen since September 2023. Most recent median HbA1c was 7.7% or 59mmol/mol (5.0–14.0%, or 30–128mmol/l). As at the time of DR screening, the median duration of diabetes was 4.0 years (0.5–8.0 years). Using ophthalmic examination, none of the 19 patients was found to have DR. One patient had a newly diagnosed refractive deficit and was issued a prescription for glasses.

Conclusions: Among the 19 Laotian patients screened, none has developed DR. We plan to conduct subsequent, regular sessions through mutual aid and collaborations to screen for diabetes-related complications in more patients in Laos and other LMICs in SEA.

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Autoimmune dysthyroiditis and type 1 diabetes: exploratory study on 419 Moroccans children and adolescents

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Introduction: The association of the autoimmune dysthyroidism to diabetes could involve disturbances of metabolic control and resound on the growth in the diabetic child. The frequency of this association, often latent is variously appreciated.

Objectives: The purpose of our study is to determine the prevalence of the antithyroid peroxidase antibodies and the dysthyroidism in a population of young diabetics people type 1 follow-up regularly to the consultation of diabetology Pediatric of the Children's Hospital of Rabat.

Methods: 419 children and adolescent diabetics (209 G and 210 B), their average age was 13, 5± 5, 9 years are concerned with this exploratory study. The duration of evolution of their diabetes (average: 5, 5± 4,8 years) and their metabolic control (HbA1c) evaluated by chromatography on ion exchanger. The proportioning of the thyroid hormones: Free Triiodothyronine (FT3), free Thyroxin (FT4), Thyroid Stimulating Hormone (TSH) and the anti-peroxidase antibodies (TPOAb) were measured by Radioimmunoassay.

Results: 53 patients (12.64%) have positive TPOAb (Average : 408.6 UI/L). Among them 10 diabetics has a dysthyroidism: 3 cases have hypothyroidism and 7 cases have hashimoto thyroiditis. 2 patients reached a hyperthyroidism. 366 diabetic children and adolescents have normal anti-TPOAb. Among these patients, 20 subjects present a latent hypothyroidism and 2 have a latent hyperthyroidism. In our diabetics young people of type 1, the prevalence of the hypothyroidism is 7,17%, the hashimoto thyroiditis is 1, 56% and that of the hyperthyroidism is 0,89%.

Conclusions: This study confirms the frequency of the autoimmune dysthyroidism at the diabetic children and their often latent character.

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Economic implications of diabetes care for young adults in Kenya

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Introduction: Diabetes poses significant economic challenges for young adults in Kenya. This study investigates these challenges among those aged 25 and above. By examining healthcare expenditures, insurance coverage, and access barriers, we aim to inform targeted interventions for improving diabetes care and reducing disparities.

Objectives: This study aims to assess the economic challenges in access to diabetes care among young adults aged 25 and above in Kenya.

Methods: A cross-sectional study was conducted in urban and rural settings across Kenya, involving young adults diagnosed with diabetes. Data on healthcare expenditures, health insurance coverage, and barriers to accessing care were collected through surveys and interviews. Descriptive statistics and regression analysis were used to analyze the data.

Results: The study revealed significant economic burdens faced by young adults with diabetes in Kenya. High out-of-pocket expenses for medications, diagnostic tests, and specialized care were reported, with limited health insurance coverage exacerbating financial strain. Urban residents and those with lower income levels were particularly vulnerable to barriers in accessing care. Regression analysis indicated a significant association between socioeconomic factors and healthcare utilization among young adults with diabetes.

Conclusions: The findings underscore the urgent need for interventions to address the economic challenges and improve access to diabetes care for young adults in Kenya. Policy efforts should focus on expanding health insurance coverage, strengthening primary healthcare services, and implementing targeted support programs for vulnerable populations. Addressing the economic dimensions of diabetes care is essential for enhancing health outcomes and reducing disparities among young adults in Kenya.

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Comparison of different insulin regimens and their efficiency on glycated hemoglobin in monitored type 1 diabetic children as part of the CDiC côte d'ivoire project

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Introduction: Insulin therapy is a lifelong treatment for type 1 diabetics. Several insulin regimens are used to manage good control of diabetes.

Objectives: This study aimed to compare five insulin regimens and their effect on glycated hemoglobin.

Methods: This is a multicenter descriptive statistical analysis study in 105 T1D monitored at three treatment sites in Cote d'Ivoire from June (M0) to December (M6) 2023. The insulins used were: Human Rapid (A), Pre-mixed Human (M), Intermediate Human (I). Five insulin regimens were used: 1: M+A+M; 2: M+M; 3: A+A+M; 4: A+ A+ A + I; 5: M+ M+ M. The statistical analysis of the epidemiological parameters was carried out using version 17 of the SPS software.

Results: The average age of the children was 13.77±4.35 years with a female predominance (sex ratio of 0.70). The mean duration of diabetes was 3.38 ± 3.33 years. The Insulin regime1: M+A+M resulted in a significant decrease (p=0.005) in glycated hemoglobin from 11.69% ± 2.69% at M0 to 6.19% ± 2.09% at M6. Insulin regime 3: A+A+M, allowed a significant reduction (p=0.028) in average HbA1c from 13.20% ± 1.13% at M0 to 8.00% ± 0.56% at M6.

Conclusions: The Insulin regime 1: M+A+M was the most effective because it comes close to physiological secretion with a reduced number of injections.

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Ethnic disparity in HbA1c and hypoglycaemia among youth with type 1 diabetes: beyond mean blood glucose, social deprivation and access to technology

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Introduction: The National Paediatric Diabetes Audit in the UK reports higher HbA1c for Black (B) youth with Type 1 Diabetes (T1D) compared to White (W) youth, presumably related to higher Mean Blood Glucose (MBG), social deprivation (SD) and less access to technology.

Objectives: To determine if HbA1c ethnic disparity persists after accounting for comprehensive glucose metrics from Continuous Glucose Monitoring (CGM), SD using the Index of Multiple Deprivation (IMD) and access to advanced technology.

Methods: This is a retrospective review of participants who received structured education and support in CGM use at a single tertiary centre. HbA1c was paired with glucose metrics from 90-day CGM data. The influence of MBG, ethnicity, IMD and other covariates on HbA1c was evaluated in a multiple-variable regression analysis. The occurrence of hypoglycemia was also evaluated.

Results: 97 W, 61 South Asian (SA), and 28 B youth with T1D were included. There were no differences between groups for age, MBG, Time in Range (TIR), diabetes duration, gender, insulin delivery method (MDI vs. CSII), or CGM usage (PSU). In multiple variable analysis, MBG (p<0.0001), ethnicity (p<0.0001), use of an interpreter (p=0.043), age (p=0.0025), duration of diabetes

(p=0.0106) and PSU (p=0.01) were influential on HbA1c. Adjusted HbA1c for the B group (67 mmol/mol) was higher than both SA (63 mmol/mol) and W groups (62 mmol/mol) (p<0.001). Although there were significant IMD differences between groups, it did not influence HbA1c. The B group experienced more hypoglycemia than W group (<3.9 mmol/L, p=0.024 and <3.0 mmol/L, p=0.035).

Conclusions: Despite structured CGM education achieving comparable MBG and TIR, the HbA1c remains higher in B compared to SA and W groups. Higher glucose-independent HbA1c in B patients may increase their risk for chronic complications. Additionally, the B youth experienced a higher incidence of hypoglycaemia, which maybe due to the treat-to-target approach for HbA1c that is audited and compared both locally and nationally.

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The co-existence of type 1 diabetes and myasthenia gravis in a 6-year-old female patient

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Introduction: Type 1 diabetes (T1D) is associated with other autoimmune diseases. Myasthenia gravis (MG) coexists with T1D very rarely, especially in the pediatric population. The diagnosis of MG may be confirmed by the presence of autoantibodies destroying the neuromuscular junction. It leads to the weakness of skeletal muscles and may result in serious life-threatening complications.

Objectives: We report a case of a 6-year-old female patient with severe MG who was admitted to the Diabetology Department due to the suspicion of steroid-induced diabetes.

Methods: We analyzed the medical history and laboratory results of the patient.

Results: The patient was diagnosed with severe MG 6 months before admission to the Diabetology Department. The diagnosis was confirmed by the presence of anti-acetylcholine receptor antibodies. The treatment with pyridostigmine, prednisone, and azathioprine, was introduced. Despite the drugs, the patient was later hospitalized three times in the Intensive Care Unit due to respiratory distress. After steroid therapy, the patient presented postprandial hyperglycemia (a measurement of 233 mg/dl in venous blood) and was referred to the Diabetology Ward with a suspicion of steroid-related diabetes. The typical symptoms of diabetes were absent. The patient's father was affected with type 1 diabetes. Muscle weakness and ptosis of the right eye were present in the physical examination. The diagnosis of diabetes was confirmed in the oral glucose tolerance test (264 mg/dl after 120 minutes). Glycated hemoglobin level was 6,1%, and c-peptide was high - 4 ng/ml. The antibodies against glutamic acid decarboxylase, islet cells, and zinc transporter were highly positive. Finally, the diagnosis of T1D was made. The patient was on a low-glycemic index diet and her glucose levels were normal. After the next 6 months, the metabolic control of diabetes deteriorated and 1 unit of detemir was implemented.

Conclusions: Even though MG is a very rare condition in the pediatric population, it may be associated with T1D.

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Comparing the efficacy of newer analogue insulins over conventional insulins in treating children with type 1 diabetes mellitus

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Introduction: Conventional insulins traditionally used in type 1 diabetes mellitus come with some limitations like delayed onset of action, postprandial hyperglycemias and nocturnal hypoglycemia which hinders patients to achieve a good glycemic control. This led to the development of insulin analogues that offer various clinical advantages over their conventional insulin counterparts. However, there are only few studies comparing these analogue insulins against conventional insulins and even lesser research among paediatric patients.

Objectives: To compare the efficacy of analogue insulins (administered via pen device) over conventional insulins (administered via syringe).

Methods: In this study 30 paediatric patients with Type 1 diabetes mellitus, who were on human regular insulin and isophane insulin, with a HbA1c of more than10 were included. These patients were then switched to basal bolus regimen with aspart and degludec. HbA1c, total daily dose of insulin and hypoglycemics episodes were compared before starting analogue insulins and 6 months after. In these subjects, conventional insulins were administered via syringes before switching to analogue pens, hence we evaluated insulin administration via syringes vs pen devices in terms of ease of use, safety, and convenience using a structured questionnaire.

Results: Glycemic control with aspart/degludec has improved significantly in comparison with regular human insulin/isophase. Mean total daily dose of insulin with analogues is lower. Simplicity, safety and convenience was better with insulin pen devices compared to that of syringes (table 1). Number of hypoglycemics episodes, body weight and BMI did not differ between two insulin regimens.

Conclusions: Analogue insulins offer better glycemic control with a lower total daily doses of insulin, hence may be considered in those with poor glycemic control for better outcomes. Furthermore, insulin administration using pen device is more acceptable when compared to that of syringes.

	Aspart/ Degludec	Regular human insulin/ Isophase	p value
HbA1c	11.17 ± 2.17	12.58 ± 1.68	0.001
Total daily dose of insulin	1.07 ± 0.21	1.14 ± 0.25	0.023
Simplicity score	9.33 ± 1.76	6.40 ± 1.13	
Safety score	9.83 ± 1.62	9.24 ± 1.22	0.000
Convenience score	7.70 ± 1.23	3.46 ± 0.73	

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Severe hypertriglyceridemia with new-onset diabetes type 1 without ketoacidosis

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Introduction: Severe hypertriglyceridemia (HTG) is as well as diabetic ketoacidosis (DKA), complication of type 1 diabetes (T1DM). This uncommon complication can be associated with acute pancreatitis (AP). Most presented cases of patients had HTG with DKA. Here we present case report of very high triglycerides (TG) levels without DKA.

Objectives: We present a 5-year-old female with new-onset diabetes type 1, severe hypertriglyceridemia without DKA, no symptoms of AP and how the treatment looked like.

Methods: A previously healthy, with a normal body weight patient was admitted to the pediatric diabetes ward with the symptoms of polydipsia, polyuria, and weight loss. She was presented with glucose level 478 mg/dl, HbA1c 16,8%, pseudohyponatremia - 125 mmol/l. Her parameters of capillary blood gases (CBS) were normal (pH 7,39, BE -2,9). She had lipemic serum and initial serum TG level was very high – 11777 mg/dl, total cholesterol (TC) 627 mg/dl.

Results: Because of no DKA and good general state of patient, after short-term intravenous (iv) saline and insulin infusion, we decided to change treatment from iv to subcutaneous intensive insulinotherapy and add iv heparin infusion to use the mechanism of heparin-induced release of lipases. Her serum TG level was reduced to the normal range - 131 mg/dl after 6 days of admission without antilipid medications. For years, the lipid profile was consistently monitored, and it remained within normal range. In the check-up after 2 years, her level of TG was 41 mg/dl, TC 179 mg/dl.

Conclusions: Severe hypertriglyceridemia is very rare acute complication of new-onset T1DM in pediatric population, specially without ketoacidosis. If the serum TG level is >1000 mg/dl, the risk of AP is much higher. We found this case so interesting because despite of HTG, there was no DKA and AP. The ways of treatment are IV insulin therapy, IV heparin therapy or very rarely used plasmapheresis. Most children don't need antilipid medications and get back to the normal TG serum level after couple of weeks.

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COVID-19 infection and diabetes, type 1 diabetes or another type?

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Introduction: The association between diabetes and COVID-19 was describe during the pandemic.Recently,published data suggest that SARS-CoV-2 could potentially contribute to an increase in the incidence of cases of type1 diabetes(T1D).The occurrence of T2D is well described in adults but remains possible in children.

Objectives: We report the observation of an adolescente who developed diabetes following SARS-CoV-2 infection.

Methods: Chaima is autistic,she was admitted at the age of 13 for lower limbs edema that appeared 3 days ago with respiratory discomfort.Clinical examination:overweight,slight respiratory difficulty,tachycardia,flat feet.A urine test: glycosuria,ketonuria. Glycemia:533mg/dL,HbA1c:14.1%,low insulinemia,negative anti-GAD and anti-IA2 antibodies.X-ray revealed cardiomegaly.The heart echo:hypokinetic dilated cardiomyopathy (DCM)(LVEF 36%)without coronary artery disease.D.Dimers:2040µg/L,TN. ProBNP:925pg/ml.SARS-Cov-2 serology:IgM negative,IgG positive.

Results: Insulin therapy has been initiated for diabetic ketosis.The diagnosis of heart failure having followed DCM post covid was retained and the adolescent underwent immunoglobulins,diuretic,ACE inhibitor,β blocker,digitalis,acetyl salicylic acid and anticoagulant.After ten days,disappearance of respiratory discomfort,edema;LVEF:42%,D.Dimers:386µg/L.The diuretic and ACE inhibitor were maintained,LVEF:48%after six weeks.Three months later,C-peptide:2.66ng/mL,HbA1c:6,9%. After ruling out the diagnosis of Alström syndrome,T1D following Covid-19 infection was mentioned but overweight,absence of autoimmunity and normal rate of C peptide suggest T2D or Ketosis-prone diabetes.The patient is managed with basal bolus insulin regimens and metformin.

Conclusions: Diabetes Mellitus might be linked to the SARS-CoV-2 infection.In childhood the leading cause of diabetes remains T1D but T2D is no longer a rare disease,particularly in adolescents and in the presence of risk factors.Further research is necessary to explain a relationship between COVID-19 and newly-onset diabetes.

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Quality of life in type 1 diabetes: a comparative analysis of treatment modalities in a predominantly hispanic population

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Introduction: Advancements in diabetes treatments are improving clinical outcomes and patient day-to-day experiences.

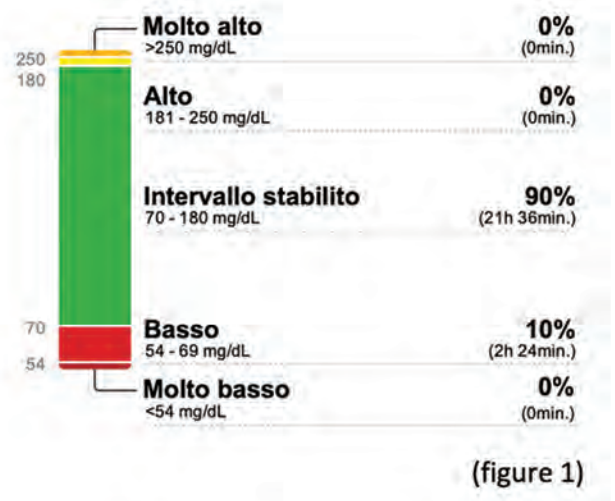
Objectives: Our study aimed to compare the quality of life (QoL) in pediatric patients with type 1 diabetes (T1D) who use multiple daily injections (MDI) versus those using the Omnipod 5 tubeless pump system (OP5).

Methods: This cross-sectional study was conducted in a free-standing childrens hospital. Participants aged 8-17 years were selected based on diagnosis and treatment modality. To assess the impact of diabetes on quality of life from both the patients and

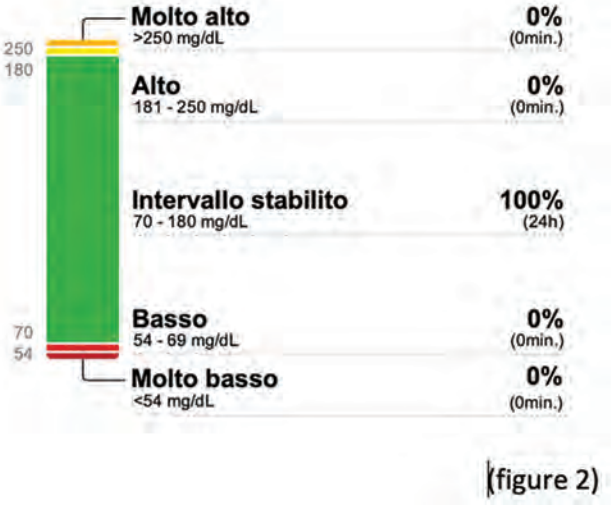
their parents perspectives, we utilized the PedsQL 3.2 Diabetes Module. Statistical analysis involved correlation methods for continuous data and T-tests for group comparisons, including parent-child analyses.

Results: Our study included 99 patients with type 1 diabetes: 49% female and 51% male, 12± 4.1years of age. The group was primarily Hispanic (86%) and most had public insurance (66%). Time since diagnosis of TD1 varied, 22% <1 year, 40% 1-5 years, 38% >5 years. 48% of the group used MDI, while 52% used OP5 for insulin delivery. We found that male patients reported higher scores in symptoms (73), management (84), and total QoL (78) compared to females, who reported scores of 60, 76, and 68, respectively (p=0.03, p=0.04, p=0.05). When comparing MDI to OP5, there was no statistical significance in symptoms scores. However, OP5 users reported higher diabetes management scores (parent 80, child 82) than those using MDI (parent 74, child 77)(p=0.08). Total QoL scores favored OP5(parent 77, child 74) over MDI(parent 71, child 71), with parent-reported scores showing a trend that approaches significance(p=0.06).

Conclusions: Our study identified gender QoL differences, with male reporting higher QoL scores. Additionally, we observed better QoL scores in individuals using OP5 than in MDI users. Further investigation is needed to understand how factors such as age, gender, diagnosis duration and social determinants of health could impact QoL perception.



(figure 1)



(figure 2)

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Glucometabolic control before and after a low-glycemic index diet intervention in adults newly diagnosed with ABCC8 gene mutation

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Introduction: Mutations in ABCC8 genes can lead to either congenital hyperinsulinism or monogenic diabetes(1)

Objectives: We report two cases of first-degree relatives of pediatric subjects with ABCC8 mutations, both with obesity, treated with a low-glycemic index diet.

Methods: The parents were diagnosed after their children's diagnosis. Hystory was characterized by hunger around 3 hours after meal. Subject 1 experienced headaches. They performed an oral glucose tolerance test (OGTT) at diagnosis. In addition, a 14 day continuous glucose monitoring (CGM), Hba1c dosage and a food recall evaluating adherence to the diet before and after a 3 month low-glycemic index diet (figure 1) were performed. We collected CGM metrics including time in range, time above and below range, estimated glycosylated hemoglobin levels, glycemic mean and standard deviation, glycemic variability, and the Glycemia risk index.

Results: Subject 1 had Impaired Fasting Glucose and normal HbA1c; while Subject 2 had diabetes at T120 minutes of OGTT and normal Hb1Ac. Subject 1 showed 10% of the time in hypoglycemia (figure 1) while Subject 2, 13%. After three months, subject 1's headache disappeared, % of the time in hypoglycemia reduced, and BMI decreased (figure 2); subject 2 didn't show a reduction of both BMI and % of the time in hypoglycemia (data not shown). Subject 1's adherence to the diet was higher than that of subject 2.

Conclusions: CGMs may be useful to detect hypoglycemia in subjects with ABCC8 gene mutations, many of which are misdiagnosed as having type 1 or type 2 diabetes mellitus or undiagnosed. The greater adherence to the diet of subject 1, compared to subject 2 might have had a favourable impact on the reduction of both hypoglycemia and BMI. The reduction of hunger, one of the symptoms of hypoglycemia, might have had a role. Prospective studies on these patients with a structured intervention with a low glycemic diet are necessary to demonstrate whether this hypothesis is correct.

P-263

Understanding needs and increasing T1D engagement (UNITE): participant perspectives from the 4t and 4t exercise study

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Introduction: The 4T UNITE project aimed to identify barriers and facilitators of participation in the 4T and 4T Exercise Studies, which included early access to continuous glucose monitoring (CGM), patient reported outcomes (PROs), physical activity trackers, exercise education, remote glucose monitoring and at-home A1c testing.

Objectives: Our aim was to identify individuals with low study engagement and explore factors that impacted their participation.

Methods: Based on PROs and exercise survey completion, as well as CGM and activity tracker wear, participants were assigned scores and categorized on levels of engagement (non-engager=1, partial engager=2, engager=3). Scores were then averaged across study domains. Our primary focus was contacting patients categorized as non- or partial engager with total average scores <2.5. We conducted focus groups (n=8) and interviews (n=25) with parent (n=30) and youth (n=12) participants in English (n=37) and Spanish (n=5). Thematic analyses and coding were completed using NVivo.

Results: Despite low study engagement, positive experiences with study activities and staff were reported. Experiences and challenges varied among parents and youth. Early CGM use was a facilitator of participation despite feeling overwhelmed post-diagnosis. Participants shared feedback on communication preferences (e.g. texting, early morning/evening contact) and offered practical suggestions for study improvement (e.g. increased contacts, peer support, gradual information delivery, fewer requirements for youth). In Figure 1, themes are highlighted by facilitators (green) and barriers (orange) to engagement within a clinical care model.

Conclusions: The study underscores the importance of pairing early technology adoption with tailored support to improve engagement and outcomes among youth with newly diagnosed T1D. We plan to implement participant suggestions into future 4T Sustainability (or Study) protocols to improve study participation and retention.

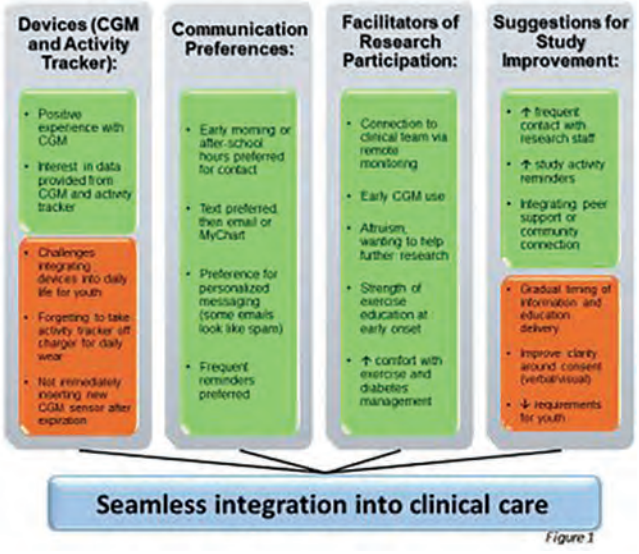

Figure 1

P-264

Type 1 diabetes mellitus and COVID-19: glycemic control before, during and after the pandemic

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Introduction: The first lockdown in Portugal during the COVID-19 pandemic began on March 16, 2020. With population isolation and reduced access to healthcare, the worsening of different chronic pathologies was described in the post-COVID-19 period.

Objectives: To assess glycemic control in pediatric patients with type 1 diabetes before, during and after the COVID-19 pandemic.

Methods: Retrospective, descriptive and analytical study. Evaluation of epidemiological and clinical data in diabetic patients (<18 years old) followed in our hospital with a diagnosis of >6 months. Comparison of different data at 3 time periods: pre-COVID, lockdown and post-COVID. Statistical analysis in SPSS29® ($p=0.05$).

Results: Out of 39 patients, 33 were included. The median age at diagnosis was 6 vs. 11 during the lockdown, 57.6% were male. An insulin pump was the method of insulin administration (MIA) in 81.8%. There was an increase in HbA1c during vs. post (7.6 vs. 8.2, $p=0.004$). There was a higher total daily dose of insulin (TDDI) between before vs. post (38.7 vs. 47.8, $p<0.001$) and during vs. post (47.8 vs. 54.1, $p<0.001$) and a decrease in hypoglycemia between during vs. post (5.5 vs. 3, $p=0.021$). There were no significant differences in the percentage of glucose levels within target range (TR) and high, nor in the medians between different MIA. In children using a pump, there was an increase in the percentage within TR (28 vs. 38, $p=0.038$) and decrease of hypoglycemia (6 vs. 3, $p=0.011$) between during and after.

Conclusions: Despite the decrease between the pre and during-lockdown periods, HbA1c increased in the subsequent period. This, along with the sustained increase in TDDI throughout the 3 periods and an increase in hypoglycemia in the 2nd period, contradicts the hypothesis that the improvement in control previously described is due to increased TDDI. Our results were not unidirectional, which may be explained by the various phases of deconfinement among different age groups. However, the worsening of HbA1c in the post-COVID period reinforces the importance of family support in disease control.

P-265

Genetic risk scores, ancestry, and autoantibodies in children and adolescents with newly diagnosed diabetes

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Introduction: Differentiation of childhood Type 1 diabetes (T1D) from Type 2 (T2D) or monogenic causes alters prognosis and treatment and can prevent life-threatening complications such as diabetic ketoacidosis (DKA). The increasing prevalence of T2D and obesity in childhood presents a challenge due to increasingly indistinct clinical presentation and overlapping biomarkers. Genetic Risk Scores (GRS) have been shown to aid discrimination of diabetes type, but few studies have validated their utility in diverse ancestry clinical populations.

Objectives: Determine the relationship between GRS, autoantibodies, and ancestry in a mixed ancestry cohort of pediatric patients recently diagnosed with diabetes.

Methods: Patients with recently diagnosed diabetes (n=173) were enrolled in the ongoing Stanford "Etiology of Type 1 Diabetes" study. Demographic and anthropometric data were collected, autoantibodies (AAB) measured (GAD, IA-2, IAA, ZnT8) and array genotyped. GRS for T1D and T2D were generated with 67 and 338 genetic variants, respectively. Enrollment, biomarker measurement, and genotyping are ongoing.

Results: Subjects analyzed to date (n=61) reported ancestry as Hispanic (31%), non-Hispanic White (18%), Asian/Pacific Islander (13%), non-Hispanic Black (1%) or Other (19%). Median age at enrollment was 15.3 years and 51% identified as male. Of those with T1D (n=30), 76.6% had ≥1 AAB, whilst among T2D (n=23) only 1 had ≥1 AAB. Mean T1D-GRS was higher in those with T1D vs T2D (p=0.0003) and when stratified by AAB count (p=0.0004). Mean T2D-GRS was higher in those with ≥1 antibody (p=0.005).

Conclusions: Preliminary data demonstrate the utility of GRS to aid the classification of diabetes type in this cohort. As recruitment, biomarker measurement, and genotyping expand, findings will be further stratified and validated by ancestry. The inclusion of the NIH-funded All of Us population study will allow comparison to a national reference cohort.

P-266

Carbohydrates intake in children and adolescents with type 1 diabetes mellitus and its relation with physical activity

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Introduction: A carbohydrate (CHO) intake of 6-10 g/kg/day is recommended in active children and adolescents. It is not known whether individuals with type 1 diabetes mellitus (T1DM) fulfill this recommendation.

Objectives: To investigate CHO intake in children and adolescents with T1DM in relation to physical activity (PA).

Methods: Retrospective analysis on all children and adolescents with T1DM using the Bolus Wizard feature in the Medtronic Minimed 780G aHCL system. Clinical data were collected from medical records of the last visit and for the 30 days before from Carelink reports.

Results: Data from 83 individuals with T1DM were collected, 50% (n=41) females, with a median age of 14.2 years (IQR 10.7;17.6). Among them, 47% (n=39) were sedentary (little or no PA), while 53% (n=44) performed regular PA for a median of 3 days per week (IQR 2;4) (n=25 <3 times/week, n=17 4-5 times/week, n=2 ≥6 times/week). Overall, the median CHO intake was 3.8 g/kg/day (IQR 2.3;5.0), with a coefficient of variation of 30.7% (IQR 21.1;43.3). No significant differences were found in CHO intake between those who were sedentary (median 3.5 g/kg/day [IQR 1.9;5.6]) and those who engaged in regular PA (median 4.1 g/kg/day [IQR 2.9;5.0], p=0.155), and no significant correlation with days per week of PA (ρ=0.108, p=0.334). Swimming had the highest CHO intake (median 5.9 g/kg/day [IQR 3.3;8.9]), with no significant differences compared to other sports or inactivity (p=0.983). In multivariate analysis, CHO intake was associated with the rate of correction boluses (β=-4.15, p<0.001), number of meals (β=0.38, p<0.001), weight (β per kg=-0.05, p<0.001), total daily insulin (β per U/day=0.03, p=0.002), and sex (β of being female=-0.29, p=0.033), but not with age, TIR, or PA.

Conclusions: Greater attention should be paid to CHO intake in young individuals with T1DM engaging in regular PA, as the amount of CHO in the diet might be insufficient. Moreover, every 1% increase in correction boluses is associated with 4 g of CHO unannounced in the aHCL system.

P-268

Mobile apps and challenges for type 1 diabetes control in children

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Introduction: The management of Type 1 Diabetes (T1D) in children needs innovative tools for effective glycemic control. Mobile applications for carbohydrate (CHO) counting may improve T1D management.

Objectives: The aim was to evaluate the efficacy of mobile apps for CHO counting in influencing glycemic control and related challenges among children with T1D.

Methods: A survey was run in 2022 to 2023 in Varna, Bulgaria. It collected demographic data, hypoglycemia events, and glycemic control measures from 76 caregivers of children with T1D. The children were categorized based on the use/non-use of mobile apps for CHO counting in 16 users and 60 non-users. Variables including age, BMI z-score, parental age, abnormal HbA1c, and hypoglycemia incidence were analyzed.

Results: The mobile app users had lower mean age of 132±50.5 months compared to 143±49.4 months of non-users, n.s. (t=0.848, p=0.399). There was no significant difference in BMI z-scores between users (0.407±1.12) and non-users (0.425±1.05; t=0.0573). A striking difference was observed in the incidence of elevated HbA1c - 37.5% in app users versus 75.0% in non-users (χ^2=8.05, p=0.005). App users didn't report problems with CHO counting compared to 26.7% in non-users (χ^2=6.29, p=0.043), although the former reported a higher incidence of everyday hypoglycemic episodes - 37.5% vs non-users (10.2%; χ^2=7.22), p=0.027.

Conclusions: The study suggests that mobile apps for CHO counting can significantly improve certain aspects of glycemic control in pediatric T1D patients. The lower prevalence of elevated glycated hemoglobin levels among app users indicates better overall control, despite a higher reported frequency of everyday hypoglycemia. The absence of carbohydrate counting difficulties in the app user group further supports the utility of these tools in T1D management. Further investigation is warranted to optimize app use and address the associated challenges, particularly the management of hypoglycemic events.

P-269

Effect of nutrition education intervention on glycemic control and nutritional status in children with type 1 diabetes: a randomized controlled trial

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[1]Sri Devaraj Urs Academy of Higher Education and Research, Department of Clinical Nutrition and Dietetics, Kolar, India. [2]Sri Devaraj Urs Medical College, Department of Pediatrics, Kolar, India. [3]St John's Medical College Hospital, Department of Endocrinology, Bangalore, India. [4]Mazumdar Shaw Medical Center, Department of Endocrinology, Bangalore, India, [5]Center for Diabetes and Endocrine Care, Bangalore, India

Introduction: Type 1 Diabetes Mellitus results from autoimmune destruction of insulin-producing beta cells, causing severe insulin deficiency. Insulin therapy is essential to prevent fatal hyperglycemic complications, while nutrition therapy plays a vital role in improving glycemic control.

Objectives: To access the effects of nutrition education on glycemic control and nutritional status among children with Type 1 Diabetes Mellitus

Methods: Participants aged 6-18 years, diagnosed for >1 year, were randomized into control (n=50) and intervention (n=50) groups via block randomization. CG participants received standard care, while IG participants underwent a carb counting intervention for 3 months. The intervention program comprised of 1 in-person session and 3 online sessions. Detailed history, anthropometric measurements, biochemical parameters, clinical examination, and 3-day 24-hour dietary intake data were collected at baseline, 3rd and 6th months. Data analysis included descriptive statistics and non-parametric tests. Ethical Clearance was obtained and study is registered in Clinical Trial Registry India (CTRI/2022/02/040696).

Results: Participants in the study included 30 boys and 70 girls with a mean age of 12.4±3.2 years. More than 50% of them hailed from rural areas. There was no significant difference between boys and girls concerning their level of education.

Table 1. Clinical Characteristics and laboratory values in the CG and IG at Baseline

Characteristics	CG n=50 Mean±SD	IG n=50 Mean±SD	t value	P value
Diabetes onset (Years)	7.6±4.0	7.0±3.7	-0.57	0.5699
Diabetes duration (Years)	5.6±3.2	5.3±3.2	-07	0.4856
Mean HbA1c%	11.5±2.5	10.6±2.9	-1.64	0.1042
Basal shot (units)	18.3±9.5	16.6±7.8	1.4743	0.1415
Bolus shot (units)	29.4±11.6	28.4±13.4	0.6130	0.5418
TC mg/dL	143.7±45.1	156.4±40.5	-1.48	0.142
HDL mg/dL	45.4±10.0	45.2±9.5	-0.1	0.920
LDL mg/dL	82.8±23.8	93.6±31.6	1.94	0.055
TG mg/dL	113.3±43.4	110.9±51.1	0.26	0.795

Table 2. Baseline characteristics of Participants

Parameter	Control Group (Girls-33, Boys-17) n=50		Intervention Group (Girls-37, Boys-13) n=50	
	Mean ± SD	Me(Q1-Q3)	Mean ± SD	Me(Q1-Q3)
Age (years)	**12.8±3**	**13(11-15)**	**12.1±3.4**	**12(10-16)**
Girls	13.1±3	14(12-15)	12.1±3.4	12(9.8-15.3)
Boys	11.6±2.8	11(10-14)	12.2±3.6	12(10-16)
Height (cm)	**142.4±16**	**149(133.5-156.6)**	**141±16.2**	**141(126.5-153)**
Girls	143.6±14.9	146(131-155)	140.8±15.6	145(126-153)
Boys	140±18.1	140(129-155)	141.3±18.5	140(128-147)
Weight (Kg)	**35.7±11.6**	**40.9(28.7-48.2)**	**35.5±12.9**	**32.3(25.9-43.5)**
Girls	37.9±11.9	44.7(38.4-51.5)	35.5±13	31(26-47)
Boys	31.5±10.1	31.7(23.9-38)	35.6±13.6	33(23-40)
BMI (Kg/m^2)	**17±3**	**16.5(15.4-16.5)**	**17.3±3.5**	**16.6(14.8-19.3)**
Girls	17.8 ±2.9	17(15.8-19.8)	17.3±3.8	16.4(14.7-19.4)
Boys	15.3±2.4	15.7(14.4-16.6)	17.2±2.6	16.9(15.2-19.2)

The average nutrient intake per 24-hour dietary recall, based on 3-day recall mean values of energy, carb, protein, and fat, showed similar distributions at baseline between the CG & IG.

Conclusions: Results indicate that the baseline characteristics of the study participants were adequately balanced between the CG & IG.

The preliminary results indicate that the intervention group has demonstrated improved glycemic control.

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Abstract Withdrawn

P-271

A rare case of digenic MODY responsive to sulfonylurea treatment: coexistence of pathogenic variants in GCK and HNF1A

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Introduction: The clinical approach to MODYs varies depending on the type of disease. While GCK-MODY generally does not require treatment, HNF1A-MODY may present with more apparent symptoms and require treatment with oral anti-diabetics.

Objectives: Herein, we aimed to present the clinical findings and follow-up results of our adolescent patient diagnosed with digenic MODY.

Methods:

Results: A 16-year-old female patient was admitted to our clinic due to incidentally detected high blood glucose level.Her parents were healthy, and there was no consanguinity between them. F asting glucose, insulin and c-peptide levels were 109 mg/dl (6.1 mmol/L), 9.9 mU/L, and 2.5 ng/ml, respectively. HbA1c level was found as 7.6%. At the 120 th minute of oral glucose tolerance test, blood glucose level reached to 304 mg/dl (16.9 mmol/L) and insulin was measured as 39.2 mU/L. Oral metformin treatment was initiated. Also, a next generation sequencing (NGS) panel test was performed for searching MODY-related genes. During the follow-up, genetic results showed variants in GCK (c.37G>T) and HNF1A (c.955G>A), both of which were likely pathogenic. Metformin treatment was terminated and glibenclamide was started considering the diagnosis of HNF1A-MODY. In the initial period, metabolic control was achieved with a daily dose of 0.3 mg/kg. Since hypoglycemic events occurred during the follow-up, the treatment dose was gradually reduced to 0.1 mg/kg/day. In the last control of the patient, she was normoglycemic and HbA1c value was 6.7%.

Conclusions: Although single gene variants are mostly detected in MODYs, it should be kept in mind that there may be digenic variants and the clinical presentation may differ. The coexistence of GCK and HNF1A variants caused high levels of fasting and postprandial blood glucose levels and these patients may require treatment with sulfonylureas. Therefore, analysis with NGS instead of a target single gene search at the diagnosis of MODY will be beneficial in terms of treatment management, patient follow-up and prognosis.

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Comparative study of type 1 diabetes in children and adolescents of Spanish origin and Caucasian ethnicity and Moroccan origin and Maghrebi ethnicity

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Introduction: The etiology of type 1 diabetes (T1D) present unresolved questions, although we know that differences in disease incidence and progression are influenced by ethnic origin as well as environmental and economic factors characteristic of different geographic areas.

Objectives: The main objective of this study is to analyze the differences in childhood and juvenile T1D between the population of Moroccan nationality of Maghrebi origin (MM) and Spanish nationality of Caucasian origin (SC).

Methods: Descriptive observational retrospective cohort study with longitudinal sense of patients under 21 years old with T1D according to the criteria established by the ADA. In the comparative analysis between the two study groups and their clinical progression were included Spaniard Caucasians and Moroccan Maghrebis followed up in our clinics at the time of the study. Population data were collected from the municipal registry of inhabitants.

Results: The prevalence in SC is 2.14 per 1,000 inhabitants (75/35,106), while in MM it is 16.6 per 1,000 inhabitants (16/965) ($p < 0.05$). In the comparative analysis of the two study groups, the average age of the sample is almost 2 years younger and the distribution by gender more frequent in the MM group, with no statistical differences Regarding metabolic control, the mean HbA1c is similar, despite the samples not being homogeneous regarding basal treatment. Autoimmune diseases is present in 13.3% (10/75) in SC and 0% in MM (p=0.27). At the time of onset, we found higher HbA1c levels (12.6 vs 11.1%) and a 58% more frequent onset with ketoacidosis (64.3 % vs 37.5%) in the MM group.

Conclusions: In our setting, the prevalence of type 1 diabetes in individuals under 21 years of age is 7.8 times more frequent in the Maghrebi origin group. Only associated autoimmune diseases have been registered in SC group. The MM group presents higher incidence of onset with ketoacidosis. Further studies are necessary to confirm the differences between the two groups.

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Neonatal diabetes about 9 cases

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Introduction: Neonatal diabetes is rare but can be life-threatening. Two main clinical forms have been identified, a transient form and a definitive form,distinguished by the duration of insulin dependence.

Objectives: to study the clinico-biological and genetic profile of patients with neonatal diabetes and the therapeutic protocol used.

Methods: A retrospective study of 9 children over an 11-year period from 2012 to 2023, including all newborns diagnosed with diabetes following a blood glucose level >1.24g/l.

Results: 9 cases of neonatal diabetes were diagnosed. The mean age of our patients was 71 days. The sex ratio was 0.11 with a male predominance. 44.44% of patients came from a consanguineous marriage. With one case of a type 1 diabetic father, one case with a low weight of 2kg, compared with normal weight in the other cases. Clinical presentation: general signs, disturbed consciousness in 33% of cases, fever in 44%, altered general condition in 11%, with one case of dehydration (11%). Respiratory distress in 55% of patients and digestive impairment in 22% of cases, with vomiting and diarrhea, while hypotonia in 11%. Polyuria syndrome accounted for 22%. There was one case (11%) of meloderma with facial dysmorphia and edema of the lower limbs. Biologically, functional renal failure was noted in 11% of cases, and hepatic cytolysis in 11%. Genetic studies were carried out in 7 cases, with 2 cases of ABCC8, one case of EIF2AK3, one case of insulin gene, no pathological variation in 2 cases, and 2 cases in a syndromic context (Wolcott-Rallison syndrome and leprechaunism syndrome). In terms of treatment, we had 5 cases on conventional therapy, one case on bolus basal and 2 cases on basal alone, with an average dose of 1.17 IU/kg/d and extremes of 1.3 and 0.5 IU/kg/d. Insulin was discontinued and Daonil started in 11% of cases. We lost one patient with Leprechaunism syndrome.

Conclusions: Neonatal diabetes is caused by mutation of a single gene.These patients most often present within the first six months of life.

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Factors associated with the presence and severity and outcome of diabetic ketoacidosis at diagnosis of type 1 diabetes in children and adolescents

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Introduction: Type 1 diabetes mellitus (T1MD) is one of the most common endocrine diseases in children. Diabetic ketoacidosis (DKA) is the most serious life-threatening acute complication of T1MD. Younger age, particularly < 2 years, low accessibility to medical care, ethnic minority groups and diagnostic error were identifed as risk factors for DKA at T1DM diagnosis. Determining the risk factors for developing DKA plays an important role in diagnosing, treating and reducing the rate and serevity of the disease.

Objectives: Objects describes the risk factors and outcome of DKA in newly-diagnosed T1DM children and adolescents.

Methods: Descriptive research

Results: At the Vietnam National Children's Hospital (NCH), in period 1995-2000 less than 10 cases per year were newly diagnosed with T1DM. The numbers in periods 2001-2006, 2010-2016, after 2017 were < 20 cases/year, < 40 cases/year, 60-90 cases/year, respectively. In the study, 212 patient were newly diagnosed with T1DM at NCH from 6/2015 to 6/2020. In the study, 212 patients included 103 boys (48.6%) and 109 girls (51.4%), the average age of onset of T1DM was 7.74 ± 3.86 years. The most common symptoms were polydipsia (86.3%), polyuria (86.3%) and weight loss (78.3%). The average plasma glucose on admission was 22.6 ± 13.6 mmol/l; HbA1c was 11.8 ± 2.7 %. Sixty patients (28.3%) were diagnosed with DKA. Serum C-peptide levels lower than 1.1 ng/ml increased both the risks for DKA (OR, 5.13; 95% CI, 1.72 – 15.29) and the risks for severe DKA (OR, 2.13; 95% CI, 0.20 – 22.21); diagnostic error increased the risks for severe DKA (OR, 6.42; 95% CI, 1.20–34.19). The mean time for the arterial blood gases to become normal was 22.5 hours. Acute kidney injury developed in 15 patients (30%). No deceased patient.

Conclusions: The rate of DKA in patients with T1DM for the first time at NCH was high. Serum C-peptide levels lower than 1.1 ng/ml and diagnostic error increased the risks for DKA and severity of DKA. Acute kidney injury is a common complication of DKA.

P-275

The comparative study focused on HbA1c level and the numbers of consultation in type 1 diabetes children and young adult at kantha Bopha children's hospital between 2019 and 2020

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Introduction: The Covid-19 outbreak was firstly identified in China in December 2019. In March 2020, Cambodia was similarly affected by the outbreak which later to be discovered as a pandemic impacting the rest of the world. Kantha Bopha Children's Hospital is one of the tertiary hospitals in Phnom Penh where all patients receive free of charge treatments. In this hospital, an extensive number of type 1 patients had been diagnosed, treated and followed up since 1997.

Objectives: The difference of HbA1C level and numbers of consultation influenced by Covid-19 pandemic.

Methods: Monocentric, retrospective and comparative study was conducted at Kantha Bopha Children's Hospital, and 163 patients' records were included, between 2019 and 2020. All the data were analyzing in Microsoft Excel 2019.

Results: Among 163 patients (F: 94, M:69), during the pre pandemic in 2019, each patient was consulted at hospital 5.71 times with an average HbA1c level of 10.35%. Meanwhile in 2020, the average visit and HbA1c level of a patient were 5.49 times and 10.44% respectively.

Conclusions: Despite the outbreak of Covid-19, the average number of each patient consultation was not significantly impacted during the period of the pandemic compared to pre-pandemic. The HbA1c level, considered a parameter of glycemic control, was slightly increased.

P-276

Effect of socioeconomic factors on glycaemic control, access to technology, BMI status and interactions with healthcare in paediatric diabetes patients

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Introduction: Outcomes in paediatric diabetes are influenced by many factors including parental support, lifestyle, access to technology and healthcare.

Objectives: Our hypothesis was that differences in socioeconomic backgrounds may lead to differences in access to technology, interaction with healthcare, BMI and glycaemic control.

Methods: This was a cross-sectional study of 246 paediatric patients (aged 3-19) with type 1 diabetes on the caseload of Peterborough City Hospital in July 2023. Patients' postcodes were used to classify them based on the Office of National Statistics Rural/Urban classification and the English indices of deprivation 2019. Outcome measures were taken from electronic records: HbA1c at 6- and 12-months post-diagnosis, current HbA1c, CGM and/or insulin pump use, BMI and clinic non-attendance in the previous 12 months. Comparisons were made between urban and rural groups and between levels of deprivation.

Results: Increased deprivation was associated with 10mmol/mol higher HbA1c at 6- and 12-months post-diagnosis (p=0.0030; p=0.0028), and current follow-up (~5.4 years post-diagnosis; p=0.0051). Deprivation was also associated with less access to insulin pumps (p=0.0024) and CGMs (p=0.0297), and more frequent missed appointments, with a non-attendance rate of 1.20 appointments per patient-year in the most deprived group compared to 0.32 in the least deprived (p=0.00018). The rural group had better access to insulin pumps than the urban group (p=0.022), but there was no significant difference in non-attendance rates, access to CGMs or HbA1c between these groups. Neither deprivation or rural/urban status had an effect on BMI. Pumps were associated with an 11mmol/mol lower HbA1c ($p=4.5x10^{-5}$) and CGMs with a 6mmol/mol lower HbA1c (p=0.0030), even with differences in deprivation accounted for.

Conclusions: Socioeconomic factors, particularly deprivation levels, have a significant impact on outcomes in paediatric diabetes. More work is needed to ensure equity for patients of diverse socioeconomic backgrounds.

P-277

Exploring the impact of laughter yoga and clapping exercises on cardiac function in obese adolescents with type 1 diabetes in rural areas of the Delhi metro population

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Introduction: Laughter therapy is easy to prescribe and do not require side-concerns with respect to allergies, dose, side effects.

Objectives: This study aimed to assess the effects of laughter yoga therapy and clapping exercises on various health parameters including blood glucose levels, blood pressure, insulin levels, lipid profile, and glycosylated hemoglobin (HbA1c) in obese adolescents with type 1 diabetes residing in rural areas of the Delhi metro population.

Methods: Sixty-two obese school children participants with type 1 diabetes, aged between 7 to 17 years, were recruited for the study. Among them, 31 participants were involved in laughter yoga therapy while the remaining 31 served as the control group. The intervention included a 30-minute lecture followed by a 30-minute intense clapping workout for those participants who underwent laughter yoga therapy for one month. Various health parameters such as fasting glucose and insulin levels, glucose tolerance test (GTT), ECG, ultrasonography, blood pressure monitoring, renal function tests, lipid profile, serum creatinine level, HbA1c, and quality of life indicators were assessed using a cross-sectional design.

Results: Postprandial blood glucose levels were significantly inhibited by laughter therapy (P<0.05) in both groups. After one month of intervention, participants in the laughter yoga group showed closer-to-normal levels of blood glucose and insulin, along with increased work efficiency among obese adolescents with type 1 diabetes. These findings underscore the importance of comprehensive treatment approaches for obese diabetic children and adolescents, which include not only anti-diabetic drugs but also family care, lifestyle education, harmonized mind-body-soul practices, psychological support, and a preventive approach to daily living activities.

Conclusions: In light of these results, future interventions aimed at preventing diabetes should include educational programs and the promotion of yoga as part of an integrated approach to managing diabetes.

P-278

Transient neonatal diabetes mellitus with an unknown cause in 1-month infant: a case report

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Introduction: Transient neonatal diabetes mellitus is a genetically heterogeneous form of diabetes characterized by hyperglycemia that remits during infancy with a tendency to recur in later life.

Objectives: The purpose of the presentation is to share the interesting case of the male infant at the age of 29 days, who was diagnosed with the diabetes in the neonatal period. The history of the patient is an example of the various genetic causes of TNDM and highlights the challenges in the whole process of diagnosing the etiology of the disease. Presented case also confirms the necessity of multiple adjusting the way of insulin delivery based on variable insulin demand.

Methods: Following the international guidelines, the genetic diagnostics of TNDM etiology was based on the new-generation sequencing methods. The insulin therapy was conducted quickly, but an intravenous insulin delivery was soon replaced by continuous subcutaneous insulin infusion, with the insulin dilution 1:1 with the 0,9% NaCl. Continuous glucose monitoring system was implemented to optimize the therapy. Due to gathering weight with a stable insulin dose the reduction of the relative demand on insulin was observed, and the CSII was switched to daily subcutaneous injection of ultra-long-acting basal insulin analogue.

Results: Broaden diagnostics exclude the majority of known genetic causes of TNDM. In the follow-up visits, due to a plenty of hypoglycemia episodes observed in the CGM data, the insulin was completely withdrawn at the age of 2 months, reaching the normoglycemia in a few days.

Conclusions: The transient neonatal diabetes mellitus remains one of the least known types of diabetes. Despite the modern technologies used in the diagnostics of TNDM etiology, the genetic basis of one-third of patients with TNDM remains unknown. For cases of transient diabetes, insulin therapy using insulin pump and CGM system seems to remain safe and successful treatment till the results of genetic testing or earlier remit of the hyperglycemia.

P-279

It's like looking for a needle in a haystack: a case report of a retained steel insulin pump infusion set needle

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Introduction: We report the management and clinical course of a rare insulin pump adverse event.

Objectives: In a 7 year old patient with type 1 diabetes mellitus a retained steel insulin pump infusion set needle was discovered, the needle was not removed.

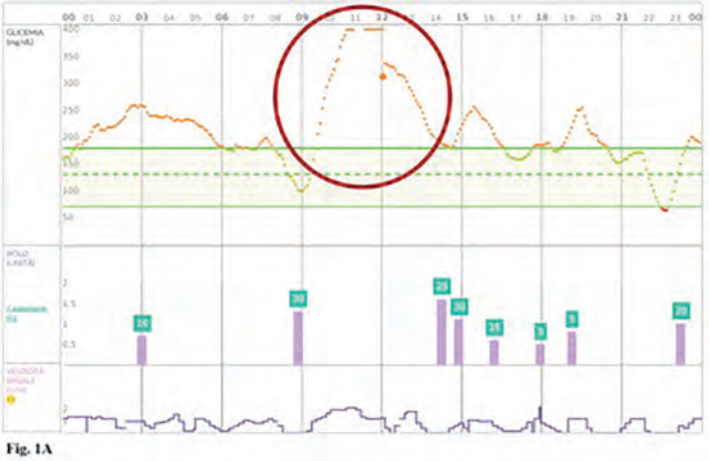

Fig. 1A

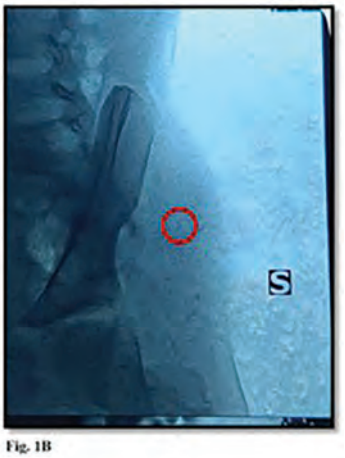

Fig. 1B

Methods: The mother noticed the absence of the needle during the set infusion substitution, occured before 3 days because of a prolonged and apparent unexplained hyperglycemia associated with the presence of ketones (fig. 1A). The needle was identified and located by X-Ray imaging in the subcutaneous tissue of the superior left gluteal region (fig. 1B). The patient was asymptomatic and no spontaneous or induced by palpation or mobilization discomfort was reported. A review of the literature was considered, in particular a systematic review regarding retained diabetes devices [1].

Results: The review described 16 cases of retained diabetes devices, all successfully localized by X-Ray imaging. 8 of them were infusion set needles. 6/8 of the infusion set retained needles were localized in the gluteal region, 1/8 in the abdomen and 1/8 in the thigh. 4/8 length was 8 mm, 1/8 length was 6 mm and 3/8 length was not reported. 5/8 successfully operated and removed the needle (62.5%), 3/8 operated unsuccessfully (37.5%), because of difficult localization, leaving the needles in the soft tissue.

Conclusions: Considering the small needle dimension (5.5 mm), which would have made localization extremely challenging, the risk/benefit ratio associated with a surgical procedure under general anesthesia appeared to be excessive. After appropriate discussion with the family, it was decided to opt for a watchful waiting approach, closely evaluating the patient clinically and instrumentally for any signs of late complications. After a 3-week follow-up, no infectious or local complications were observed, and the radiographic picture appeared stable.

P-280

Health care utilisation and follow-up data of youth with type 1 diabetes after transition to adult care

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Introduction: Challenges may arise in youth with Type 1 Diabetes (T1D) during and after transitioning to adult care.

Objectives: Our aim was to assess the post-transfer follow-up data in our center, where regular transfer clinics are conducted.

Methods: We evaluated data from 118 youth with T1D who transitioned to adult follow-up. Metabolic control data and complications pre- and post-handover were analyzed.

Results: Of the 118 youth with T1D, 80 (67%) were transferred during the transition council, 54 (67.5%) continued follow-up in our centre, while 26 (32.5%) did not. The mean age at transition was 21.38±2.75 years, with a mean diabetes duration of 12.16±4.32 years. The time from transition to first follow-up was 11.76±13.32 months with a follow-up duration of 2.58±2.22 years. Post-transfer follow-up frequency was higher compared to pediatric care (mean 3.19 times/year vs 4.27 times/year, p:0.02). Follow-up continuity increased with older age at transition (p:0.02). 17 individuals with T1D (31%) dropped out of follow-up in the adult clinic after 2.58±2.19 years. Mean HbA1c during pediatric follow-up was 7.95±1.27%, and during the first and second years of adult follow-up, it was 7.73±1.17% and 7.74±1.17%, respectively (p=0.42). During transition, 51% (n=28) experienced a decrease in total insulin dose (1.40±0.53 U/kg vs 0.74±0.16 U/kg; p=0.00). The treatment of 10 individuals with T1D was changed to U300 glargine, 5 to detemire, 4 to pump and 3 to multiple dose insulin therapy. Chronic complications were present in 22.5% (n:18) during handover and new complications arose in 22% (n:12) during adult follow-up (Table 1), occurring at a mean age of 25.5±2 years.

Complications (n,%)	Complications developing in childhood (18, 22.5%) (18/80)	New complication in adult follow-up (12, 22%) (12/54)
Nephropathy	7, 9%	2, 4%
Neuropathy	8, 10%	5, 9%
Retinopathy	3, 4%	5, 9%

Conclusions: Regular follow-up rates are low for people with T1D transition. Although HbA1c values showed no significant change post-transition, there was an increase in complication rates with longer diabetes duration. The transition to adulthood in T1D should be monitored closely with collaborative efforts to reduce the incidence of complications.

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Lifestyle modification knowledge among parents of children with diabetes in Lagos University Teaching Hospital Lagos

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Introduction: Diabetes mellitus (DM) is one of the deadliest diseases in the world, especially in developed nations. In recent years, it has become rampant in the developing nations such as Nigeria. DM is one of the growing public health concerns in Nigeria.

Objectives: The purpose of this study aimed at assessing lifestyle modification knowledge among parents of children with diabetes in Lagos University Teaching Hospital Idiaraba Lagos.

Methods: Descriptive cross-sectional survey design was used, where 100 respondents were conveniently sampled which were used to conduct the study. Questionnaires were used to collect the data, the data was analyzed and presented in frequency and percentages.

Results: Majority of the respondents were females 74% while 26% were males, 88% were married and few were able to further their education to tertiary level. (37%) indicated that their children were diagnosed 4-6 years ago, while 15%, 27%, and 21% were diagnosed 1-3 years, 7-9 years and more than 10 years ago respectively. About two-third of the respondents (68) claimed fatty food are main cause of increase blood glucose and (85%), (83%) and (78%) of the respondents recommended both fish, fruits and vegetables for diabetics respectively, half (52%) sees regular exercise very important and majority (80%) choose brisk walking as best

exercise for diabetics, majority (60%) affirmed that main risk factor of contracting diabetes is obesity and 79% recommended that weight control helps manage diabetes better.

Conclusions: The overall level of awareness among parents of diabetics was sound and majority of the participants suggested physical exercising, healthy dieting and weight loss has a great role in prevention and control of blood glucose raised. It was recommended that there is need to create awareness to the community through health education about importance of lifestyle modification, also public and private health sectors need to offer training programs for health care workers.

P-282

A case study of hyperglycemia management in neonate

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Introduction: Neonatal Diabetes Mellitus is a rare genetic disease causing severe high hyperglycemia requiring insulin treatment from birth to 6 months. Mutations in the 6q24 chromosome region and KCNJ11/ABCC8 genes, linked to pancreatic beta cell potassium channels, are the main genetic culprits.

Objectives: To present the clinical feature, work-up, and manage neonatal diabetes mellitus.

Methods: Admitted to National Pediatric Hospital on March 20, 2021 with vomiting, fever, diarrhea, and dehydration, the patient received supportive care. We did an abdominal ultrasound, complete blood count, C-Reactive Protein, electrolyte, glycemia, urinalysis, transaminase, kidney function test, and calcemia. We found intense hyperglycemia while other tests were unremarkable. We had repeated fasting glycaemia, it remained high. We did another test to support the diagnosis such as Hemoglobine A1C and C-peptide. There was high of hemoglobin A1C (15%) and C-peptide was low (0.11ng/dl), negative of pancreatic islet-autoanitbodies. We started conventional insulin regiment-Actrapid and Insulatard with the starting dose of 1ui/kg/d, two-third in the morning and one-third in the evening. The blood glucose was reduced but was not still in the time in range. We monitored the trend of blood glucose, the result was uneventfully reduced. We considered to try oral anti-glycemic agent- Glybenclamide 5mg in a dose of 0.05mg/kg/d until maximum dose.

Results: The study demonstrated a significant improvement in managing blood glucose including fasting and postprandial, with standard growth development. Otherwise, the HbA1c to 7.2%. If the trends of blood glucose are not in time range, the complication will occur early and the developmental will delay.

Conclusions: Evidence-based management for this patient involved switching from insulin to oral medication, resulting in successful blood glucose and HbA1c control with normal growth. Genetic testing is unavailable in developing countries like Cambodia to confirm chromosomal abnormalities.

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Self-managed insulin injections and its association with Lipohypertrophy, pain, and glycemic results in pediatric type 1 diabetes

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Introduction: Lipohypertrophy (LH) is marked by abnormal fat accumulation at injection sites. Management through systematic rotation and patient education is critical to prevent this complication and improve glycemic control.

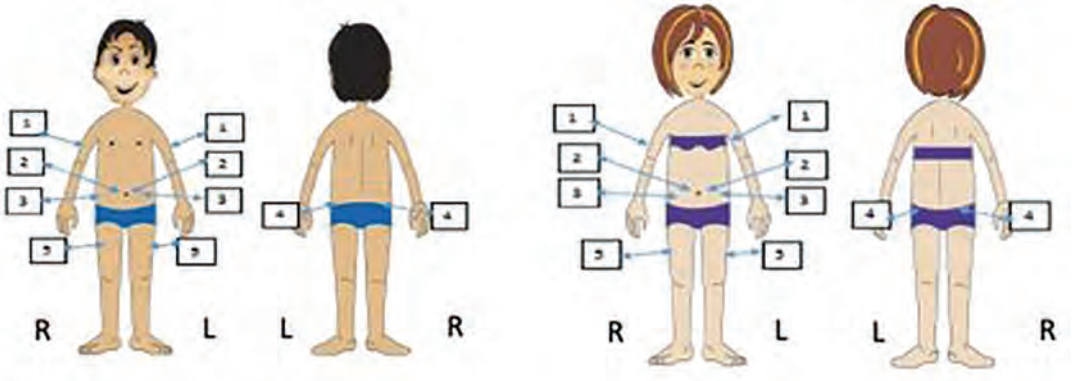

Figure 1: Assessment of lipohypertrophy and tenderness/discomfort (pain) according to specific injections sites: 1R (right upper arm), 2R (right periumbilical), 3R (right flank), 4R (right buttock), 5R (right thigh), 1L (left upper arm), 2L (left periumbilical), 3L (left flank), 4L (left buttock), 5L (left thigh)

Objectives: We searched for the association between injection sites and the development of LH and/or pain.

Methods: During a five-day diabetes camp in Ecuador, we evaluated whether ten insulin injection sites (figure 1) were associated with LH and/or tenderness/discomfort (pain) and related them to HbA1c levels that were categorized as optimal (≤7.5%) and suboptimal (>7.5%).

Results: Among 62 participants with type 1 diabetes (59.7% female; mean age 13.7±3.1 years; mean duration of diabetes 6.4±3.4 years; 97% on multiple-daily regimen and only 3% on pumps; 73% self-injecting insulin without assistance; mean HbA1c 8.73±1.79%), the most common injection sites were 1L (86.6%) and 2R (85.2%), while self-injection sites included both 2R (85%) and 2L (83%) and concurred with the highest LH rates of 55% (p=0.005) and 50% (p=0.002). Campers with suboptimal glycemic results (74%) also showed increased LH prevalence in all body sites, particularly in the 1R (100 vs 0%, p=0.03) and 2R (83 vs 16%, p=0.02) sites. The prevalence of pain, although less clear, mirrored the LH rates, with highest frequency of pain occurring in the legs (29% in 5R and 27.5% in 5L). No significant association was found with the frequency of severe hypoglycemia, diabetic ketoacidosis events, and duration of diabetes with the highest frequency of LH.

Conclusions: Children and adolescents manage insulin injections independently well, with high rates of self-injection at all sites, despite the notable incidence of LH and associated pain, particularly in those with suboptimal glycemic results. These findings underscore the critical need for targeted educational programs to improve injection practices, prioritize site rotation, and promote early detection of LH.

P-284

Evaluating the impact of introducing Basaglar, a long-acting analog insulin, on quality-of-life outcomes in youth with diabetes in Bangladesh

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Introduction: While glycemic control remains a primary concern in diabetes management, attention to quality of life (QOL) is equally crucial, particularly in the pediatric population where psychosocial and developmental factors significantly influence well-being.

Objectives: To determine the effect of introducing analog insulin (the glargine biosmilar "Basaglar") and insulin pen devices on QOL parameters in children and young adults with type 1 diabetes (T1D) in an under-resourced country.

Methods: **202** youth with T1D aged 10-25 years attending Life for a Child Program in BADAS (Paediatric Diabetes Care and Research Center), BIRDEM 2, Dhaka, Bangladesh, were included in the study. The 22 item, short form diabetes quality of life in youth (DQOLY-SF) questionnaire was used to elicit indices of quality of life in those who were switched to basal bolus regimen with long-acting analog insulin from human insulin. Sociodemographic and clinical parameters were also collected and will be separately reported. QOL questionnaire was administered at baseline and at 6 and 12 month follow up. Data were collected by face-to-face interview with patients.

Results: The median age was 20 [16-23] years, 55.15% were male. There was significant positive impact on QOL, as compared to baseline, at 6 months (p.012) and 12 months (p.003). Although there was mild improvement of parent issues score after 6 months (p.348) but there was no improvement observed after 12 months (p.802). The total score for QOL was significantly improved at 6 (p.005) and 12 months (p.0001) in the participants compared to baseline.

Conclusions: Quality of life of young people living with diabetes is an essential factor that should guide diabetes management. The introduction of long-acting analog insulin and pen devices improved QOL in Bangladeshi children and adolescents with T1D.

P-285

Poverty-proofing the first health care service that led to a whole-region approach to reduce impact of poverty on accessing paediatric diabetes care

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Introduction: Paediatric Diabetes Care should not identify, exclude, treat differently or make assumptions about those children, young people and families whose household income is lower than others.

Objectives: To identify families' engagement barriers; understand impact of poverty; use feedback to focus interventions and challenge structural inequity and unconscious healthcare professional (HCP) bias.

Methods: Poverty-proofing involves 5 stages: training HCPs; scoping current work of the team; consultation with patients and families; production of a recommendations report; progress review.

Results: Five themes were Identified: Travel**;** Navigating and negotiating appointments; Financial awareness and understanding; Accessing support and education; Barriers to accessing diabetes technologies. We increased access to diabetes technology regionally with a project refurbishing NHS cellphones and laptops. 60% of families accessing this project live in areas ranked in the 30% most deprived in the UK. We enabled regional access to treatment on prescription for mild to moderate hypoglycaemia. HCP awareness about financial barriers was facilitated by signposting to local and national support via our Paediatric QR code directory enabling HCPs to make every contact count. We provide fruit and sugar-free drinks in waiting rooms.

Conclusions: Poverty-proofing aligns with Core20PLUS5 NHS approach to reduce health inequalities. Interventions can be at a service delivery level however some require a higher systems

approach. HCPs can advocate for a poverty-proofing lens to be put on policies and procedures and for appropriate reasonable adjustments to care delivery. Feedback from our poverty-proofing project led to 2 other services being poverty-proofed. All 3 projects enabled development of a Poverty-Proofing training package including a Workforce guide and Common Themes booklet. These supported the delivery of 7 diabetes HCP training events region-wide in 2023 and development of a national online course to be delivered later in 2024.

P-286

Audit of management of diabetic ketoacidosis in children and young people at the noah's ark children's hospital for Wales

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Introduction: Diabetic Ketoacidosis (DKA) is a life-threatening complication of type 1 diabetes mellitus (T1DM) in children and young people (CYP). A 5th edition Integrated Care Pathway (ICP) for management of DKA was published in 2022 in Wales based on current British Society for Paediatric Endocrinology and Diabetes (BSPED) guidelines. The BSPED guidance is broadly similar to ISPAD guidance and includes updated NICE guidance.

Objectives: Our aim was to audit and compare DKA management within a large teaching hospital before and after the introduction of the updated ICP.

Methods: Retrospective case note review of CYP admitted in DKA, managed on current guidance between 01/04/2022 and 31/03/2024 and compared with previous audit based on interim guidelines between 01/04/2020 and 31/03/2022.

Results: In the current audit, 21 episodes occurred in 20 CYP (13 male). The median age was 12 years (range 8 months to 15 years). All were appropriately diagnosed and 7 CYP presented in severe DKA, 5 moderate DKA and 9 mild DKA. This data was consistent with the previous audit however there were less episodes in newly diagnosed CYP, 13(62%) vs 17(85%). In both audits, all had appropriate fluid boluses and maintenance intravenous (IV) fluid prescriptions. In the current audit, initiation of fluids was delayed in 11 of 21 (52%) episodes compared to 35% previously. IV insulin was delayed in 14 of 21 (67%) episodes. In both audits, hypokalaemia was noted in half of the episodes and hypoglycaemia was noted in a fifth of the episodes whilst on the pathway.

Conclusions: The updated ICP was generally followed accurately, and all were diagnosed appropriately. No adverse outcomes were identified. Commencement of IV fluids and insulin was often delayed. Half of CYP experienced hypokalaemia, this needs to be compared with other centres and closely monitored. The increase in number of established CYP presenting in DKA is being reviewed and staff education is planned to improve DKA management.

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Depressive symptoms in adolescents with and without PolyCystic ovary syndrome living with obesity: a prospective, observational study

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Introduction: Adults with polycystic ovary syndrome (PCOS) and obesity are at increased risk of depression, which is often overlooked in practice. Less is known about the relationship between PCOS, obesity, and depression in adolescents.

Objectives: The objective of this study was to establish whether PCOS is independently associated with symptoms of depression in adolescents living with obesity.

Methods: This was a prospective observational study of adolescents aged 12-19 years living with obesity and severe obesity (>95th percentile) with (n=45) and without (n=26) PCOS diagnosed according to combined clinical, biochemical, and radiological criteria. Symptoms of depression was self-assessed using the Center for Epidemiological Studies Depression Scale for Children (CES-DC). Associations between clinical and biochemical variables, PCOS, and symptoms of depression were assessed with the chi-squared test, Student's *t*-test, one-way ANOVA.

Results: The mean (SD) age and BMI Z-score of the study population was 14.8 (2.0) years and 2.19 (0.35), respectively. There were no differences in clinical, anthropometric, nor biochemical parameters between patients with and without PCOS. The mean (SD) CES-DC score was significantly higher in patients with PCOS than those without [31.2 (8.9) vs 13.1 (6.0); $p<0.001$]. A diagnosis of PCOS was associated with mild to moderate or major depressive symptoms ($p<0.001$), with nearly all (95.6%) patients with PCOS screening positive for the possibility of major depression.

Conclusions: Severe depressive symptoms are extremely common in adolescents with PCOS, even when controlling for BMI, suggesting that obesity is not the only mechanism leading to depression in these individuals. The underlying mechanisms leading to depression in adolescents with PCOS require further exploration to personalize therapy in this group of vulnerable individuals.

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Utilising technology to provide preclinical care for an infant with suspected (and later confirmed) INS mutation

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Introduction: Beyond the known challenges of neonatal diabetes, preclinical suspicion of mutations can present unique diagnostic and management considerations.

Objectives: We describe preclinical use of Continuous glucose monitoring (CGM) in an infant with suspected INS mutation to inform early insulin initiation.

Methods: An infant was born at term weighing 3010g whose mother possessed an Arg89Cys mutation on the INS gene; she had presented with diabetic ketoacidosis at 5 months of age. From day 1 of life, the infant's fingerprick blood glucose levels (BGL) measured 7 - 9.7 mmol/L. A HbA1c of 3.8% was considered unreliable given presence of fetal haemoglobin. Thus, CGM inserted on day 2 of life was utilized to monitor for hyperglycemia. At 2.5 weeks of age postprandial excursions > 10 mmol/L emerged and time >10 mmol/L progressively increased prompting admission and initiation of basal insulin at 3 wks of age. The infant was confirmed to have the same pathogenic mutation as her mother. Insulin pump therapy was started at 5.5 wks.

Results:

Conclusions: INS mutations interfere with beta-cell function via effects on processing and structure of proinsulin (1). Dominant INS gene mutations led to diabetes in the first 6 months of life in 66% of cases (2), with median onset at 4 months (1). A more severe phenotype presenting in the first week of life in recessive INS mutations has also been described. Our patient displayed hyperglycaemia on day 1 of life, with progression to clinical diabetes within 3 weeks identified via preclinical intervention with CGM facilitating early introduction of insulin. Insulin requirements have continued to escalate, suggesting early identification may have avoided a more acute presentation. Early exogenous insulin therapy may be beneficial for endogenous insulin by minimising the negative impact of abnormal proinsulin on beta cells (3).

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Healthcare resource utilization in newly diagnosed children with type 1 diabetes in us clinical practice

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Introduction: There are limited contemporary data available on healthcare resource utilization (HCRU) in children newly diagnosed with type 1 diabetes (T1D).

Objectives: This study estimated HCRU in newly diagnosed pediatric patients with T1D in US clinical practice.

Methods: Merative MarketScan® data were retrospectively analyzed for newly diagnosed pediatric patients with T1D enrolled in Commercial or Medicaid health plans (January 1, 2014–June 30, 2019). Included patients had ≥2 T1D claims ≥30 days apart (first claim was index date), ≥12 months of pre-index enrollment, ≥1 month of follow-up, and were aged <18 years at index. Outcomes included T1D-related inpatient care, TD1-related outpatient visits, and emergency room (ER) visits and hospitalizations for hypoglycemia.

Results: We identified 4092 patients in Commercial and 1153 patients on Medicaid plans (mean [SD] age: 10.5 [4.3] vs 11.1 [4.1] years; 44.5% vs 51.4% female); median (range) follow-up was 27.9 (1.2–54.0) versus 24.7 (1.2–54.0) months. Almost all patients experienced T1D-related outpatient care (Commercial 99.3%; Medicaid 97.3%). T1D-related inpatient care (42.3% vs 36.0%) and use of insulin pumps (45.8% vs 30.5%) and continuous glucose monitoring (66.1% vs 51.9%) appeared higher for patients on Commercial versus Medicaid plans. ER visits for hypoglycemia occurred in 4.4% of patients on Commercial plans and 7.3% of patients on

Table 1: CGM metrics and insulin therapy

Age (weeks)	2	3	5	8	10	12
TIR 3.9-10mmol/L (%)	96	87	69	46	36	47
Time above range >10mmol/L (%)	0	13	31	54	64	53
C peptide (nmol/L)	0.52					
Diabetes Autoantibodies (U/mL)	Islet cell 512 antibody: 3.4; GAD 65: <5; Zinc transport 8: 5					
Insulin regimen	n/a	daily injection	Daily injection, transitioning to pump therapy	Pump	Pump	Pump
Total daily dose of insulin (units)	0	0.5	1.5	2.2	3.2	4
Basal insulin (units, %)	0	0.5, 100	1.5, 100	1.3, 59	2.1, 66	2.9, 72
Bolus insulin (units, %)	0	0, 0	0, 0	0.9, 41	1.1, 34	1.1, 28

Medicaid plans. Few patients were hospitalized for hypoglycemia (Commercial 0.7%; Medicaid 1.0%).

Conclusions: Newly diagnosed T1D in children was associated with generally high rates of T1D-related HCRU. Distinct disparities in HCRU were identified between Commercial and Medicaid plan participants. Patients in Medicaid plans had higher ER visits for hypoglycemia compared to those with Commercial plans. Medicaid plan participants had lower use of continuous glucose monitoring and insulin pumps.

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Real-world experience of Omnipod 5 (OP5) hybrid closed loop (HCL) system in children and adolescents in a UK diabetes centre

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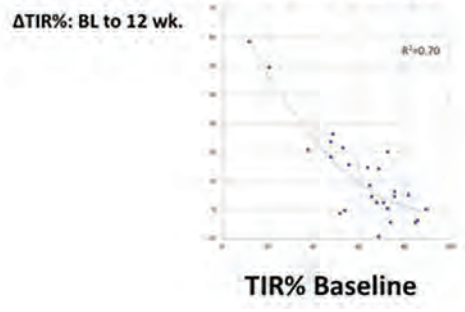
Introduction: The introduction of OP5 to the UK (July 2023) led to a surge in requests for this tubeless HCL system from children and adolescents with T1D (CA1D) in the UK and abroad.

Objectives: We report our initial real-world experience from a large single UK centre auditing our hybrid face-to-face OP5 initiation and remote follow-up protocols

Methods: Since July 2023, 97 adults and children with diabetes registered at our Centre for HCL therapy, of which to date 39 CA1D (age range 2.0-18 yr.) completed >12 weeks use of OP5. Referrals were received from a wide geographical area, necessitating remote follow-up and telemedicine-based approaches, alongside initial face-to-face initiation; 77% self-referred from within the UK. 56% are new to pump therapy, others transitioning from non-HCL systems, all monitoring with CGM sensors. Glycaemic outcomes from baseline to first 12-weeks of OP5 HCL use are detailed.

Results: At baseline, median HbA_{1c} was 58.5 mmol/mol. Median time-in-range (TIR, 3.9-10 mmol/L) improved from 66.5% to 73.0%; median time-below-range (<3.9mmol/L) remained the same (1.0 to 1.0%); time-above-range (>10mmol/L) decreased 23 to 17%. No instances of DKA or severe hypoglycaemia were noted. Automode use was >99%. Median TIR improvement (baseline to 12-weeks) was 6.5%., with the change in ΔTIR greatest in those with lower TIR at baseline (Fig 1). A high baseline HbA_{1c}, was associated with a lower TIR% at 12 wk.

Figure1: Baseline TIR% vs. Change in TIR% at 12wk.



Conclusions: OP5 HCL is actively sought after as a treatment modality for families with a child or adolescent with T1D and is well-received. The centre's blended HCL program demonstrates immediate improvements in glycaemic control. It provides further support for safety and efficacy of OP5 HCL therapy and learnings for wide-scale adoption of HCL systems. Collection and analysis of further data is ongoing.

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Patterns and determinants of serum amylase, lipase concentrations in Indian adolescents and youth with type 1 diabetes (T1D)

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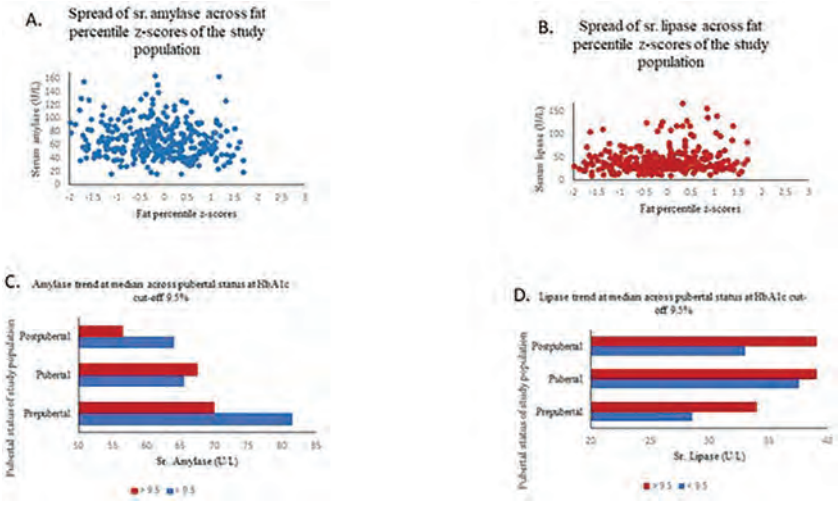
Introduction: Pancreatic exocrine dysfunction in T1D and its association with metabolic risk is debatable.

Objectives: 1) To characterize and predict determinants of serum amylase and lipase concentrations in children/youth with T1D 2) To assess the relationship between amylase, lipase, and the prevalence of metabolic risk in these children

Methods: Design: observational cross sectional; Participants:291(155 girls) adolescents/youth (10-24 years) attending T1D clinic in India. Assessments: body composition, biochemistry (HbA1c, TSH, lipids).

Results: Mean age, diabetes duration and HbA1c were 15.3, 7.0 years and 10.0 ± 2.1 resp.; 4.5% were prepubertal and 95.5% were in puberty/had completed puberty. Mean fat percentiles were 13.7 ± 7 and 24.1 ± 7.2 in boys and girls resp. and relationship with amylase, lipase concentrations were plotted **(figure 1A & 1B)**. Mean lipase concentrations were significantly raised when HbA1c > 9.5, as assessed by a student's t-test ($p = 0.041$). Relative risk of lower amylase concentrations (<median) and higher lipase (>median) in subjects with poor glycemic control (HbA1c > 9.5%) was 1.42 and 1.34, respectively, and trend across pubertal status is illustrated in **figure 1C & 1D**. A multiple linear regression model predicted higher TSH and low serum calcium as significant risk factors for higher lipase (F = 3.322, adjusted R^2= 0.061, p value <0.001). Metabolic risk was prevalent in 76.2% children but did not correlate with amylase or lipase concentrations.Trend of median serum amylase and lipase values as per fat percentile and pubertal status



Conclusions: We have characterized amylase and lipase concentrations in our participants across puberty and fat percentile fat Z scores. Participants had similar patterns of amylase and lipase, regardless of metabolic risk; poor glycemic control in puberty resulted in lower amylase and higher lipase. Risk factors associated with increased lipase concentrations included raised TSH and serum calcium.

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Screening for pancreatic autoantibodies among the first-degree relatives of children and adolescents with type 1 diabetes

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Introduction: US-FDA has recently approved using Teplizumab to delay the progression from stage 2 to stage 3 Type 1 diabetes (T1D) among individuals with pre-symptomatic T1D. This has led to active screening programs globally.

Objectives: We screened the first-degree relatives of children and adolescents with T1D to assess the prevalence of related autoimmunity and presymptomatic T1D among them.

Methods: A cross-sectional, single-center study among parents and siblings (6 months to 40 years) of children with T1D. Antibodies against glutamic acid decarboxylase-65 (GAD65), insulinoma-associated antigen-2 (IA-2A), and insulin (IAA) were measured. Those with at least 2 positive antibodies underwent oral glucose tolerance test (OGTT), HbA1c, and fasting C-peptide levels.

Results: A total of 321 non-diabetic first-degree relatives (138 males), comprising 58 siblings and 263 parents of children and adolescents with T1D (n=176), were screened (median age: siblings 7.5 y, parents 34y). Seventy-eight subjects (24.3%) tested positive for at least one antibody. Out of 78 antibody-positive subjects, 71 (22.1%) had one antibody positive, and 7 subjects (2.2%) had two antibodies positive. Among 7 subjects with 2 antibodies positive, 2 had no dysglycemia (Stage 1 T1D), and 5 had dysglycemia (Stage 2 T1D) (Table 1). Among siblings, 22.4% tested positive for one antibody, and 1 (1.7%) tested positive for 2 antibodies (without dysglycemia). The prevalence of Stage 1 T1D was 0.4% in parents and 1.7% in siblings. Stage 2 T1D was observed in 1.55% of screened subjects, all parents. The individual antibody positivity for GAD65, IAA, and IA2A were 5.1%, 6.8%, and 13.7% in siblings, and 3.4%, 10.6%, and 12.5% in parents, respectively.

Conclusions: The prevalence of preclinical T1D (Stages 1 & 2) was 2.2%, with a breakdown of 1.7% in siblings and 2.3% in parents of children with T1D. The frequency of Stage 1 T1D and Stage 2 T1D among the first-degree relatives was 0.6% and 1.5%, respectively.

Table 1: Demographic details and further workup of multiple antibody positive individuals

S. No	Name initials	Age (years)	Sex	Antibodies positive	Hba1c (%)	FBG (mg/dL)	PPBG (mg/dL)	Fasting C-peptide (ng/mL)	Stage of T1D
1	AK	30	Male	IAA, IA2A	5.5	82	138	1.78	1
2	MS	39	Male	GAD65, IA2A	**6.2**	**124**	**190**	1.28	2
3	JS	40	Male	GAD65, IA2A	4.2	**102**	134	1.63	2
4	PK	40	Male	IAA, IA2A	**5.9**	83	132	1.2	2
5	MS	40	Male	IAA, IA2A	**5.7**	70	110	1.78	2
6	KS	40	Male	GAD65, IA2A	5.4	**104**	**152**	1.32	2
7	JK	16	Female	GAD65, IA2A	4.8	92	138	1.21	1

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Nutritional status of the children with newly diagnosed type 1 diabetes

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Introduction: One of the major presenting symptoms of Type 1 diabetes (T1D) is weight loss. With increasing obesity worldwide newly diagnosed children are not undernourished as they were in the past. After the diagnosis, dietitian recommendation might cause the rigid meal routine in the first year after the diagnosis, affecting the weight stagnation and the arrest of further child's growth and development.

Objectives: The objective of our study was to test the hypothesis that the weight loss and malnutrition are not the essence of diabetes diagnosis. The other objective was to estimate the nutritional status of newly diagnosed patients, 6 months after the diagnosis.

Methods: We conducted the retrospective analysis of new onset T1D patients, treated from 2020-2023 at our tertiary care hospital. We collected data (height, weight, HbA1c, pH) from the hospital records at admission and at outpatient visit after 6 months. We calculated the body mass index (BMI) SDS to be able to compare the children at different stages of growth and development.

Results: Study group consisted of 140 (66F/ 74M) patients, aged 8.96 ± 4.34 (1.5-17.4) years, 61 (44%) of them were in puberty. Our analysis included the data during COVID 19 period, affecting that 61 (44%) patients were in DKA at admission, with average HbA1c of 11.1±2.07 (6.5-16)%. Reported weight loss was 2-10 kg over the previous 6 months. Mean BMI SDS at admission was -0.65±1.48 (-3,56 to +2.56) SDS, indicating that although majority were underweight/normal weight, some of them were overweight at presentation. BMI SDS after 6 months improved to -0.14±1.15, suggesting that most of them regain the lost weight after 6 months. We also noted that some families adopt the insulin regime, improve HbA1c, but insist on the low carb diet causing the further weight loss of their children.

Conclusions: Our results suggest that increasing obesity trends could have the influence on the rise of BMI of children with T1D at presentation and might contribute to the delayed diagnosis.

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Developing a scalable intervention for recognizing signs of diabetes in children at school

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Introduction: The rate of diabetic ketoacidosis (DKA) at diagnosis of type 1 diabetes in children was 38.9% in an international study in 2021 and 55% in a Canadian study in 2020. The Canadian Pediatric Endocrine Group (CPEG) is developing a scalable and equitable intervention to prevent DKA at diagnosis in Canada.

Objectives: Informed by a scoping review and consultation with knowledge users and researchers with relevant expertise, we co-designed materials to help school staff recognize signs of diabetes in children because most Canadian children are educated within an organized school system.

Methods: Intervention materials were co-designed with educators, caregivers, people living with diabetes, and healthcare professionals to support school staff on how to recognize signs of diabetes and inform caregivers to seek immediate medical attention. Two virtual co-design sessions were held and extensive asynchronous feedback was obtained.

Results: For schools, participants stressed the importance of focusing on how to recognize the signs of diabetes (increased frequency of bathroom trips (peeing) and/or drinking (excessive thirst)) and the action needed (notify child's caregiver to seek immediate medical attention). Explanations about the pathophysiology of DKA and diabetes were seen as distracting from the main messages. We created a 3-minute video, a poster (figure), and an action plan, which can be tailored to each school district's needs.

Conclusions: The co-design process led to development of material that is highly focused on helping school staff recognize signs of diabetes and inform caregivers to seek immediate medical attention. Development and testing the feasibility of implementing these materials in three school boards is key to this equitable and scalable intervention to prevent DKA at diagnosis, across Canada.

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Assessment of derangements in glucose metabolism in children with transfusion dependent thalassemia: cross sectional analytical study from India

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Introduction: The mechanisms of abnormal glucose homeostasis in children with transfusion dependent thalassemia (TDT) are complex and multifactorial.

Objectives: Assessed the prevalence and spectrum of deranged glucose metabolism in children with TDT in comparison with age & sex matched controls.

Methods: Cross-sectional analytical study conducted in 110 children (5-18 years) with TDT (cases) and equal number of age & sex matched controls from a tertiary care hospital in North India. Proportion of children with deranged fasting blood glucose and fasting insulin levels were assessed in both cases and controls. Impaired glucose tolerance and insulin resistance were evaluated using oral glucose tolerance test (OGTT) and Homeostatic model assessment of insulin resistance (HOMA-IR) levels respectively in children with TDT.

Results: 110 each of cases and controls with mean (SD) age 11.49 ± 3.65 and 12.04 ± 3.61 years respectively enrolled in the study. Altered glucose metabolism was observed in 33.6% (37/110) children with TDT. Prevalence of impaired fasting glucose (IFG), impaired glucose tolerance and diabetes observed in 31.8%, 5.45% and 1.8% cases respectively. The spectrum and proportion of cases with glucose derangements increased with advancing age (≥ 10 years). Proportion of children with IFG [31.2% vs 0], fasting insulin deficiency [19% vs 5.5 %] and raised HOMA-IR [17.3% vs 1.82%] were respectively higher in cases as compared to controls (p <0.001). The mean fasting glucose, fasting insulin and HOMA-IR

		Altered glucose metabolism				
	NGT (n=73)	**IFG (n=35)**	**IGT (n=6)**	**Diabetes (n=2)**	**Total (n=37)**	
	Mean ± SD/ Median [25th to 75th percentile]	**Mean ± SD/ Median [25th to 75th percentile]**	**Mean ± SD/ Median [25th to 75th percentile]**	**Mean ± SD/ Median [25th to 75th percentile]**	**Mean ± SD/ Median [25th to 75th percentile]**	**p value NGT vs altered glucose metabolism**
Mean fasting glucose (mg/dl)	91.05±6.34	106.6±6.07	122.33±19.4	142.5±20.51	108.51±70	**<0.001^**
Mean Serum fasting Insulin (uU/ml)	4.73±2.72	8.37±5.54	10.68±6.25	11.26±9.11	8.53±5.64	**<0.001^**
Median Serum Insulin (uU/ml) at 30 minutes (of OGTT)	13.5[7.9 to 21.98]	19.40[11.70 to 39.23]	28.20[13.47 to 66.35]	36.38[28.20 to (*]	22.35[13.37 to 40.76]	**0.004^**
Mean HOMA-IR	1.06±0.64	2.23±1.56	3.35±2.33	4.19±3.78	2.34±1.7	**<0.001^**
Median Insulinogenic Index	0.27[0.14 to 0.74]	0.46[0.23 to 1.08]	0.25[0.04 to 0.73]	0.26[0.0 to *]	0.46[0.23 to 1.08]	0.084

*2 subjects diabetes, 75th percentile not estimated, ^ p value <0.05 significant

were significantly higher in children with TDT and altered glucose metabolism than with normal glucose tolerance (table 1). Significant predictors of altered glucose metabolism in TDT cases were delayed puberty, raised ALP and high BMI for age.

Conclusions: Children with TDT should be periodically monitored for glycemic indices. Early intervention could prevent further deterioration of glucose metabolism.

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Improving rates of physical activity education for youth with type 1 diabetes (T1DM) in a pediatric diabetes clinic

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Introduction: Youth with T1DM have higher rates of obesity which may prevent attainment of glycemic targets. Physical activity (PA) helps combat obesity, however, many youth with T1DM encounter additional barriers to PA, most notably fear of hypoglycemia. Guidelines recommend >1 hour of PA daily, and suggest clinicians provide PA education including individualized blood glucose management plans. Such education is vital in facilitating safe exercise and decreasing fears of hypoglycemia to improve PA rates.

Objectives: The objective of this quality improvement intervention was to increase the percentage of patients with T1DM who reported receiving PA education from 38% to 50%.

Methods: Baseline rates of PA education were determined and staff focus groups were conducted to identify perceived barriers. Multiple plan-do-study-act cycles were completed in the clinic, focusing on the use of educational posters, handouts, videos, and development and integration of personalized exercise insulin worksheets. A staff educational session reviewing PA in T1DM was conducted. One-way ANOVAs were conducted to compare cycles.

Results: Interventions were associated with a significant increase in rates of PA education reported by patients from a mean of 38% to 50%. Staff-reported rates also significantly increased from a mean of 25% to 39%. Handout and worksheet use was consistent over the course of the study, with video use increasing each week. Staff reported that integrating PA education was not overly time consuming and did not detract from other clinical activities.

Conclusions: The use of educational tools and sessions were effective in increasing the percentage of patients who received PA education, with the staff education, handouts, worksheets, and posters associated with the largest change. Further studies are need to understand if higher rates of PA counselling can translate into increased rates of PA activity for youth with T1DM.

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Exploring risk factors for long-term renal complications in type 1 diabetes: a case control study

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Introduction: In Type 1 Diabetes (T1D) adolescents it is known that transient microalbuminuria increases cardio-renal risk in adulthood.

Objectives: We evaluated the prevalence of albuminuria in T1D.

Methods: A case-control study was done at a Pediatric Hospital, from 10/05/2023-13/10/2023. Population included: T1D group(D); Genetic-related group(G): T1D's brothers/sisters; Control group(C): healthy children; all without chronic conditions/medications. Demographics, clinical characteristics, biochemistry, C-peptide, urinary albumin/creatinine ratio (UACR) in the first-voided urine were collected.

Results: 104 children (D n=57, G n=28, C n=19), 51% males, 50% prepubertal, age of 10.0±3.4 years(y) were included. All had blood pressure(BP) under 90thcentile, 76% adequate BMI. The global means were: creatinine 0.62±0.1mg/dL, systolic-BP(SBP) 99±11, diastolic-BP(DBP) 60±8mmHg, Glomerular Filtration Rate(GFR) 93±9ml/min/1.73m^2 and UACR 27±149mg/g. 66% had GFR≥90ml/min/1.73m^2(G1 category) and 34% GFR60-90ml/min/1.73m^2(G2). 6 children had UACR 30-300mg/g(A2) and 1 UACR>30mg/g(A3). 88% had low risk of chronic kidney disease(CKD), 5/7 intermediate CKD risk were T1D, all pubertal. SBP correlated with BMI (r=0.446,p<0.001). T1D had higher SBP (107±11vs94±8mmHg,t=5.464,p<0.001),DBP61±8vs57±8mmHg, t=2.076,p=0.041), creatinine (0.61±0.09vs0.60±0.1mg/dL, t=2.131,p=0.013). Only SBP differed between groups D-G (t=4.508,p<0.001) and groups D-C (t=3.477,p<0.001). Group D had4.9±3.0ydiseaseduration,A1c7.3±0.8%,glucose178±26mg/dL, variability coeficient 39±5% with Time in Range(TIR) 54±16%, insulin-daily-dose(IDD) of 0.80±0.15U/kg/day.

Conclusions: Our cohort showed no differences in renal disease between T1D and healthy children. Although all had BP under 90th centile, T1D had higher SBP. There was a low incidence of albuminuria(A2-A3). These results highlight the importance of a strict metabolic control in T1D and reinforce the need for regular screenings, namely from the start of puberty.

P-299

Is glucose control and quality of life improving with use of Omnipod 5[R]? Evidence in real life

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Introduction: Advances in diabetes technology have been exponential in the last decade. Its use aims to reduce the burden on patients and their families of glucose control while improving health and reducing the risk for long term complications for CYP with T1D. Accurate and reliable CGM sensors, accurate and safe algorithms, fast insulin preparations and insulin pumps that work with each patient's lifestyle have been playing a pivotal role in enabling increased time in range and decreased hypoglycaemia events.

Objectives: Is the use of Omnipod 5 having a positive impact on glycaemic outcomes in children with T1DM in real life?. Can we demonstrate safeness and effectiveness?

Methods: Prospective, single centre study analysing glycaemic outcomes compared to desired target glucose settings in all children and young people from Wrexham Maelor Hospital Children Diabetes Department with T1DM who were using pumps and were changed to Omnipod 5 and Dexcom G6. Analysis done at 3 months, 6 months and 12 months post changing to these devices. Exclusion criteria included history of severe hypoglycaemia or diabetic ketoacidosis in the past 6 months or during study, stop using the devices, usage of CGM <90% and patients diagnosed with T1D for less than 6 months.

Results: In total, 46 CYP were included. Median percentage of time in range (TIR; 3.9–10.0 mmol/L) was 52% before changing to Omnipod 5, 68% at 3 months and 72% at 6 months. Time below 3 mmol/L median percentage improved from 1.8% before Omnipod 5 to 0.8% at 3 months and 0.3% at 6 months. Median HbA1c was 58.4 mmol/mol before Omnipod 5, at 3 months 54.4 mmol/mol and 52.1 mmol/mol at 6 months.

Conclusions: Results demonstrated a greater TIR and general improvement of glucose metrics in patients using Omnipod 5. There were no serious adverse events (no DKA or severe hypoglycaemia, no hospital admissions) during the study. Potential long-term benefits with better glycaemic control in reducing risk of complications.

P-300

Stable glycemic control but increased insulin requirements in children and adolescents with type 1 diabetes before and after diagnosis of celiac disease

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Introduction: The impact of a gluten-free diet (GFD) on glycemic control and insulin requirements in children and adolescents with type 1 diabetes (T1D) and celiac disease (CD) remains controversial.

Objectives: Hence, this study investigates the glycemic control and insulin requirements in children and adolescents with T1D and newly diagnosed CD. It was hypothesized that the glycemic control and insulin requirements before start and after start of GFD.

Methods: This observational, retrospective study included children and adolescents with T1D for at least 3 months and subsequent small bowel biopsy confirmed CD diagnosis treated at two University Children Hospitals in Switzerland between March 2001 and March 2021. Demographics, insulin treatment and glycemic control data up one year before and one year after CD diagnosis were obtained from medical records and compared using paired t-tests.

Results: Twenty-nine (15 male, 14 female) children and adolescents with T1D and subsequent diagnosis of CD were included. Mean (±SD) age at CD diagnosis was 7.4 (±3.7), mean diabetes duration 2.8 (±3.0) years; 6 (20%) children were using an insulin pump. HbA1c three months after start of GFD due to diagnosis of CD compared to three months before was similar, 7.5% (±0.9) *vs* 7.7% (±1.0), respectively, p=0.252. Insulin requirements increased from 0.75 (±0.29) to 0.91 (±0.31) U/kg/d, p= 0.016. The increase

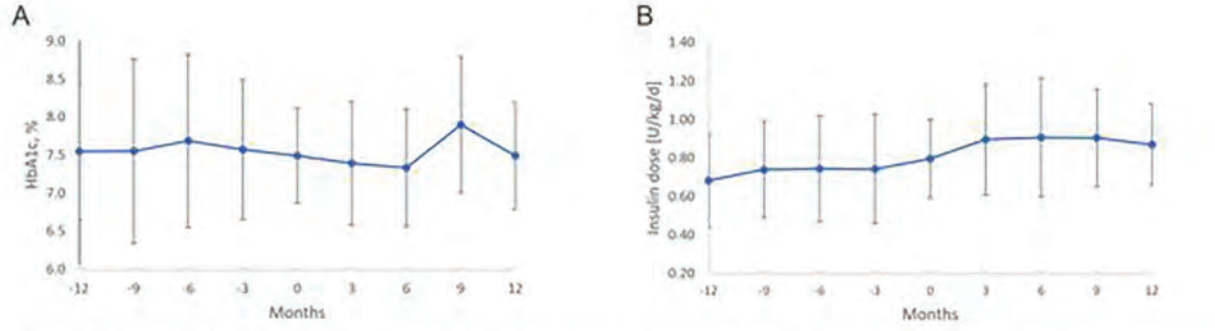

Figure 1. Mean (±SD) **A.** HbA1c and **B.** insulin requirements (U/kg/d) one year prior and one year after diagnosis of CD and start of GFD (timepoint 0 months).

in insulin requirements persisted up to one year after the start of GFD, 0.72 U/kg/d (±0.24) *vs* 0.87 U/kg/d (±0.21) (p= 0.001); mean HbA1c, however, was not different after one year, 7.5% (±1.0) vs 7.6% (±0.8), p=0.538.

Conclusions: This retrospective two-center observational study showed similar glycemic control but increased insulin requirements in youth with T1D and celiac disease up to one year after the start of GFD. These observational findings warrant verification in a larger cohort and comparing children and adolescents with T1D with and without CD.

P-301

Misdiagnosis of type 1 diabetes and multiple sclerosis: a case of wolfram syndrome

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Introduction: Wolfram syndrome, a rare autosomal recessive disorder resulting from mutations in the WFS1 gene, manifests through a spectrum of symptoms including early-onset diabetes mellitus, diabetes insipidus, optic nerve atrophy, hearing loss, and neurodegeneration

Objectives: Describe a case initially suspected to be an autoimmune disorder involving type 1 diabetes (T1D) and multiple sclerosis (MS), emphasizing the importance of genetic testing in differential diagnosis.

Methods: We report on a 41-year-old female initially referred for an MS evaluation due to optic disc atrophy identified during a routine ophthalmologic examination.

Results: Past medical history revealed T1D since age 17, managed with an insulin pump and continuous glucose sensor. Despite her inconsistent treatment adherence, she had no history of diabetic ketoacidosis. A neurological examination identified bilateral mild optic atrophy without further abnormalities. Brain MRI showed three nonspecific T2 white matter lesions. Subsequent genetic testing revealed compound heterozygous mutations in the *Wolfram syndrome 1 (*WFS1) gene, leading to a revised diagnosis of Wolfram syndrome.

Conclusions: The absence of diabetic ketoacidosis despite poor treatment compliance, the lack of significant neurological findings, and the presence of nonspecific MRI lesions raised the clinical neurologist's suspicion that MS was not the correct diagnosis, guiding the diagnostic process towards genetic testing. This case highlights how a detailed medical history, alongside clinical and imaging findings, can direct the differential diagnosis away from common conditions like MS to rarer disorders such as Wolfram syndrome. A high index of suspicion is needed for prompt diagnosis and appropriate treatment.

P-303

Aspect of diabetic ketone acidosis on type 1 diabetes mellitus patients at Cambodia-Korea diabetes center(CKDC) in 2023

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Introduction: In Cambodia, there is a paucity of research on diabetic ketone acidosis among patients with type 1 diabetes mellitus. This study was designed to assess the number of diabetic ketone acidosis, among patients with type 1 diabetes who came to seek health care.

Objectives: This study to see the number of Diabetic Ketone Acidosis in Type 1 Diabetes Mellitus (T1DM) patients who came to get treatment and follow-up at CKDC in 2023.

Methods: Non-probability sampling was conducted. We measured the blood glucose, HbA1c, and urine tests to determine ketone bodies in the urine of 38 T1DM patients aged 18 to 25 years old. T2DM patients were excluded. Urine dipstick analysis was conducted to detect ketone bodies.

Results: Among a total of 38 patients, the lowest blood glucose level recorded was 67 mg/dl, and the highest was 600 mg/dl. The lowest HbA1c level was 6.5%, and the highest was 19%. Additionally, we found ketone bodies in the urine of 12 patients, representing 31.57% of the total (5 females, 7 males) with ketone(+) bodies in the urine 2patients(1female,and 1male), ketone(2+) bodies in the urine 4patients (2females, 2male), ketone(4+) bodies in the urine 6patients(2females, 4male).

Conclusions: In conclusion, we found that 31.57% of diagnosed T1DM patients had experienced Diabetic Keto acidosis. The most common precipitating factors were infections and non-compliance to treatment. Based on these results, patients must inject insulin regularly and learn to flexible insulin dose according to food intake and activities, maintain a healthy diet by reducing salt intake and avoiding fatty foods, exercise regularly, balance healthy weight, and follow-up regularly to minimize the risks and complications of Diabetes.

P-304

Factors affecting linear growth and growth velocity among Indian children and adolescents with type-1 diabetes: a longitudinal study

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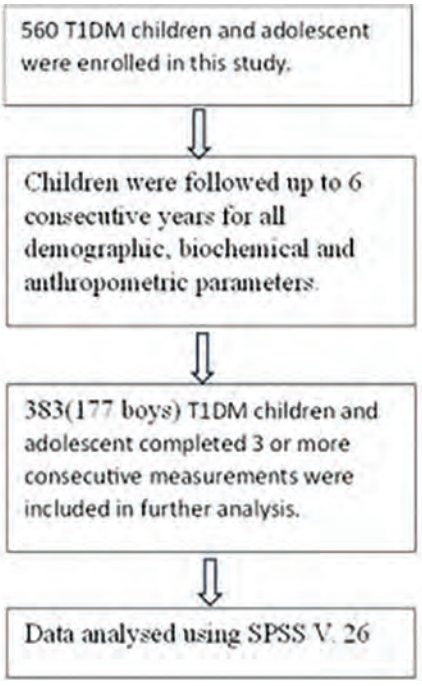
Introduction: In a previous study, the author's group have reported 15.7% prevalence of stunting in Indian children and adolescents with type-1 diabetes (T1D). Comorbidities (like hypothyroidism, vitiligo, celiac disease), development of diabetic nephropathy and longer disease duration were significant predictors of stunting.

Objectives: We conducted this study with the aim to study role of disease duration in Indian children and youth with T1D. The specific objectives were to characterize the growth of children and adolescents with T1D with respect to diabetes duration and to describe longitudinal changes in growth parameters over a 3- and 6- year period.

Methods: This longitudinal follow-up study included 383 children (177 boys) with T1D aged 2 months-18 years with at least 3 or more consecutive recorded growth parameters (figure). Demographic data, anthropometry, dietary intake and laboratory measurements were performed using standard protocols at baseline and endline. P-value<0.05 was considered significant.

Results: We report that height velocity Z-score was significantly low at 6-year follow-up from baseline and 3-year follow-up in boys with T1D with disease duration between 2-5 years at baseline. The fixed-effect estimates from the linear mixed model regression using height velocity Z scores as dependent and time as primary independent variable are shown in table. We report that insulin requirement, disease duration less than 2 years and subjects without complications were positively associated with height velocity Z scores, whereas glycemic control, dietary protein intake, vitamin D levels and comorbidities had no effect on height velocity Z scores.

Conclusions: Children with higher disease duration, particularly boys are more likely to have poor growth due to development of complications and high insulin requirement.



P-305

A follow up of an extremelly obese girl with diabetes mellitus and pituitary hyperplasia due to severe primary hypothyroidism, mimicking pituitary macroadenoma

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Introduction: Anterior pituitary enlargements should be differentiated and well distinguished from each other, especially macroadenomas from pituitary hyperplasia in patients with primary hypothyroidism (PHPT).

Parameter	estimate	standard error	df	t	significance	lower bound	upper bound
increase in duration of diabetes*	-0.12	0.04	451.1	-2.89	0.01	-0.20	-0.04
insulin dose*	0.36	0.17	1152.14	2.11	0.04	0.02	0.70
glycemic control	-0.04	0.03	1275.72	-1.45	0.15	-0.09	0.01
dietary protein	0.01	0.01	1267.90	1.13	0.26	-0.01	0.03
vitamin D	-0.01	0.00	1234.09	-1.55	0.12	-0.01	0.03
disease duration at baseline*	0.59	0.21	783.34	2.83	0.01	0.18	0.99
complication*	0.67	0.26	890.24	2.57	0.01	0.16	1.18
comorbidity	-0.18	0.19	885.43	-0.93	0.35	-0.56	0.20
intercept	-1.34	0.54	1214.81	-2.56	0.01	-2.36	-0.31

Objectives: PHPT is not common in children and even when they may be obese, it is rarely associated with diabetes mellitus (DM).

Methods: An extremely obese 14-year-old girl, with BMI=60.3 kg/m^2 and BMI z score=5.79, with acanthosis and stria, has normal height (+0.57 SDS), blood pressure, and IQ (114) for her age, but with learning difficulties. She has a family history of obesity, diabetes mellitus, and cardiovascular disorders. The diagnostic assessment included a clinical examination, biochemical and hormonal investigations, followed by imaging studies.

Results: An oral glucose tolerance test revealed hyperglycemia at 0' (12.82 mmol/l) and 120' (19.91 mmol/l), an elevated HbA1 (14.7%) and C-peptide (8.11 ng/ml), but normal values of the insulin antibodies. The thyroid function tests showed increased TSH (>75 μIU/ml), and TPO antibodies (>1000 IU/ml) and decreased T4 (3.15 μg/dl). The prolactin, steroid, and gonadal hormone values were within reference range. The MRI of the hypophysis revealed its anterior part enlargement with superior convexity and suprasellar extension (14.5x13.2mm) without visual impairment. The commencement of Metformin and dietary regimen improved the metabolic control, and the thyroid function as well with L-thyroxine treatment. After 1 and half years of thyroid hormone replacement therapy, an MRI revealed a reduced pituitary mass, but unfortunately, she gained weight again and had SARS-COV2 infection that worsened the metabolic control, increased GAD65 (65.9 IU/ml) and ICA (35.4 IU/ml) antibodies, so basal insulin was started.

Conclusions: Herein we present an extremely obese adolescent girl with DM associated with PHPT. The rarity of the existence of these two major diseases and their outcome demands adequate treatment and constant follow-up of the patient.

P-306

Characterization of oral microbiota and cytokines in children and adolescents with type 1 diabetes

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Introduction: The oral microbiota is considered one of the most complex bacterial communities in the human body.Dysbiosis of the oral microbiome has been observed in many diseases and has been associated with local and systemic inflammation. However, the effect of type 1 diabetes (T1D) on the microbiome of the oral cavity is still poorly understood.

Objectives: Here, we studied the oral microbiota and inflammatory profile of children and adolescents with T1D compared to healthy controls.

Methods: Saliva samples were collected in 75 T1D individuals (mean age:15.3±3.8, 53% females) and 79 healthy controls (mean age:13.5±4.6, 54% females). 16S rRNA V3-V4 targeted sequencing for microbiome profiling and magnetic bead-based multiplex immunoassays for cytokines dosage were performed. Oral microbiota diversity was measured using Chao1 and Pielou indices to represent richness and evenness, respectively.

Results: Lower microbial community richness (Chao1 index) and higher evenness (Pielou index) emerged in T1D compared with healthy controls (p-value<0.0001), suggesting the presence of oral dysbiosis in T1D. Specifically, the bacterial genera *Fusobacterium* and *Neisseria* showed a significantly higher abundance in T1D compared with healthy controls, while *Prevotella* was less abundant (q-value < 0.05). In T1D, also emerged a lower prevalence of bacteria producing butyrate (*Eubacterium*, *Butyrivibrio)*, a metabolite that plays a crucial role in regulating immune function and known to prevent pro-inflammatory cytokine-induced β-cell dysfunction. Interestingly, analysis of oral inflammatory profile also showed in T1D higher values of interleukin 1β (IL1β) (p-value=0.01), a pro-inflammatory cytokine previously reported as a strong driver of β-cell dysfunction and apoptosis.

Conclusions: Our findings highlight a distinctive oral microbiota composition and cytokines profile in T1D and suggest a possible joint effect of cytokines and bacteria metabolites on β-cell damage and pathogenesis of T1D.

P-308

A case report: difficulties in the diagnostic process in mitochondrial diabetes

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Introduction: Inherited or primary mitochondrial disorders are inborn errors of metabolism with a prevalence of ~ 1:4300 in the general population. The clinical presentation of mitochondrial diseases is heterogeneous, complicating the diagnostic process, and may include signs such as premature fatigue, early-onset sensorineural hearing loss, ptosis, metabolic strokes, and a family history of diabetes. Mitochondrial diabetes is a rare form of monogenetic diabetes, accounting for up to 1% of all cases. Failure of mitochondrial activity impairs insulin exocytosis from beta cells and insulin sensitivity in target tissues.

Objectives: The complex diagnostic process in a patient with clinical findings compatible with mitochondrial disease is presented.

Methods: Case report.

Results: He was born at 38 weeks, 3000 g and was diagnosed with diabetes at the age of 4.5 years, and multiple-dose insulin therapy was started. One year later behavioral problems occurred. His weight was 22 kg (0.43 SDS), height 121.5 cm (1.36 SDS). HbA1C was 14%, C-peptide <0.2 ng/mL, concurrent venous blood glucose 434 mg/dL; diabetes-related autoantibodies were negative. At 7 years old, sensorineural hearing loss was noted. Five years after diagnosis diabetic complications screening revealed myopathy. At the age of 15.5 years, there was a percentile loss in height (162.5 cm/-1.30 sds), and proteinuria (65 mg/m^2/hour) was detected.

During follow-up he developed ptosis and tremor. Mitochondrial disease was considered, MLPA analysis was performed and no deletion or duplication was found. Whole mitochondrial genome sequencing was performed by sequence analysis and mt.5864G>A (*TRNY* gene) (27%) change was detected. Heteroplasmy rate was low. We plan to perform genetic analysis from another tissue.

Conclusions: Mitochondrial diabetes mellitus is rare in children and should be considered by when different system involvements accompany diabetes. In patients with a strong likelihood of mitochondrial disease, mtDNA negative in the blood, low heteroplasmy in the blood and analysis from another tissue to avoid missing tissue-specific mutations may be helpful for diagnosis.

P-309

Does automated insulin delivery improve time in range and reduce glucose variability in children < 7 years with type 1 diabetes

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Introduction: Automated insulin delivery algorithms have been shown to improve glucose time in range (TIR) and reduce glucose variability in children >7 years and adults, however there is little evidence about safety and effectiveness in children <7 years. The success of these systems in older children and adolescents has led clinicians to use Advanced Hybrid Closed Loop (AHCL) pumps "off label" in the <7-year-old age group. "Off label" use of a device in Australia means the product has not been assessed by the Therapeutic Goods Agency (TGA) for safety and effectiveness.

Objectives: To compare the safety and effectiveness of AHCL pumps to standard pump therapy in this younger cohort at a tertiary children's hospital.

Methods: This is a single centre retrospective audit in 22 children aged <7 years with >1 year diabetes duration who were on standard pump and then transitioned to AHCL pump therapy. Data was collected around the time of transition from standard to AHCL therapy at four time points -3, 0, 3 and 6months after transition. Outcome measures were %TIR (3.9-10mmols/l), glucose variability (%time <3.9mmols/l and >10mmols/l), mean sensor glucose level, sensor wear time, HbA1c, and diabetes related hospital admissions.

Results: Results are reported as mean + SD

Conclusions: Transition from standard pump to AHCL pump therapy in < 7 year-old patients improved TIR, HbA1c, sensor wear time, average sensor glucose and %time <3.9mmols/l. Glucose variability, %time >10mmols/l, and hospital admissions data will be available for presentation at the Annual scientific meeting.

P-310

Addressing health inequalities in access to activity for children and young people with type 1 diabetes: a combined community/health approach

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Introduction: Regular physical activity (PA) plays a key role in diabetes management. Children and young people (CYP) with type 1 diabetes (T1DM) are often less active than their peers.

Objectives: A free 10 week sports programme was set up for CYP with T1DM to promote PA and assess the impact on diabetes control, wellbeing and confidence managing diabetes around PA.

Methods: Ten weekly sports sessions were set up for CYP aged 8-14 years. Participants completed a survey at the start and end of the programme about their current physical activity levels, wellbeing and the activities they enjoyed. Their height, weight, HbA1c, BMI SDS, % time in range (TIR) were measured at the appointment prior to the start of the programme and again at the end of the programme.

Results: The programme was accessed by 26 CYP with 15 CYP attending all 10 sessions. 26% of attendees were from non-white backgrounds, compared to 15% of our clinic population. There was no improvement in mean HbA1c (0±8 mmol/L, p=NS) or TIR (4±10 %, p=NS). Those with obesity (n=4) experienced a reduction in BMI SDS of 0.1±0.08 kg/m^2 but no significant change in %TIR or HbA1c. 87% agreed or strongly agreed that they felt more confident managing their diabetes. 80% agreed or strongly agreed they

	-3 months (on standard pump)	0 months (on standard pump, prior to transition to AHCL)	3 months post transition to AHCL	6 months post transition to AHCL	p-value
HbA1c (%)	7.7 ± 1.2		7.4 ± 0.8		p < 0.01
HbA1c (%)	7.7 ± 1.2			7.2 ± 0.8	p < 0.01
Average sensor glucose (mmol/L)		9.8 ± 1.7		9.4 ± 1.1	p = 0.006
Sensor wear time (%)		76 ± 28	90 ± 10		p = 0.032
TIR (%)		54.6 ± 15.8		61.1 ± 11.2	p <0.01
Time < 3.9mmol/L (%)		2.9 ± 2.3	0.8 ± 1.4		p = 0.01

would be more active in future. There was a 57% reduction in feelings of worry or anxiousness by the end of the programme.

Conclusions: The attendees experienced an improvement in mood and confidence in managing their diabetes around PA. However, there was no significant improvement in diabetes control from the programme, indicating that there are many variables to achieving optimal diabetes control including treatment compliance, parental support, diabetes technologies and overall activity levels. There needs to be further consideration about how we engage CYP from lower socioeconomic backgrounds, a range of ethnic groups, those who have low levels of PA and those with overweight and obesity.

P-312

Impact of closed-loop systems in metabolic control and quality of life in pediatric patients with type 1 diabetes

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Introduction: Automated insulin delivery (AID) systems have been an important advance in Type 1 Diabetes (T1D) treatment and control.

Objectives: The primary aim of our study was to compare glucose monitoring data from pediatric patients 3-months before and after ongoing in an AID system. The secondary aim was to describe patient´s quality of life using the Pediatric Quality of Life Inventory PedsQL3.2, translated into Spanish.

Methods: Retrospective cross-sectional obervational study. Data were collected from children and adolescents diagnosed with T1D (ages 2-18) on treatment with AID system and followed up in a pediatric diabetes unit. The T- student test was used to compare quantitative variables.

Results: 101 patients (mean age 12.5 ± 3.9 years, and mean diabetes duration of 6.5 ± 3.8 years). 98 were Minimed 780G® users and 3 Ypsopump CamAPS FX® users. Prior to the AID system, 54% were on treatment with multiple dose insulin injections (MDI) and 46% on continous subcutaneous insulin infusion (CSII) (MiniMed640G®). 62% were Freestyle Libre2® sensor users, 25% were using Medtronic Guardian3®, 9% DexcomG6®, and 3% performed controls with capillary blood glucose (BG). Significant changes were observed for TIR (65% vs 77.17%; p <0.01), TAR (23% vs 16.5%; p<0.01), average BG (159mg/dl ± 19 vs 144mg/dl ± 13; p<0.01), glucose variability (p<0.01) and HbA1c (7.1% vs 6.8%; p<0.01). 75/101 patients completed the PedsQL3.2 questionnaire. The mean score for patients was 72.3 ± 14.2, and 69.7 ± 13.5 for parents. The best scores were obtained in adherence to treatment (3rd module; 80.4 ± 13) and the worst, in posible complications concerns (4th module; 62.3 ± 25).

Conclusions: The use of AID systems led to a significant improvement of glycemic control after 3-months follow up in pediatric patients at our centre previously treated with MDI and CSII. Pediatric patients using AID systems and their parents have a good perception of health-related quality of life according to the PedsQL3.2 questionnaire.

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Effectiveness of aHCL systems in controlling glycemic levels after a high-fat meal in youths with type 1 diabetes

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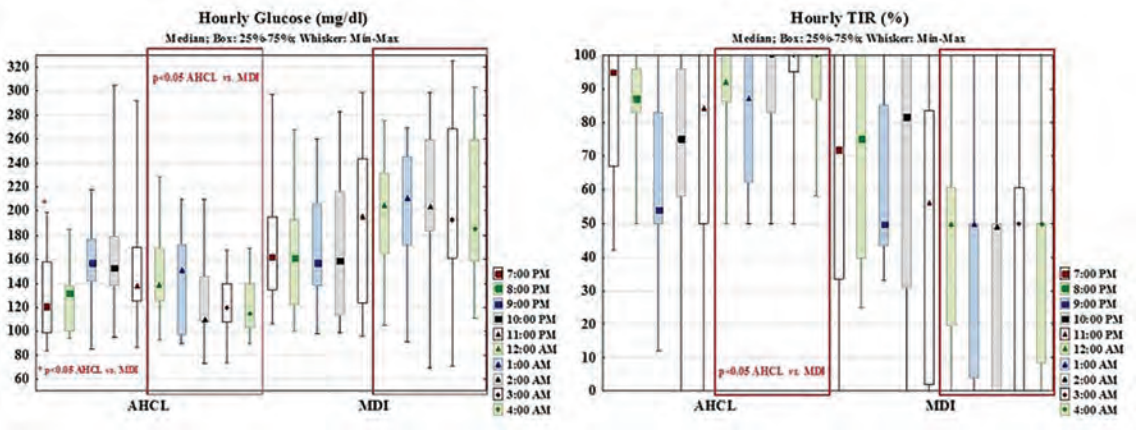
Introduction: Meals rich in protein or fat (HF) cause delayed hyperglycemia in patients with type 1 diabetes (T1D). The management of protein and fat in AHCL systems is not yet well studied



Objectives: To evaluate postprandial glycemic levels after a HF meal in youths with T1D, comparing AHCL systems users with MDI ones (degludec and short-acting insulin)

Methods: A HF dinner (pasta with 4 cheeses, Milanese cutlet, French fries, and fruit) was offered to all patients during an educational camp. Macronutrients (% of energy intake) were: carbohydrates (CHO) 116.5 gr (33.8%), fats 70.2 gr (45.9%), and proteins 69.9 gr (20.3%). The mealtime insulin dose was calculated using the individualized insulin-to-CHO ratio. Exercise during the day was the same for all patients. Data on gender, chronological age (CA), T1D duration, insulin treatment (AHCL/MDI), and AGP statistics on hourly glycemic values and TIR from 7:00 PM to 4:00 AM were recorded

Results: Twenty-one children and adolescents with T1D were enrolled (62% male; median CA 13.4 yrs; T1D duration 4.0 yrs); 9 out of 21 (42.8%) were using an AHCL system. MDI patients were all using a rtCGM. AHCL and MDI patients were comparable for CA, while median T1D duration was higher in AHCL (8.0 vs 2.5 yrs; p=0.048). As depicts in Figures, median glucose values before dinner (7:00 PM) were lower in AHCL (p=0.042). Patients using AHCL systems had postprandial glucose and TIR values from 12:00 AM to 4:00 AM significantly lower and higher, respectively (p<0.05), than MDI ones in 50% of which at least 2 short-acting insulin injections were performed during the night to correct hyperglycemia. No manual correction bolus was performed in AHCL. TIR values decreased in MDI patients (ANOVA X^2=20,9; p=0.013)

Conclusions: Despite the small sample size, in our real-word setting we found that AHCL systems seem to be effective and safe in the HF meals' management allowing a better glycemic control than MDI, avoiding prolonged postprandial hyperglycemia

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Glycemic control in preschool children with type 1 diabetes treated with the advanced hybrid closed loop system remains stable - 2-years prospective, observational, two-center study

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Introduction: The MiniMed 780G, the first automated insulin delivery (AID) system available in Poland, has CE mark approval for children with T1D from 7 years of age.

Objectives: We analysed glycemic parameters in T1D children under 7 years of age treated with this AID system in relation to the previous pump therapy.

Methods: We compared the continuous glucose monitoring (CGM) records of 10 children with T1D, aged 5.76 ± 1.36yrs, who switched from a sensor-augmented pump (SAP; personal insulin pump with real-time continuous glucose monitoring) to AID. SAP records from the two weeks preceding the AID connection were compared to those of the first two weeks of AID use and two-week records after 6, 12, and 24 months of AID.

Results: AvgSG and GMI decreased significantly after starting AID (p<0.05). The sensor glucose profile shifted significantly towards the target TIR (70–180 mg/dl) (p<0.05). The improvemen in CGM metrics was maintained by the AID system for two years (p>0.05). After 2 years of AID treatment, the time spent < 54 mg/dl significantly decreases (2.47±2.40 vs. 0.54±0.48 p<0.05).

Conclusions: We report and effective and safe improvement in CGM metrics - increase in the TIR (70-180 mg / dl) and decrease of the average glucose concentration - after switching to AID from a SAP. The outcomes were maintained during the 2-years observation.

	SAP	AID First two weeks	AID two weeks after 6 months	AID two weeks after 12 months	AID two weeks after 24 months
AvgSG[mg/dl]	149.31±15,56	134.17±13.30	135.44±17.23	137.23±15.46	140.20±14.32
TDI [u.]	15.42±4.43	14.86±4.26	16.90±5.80	19.13±7.71	22.91±10,40
GMI [%]	6.88±0.37	6.52±0.32	6.54±0.41	6.59±0.37	6.65±0.35
Percent of sensor glucose values in range [%]					
>250mg/dl	6.09±4.68	4.29±2.96	4.49±4.55	4.12±4.64	5.02±4.48
180-250mg/dl	22.06±5.68	14.67±4.37	14.70±6.72	15.90±5.04	16.22±5.05
70-180mg/dl	65.63±9.68	72.34±6.68	73.70±10.07	74.26±8.67	74.16±9±9.18
54-70mg/dl	4.12±2.60	6.22±3.65	5.09 ±3.02	4.37±2.40	3.13±1.83
<54mg/dl	2.09±2.63	2.47±2.40	2.01±2.30	1.48±1.02	0.54±0.48

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Unravelling the contribution of MODY genes in type 1 diabetes susceptibility through a polygenic approach

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Introduction: Monogenic and polygenic diabetes are usually considered distinct diseases, however recent data support the hypothesis of a genetic continuum between MODY and polygenic forms of diabetes, such as type 1 diabetes (T1D).

Objectives: In the present study, a polygenic approach was used to assess the contribution of MODY genes on T1D susceptibility.

Methods: 383 T1D young individuals (mean age:13.9±3.4, 52% females) and 187 healthy controls (mean age:12.8±3.4, 56% females) were recruited. Participants were genotyped using Illumina Infinium Global Screening Array. A Polygenic Score (PGS) based on Single Nucleotide Polymorphisms (SNPs) in 16 genes responsible for MODY was developed and its association with T1D and related clinical characteristics (i.e., age at diagnosis, glycated haemoglobin, autoantibody positivity) was tested by regression analysis.

Results: The PGS obtained by a Bayesian regression approach using 334 SNPs performed best. This PGS was associated with a higher risk of developing T1D (beta=5.14, p-value=0.001). In a sub-sample of 107 T1D individuals, PGS was also associated with a higher presence of Zinc transporter 8 autoantibodies (ZnT8-ab) s (beta=12.58, p-value=0.01). Analysis of clinical characteristics of ZnT8-ab in T1D showed older age at diagnosis in T1D with positive ZnT8-ab (median: 8.8, IQR: 3.7) compared to T1D with negative ZnT8-ab (median 7.6; IQR: 5.9) (p-value=0.0007). Moreover, diabetic ketoacidosis at diagnosis was less common among T1D with positive ZnT8-ab in comparation with T1D with negative ZnT8-ab (10% versus 39%, p-value=0.025). No association between PGS and other T1D clinical characteristics emerged.

Conclusions: Our study showed a polygenic contribution of MODY variants in T1D susceptibility and ZnT8 autoimmunity, confirming the existence of shared genetic characteristics between different forms of diabetes.

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Introduction of oral health module to structured diabetes education – pilot program in Silesian regional children's diabetes centre, Poland

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Introduction: Oral health problems are regarded as the sixth most common complication of diabetes. People with diabetes are unaware of the importance of Oral Health in their diabetes management regime. The current model of diabetes education does not include recommendations on oral health. According the IDF School of Diabetes oral health education should be included in diabetes management guidance.

Objectives: The purpose of introducing an Oral Health Module (OHM) is to deliver consistent knowledge to children, young adults and their families how the health of the mouth, teeth and gums can affect their general health and glycemia

Methods: An authoring pilot program was based on Module 8: Oral Health and Diabetes, IDF Diabetes Educator Course and delivered by oral surgeon, who is a member of diabetes therapeutic team. It was dedicated to newly diagnosed patients with T1D.

Results: Ours pilot program includes Power Point presentation, demonstration of teeth brushing techniques, oral examination, and individualized advice regarding oral health. Power Point presentation consists of the explanation of the importance of the oral health, bidirectional relationship between oral diseases and glycemia, recommendations for day-to-day dental care such as regular health check-ups and symptoms of gum diseases. Education of young adults about lifestyle modifications to manage oral health including smoking cessation and avoiding harmful substances was also part of pilot program. Patients were able to improve their self-examination and self-care skills and gained important knowledge about the implications of diabetes on oral health. Oral examination and individual advise resulted in early detection of oral health problems.

Conclusions: Increasing diabetes education curriculum with an integrated knowledge of OHM would play an extremely important role when it comes to preventing diabetes related oral health complications as well as diabetes management.

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The unintentional misuse of glargine and degludec insulins with AID system (CamAPS) and aHCL MeDTronic 780g pump in a 3.5 and 9 year-old children with T1D - 2 case reports

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Introduction: A 3.5 year-old child with newly diagnosed T1D initiated insulin therapy (lispro) with the AID system using mylife Ypso pump with CamAPS. Following control visits presented stable glycaemic control, however 2 months later it turned out that, just after leaving the hospital, the child was being administered glargine in the pump, prescribed in case of insulin pump failure, instead of lispro. At this point lispro was re-introduced and parents underwent re-education. In second case 9 year-old child with newly diagnosed T1D was delivered degludec insulin in Medtronic 780G pump for 19 hours due to the parents' mistake at reservoir change in the evening. After postprandial glucose spike in the morning, parents realised probable mistake and contacted the hospital.

Objectives: To present how unintentional use of glargine and degludec in AID impacted the glycaemic control in the children with recent onset of T1D.

Methods: In the first case two statistical reports (2-weeks period each) were generated from AID - CamAPS. One presenting the data of glargine use before re-admission to the hospital, whereas the second after lispro reuse. In second case, the statistical report for the day of reservoir change and the two following days was generated. The short time (19 hours) of degludec use precludes daily report analysis but enables to observe glycaemic trend.

Results: Apart from a decrease in average total daily dose (IU/day) by around half, presented parameters, together with % use of AID (98% and 99% respectively), are similar in two periods and indicate glycaemic control.

In the second case, euglycemic night and high post-meal glucose spike in the morning (390 mg/dL) were noticed, followed by infusion set change with appropriate insulin. No signs of decompensation or ketones were found.

Conclusions: The unintentional mistake in the type of insulin delivered did not deteriorate glycemic control. Not only low insulin demand but also AID system could explain this observation.

	(Glargine 100 IU/ml)	(Lispro 100 IU/ml)
Mean Glucose Value (mg/dL)	133	139
Time in Range TIR (%)	86	88
Time below Range TBR (%)	1	0
Time above Range TAR (%)	13	12
Coefficient of variation (%)	29	26
TDD Average total daily dose (IU/day)	13.3	6.4
Bolus to basal ratio	45:55	50:50

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Characteristics of hospitalized adult patients with type 1 diabetes in a tertiary diabetes center

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Introduction: T1DM hospitalization burdens healthcare systems. Global data exists, but specific characteristics of Cambodian T1DM admissions are unknown due to data limitations. This hinders understanding of challenges faced by Cambodian hospitals and patients

Objectives: Describe clinical characteristics and reasons of Hospitalized Adult Patients with Type 1 Diabetes in a Tertiary Diabetes Center

Methods: Retrospective study of electronic medical records from Cambodia-Korea Diabetes Center in Phnom Penh, Cambodia, from January 1 to June 30, 2023 (~130 daily OPD patients) over 6 months. Data analysis using Excel software. Among 168 admissions, 155 had diabetes (93.3% DM2, 6.6% T1DM), and 3 had hyperthyroidism

Results: Average T1DM's age was 29±7.1 years. Diabetic ketoacidosis (DKA) was the most common reason for T1DM hospitalization (60%), followed by uncontrolled diabetes (40%). Sex ratio was 6:4 male-to-female. Notably, 6 were newly diagnosed, while 4 had established T1DM (5 months to 3 years follow-up). Common symptoms included asthenia (100%), dry mouth (70%), nausea/vomiting (30%), abdominal pain (20%), and dyspnea (10%). Average eGFR on admission was 66 ml/min (±23). Average HbA1c was 10.31% (±2.3). No infections were found during admission. Mean length of stay was 5 days (±2), and patients performed an average of 3 (±2) self-monitoring blood glucose measurements per week. Most cases were not treated intensively, and 3 patients missed insulin injections and had irregular follow-up

Conclusions: This pilot study suggests DKA is the most common reason for T1DM hospitalization, primarily caused by missed insulin injections. In contrast, uncontrolled diabetes can result from several factors, including therapeutic inertia and patient's compliance. While this pilot study provides initial insights, the small sample size limits generalizability. Future research with larger cohorts is needed to confirm these findings and explore other factors contributing to hospitalization in Cambodian T1DM patients

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Effect of diabetes camp on glycemic control, diet-related behaviors, and diabetes knowledge among patients with type 1 diabetes attending the diabetes camp

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Introduction: Medical nutrition therapy (MNT) is an important part of diabetes self-management education (DSME). Continuous glucose monitoring (CGM) can help patients understand the causal relationship of food, insulin, and physical activity on blood glucose levels. Diabetes camp is a model setting to provide DSME and introduce CGM.

Objectives: The objective of this study was to evaluate the effectiveness of diabetes camp on glycemic control, diabetes nutrition knowledge, diet-related behaviors, lipid profile, body composition, and diabetes distress among patients with T1D.

Methods: Patients with T1D aged 12 to 30 years were recruited to attend a 5-day Siriraj Diabetes Camp held during March 27th -31st, 2023. During the camp, patients were provided CGM and DSME focusing on MNT was taught. HbA1c levels, lipid profiles, body composition, diet-related behaviors, and diabetes distress were measured at baseline, 3-, and 6-month post-camp. Diabetes nutrition knowledge was assessed at baseline, at the end of the camp, 3-, and 6-month post-camp.

Results: Forty patients attended the diabetes camp (mean age 16.3±3.6 years old). There were no changes in HbA1c levels. The nutrition knowledge score improved significantly (pre-camp, at the end of camp, 3-, and 6-month post-camp were 16.6±4.3, 19.3±5.6, 19.2±4.9, and 19.6±4.8, p<0.0001, respectively). Patients gained more knowledge regards fat, sodium, glycemic index, fiber, nutritional labels, and preparing for exercise. More patients gave extra insulin injection when having extra food (pre-camp 40%, 3-month post-camp 47.5%, 6-month post-camp 60%, p=0.08). Factors associated with good glycemic control at 6-month post-camp were good nutrition knowledge and appropriate diet-related behaviors.

Conclusions: DSME provided at diabetes camp resulted in improvement of patients' knowledge on MNT. However, changes in glycemic control, lipid profiles, diet-related behaviors, or diabetes distress score were not seen after attending a 5-day camp.

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Exploring HLA genotype variations in type 1 diabetes: implications for precision medicine and immunotherapy response

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Introduction: Given the heterogeneity of Type 1 Diabetes (T1D), precision medicine approaches targeting HLA associated endotypes have been suggested.

Objectives: To shed more light on the heterogeneity of T1D incidence, we here investigate how HLA genotype frequencies vary across gender, region and age in individuals with recent onset stage 3 T1D.

Methods: We analyzed geographic region, age, gender and HLA frequencies in data from 656 participants across four trials evaluating the antigen-specific immunotherapy Diamyd® (GAD-alum) and 239 screened individuals as part of the ongoing phase III trial DIAGNODE-3 (cut-off date 05 January 2024). Our

	Mean (SD)				p-value		
	Pre-camp	3-month post-camp	6-month post-camp	p-value	Pre- vs. 3-month post-camp	Pre- vs. 6-month post-camp	3- vs. 6-month post-camp
HbA1c (%)	9.3 (2.2)	9.2 (2.1)	9.4 (2.0)	0.14	1.00	0.89	0.16
Diet-related behaviors (full score = 3, high score means good behavior)	1.7 (0.3)	1.7 (0.4)	1.7 (0.3)	0.54	1.00	0.81	1.00
Diabetes distress score [reported as median (IQR)](high score means more distress)	24 (16.0, 38.3)	23.5 (17.3, 33.0)	23.5 (17.3, 37.0)	0.76	0.77	1.00	1.00
Cholesterol (mg/dL)	195.9 (41.4)	183.9 (36.1)	190.0 (38.6)	0.06	0.06	0.90	0.45
Triglyceride (mg/dL) [reported as median (IQR)]	82.5 (55.8, 128.0)	69.0 (54.0, 112.5)	81.5 (53.0, 134.0)	0.30	0.22	0.68	0.03
HDL-cholesterol (mg/dL)	65.9 (12.6)	64.8 (13.5)	65.3 (13.6)	0.79	1.00	1.00	1.00
LDL-cholesterol (mg/dL)	110.9 (36.2)	102.5 (29.7)	105.2 (31.6)	0.11	0.11	0.59	1.00
Percent body fat (%)	30.7 (11.6)	29.4 (11.7)	29.8 (11.3)	0.07	0.11	0.33	1.00

analysis focused on HLA DR3-DQ2 that has been associated with a potential endotype associated with primary autoimmunity against GAD as well as with response to Diamyd® (GAD-alum) immunotherapy.

Results: Our findings indicate significant geographical variations in HLA DR3-DQ2 prevalence, with >60% of patients in southern European countries being carriers, compared to <50% in Nordic countries. Furthermore, we found that HLA DR3-DQ2 frequencies also differ by gender and age, being higher in pediatric females compared to males but more prevalent in adolescent and adult males than in females.

Conclusions: The interplay between gender, age and geographically heterogenous factors like HLA should be considered when designing screening programs for early diagnosis of T1D as well as clinical development programs for treatment of stage 1-3 T1D. Also, as is the case for the antigen-specific immunotherapy Diamyd® (GAD-alum), similar underlying dynamics may be central when evaluating therapeutic response.

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Children with type 1 diabetes who have obesity show differences in their immune phenotype compared to lean children with type 1 diabetes

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Introduction: Children with T1DM are demonstrating increasing levels of obesity. The consequences of obesity in people with T1DM are of concern due to increased risk of morbidity and mortality. People with obesity have changes in their inflammatory state and immune phenotype which are linked to cardiovascular disease and cancer risk. Whether these changes are present in children with T1DM is currently unknown.

Objectives: To assess whether children with T1DM who also have obesity have changes in their immunophenotype similar to that seen in children with severe obesity

Methods: We performed a cross-sectional study on Irish children (5-16 yrs) with established T1DM who had obesity (WHO BMI z-score >2) and lean children with T1DM. We isolated PBMC from peripheral blood from each participant at a single time point. Using multicoloured flow cytometry we assessed the immunophenotype of children with ObT1DM and LnT1DM. We measured CD4+, CD8+, Naïve, Central Memory, Effective Memory T Cells between both groups, NK cells, MAIT cells, iNKT cells. Lymphocytes were gated within FlowJo. Statistics were performed using parametric and non-parametric tests.

Results: 21 LeanT1DM and 15 ObeseT1DM children were recruited. They were matched according to age and sex. LeanT1DM BMI z-score 0.3, ObeseT1DM z-score 2.3. Waist-to-Height Ratio LeanT1DM 0.425, ObeseT1DM 0.56. ObeseT1DM had a higher proportion of NK Cells (p0.01), and their T-cells showed patterns of exhaustion. There was no difference in proportion of other measured lymphocyte subsets. ObeseT1DM had higher insulin requirements, higher waist-to-height ratio but similar diabetes control (HbA1c). ObeseT1DM had no clinically significant hypertension or dyslipidaemia.

Conclusions: Our findings show obesity-related alterations in immunophenotype present in childhood, before classical cardiovascular risk factors are detectable. Weight management in the context of type 1 diabetes is an underserved area in research and preventive clinical recommendations are required for this high-risk group.

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Cataracts in a 17-year-old female: unveiling undiagnosed type 1 diabetes through ocular manifestations

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Introduction: Cataracts in pediatric and adolescent patients with Type 1 Diabetes (T1DM) are a rare complication, primarily arising in individuals with longstanding poorly controlled glycemia.

Objectives: NA

Methods: NA

Results: This case report highlights a 17-year-old girl initially presenting with newly diagnosed T1DM following an ophthalmologist's identification of cataracts during a routine examination. She had an 8-month history of weight loss, polydipsia and polyuria. Recognizing the potential link to undiagnosed diabetes, the ophthalmologist referred the patient to the emergency department (ER). Initial evaluation at the ER revealed no significant findings during physical examination. Laboratory findings included glucose of 442 mg/dL, hemoglobin A1c of 15%, beta-hydroxybutyrate of 4.6 mg/dL and mild acidosis (pH 7.29). Following resolution of diabetic ketoacidosis (DKA), she was started on a basal-bolus insulin regimen. Serological tests showed negativity for anti-GAD, anti-insulin and anti- ICA antibodies. Anti-ZnT8 and C peptide tests are pending.

Conclusions: Cataract development in diabetes is believed to stem from dysregulation of the polyol pathway and acute osmotic stress due to hyperglycaemia, typically manifesting years after poorly controlled diabetes. It is yet to be clarified whether early-onset cataract development in the course of diabetes follows specific pathophysiological mechanism. In light of current guidelines, which advocate for the initiation of screening for chronic ocular

complications, mainly focusing on diabetic retinopathy, 3-5 years post T1DM diagnosis, cases involving cataracts may go unnoticed. Recognizing the significance of identifying risk factors for this pathology is imperative to facilitate earlier and targeted screening strategies.

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Dynamic cognitive function and glucose fluctuations in the daily lives of youth with type 1 diabetes (T1D): a pilot and feasibility study

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Introduction: Worse glycemic control has been related to lower cognitive scores in youth with T1D. However, most studies only assessed long-term glucose control (e.g., years-decades) and cognition at a single time point. Little is known about the relationship between short-term glucose control (e.g., within a single day) and dynamic cognitive functions that fluctuate throughout the day which can only be measured using ecological momentary assessment (EMA). A recent EMA study showed a relationship between short-term glucose fluctuations and slower processing speed in adults with T1D.

Objectives: Before we can assess this relationship in youth, we first need to determine the feasibility of measuring cognition in youth in daily life and the practicality of integrating EMAs of cognition and continuously measured glucose—the purpose of this study.

Methods: Youth with and without T1D, aged 9-16, were asked to complete cognitive tests 5 times per day on a smartphone during their daily lives, using the Ambulatory Research in Cognition (ARC) app, for 10 or 14 days. The ARC app included tasks measuring processing speed, associative memory, and working memory. Youth with T1D wore a CGM.

Results: N=62 youth (N=41 Control; N=21 T1D) participated. Groups were similar in demographics and mean cognitive performance (Table). Youth had high mean testing adherence (77.4%) and reported liking/understanding the tasks. EMAs of cognition and glucose data were integrated at 2 distinct temporal resolutions for each participant with T1D—for each day of participation and for each individual cognitive test (**Figure**).

Conclusions: The data support the feasibility of measuring dynamic cognitive function in youth in naturalistic settings and integrating this information with CGM data. Next steps include using EMA in a fully powered study to determine the relationship between short-term glycemic control and fluctuations in cognition in youth with T1D.

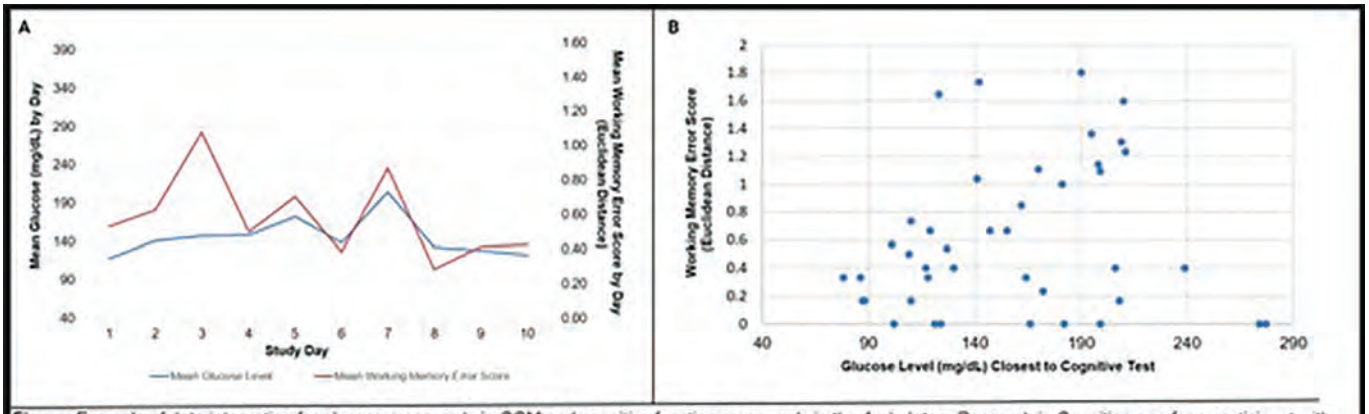

Figure. Example of data integration for glucose measured via CGM and cognitive function measured via the Ambulatory Research in Cognition app for a participant with T1D. Higher Working Memory Error Scores represent worse performance. **A)** Mean Glucose against mean Working Memory Error Score for each day of study participation. **B)** Glucose level closest to the time of each individual cognitive test; the glucose level was measured within 5 minutes of the cognitive test.

Table. Demographics and cognitive test performance for youth with and without T1D. Processing Speed=median reaction time (sec); Associative Memory=%error; Working Memory=mean Euclidean distance from selected response to correct placement of task items. Higher score=worse performance on all tasks.

	Control (N=41)	T1D (N=21)
Age: Mean (SD)	13.0 (1.8)	13.1 (2.0)
Sex: Female/Male	22F/19M	8F/13M
Race: % Non-White	12%	0%
Annual Household Income: Mean (SD)	$125,276 ($66,840)	$123,578 ($43,799)
Processing Speed Performance: Mean (SD)	1.8 (0.4)	1.9 (0.4)
Associative Memory Performance: Mean (SD)	40.0 (8.3)	42.0 (5.1)
Working Memory Performance: Mean (SD)	0.5 (0.2)	0.5 (0.2)

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Challenges of treating complicated diabetic ketoacidosis

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Introduction: While brain edema is the most common complication, accompanying systemic events make diabetic ketoacidosis (DKA) management difficult.

Objectives: Difficulties in DKA management with complications caused by accompanying pathologies and/or prolonged acidosis are presented.

Methods: Cases with Type 1 diabetes (T1D) with problems complicating DKA management were retrospectively reviewed and features at diagnosis and management are presented.

Results: Characteristics of cases are shown in the table. Case-one: after four hospital admissions brain edema, disseminated intravascular coagulation, and sepsis were treated. Right hemiparesis was associated with left frontoparietal infarct & right sinus thrombus. The right extremity was mobile on discharge. Case two: Mannitol was given for tonic-seizure, and loss of strength in the left arm was detected. Brachial nerve injury due to venous catheterization was healed with physiotherapy. Case three: serum was lipemic, triglyceride level at the 12th hour of IV fluids and insulin treatment was >1401.3 mg/dL. Gemfibrozil and omega-3 were started and on discharge triglyceride was 153 mg/dL. Case four: received antibiotics for sepsis, mannitol was given due to lethargy. Oxiris hemodialysis was performed for hyperlactatemia, hyperkalemia and prolonged acidosis. Bone marrow aspiration was performed for fever and pancytopenia and revealed aplastic anemia. Cytopenia improved with combined antibiotics.

Conclusions: Not all DKA stroke cases are due to cerebral edema and it is difficult to distinguish whether cerebral infarction is the cause or the result. Hypertriglyceridemia in DKA can range from asymptomatic cases to acute pancreatitis and is treated with insulin and/or plasmapheresis. Early treatment reduces morbidity and mortality in T1D patients with infections, but management becomes difficult due to clinical similarity. Prolonged acidosis causes complications and increases morbidity and mortality. Greater awareness of this will avoid delay in diagnosis.

P-325

Giving the child with diabetes, aged 4-12 years, a clear voice and involvement in own treatment. We present our first Prokidsdia-project data on patient reported outcomes (PROMS)

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Introduction: Our overall aim of the ProKidsDia project is to develop and clinically implement a national Danish digital, diabetes specific Patient Reported Outcomes (PROMS) measurement instrument and dialogue tool for children with Type 1 diabetes aged 4-12 (CwD).

Objectives: The specific aims of this first study were to obtain the perspectives of CwD and caregivers on impact of diabetes, and to establish a minimal set of PROMS domains. Next steps include adaption of Child Health Rating Inventories (CHRIS) to a Danish module (CHRIS-DM)

Methods: Three participatory design workshops, were executed in 2 Regions of Denmark. Relevant stakeholders partook in the workshops: 16 CwD, 36 Parents, 7 Teachers and 19 Diabetes Healthcare Professionals (HCP) and 27 facilitators. All participants (but HCP) were systematically encouraged to describe what is of personal value in daily life with diabetes and describe bio-psycho-social challenges and needs. CwD were enabled to participate in interviews and workshops based on Play based communication and storytelling methods. All workshops were audio- and video-recorded, transcribed and thematically analysed using NVivo-software and a protocolized psychometrical analysis was performed.

Case	Age (years)	Gender	Duration of diabetes (years)	Presenting sypmtom	Symptom duration (days)	Blood sugar (mg/dL)	Blood Ketone (mmol/L)	pH / HCO3	Degree of DKA
1	2	Female	0 (new)	Moaning, weakness	3	618	5.2	7.08 / 5.1	Severe
2	10	Male	0 (new)	Stomach ache vomiting	10	422	4.1	6.99 / 6.7	Severe
3	9	Female	0 (new)	Polyuria, polydipsia	30	440	6.0	7.18 / 8.7	Moderate
4	15	Female	7	Weakness	3	1028	7.0	6.2 / 1.2	Severe

Results: We have identified and described a minimal set of specific domains of specific individual value to CwD, parents, teachers and HCP, encompassing 1) social aspects, 2) emotions, 3) bodily symptoms, 4) food and 4) technology. These detailed data are now undergoing stringent psychometric analysis utilizing NVivo and will be presented as a full paper and in detail with respect to weighted impact of each item and domain on individuals and cohorts.

Conclusions: This project builds on prior work done at UC-Irvine in the US and is now being adapted to reflect Danish culture. It is the first project of this nature and magnitude, involving full and exclusive involvement of children with diabetes (4-12 years of age) describing their individual robust and representative diabetes-specific value-based areas.

P-326

Assessing mait cell frequency in children with type 1 diabetes who also have obesity

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Introduction: Mucosal Associated Invariant T cells (MAIT) are a subset of T cells with both innate, effector-like functions and adaptive functions. They are thought to be a key player linking gut microbiome and some autoimmune diseases. MAIT cells produce IL 17 when activated. IL 17 has been linked to insulin resistance although the pathway remains unclear. Both children who have obesity, and children with T1DM, have alterations in MAIT cell frequency but with conflicting results. No study has assessed MAIT in the context of T1DM with obesity

Objectives: Assess the frequency of MAIT cells in children with T1DM and Obesity

Methods: We performed a cross-sectional study on Irish children (5-16) with established T1DM who had obesity (WHO BMI z-score >2) or were lean, as well as healthy age-matched controls. We isolated PBMC from peripheral blood from each participant at a single time point. MAIT cells were defined as CD3+ CD161+ CDVα7.2+ and detected by flow cytometry. Surface markers were analysed to determine signs of activation and differentiation (CD27 and CD62L). Flowjo software was used. Statistical analysis was performed using appropriate parametric and non-parametric testing

Results: 55 children (LeanT1DM 25, ObeseT1DM 16, control 14) were recruited. We observed no difference in frequency of MAIT cells in leanT1DM 1.44% vs obeseT1DM 1.68%. ObeseT1DM MAIT phenotype was altered with higher cell surface MFI CD27 p0.04**and MFI CD62L p0.015*. ObeseT1DM in our clinic have higher insulin requirements 0.94u/kg/d vs 0.8u/kg/day. In our cohort there was no difference in MAIT cell frequency between all T1DM and healthy lean controls (1.64% vs 1.7%)

Conclusions: To our knowledge this is the first study to assess the frequency of MAIT in children with T1DM based on BMI status. Our data shows that peripheral MAIT cell frequency is similar in leanT1DM and obeseT1DM. MAIT cells in ObeseT1DM show signals of increased activation. The more activated MAIT cells in obeseT1DM cohort could contribute to insulin resistance by IL 17 signalling

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Empowering type 1 diabetes self-management: the impact of DREAMS Practicals

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Introduction: DREAMS Practicals (DP), a cornerstone of Project DREAMS (Diabetes Resources, Education, Awareness, Advocacy, Mentorship, and Support) by P. Kesavadev Trust, represents a ground-breaking approach in Type 1 diabetes (T1D) education and management. Initiated in September 2023, this initiative is designed to translate theoretical knowledge into practical skills, enhancing the self-management capabilities of individuals with T1D. The project underscores the importance of experiential learning through comprehensive, hands-on workshops and sessions across Kerala, starting with its successful launch in Trivandrum.

Objectives: Led by the DREAMS Squad, comprising healthcare professionals like doctors, dietitians, pharmacists, and diabetes educators, DP offers a dynamic learning environment. The curriculum, aligned with ISPAD and ADA guidelines, covers crucial topics such as insulin administration, self-monitoring of blood glucose (SMBG), continuous glucose monitoring (CGM), dietary management, carbohydrate counting, mental health, physical activity, and early detection of complications.

Methods: Since its start, the squad has conducted DP in different districts, involving T1D individuals, parents/guardians, and teachers/school staff. The pedagogical approach blends theory with practicals and interactive games, tailored to diabetes themes, aiming for engaging education. Pre and post-assessment tests reinforce learning, ensuring a comprehensive educational experience.

Results: DP not only provides a platform for learning and interaction but also fosters a supportive community, contributing significantly to the empowerment and improved quality of life of those with T1D. DP, beyond education, serves as a platform to identify and foster T1D advocates, empowering participants to champion diabetes awareness and management in their communities.

Conclusions: The initiative combines entertainment and education to motivate and inform participants, fostering a proactive approach to diabetes management.

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Type 1 diabetes in India: towards a strategy to transition to sustainability of programmes supported by CDiC in India

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Introduction: Introduction: The report presents a systematic analysis of CDIC's transition in India, utilizing an analytical framework to assess readiness and inform transition management. It discusses sustainability, empirical evidence, transition readiness assessment, and strategies for promoting program sustainability within the context of India's healthcare objectives.

Objectives: Objectives: The study aims to develop a structured process to scale up Changing Diabetes in Children (CDIC) programs in India for Type 1 diabetes (T1D) care, enhancing outcomes and contributing to Universal Health Coverage (UHC).

Methods: Methods: Employing mixed methods across study co-design, implementation, and analysis/reporting stages, the study utilized surveys, interviews, and desk research. Consultatory meetings refined objectives and tailored the framework, adapting the survey tool based on clinician feedback. Data triangulation informed readiness-to-transition scores, visualized through spider diagrams. Desk research supplemented findings.

Results: Results: Readiness analysis identified low integration and receptivity of CDIC programs, necessitating efforts to bolster both aspects. While CDIC demonstrated strong integration in service delivery and monitoring, deficiencies were noted in resource management and governance. Opportunities were found to align CDIC-supported services with T1D challenges.

Conclusions: Conclusions: Three pathways were identified to foster CDIC India's sustainability and align with UHC goals: integration within health systems, fostering receptivity among stakeholders, and integrating both approaches. A formal transition management process involving stakeholders is crucial, establishing clear objectives, defining transition stages, and developing incentive mechanisms. Strategic vision, data leverage, and alignment with sustainability goals are vital for successful transition management, laying the foundation for continued CDIC effectiveness in T1D care in India.

P-329

The impact of MiniMeD^{Tm} 780 g on the sleep quality among caregivers of children with type 1 diabetes

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Introduction: Achieving recommended glycemic targets with the fear of hypoglycemia are major stressors for caregivers. Caregivers are usually not achieving the minimal requirements and recommendations for sleep, consequently, increasing paternal stress and negatively impact diabetes management.

Objectives: Thus, the aim of this study was to assess the impact of Minimed^{TM} 780 G on caregivers' sleep quality.

Methods: The Arabic validated form of Insomnia Severity Index (ISI) was used to evaluate the sleep quality among 30 caregivers of children with T1D (7-13 years).The questionnaire assessed the severity of problems associated with sleep onset, maintenance of sleep, overall satisfaction with current sleep pattern, impairments and distress es caused by sleep problems. The questionnaire was assessed at baseline and after completing 3 months on automated insulin delivery (AID). Beside ISI, participants completed a sleep diary at the two tested time points.

Results: All participants were female with mean age of 36± 4.2 years. Children of the participating caregivers were diagnosed with T1D for at least 1 year. After completing 3 months on Minimed ^{TM} 780 G, time in range (TIR;70-180 mg/dL) substantially improved from 54.23 ± 6.71 % to 79 ± 7.05 % with 1.9 ± 0.91 % of the time spent below 70 mg/dL. Based on sleep diaries, the mean total hours of continuous sleep increased from 3.6 ± 2 hours to 5.5 ± 1.05 hours after completing the 3 months ($P < 0.01$). Before initiating AID, 53.3 % of participating caregivers showed clinically significant symptoms of insomnia (ISI ≥ 15) with a mean score of 17 ± 1.8 and 13.3 % of caregivers had a score suggestive of subthreshold insomnia. Three months latter, 5 caregivers (16.7%) showed scores ≥ 15 and subthreshold insomnia was diagnosed in 16.7% ($P < 0.01$).

Conclusions: Caregivers of children with T1D are at higher risk of sleep disturbance and clinically significant insomnia. Using MinimedTM 780 G was associated with significant improvement in both quantity and quality of sleep among caregivers.

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Euglycemic diabetic ketoacidosis in preschool children with type 1 diabetes mellitus using advanced hybrid closed loop system

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Introduction: Euglycemic Diabetic Ketoacidosis (eDKA) is characterized by ketonemia, metabolic acidosis (pH <7.3 and serum bicarbonates <18 mEq/L), and euglycemia (blood glucose <250 mg/dL). The mechanism of eDKA on insulin pump therapy involves a state of starvation, leading to ketosis while normoglycemia is maintained. The diagnosis of eDKA is often overlooked because euglycemia masks the underlying diabetic ketoacidosis. To the best of our knowledge, only three cases of adolescents with T1D on insulin pump therapy have been reported so far, establishing the rarity of eDKA in pediatrics.

Objectives: To assess the occurrence of eDKA in 67 children and adolescents with T1DM using advanced hybrid closed-loop systems (aHCL).

Methods: Retrospective analysis of admissions to the Emergency Department from September 2021 to October 2023.

Results: We recorded two admissions with eDKA, both in preschool girls (aged 3 and 6 years) during gastroenteritis. The 3-year-old girl is affected by Down syndrome and presented symptoms from two days; at admission, her pH was 7.29, bicarbonates 15.3 mEq/L, ketonemia 7.3 mmol/L, and glycemia 130 mg/dL. The 6-year-old girl developed several gastroenteritis episodes in the previous five days and presented with pH 7.29, bicarbonates 16.8 mEq/L, ketonemia 5.6 mmol/L, and glycemia 132 mg/dL. Both were in auto mode at the time of admission and were treated with discontinuation of the insulin pump, fluid resuscitation, and continuous insulin infusion associated with glucose saline until resolution of ketoacidosis. The discontinuation of the insulin pump continued for four hours and twelve hours, respectively.

Conclusions: To the best of our knowledge, this is the first report of eDKA in preschool children with T1DM using aHCL. The two patients presented were preschool-aged, reflecting that the vicious cycle between underfeeding and ketosis occurs more frequently in younger children.

P-331

Next-generation diabetes technology and sulfonylurea use in neonatal diabetes

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Introduction: We describe the early use of next-generation technology and sulfonylurea (SU) in two cases of neonatal diabetes (ND).

Objectives:

Methods:

Results: **Case 1** A 38-week infant (BW 2400g; -2.21 SDS) presented with respiratory distress, capillary blood glucose (BG) of 264 mg/dL. iv insulin was started but discontinued after 12 hours due to hypoglycemia. The patient was referred to endocrinology, (weight 2300g; -2.88 SDS) and was dehydrated and cachectic. Venous-BG was 386.5 mg/dL, with ketones negative, c-peptide 0.367 ng/mL, glucosuria, HbA1c 5.1% and negative diabetes autoantibodies. Intermittent iv insulin (0.01U/kg/h) was initiated for suspected ND. Hypoglycemia that may develop with subcutaneous (sc) glargine did not occur with sc continuous insulin infusion therapy (ciit). Insulin therapy was discontinued on day 75. Genetic analysis, identified a 6q24 mutation.

Case 2 A 36-week (BW 1675g; -3.92 SDS) presented with tachypnea, day 3 BG was 300 mg/dL and enteral feeding was started with discontinuous liquid treatment. Hypoglycemia occurred after sc insulin (0.1 U/kg) given because of continuing hyperglycemia and the patient was refered to endocrinology (weight 1675g; -3.92 SDS) with cachexia and hirsutism. Venous BG was 243 mg/dL, with ketones negative, c-peptide 0.312 ng/mL, insulin <0.3 mU/L, glucosuria, HbA1c 3.7% and negative autoantibodies. Sensor-guided iv insulin (0.01 U/kg/h) was initiated (day 15), followed by continuous sc infusion (Omnipod-Dash 0.05 U/h), and SU (0.12 mg/kg/day) was added on day 17. Insulin requirement ceased on day 25. SU therapy was discontinued on day 77 because of 90% time in range. Genetic analysis found a heterozygous VUS in WFS1 (c.1930G>A [p.Val644Met]).

Conclusions: Conventional insulin therapy may inadequately control hyperglycemia while increasing the risk of hypoglycemia. The use of sensor and sc ciit systems facilitates management by reducing hypoglycemic episodes. Early molecular genetic diagnosis and treatment are important even in ND. However, SU is rapid and effective in achieving normoglycemia even while awaiting genetic results.

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Evaluation for Ramadan fasting preparedness in children and adolescents with type 1 diabetes: an experience from Indonesia

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Introduction: A comprehensive program of preparing children and adolescents affected by type 1 diabetes (T1D) for fasting during Ramadan in Indonesia - one of the countries with the highest number of affected patients.

Objectives: This study aims to evaluate the preparedness of children and adolescents with T1D for fasting during Ramadan.

Methods: A pre-post study was conducted in Jakarta, in March 2024. The participants (N=25) were children and adolescents with T1D who completed both pre-post tests before and following the symposium and workshop about fasting preparedness. During the activities, participants received education about essential topics related to fasting such as insulin adjustments, monitoring, and meal planning. They also engage actively in discussions surrounding their cases and filled out the IDF-DAR 2021 risk stratification questionnaires.

Results: The majority of subjects were aged 2-11 years (N=11;44.0%) with the median age being 12 years in the range 7-18 years and being female (64%). The subjects mostly used basal-bolus insulin (84%). According to IDF-DAR, 57% of participants were at high risk, 42% at moderate risk. Based on SMBG, 50% have good SMBG, 33% suboptimal, and 17% poor. Seventy percent of participants had HbA1C levels <7.5%, 20% had 7.5-9%, and 10% had >9%. According to the participants' responses, even before the activities, more than half of the participants could correctly answer questions regarding diabetes and fasting (82%), insulin dose (96%), complications (73.3%), blood glucose monitoring (96%), nutrition management (92%), and physical activity (84%) during fasting. There is no significant increase in the pre-post test results before and after the activities (P=0.091). However, a noticeable increase occurs for two aspects, namely the knowledge related to complications (88%) and physical activity during fasting (92%).

Conclusions: In general, the participants have relatively adequate basic knowledge related to fasting education. Continued efforts are needed to address knowledge and preparedness for fasting during Ramadan.

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Correlation between self-monitoring of blood glucose using Indonesia pediatric mobile application and HbA1c levels in type 1 diabetes patients

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Introduction: Self-monitoring of blood glucose (SMBG) and HbA1c are essential in diabetes care. Understanding their correlation can optimize diabetes management and reduce complications.

Objectives: To investigate the correlation between SMBG and HbA1c levels in patients with type 1 diabetes (T1D).

Methods: This paper presents a correlation analysis of secondary data available in PrimaKu apps that contain information regarding T1D patients' registration of their SMBG activity and blood glucose level for a period of 3 months and the following HbA1c level. The subjects are children and adolescents (2-21 years). Out of 153 samples, 112 samples met the inclusion criteria.

Results: A total of T1D 112 patients were included with a median age of 12 years, female (N=59; 52.7%), male (N=53; 47.3%). Mostly the subjects were aged 2-11 years (N=46;41.1%). The average blood glucose level of the patients over 3 months was 161.18 mg/dl. Based on SMBG frequency within our study revealed notable differences, more than half of the sample falls into the low frequency categories (N=77; 68.8%), the medium-high frequency only 31.3% (N=35), which means that the awareness of SMBG is still very low, with only 8% (9 out of 112) adhering to the Indonesian Pediatrician Society's recommendations. This data indicates that the majority of our samples are non-compliant in SMBG. Meanwhile, our study showed a significant negative correlation between the frequency of SMBG and HbA1c level (p=0.007). This implies that patients who did SMBG more frequently tend to have lower HbA1c levels. The negative correlation coefficient result showed that an increase in the frequency of SMBG correlates with a decrease in HbA1c level. The correlation found to be weak (r= 0.255).

Conclusions: The more compliance in SMBG can result in more optimal metabolic control among children and adolescents with T1D. We recommend continuing comprehensive diabetes therapy to achieve optimal metabolic control as well as support and monitoring from both healthcare professionals and family.

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Cross-sectional and longitudinal relations between parent and child diabetes distress and child HbA1c

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Introduction: Diabetes Distress (DD) captures the emotional and behavioral challenges that people experience related to living with or caring for someone living with type 1 diabetes (T1D). DD is common in school-age (8-12yrs) youth and their parents and cross-sectional research suggests positive associations between child and parent DD and HbA1c.

Objectives: Here, we aimed to examine both cross-sectional and longitudinal relations between parent and child DD and child HbA1c.

Methods: We recruited 158 families of school-age youth with T1D (mean child age= 10.2±1.5 years; 51% male, 82% Non-Hispanic White, mean baseline HbA1c=8.0±1.7%) to complete the parent and child versions of the Problem Areas in Diabetes-Child (PPAID-C and PAID-C, respectively) at baseline and again 6-months later. We also collected baseline demographic data and child HbA1c at both timepoints. We used a linear regression model to examine how PPAID-C and PAID-C scores at baseline relate to child HbA1c at baseline and six months later.

Results: In both cross-sectional models (baseline and 6-months), the PPAID-C, but not the PAID-C, was significantly associated with higher HbA1C, β=.03, t(157)=3.62, p<.001 (baseline) and β=.03, t(157)=3.30, p=.001 (6-months). In the longitudinal model, the PAID-C, but not the PPAID-C, significantly predicted HbA1C six months later, β=.01, t(157)=2.32, p=.02.

Conclusions: Our analyses suggest that only parent DD was significantly related to higher HbA1c at the same timepoint, both at baseline and 6 months later, but that only child DD at baseline predicted higher HbA1c six months later. This indicates that we may see delayed impacts of child DD on glycemic levels, which further highlights the importance of 1) routine DD screening in both parents and children and 2) targeting parent and child DD in treatments aimed at lowering child HbA1c.

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Identifying current challenges in pediatric type 1 diabetes diagnosis and management in Indonesia: a report of a health needs assessment conducted in diabetes camps

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Introduction: Type 1 diabetes (T1D) is one of the most common non-communicable diseases (NCDs) in children and adolescents.

Objectives: A health needs assessment (HNA) was conducted during diabetes camps to identify current challenges in diagnosis and management.

Methods: The HNA was distributed as an offline paper survey to caregivers of children and adolescents living with T1D who attended Changing Diabetes in Children (CDiC) Indonesia diabetes camps in Batu, East Java, and Parung, West Java in June and July 2023 respectively.

Results: The HNA was completed by 41 caregivers of children living with T1D who were 10-17 years old. The median age at the time of diagnosis was 9 (8.6 ± 3.6) years old, with the majority being female (58.5%). T1DM diagnosis predominantly occurred in top-tier hospitals (63.4%). Self-monitoring blood glucose (SMBG) is still a challenge with 29.3% reporting that they check blood glucose levels less than four times a day. Several reasons for not checking more often include feeling lazy and tired, inconvenience when away from home, and limited blood glucose strips. Other prevailing challenges include the management of acute illnesses as 68.3% of respondents stated that their child has previously been admitted to hospital for diabetic ketoacidosis (DKA). Most DKA episodes occurred at the time of diagnosis. While most were able to reach their healthcare facility within 2 hours, 10.7% of respondents stated that distance was often a hurdle.

Conclusions: While there have been clear advancements in T1DM management and diagnosis in Indonesia over the years, the lived experiences of families and children living with T1DM speak to the need for further improvements of current strategies. There is an existing urgency to strengthen the healthcare system by training healthcare professionals to promptly diagnose T1D. Patients and families must be supported with better diabetes education as well as support with regard to access to SMBG and other diabetes care.

P-336

Impact of using hybrid closed loop (HCL) systems in a tertiary children's hospital: real world experience

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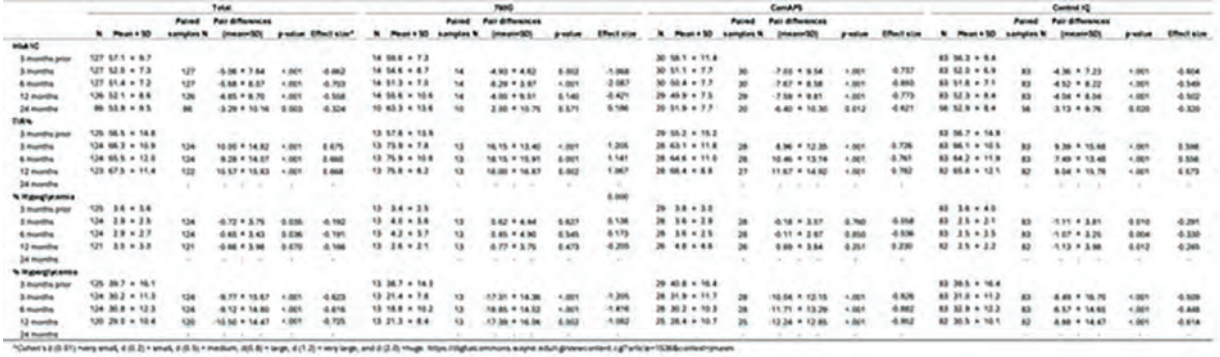
Introduction: HCL insulin systems are associated with better glycaemic control and reduced hypoglycaemia risk. They are an advanced form of insulin delivery for people with type 1 diabetes mellitus (T1DM).

Objectives: The study aimed to evaluate effectiveness of three HCL systems in children and young people (CYP) with T1DM at Nottingham Children's Hospital.

Methods: Patients who started either Medtronic MiniMedTM 780G, CamAPS FX (CamDiab, Cambridge, UK) or Tandem Control-IQ AP system between December 2019- November 2022 were included. Data on HBA1c, Time in range (TIR), Time below range and time above range three months before and at 3,6,12 and 24 months after HCL commencement were collected from Diasend® system (Glooko), Dexcom Clarity, and Care link. Time below range and above range were calculated as combination of percentages of low/very low and high/very high, respectively.

Results: A total of 127 patients were eligible (mean age 10.5±4.3 years, 50% boys, 75% White British and diabetes duration 4.8±3.9 years). Among those, 17 were on Medtronic 780G, 30 on CamAPS FX and 83 on Tandem Control-IQ AP. Outcome measures at



different time points and by HCL system were summarized in Table 1. Improvements in HBA1c, TIR, and time above range were seen with HCL for 3 months & was sustained at 12 months in all three systems. HCL significantly reduced HbA1c at 12 months (52.0±7.3 vs 57.1±9.7, p<0.001) and at 24 months (53.9±9.5vs 57.1±9.7, p=0.003). Cohen's d was calculated as -0.558 and -0.324, indicating a medium and small effect, respectively.

Conclusions: Comparison within the systems was not possible but 12 months data showed a greater reduction in HbA1c with CamAPS FX, more TIR with 780G, more reduction in Time below range with Control IQ and more reduction in Time above range with 780. It is interesting to see improvement in TIR not reflected in improved HbA1c with 780 but we think this may be due to patients' blood glucose levels spending more time in the higher range of TIR.

P-337

Case study of a child patient with neuropathy complication in type 1 diabetes: medical history and symptoms development

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Introduction: Diabetic neuropathy complication of type 1 diabetes (T1D) rarely occurs in children. An understanding of the rare case can add valuable insights to the existing knowledge in the field.

Objectives: This study aims to describe the medical history and experience of a child patient with suspected neuropathy complications of T1D.

Methods: This study used a qualitative single case study design. A female child patient (aged 7 years) diagnosed with T1D within 2 years and her mother were interviewed regarding the history of diabetes, symptoms of neuropathy, medication history, and home care in handling the child's illness. The Michigan Neuropathy Screening Instrument (MNSI) questionnaire is used to cross-check the neuropathy symptoms. Data was analyzed with qualitative content analysis.

Results: The patient was diagnosed with diabetic ketoacidosis at the age of five. The insulin dose has been increased several times within 2 years because she showed more severe symptoms. Her latest A1c was 7.5%. Of 15 items in the MNSI questionnaire to detect diabetic neuropathy cases, the examination resulted in 7 matched symptoms: open wounds, sensitive skin and foot, prickling feelings in legs and foot, able to sense feet when walking, and severe symptoms of fatigue during the day. While parents tried to provide the best home care for the patient, parents reported the challenge of doing routine blood glucose checks several times. The strict diet restrictions, during the first few months after the diagnosis, often worsen the patient's reaction to do SMBG or to take medication. With adequate and continuous education from health professionals, both parents and the child have a better understanding about how to treat the illness.

Conclusions: Neuropathy complications could occur within two years after being diagnosed with T1D. MNSI is the initial tool for screening diabetic neuropathy. Further examinations, such as nerve conduction velocity testing, are required to ensure that the patient receives the proper medication.

P-338

Depressive symptoms, screen time, physical activity, and family meals for adolescents with type 1 diabetes

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Introduction: Adolescents with Type 1 diabetes (T1D) are vulnerable to depressive symptoms. Screen time (ST), physical activity (PA), and eating meals with one's family are modifiable lifestyle behaviors previously shown to affect mood.

Objectives: This study examined how ST, PA, and eating family meals together are related to depressive symptoms in adolescents with T1D.

Methods: At outpatient medical visits, adolescents with T1D (n = 216) electronically completed the PHQ-9, Adolescent Version (PHQ-A, Johnson et al., 2002) and an adolescent health questionnaire (AHQ; DiFiore et al., 2023) with questions about ST use > 2 hours/day excluding homework (yes/no), number of days in the previous week with > 60 minutes of PA, and whether they eat family meals together (yes/no). PHQ-A and AHQ results and background variables (e.g., diabetes duration, age, sex, race, ethnicity, BMI) were obtained from the medical record. Linear regression models adjusted for background variables were used to examine associations between lifestyle behaviors and depressive symptoms.

Results: Adolescents with T1D had a median (IQR) age of 16.1 (2.1) years old and diabetes duration of 7.1 (6.9) years. On the PHQ-A, most teens endorsed minimal symptoms (median: 1.0, IQR: 4.0). The majority engaged in over 2 hours/day of ST (78.2%) and ate meals with family (81.5%). On average, adolescents engaged in PA on 4.06 $\pm$ 2.13 days/week. Adolescents with T1D who indicated that they had family meals (B = -3.17, $p < .001$) and completed more days of PA (B = -.41, $p < .001$) endorsed fewer depressive symptoms. ST > 2 hours/day was not associated with depressive symptoms.

Conclusions: Shared family meals and increased PA levels may be protective against depressive symptoms for adolescents with T1D. ST was not associated with depressive symptoms, but our measure may lack sufficient sensitivity. In addition to direct interventions with adolescents, caregivers may be able to positively affect adolescent mood by prioritizing mealtimes together and encouraging PA.

P-339

A follow-up of the randomized, placebo-controlled, clinical trial DIAPREV-IT evaluating the effect of Diamyd on the progression to type 1 diabetes in children with multiple islet cell autoantibodies

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Introduction: There is a great unmet need for treatments delaying the progression to stage 3 type 1 diabetes (T1D). DiAPREV-IT and DiAPREV-IT2 were investigator-initiated, randomized, placebo-controlled trials (RCT) testing if Diamyd (rhGAD65) administration could delay stage 3 T1D in children with multiple autoantibodies. Independently, the studies (completed before 2019) did not show a statistically significant effect of Diamyd. However, since the conclusion of the trials, efficacy of Diamyd has been shown to be dependent on the presence of the HLA DR3-DQ2 genotype.

Objectives: To perform a follow-up of participants in the two RCTs to investigate if Diamyd delays the diagnosis of stage 3 T1D in subjects with HLA DR3-DQ2.

Methods: Follow-up based on data from the Swedish National Diabetes Registry and phone interviews (mean time from baseline to diagnosis or last follow-up of 7 years).

Results: 40 of 76 participants in the RCTs carry HLA DR3-DQ2. In this group, 28 participants have been diagnosed with stage 3 T1D as of 02/2024. Cox proportional hazards regression was used to analyze time to T1D diagnosis. Time to diagnosis was not affected by treatment with Diamyd vs Placebo in the full population (n=76) HR 1.069 95%CI 0.598: 1.911, p=0.82. In the DR3-DQ2 group (n=40) a tendency was seen in favor of Diamyd, HR 0.701 (0.318: 1.545) p=.38, clearer in DiAPREVIT, HR 0.493 (0.208: 1.172) p=0.11. T1D incidence rate (number diagnoses / person-years) analyzed using Poisson regression model showed a similar pattern. A rate ratio (Diamyd vs Placebo) of 0.539 (0.228:1.273) p=0.16 was seen in DiAPREVIT participants with HLA DR3-DQ2 (n=28).

Conclusions: These hypothesis-generating results, while not reaching statistical significance, suggest a delayed time to stage 3 T1D in Diamyd treated individuals carrying HLA DR3-DQ2 compared to placebo. No benefit was seen in individuals negative for HLA DR3-DQ2, highlighting the need for a precision medicine approach in future studies with Diamyd.

P-340

Knowledge of hyperglycemia in people living with type 1 diabetes through tele-education: a follow-up study

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Introduction: Despite limited resources, Pakistan allocates only 0.05% of its GDP to healthcare. With a population of approximately 230 million, organized education is urgently needed to enhance the knowledge of families dealing with type 1 diabetes (T1D). A tele-education program was initiated post-COVID-19 to improve diabetes self-management among 400 children, young adults (below 22 years), and their caregivers, all registered with Meethi Zindagi, an NGO aiding the underprivileged.

Objectives: To assess the impact of tele-education on Knowledge of Hyperglycemia in People Living with Type 1 Diabetes Mellitus.

Methods: An observational study tracked 10% of 400 children under 22 who received tele-education. They were randomly chosen and remained consistent for follow-up. This is the 3rd session out of ten, completed in January 2024. The first session's results were e-posted at the IDF Virtual Congress 2023, while the 2nd session's results were accepted for poster presentation at the Diabetes UK Professional Conference 2024. A school teacher and T1D community members ensured language and content clarity. A structured telephonic session included pre-session questions, topic-based information delivery, and post-session reassessment after eight weeks. Simple descriptive statistics were collected before and after the session to gauge the impact of tele-education on hyperglycemia knowledge, assessed for statistical significance using SPSS 21.

Results: All results are tabulated with N=40 and P<0.05

Table 1

Study Observations	Pre Session %	Post Session %
Knowledge about fasting & before meals blood glucose levels (70-120 mg/dl)	70	77.50
Knowledge about good range for post meal blood glucose levels (90-180 mg/dl)	75	90
Knowledge about complication of high blood glucose level	32	94
Knowledge about glucose level readings considered as high	5	87.50
Knowledge about yearly regular laboratory tests	15	65

Conclusions: The findings of this study indicate a strong and statistically significant enhancement in knowledge concerning the management of type 1 diabetes and hyperglycemia through tele-education. This underscores the importance of structured educational programs for families coping with type 1 diabetes. Moreover, it emphasizes the necessity for further prospective studies to delve into the correlation between specific educational topics and the enhancement of knowledge.

P-341

Failure of MiniMed 780g to maintain glycemic targets in a type1 diabetic on steroid treatment

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Introduction: The MiniMed 780G integrates glucose monitoring and insulin delivery with customizable settings like 2-hour active insulin time and a 100 mg/dL glucose target, auto-corrections every 5 minutes. Glucocorticoids cause elevated blood glucose levels by antagonizing the effects of insulin, directly and indirectly.

Objectives: To discuss a challenging situation faced with 780G insulin pump in managing steroid induced hyperglycemia.

Methods: The 12-year-old girl was diagnosed with autoimmune type 1 diabetes in August 2022, with an initial HbA1c of 15%. Following management with MDI, her HbA1c improved to 8.4% by April 2023. In May 2023,she transitioned to an insulin pump (780 G), which led to further improvement of HBA1C 7.1% by September 2023. In November 2023, she was additionally diagnosed with juvenile idiopathic arthritis and was prescribed prednisolone starting at 5 mg on November 21, 2023, which was increased to 10 mg on December 2,2023. Prior to steroids, her time in target remained at 80% which decreased notably to 65% after initiation of steroids which further diminished to 49% after change in dose. The only feasible mechanism was to administer boluses by simulating carbohydrate intake called pseudo-carbs. The insulin carbohydrate ratio for the patient was adjusted to 1:10 from 1:15, and the active insulin time was reduced to 2.0 hours. Initially, there were elevated glucose readings following these.The pump algorithm facilitated an improvement in glycemic control after time period of 1 week.

Results: NA

Conclusions: The Minimed 780G's PID algorithm struggled to maintain glycemic control in a child on glucocorticoid treatment due to its inability to predict and manage insulin sensitivity fluctuations. This led to suboptimal glycemic control, increasing the risk of diabetic ketoacidosis for the child. Addressing these challenges involves closely monitoring blood glucose levels and maintaining direct communication with caregivers to address any issues concerned.

P-342

Integrated care process (ICP) in the inaugural episode of type 1 diabetes mellitus (T1DM) in children and adolescents

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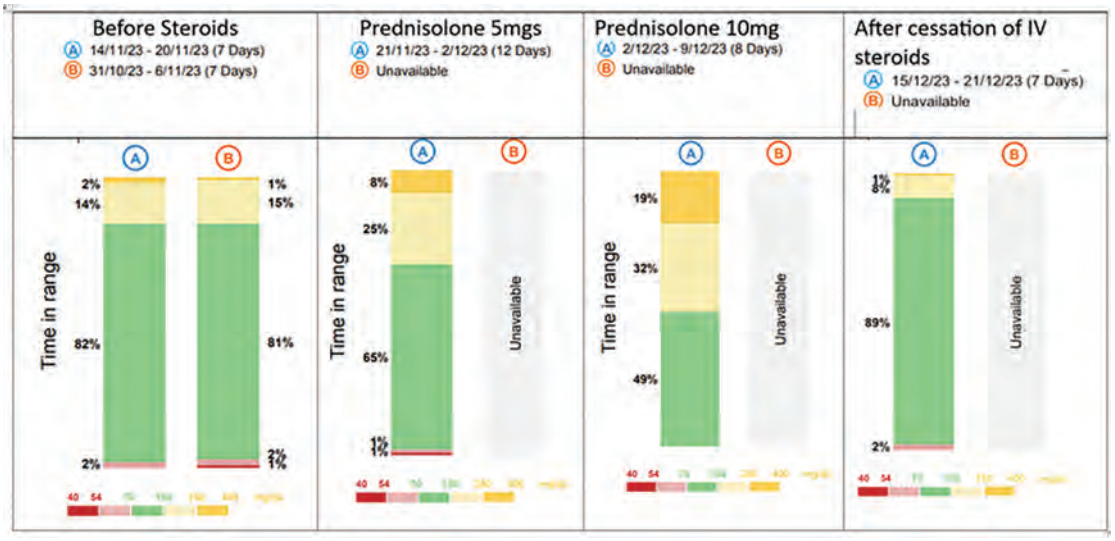
Introduction: The inaugural episode of T1DM may be a burden on children, their caregivers and health care providers. An ICP was implemented in a level I hospital in 2015, aiming to establish a standardized approach of care to all inaugural episodes of T1DM and to promote shorter hospital stays (4 days).

Objectives: Evaluate ICP compliance and verify if the 4 quality indicators were achieved in ≥80% of cases.

Methods: Observational, retrospective, descriptive study of all hospitalizations in a pediatric unit due to an inaugural episode of T1DM between 2015 and 2023 in a level I Portuguese hospital. Compliance of the ICP and the 4 indicators were assessed: 1) >70% of blood glucose levels between 70-180mg/dL in the 24 hours before discharge; 2) patient/caregiver knows how to assess



capillary blood glucose; 3) patient/caregiver knows how to administer insulin, and 4) patient/caregiver knows how to detect and correct hypoglycemia. Statistical analysis was performed using SPSS 21.0

Results: There were 69 hospitalizations, 52% female, with a median age of 10.6 [1.9 – 17.7] years and a mean hospital stay of 5.4 ± 1.8 days (67%> 4 days). There were 7 educational sessions scheduled for each patient but 12% were not conducted. Of the sessions conducted, only 51% were performed on schedule. Indicator 1 was met in 71%, indicators 2 and 3 in 94% and indicator 4 in 83%.

Conclusions: The target for indicator 1 was probably not met due to the difficulty in achieving the glycemic target in the early stages of treatment. About 2/3 of hospitalizations lasted >4 days, which needs improvement. According to our results, there were also procedures that may not have been performed (or were performed but not in the scheduled day) but we identified significant gaps in completing the paper form (that maybe could be avoided if a computerized checklist were used), which may indicate a failure in recording procedures rather than their execution. There is a need to raise awareness among professionals for better compliance of the ICP.

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Abstract Withdrawn

P-344

The broad health, social, and economic burden of type 1 diabetes: a value taxonomy

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Introduction: The burden of Type 1 diabetes (T1D) and the potential benefits of novel technologies have been underestimated mainly because traditional health technology assessment (HTA) has focused on a narrow list of health-related outcomes (i.e., direct mortality and morbidity and healthcare cost savings) and failed to consider the broad health, social, and economic burdens of T1D. Examples of broad impacts include labor force participation and productivity, educational attainment, mental health, and stigma.

Objectives: To develop a conceptual framework capturing the broad health, economic, and social impacts of T1D and to assess the extent to which these impacts have been overlooked in traditional HTA.

Methods: We conducted a targeted literature review on the nature and magnitude of the broad impacts of T1D on patients, caregivers/family, the health sector and society. We also elicited the opinions of T1D experts and those with lived experience of T1D on the broad impacts.

Results: Our conceptual framework includes 19 value elements related to the impacts of T1D on physical and mental health, labor market outcomes, healthcare and nonhealth costs, education, public finances, and social outcomes. We found significant gaps in the evidence that considers the broad benefits of T1D-related technologies. Some studies reviewed incorporate certain labor market impacts of T1D in assessing the value of alternative technologies. Other impacts (e.g., education, caregiver productivity) have been substantially neglected so far.

Conclusions: Since T1D is a lifelong condition with sizable health, social, and economic impacts, failure to account for those broad impacts may lead to biased decisions concerning the funding, development, approval, and reimbursement of novel therapies. Accurate assessment of the full societal burdens of T1D would likely support further investment in approaches to delay T1D onset and improve T1D management.

P-345

Effect of closed-loop insulin delivery system on glycemic control in an adolescent with type 1 diabetes

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Introduction: Type 1 diabetes is a chronic disease that is characterized by the destruction of the beta cells of the pancreas, leading to impaired glucose regulation and persistent hyperglycemia, and consequently the need for lifelong insulin replacement therapy. Closed-loop control systems for insulin delivery can improve glycemic outcomes in young children with type 1 diabetes.

Objectives: The aim of this paper is to describe the glycemic profile of a young adolescent girl with type 1 diabetes during the 3 months following the installation of a closed-loop insulin delivery system.

Methods: young adolescent girl with type 1 diabetes during the 3 months following the installation of a closed-loop insulin delivery system.

Results: The patient was 12 years old and had been followed for 5 years for autoimmune type 1 diabetes, with positive anti-GAD antibodies and anti-IA2 antibodies. The patient was not underweight or had any associated autoimmune disease, she was

in Tanner stage 3 and had no degenerative complications, the patient had been on an insulin pump for 1 year, the closed-loop insulin delivery system had been installed 3 months ago, and hbA1c at baseline was 8%. On the FSL data for the 3 months before initiation of the closed-loop insulin delivery system, the patient was 38% within target, 60% above 180 mg/dl and 2% below 70 mg/dl. After 3 months, hbA1c was 6,7%, the patient was 81% within target (70-180 mg/dl), 16% between 180-250 mg/dl, 1% above 250 mg/dl, 2% below 70 mg/dl, no blood glucose levels below 54 mg/dl, mean blood glucose was 150 ± 45 mg/dl, variability was 28.7%.

Conclusions: Several studies have focused on the strengths, benefits, and limitations of the closed-loop insulin delivery system, which algorithms are the main features of current insulin delivery systems, which represent a crucial advance towards fully automated closed-loop systems.

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Rare combination of diabetic ketoacidosis and hyperosmolar hyperglycemic syndrome in type 1 diabetes – a case report

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Introduction: Hyperosmolar Hyperglycemic Syndrome (HHS) occurs in approximately 10-15% of people with type 2 diabetes, in children and adolescents with type 1 diabetes this condition is rare.

Objectives: 9-years old boy with a history of vomiting the previous day, polydipsia with an excessive intake of hyperosmolar fluid (apple juice), fatigue and somnolence on the morning of admission. Emergency physician's findings: Glasgow coma scale 3, Kussmaul's breathing, temperature 39.9°C, blood glucose (BG) not measurably high. Improvement in alertness after volume boluses with saline (48,5mL/kg body weight[bw]) Baseline: pH 7.10, lactate 2.6 mmol/L, ß-hydroxybutyrate 4.2 mg/dL, BG 1400 mg/dL, osmolarity 422 mOsm/kg, creatinine 4.09 mg/dL, CK 1675 U/L, Na^{2+} 148 mmol/L, K^{+} 4.0 mmol/L. Follow-up (7 hours): pH 7.31, HCO3 19.7 mmol/L, Na^{2+} 167 (max.176) mmol/L, BG 769 mg/dL, lactate 3.6 mmol/L, osmolarity 377 mosmol/L, creatinine 2.48 mg/dL, GOT 52 (max. 192) U/L, GPT 32 (max 351) U/L, CK 2323 (max 49383)U/L, troponin I 1519 ng/L, NT-proBNP 2371 (max. 4738) ng/L, CRP 0.52 mg/dL. Normalization of all laboratory parameters within 3 –to 7 days

Methods: Onset of T1D with moderate DKA in combinati on with HHS, signs of malignant hyperthermia with cardiac co-reaction, rhabdomyolysis, hypernatremia and consecutive prerenal failure. The decreased vigilance led to the suspicion of cerebral edema. There was no evidence of infection.

Results: Intravenous fluid replacement with 0.45% saline (avg 150ml/h) and insulin (0.025 IU/kg bw/h). High fluid intake and furosemide treatment was carried out for rhabdomyolysis over 7 days. One dose of mannitol (0.5 g/kg bw) for initially suspected cerebral edema

Conclusions: The treatment of HHS differs from those for regular DKA requiring higher amount of fluids and lower dose of insulin, in order to have a slow compensation of hyperosmolality. Life-threatening complications such as stress-induced malignant hyperthermia, hypernatremia, rhabdomyolysis and acute renal failure require a multidisciplinary management.

P-347

Diabetic children's blood glycemic self-monitoring journal, is it reliable?

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Introduction: Logbooks of self-monitoring of blood glucose (SMBG) are useful in the modulation of insulin regimens, which aid in achieving glycemic control in type 1 diabetes mellitus (T1DM). However, discrepancies in SMBG charting may impede its utility.

Objectives: To evaluate the reliability and accuracy of journal entries in relation to the memory of the glucometer in children with DT1 and its impact on the glycemic results in the medium term.

Methods: The self-monitoring blood glucose (SMBG) in the journals were compared to the memory readings of the glucometer in accordance with the international standard ISO 15197 using the EMPECS software in 2 groups of 10 diabetics (G1 control, G2 software knowledge) for a duration of 6 weeks, aged 6 to 16 years; with a DT1 history of 1 to 13 years, followed by a diabetic consultation

Results: 164 SMBG on average, i.e. 3.5/ day reported to the journal vs. 3.9 tests / day for G1 and 177 SMBg i.e 3.65/ day vs. 4.2 tests / Day for G2. Errors in glucose graphs were observed in 1.3% compared to the transmitted values in (G1) versus 0.3% (G2); manufacturing in 1.7% versus 2.4% (G2). 85% of shots were accurate in (G1) vs. 94% (G2). All had more marked postponement omissions for G2. The 3 children with 100% accurate SMBG records had an average drop of -0.76 in HbA1c in the 3rd month of follow-up.

Conclusions: The reliability of SMBG journals is an important problem for children with DT1, so it is important to incorporate the reading software into the diabetic consultation and the use of continuous CGM blood glycemic measurement systems for better control.

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Type 1 diabetes management and hypoglycaemia-related anxiety in competitive athlete: a case study

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Introduction: There is a lack of specific knowledge on diabetes management and exercise, which leads to suboptimal results, with frequent hyper and hypoglycaemia affecting athlete's long-term health, quality of life, and ability to perform activity.

Objectives: To manage T1DM in a 16-year-old award-winning freestyle dancer who has hypoglycaemia-related anxiety due to the risk of disqualification from competition.

Methods: Patient was diagnosed with T1DM in 2021 with DKA shortly after recovering from COVID 19. Dancing has been her passion since she was 2 years old. She is managed at a district general hospital in the UK. To find the optimum management technique, variety of interventions were applied, including MDI and finger-prick, MDI and CGM (Dexcom G6), CSII (t:slim X2) and CGM (Dexcom G6), untethered pumping (t:slim X2 and levemir: 1.5 units) and CGM (Dexcom G6), CSII (t:slim X2) and CGM (Dexcom G7), along with a referral to an expert exercise diabetes dietitian in the country. Activity involved long periods of consecutive, high-intensity freestyle dancing, which equates to more than 30 hours of activity per week. Freestyle dancing involves a combination of multiple aerobic movements resulting in hypoglycaemia and can also cause an adrenaline rush, resulting in high blood glucose levels.

Results: The CGM revealed only 2% low while, 33% high blood glucose levels in an average of two weeks' time, which indicated that there is a discrepancy between the sensor and finger-prick blood glucose levels as reported by the patient and also evidenced by multiple hospital admissions due to frequent low blood glucose levels. Closed-loop hybrid systems are extremely useful for the management of T1DM in complex situations and have provided patients with comfort and ease. However, the reliability of the sensor plays a pivotal role in determining the role of CSII. Untethered pumping is also an interesting approach. However, it did not reap much benefit in this case.

Conclusions: Management of T1DM in athletes is very individualized.

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A case of neonatal diabetes from Kazakhstan

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Introduction: Neonatal diabetes mellitus is a rare condition characterized by the onset of transient or permanent hyperglycemia within the first six months of life due to impaired insulin function and a monogenic mutation.

Objectives: The persistent hyperglycemia observed in the infant necessitated insulin therapy, highlighting the severity of the condition.

Methods: We report a case of a 6-week-old infant (birth weight 1.4 kg, height 43 cm) with neonatal diabetes who presented hyperglycemia up to 756 mg/dl from the second day of birth and received insulin therapy. We had well-controlled glycemia on the insulin pump, but only for 12–15 hours each time after we set up the pump, and then we kept having hyperglycemia above 300 mg/dl due to repeatedly bent insulin pump cannulas, which might be due to a thin subcutaneous fat layer. The challenges faced with insulin pump therapy, such as bent cannulas leading to inadequate insulin delivery and subsequent hyperglycemia, underscore the importance of careful monitoring and troubleshooting in infants with NDM. The patient had stable glycemia with negative urine glucose and ketones on multiple insulin injections with a basal and bolus insulin doses. We recommended labs for diabetes autoantibodies but have not received the results yet. The mention of detecting diabetes autoantibodies underscores the importance of distinguishing between monogenic and autoimmune forms of diabetes. The genetic testing is recommended due to monogenic etiology of NDM too; but the test has not yet proceeded due to its current unavailability.

Results: The lab results showed: HbA1C 6.52%, insulin 0.20 mIU (2.60–24.90), C-peptide 0.02 ng/ml (1.10–4.40), positive urine glucose, urine ketones were detected only once after birth.

Conclusions: Thus, this case highlights the multifaceted approach required for the diagnosis and management of neonatal diabetes mellitus and the importance of further detection of diabetes autoantibodies along with genetic testing for their diagnosis and therapeutic implications.

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Artificial pancreas has huge impact on glycaemic parameters in children with T1D in the western world- what is next?

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Introduction: Hybrid closed loop (HCL) insulin pump i.e. **Artificial pancreas**, has revolutionised diabetes management in people with T1D. Choices with HCL pumps and CGM devices helps the health care team to choose the right combination based

Table-1

	Demographics		
Total	36/98 of T1D	[M-16, F-20] {1 outlier excluded}	
Age at diagnosis	7.3 (1.7- 14.8) yrs		
Age at start of HCL- 12.1 (5.1- 16.7) yrs		**Duration of HCL**- 0.47 (0.08- 0.77) yrs	
Glycaemic outcomes	**Just before HCL start**	**Latest data (5/4/2024)**	**p value**
TBR (<4 mmol/l)	3.5 (0-10)	2.3 (0- 11)	**0.041***
TIR (4-10 mmol/l)	54.8 (20- 92)	65.2 (32- 80)	**0.00001***
TAR (>10 mmol/l)	41.2 (7- 78)	32.5 (17- 57)	**0.00015***
HbA1c	58.4 (36- 86)	56.7 (36- 72)	0.17 - NS
BMI SDS	+0.01 (-1.23 to +2.58)	-0.05 (-1.17 to +2.39)	0.16 - NS

Limitations: Short observation period in a single centre.

on clinical and financial grounds. Rapidly evolving technology is a huge challenge for MDT teams managing person with diabetes. Regular technological refreshers and also support from information technology team in the health care set up is crucial.

Objectives: To assess the impact of tubeless HCL pump (Omnipod- Insulet) in improving overall glycaemic control in children and young person (CYP) with T1D

Methods: A retrospective analysis of all children moved over from open loop tubeless pump (Omnipod Dash) to closed loop version (Omnipod 5) in Bangor hospital, North Wales, UK. All of them were using open loop pump with CGM device at the time of change over (either F2F or remotely).

Data on basic demographics were collected. The glycaemic outcomes on TBR, TIR, TAR and HbA1c levels were collected at the time of change over and at the latest time point. BMI SDS score was also collected for similar time points. Any reported severe hypoglycaemias documented.

"Paired T test" is used to calculate statistical significance between time points. Results are expressed as Mean (Range), summarised in Table-1.

Results: 1/3 of our cohort was moved over to HCL therapy. One was excluded due to outlier status on BMI SDS.

1. All glycaemic parameters (TBR, TIR, TAR) showed statistically significant improvement
2. HbA1c improved by 1.7mmol/mol but not significant
3. BMI SDS remained stable during the follow-up period

Conclusions:

1. Artificial pancreas (HCL) clearly improves the glycaemic control with long term benefits
2. This technology provides remote access to patient data for effective & timely management
3. Financial support is paramount and this precludes wider use of HCL technology in resource limited settings

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Variable expressivity of the KCNJ 11 gene mutation in a family with diabetes mellitus

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Introduction: The KCNJ11 gene is associated with autosomal recessive familial hyperinsulinism, autosomal dominant familial hyperinsulinism and autosomal dominant KCNJ11-related early onset diabetes.

Objectives: We analized the variable expressivity of a KCJN 11 gene mutation in a family with more than one case of diabetes

Methods: Because of the present of more than one case of DM in the same family, we performed a genetic test in all members starting from the index case

Results: We present the case of F.L.Z. that came in our clinic at the age of 15 years with increased glycemic values. Clinically, he presents severe obesity, BMI = 37.4 kg/m^2. Biologically, the diagnosis of diabetes mellitus was confirmed by a Hb A1c of 11, 5% He was initiated on BBT with an ultra-rapid insulin analogue and glargine 300 U- insulin. We performed a C peptide analysis that showed a value of 2.62 ng/dl (normal 0.9-7.1 ng/dl) and anti-GAD 65 and anti- ICA antibodies that were both negative. Because the father was also diagnosed with type 2 DM and in the absence of signs of autoimmunity, the possibility of monogenic diabetes was raised. We recommended a genetic test-Invitae Monogenic Diabetes Panel that identified a pathogenic variant at the level of the KCNJ 11 gene, a heterozygous mutation c.616C >T (p.Arg206 Cys). This variant is present in population databases with a low frequency (gnomAD 0.0012%). Next we tested this specific mutation on the other family members that came pozitive for the mother and negative for the father and sister. Considering the genetic diagnosis and the decrease of HbA1c, the therapeutic scheme was reconsidered. He returned at the age of 17 years for reassessment. We found poor glycemic control with HbA1c of 11.2%.

Conclusions: The genetic testing allowed us to differentiate between type 1,type 2 and monogenic diabetes in the index case and to establish a proper therapy. Also we observed that the expresivity of KCNJ 11 mutation is variable in the same family, the mother still don't have biological signs of diabetes.

P-352

More informed school, more controlled diabetes

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Introduction: Type 1 Diabetes Mellitus (DM1) significantly affects patients' and families' quality of life and it is essential to ensure adequate care in all contexts, particularly at school.

Objectives: This study aims to evaluate the perception of caregivers/patients and the school community regarding DM1 management at school.

Methods: Descriptive cross-sectional observational study using two questionnaires: one aimed at caregivers/children with DM1 (Q1) receiving care at a level II hospital's Diabetes consultation, and another aimed at the school community with past or present contact with children with DM1 (Q2).

Results: Q1 - Out of 82 respondents, 33% of patients were attending pre-school and primary school. Additionally, 58.5% reported having support from a responsible employee (RE) appointed by the school. Of 10 children who are not able to independently carry out any essential step in DM1 control, 2 don't have any RE assigned. In the classroom, 6.1% cannot check capillary blood glucose (CBG) or administer insulin (AI) and 7.3% cannot eat to correct hypoglycemia. Around 9% have restrictions on school activities, mainly in Physical Education, and 50% expressed dissatisfaction or identified areas needing improvement. Q2 - Involved 103 respondents that revealed concerning gaps in knowledge and support. Regarding hypoglycemia, 36.9% don't know how to recognize symptoms and 44.7% don't know what glucagon is. Concerning hyperglycemia, 48.5% don't know how to recognize symptoms and 55.3% don't know how to act. Additionally, 5.8% reported that CBG/AI checks were not allowed in the classroom, and 6.8% noted restrictions on food intake. Around 10% recognize that there are restrictions on school activities, mainly sports. Only 32.1% felt confident in managing DM1.

Conclusions: There is a clear need to reinforce intervention at school to improve the care provided, in order to ensure an inclusive, non-discriminatory and safe education.

P-353

Abnormal glucose tolerance in children with Cystic fibrosis - a single centre study

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Introduction: Cystic fibrosis related diabetes (CFRD) is one of the most common complications of cystic fibrosis (CF). Around a half of patients develop CFRD by the age of 25 years, so annual screening using oral glucose tolerance test (OGTT) is recommended starting from childhood.

Objectives: Screening for abnormal glucose tolerance in pediatric patients above10 years of age.

Methods: Children aged 10 to 18 years, without acute pulmonary exarcerbation one month prior, were prospectively recruited to undergo OGTT, measuring fasting blood glucose levels and at 30, 90, 60 and 120. minute, as well as C-peptide, insulin and HbA1c levels.

Results: OGTT was performed in six patients, four male (66.7%) and two female (33.3%). Average age was 15 years and 3 months (median 15 years), while average BMI was 19.5 kg/m^2 (median 19.8 kg/m^2). Average FEV_1 was 86.7 % (median 83.3%)The results are presented in Table 1.

Fasting glycemia was normal in all patients. One male patient had impaired glucose tolerance with 2-hour plasma glucose level of 10.6 mmol/l. C-peptide and insulin values were normal in all patients. Indeterminate glycemia (INDET) was present in two patients, one male and one female. The 1-hour plasma glucose levels were 11.1 and 11.6 mmol/l retrospectively.

Conclusions: CFRD is associated with pulmonary exacerbations, lung function decline and increased mortality. INDET requires continuous monitoring of glycemia. Glucose levels monitoring is necessary during acute exacerbations of the disease. Annual OGTT screening is necessary for the early detection of INDET and CFRD.

	Average	Median
Fasting glucose levels (mmol/l)	5.13	5.2
Glucose levels 30. minute (mmol/l)	8.95	9.35
Glucose levels 60. minute (mmol/l)	9.3	9.35
Glucose levels 90. minute (mmol/l)	8.4	9
Glucose levels 120. minute (mmol/l)	6.6	5.7
Fasting C-peptide levels (ng/ml)	1	1.04
Fasting insulin levels (μU/mL)	5.98	5.3
HbA1c (%)	5.7	5.8
HOMA-IR	1.37	1.21

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Mauriac syndrome, a rare complication of T1DM

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Introduction: Mauriac syndrome is a rare complication of poorly controlled diabetes mellitus.

Objectives: This case presents Mauriac syndrome in a 17-year-old female with a development of acute hepatic insufficiency.

Methods: In history, T1DM was diagnosed at the age of 10. She admitted to having complaints of instable glycemic, episodes of hyper and hypoglycemia, abdominal pain, swelling of the face, eyelids, memory impairment, drowsiness, and hair loss. Mauriac syndrome was diagnosed after 3 years of diabetes manifestation. On physical examination at the admission: moon facies, protuberant abdomen, hepatomegaly, short stature, physical and puberty maturation delay, height 139 cm SDS (-3,87), weight 41,2 kg SDS (-2,44), BMI 21,32 kg/m^2. Labs: hypoglycemia-2.30 mmol/l, HbA1C-12.85%, total cholesterol-17.99 mmol/l, LDL-13.72 mmol/l,triglycerids-7.71 mmol/l, ALT-223.30 ME/l, AST 271.50 ME/l, GGT-211 ME/l, urea-7.60 mmol/l, GFR-80.4 ml/min. Hormone profile: TSH-417 mIU/ml, anti-thyroid peroxidase autoantibodies-75.31 ME/ml, thyroxin-< 0.525 pmol/l, estradiol level-13.29 pg/ml, FSH 8.03 mIU/ml, ESR-69.00 mm/h, proteinuria-0.45 g/l, microalbuminuria-34.40 mg/l. On ultrasound and CT: hepatomegaly. On the 3rd day of hospitalization, the patient's general condition has worsened with an appearance of severe abdominal pain, hyperthermia, severe weakness, and lethargy, and he has developed acute liver insufficiency by a sharp increase in liver enzymes: AST 2383.82, ALT 476.94, LDH 771.20, and GGT 219.60. Considering the condition, extended detoxification methods proceeded for the purpose of extracorporeal detoxification: continuous venovenous hemofiltration.

Results: After a 10-hour treatment on hemodiafiltration, the condition stabilized with improvements: AST 982.99, ALT 347.87, GGT 211.70. On discharge: AST 150.40, ALT 169.50, GGT 171.20

Conclusions: The case shows the severe complication of poor controlled T1DM, which mostly occurs in families with a disadvantaged social status without proper care, which is typical for this patient.

P-355

Family ties. Journey of wolfram syndrome in siblings and cousin from lMIC

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Introduction: Wolfram syndrome is a multifaceted degenerative neurological condition that can lead to a range of symptoms such as diabetes insipidus, diabetes mellitus, optic atrophy, and deafness. Typically, diabetes mellitus is the initial symptom of this syndrome, succeeded by the onset of optic atrophy, neurosensory hearing loss, and ultimately diabetes insipidus.

Objectives: ITS CASE SERIES

Methods: CASE SERIES

Results: It is triggered by a genetic mutation, affecting the WFS1 gene. This mutation impacts the role of Wolframin, a protein essential in various cells throughout the body, including those in the brain, pancreas, muscles, heart, liver, and kidneys. The dysfunction of Wolframin is responsible for the characteristic traits linked to Wolfram Syndrome. This case report describes a rare instance of Wolfram syndrome affecting a single family, with two siblings and a cousin displaying early-onset diabetes mellitus during the first decade of life. Subsequently, one of them experienced progressive hearing and visual impairment during the second decade of life, with genetic testing confirming the mutation in WFS1 gene. This report emphasizes the critical role of genetic counseling and early detection in families with a prior history of Wolfram syndrome, underscoring the essential requirement for implementing comprehensive management strategies aimed at enhancing the quality of life for individuals affected by this condition.

Conclusions: This report emphasizes the critical role of genetic counseling and early detection in families with a prior history of Wolfram syndrome, underscoring the essential requirement for implementing comprehensive management strategies aimed at enhancing the quality of life for individuals affected by this condition.

P-356

Accessing technology and challenges of technology use in school in children with type 1 diabetes mellitus (T1DM)

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Introduction: The aim was to investigate the difficulties encountered by patients using the Continuous Glucose Monitoring System (CGMS) in our clinic when accessing and using technology in their daily lives.

Objectives: .

Methods: A total of 103 children using CGMS among 535 children with T1DM who were regularly followed up in our clinic between 2020 and 2023 were included. Problems related to accessing and using technology were identified during diabetes team-family meetings. Demographic characteristics, duration of diabetes, method of accessing CGMS, and HbA1c levels before and after CGMS use were recorded for all cases to evaluate the effect of technology use on metabolic control.

Results: The proportion using CGMS among the 535 cases with T1DM was 19% (n=103) and 67% accessed it through their own means, 33% with government support, and only 6.5% (35/535) of all cases were able to get government support. Of school-age cases, 8% experienced problems with technology use at school. The

median (range) age was 9.48 (2.79-18.31) years, and the median duration of diabetes was 6.17 (0-17.34) years. There was no significant difference between parental education level and HbA1c (p=0.46 and p=0.08, respectively) in those using or not using CGMS. When socioeconomic level was investigated, all fathers were working, while 17% of mothers (n=18) were working and 45% of families were receiving minimum wage. The HbA1c of those using CGMS decreased from 8.1% to 7.8%.

Conclusions: Although Turkey falls into the category of upper-middle income countries according to the World Bank, the sensor usage rate is very low, and low socio-economic groups face difficulties in accessing diabetes technologies. Although the number of those using CGMS with government support has increased in recent years in our country, it is still inadequate.

P-357

Factors associated with ketoacidosis at diagnosis of type 1 diabetes in children and adolescents

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Introduction: The diagnosis of type 1 diabetes in youth is often associated with diabetic ketoacidosis, which is a cause of high morbidity that can be preventable if early diagnosed.

Objectives: The aim of our study is to identify the factors associated with diabetic ketoacidosis at diagnosis of type 1 diabetes in children and adolescents.

Methods: A retrospective chart review of 527 children and adolescents diagnosed with type 1 diabetes at the Endocrinology-Diabetology and Nutrition Department. The Statistical analysis was performed using SPSS version 21 software.

Results: Of a total of 527 patients, 204 (49%) patients presented with diabetic ketoacidosis(DKA) at initial diagnosis. The median age of diabetic ketoacidosis patients was 10 ±5.2years. The patients with diabetic DKA were younger than non-diabetic DKA patients (10 versus 13 years, P=0.002), thinner (mean body mass index was 18 ± 4.07 versus 19.8±4.7 kg/m^2, P = 0.002) and had a less frequent family history of type 1 diabetes than those without DKA at presentation (11 versus 28%, P = 0.001). The mean duration between first symptoms and first consultation was longer in diabetic ketoacidosis patients 15 ±9days versus 10 ± 8 days. For the more specific symptoms of hyperglycemia, polyuria, polydipsia, fatigue, and weight loss are more frequently described in the case of DKA, the triggering factor was often an infection (53.2%).HbA1c levels were significantly higher in youth with diabetic ketoacidosis versus those who were not (10.2% ± 1.5% versus 9.5% ± 1.4%,).

Conclusions: Several factors influence the risk of developing diabetic ketoacidosis in the diagnosis of type 1 diabetes, the importance and the seriousness of ketoacidosis impose preventive measures based on awareness, information, and education campaigns.

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Statural growth in type 1 diabetic children

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Introduction: Type 1 diabetes is the most common chronic endocrine disease in children. It affects the quality of life of children and their families. It is responsible for adverse effects on stature and pubertal development.

Objectives: The aim of our work is to describe the various growth disorders observed in type 1 diabetics.

Methods: This is a retrospective descriptive study including 117 type 1 diabetic patients aged under 21 years, hospitalized at the Endocrinology Diabetology and Nutrition Department between 2016 and 2023. Weight and height were interpreted according to the growth curve: Sempé-Pédron and statistical analysis by SPSS version20 software.

Results: The mean age was 12.9±3years, 19.5% of patients were less than 10 years old, and the sex ratio (M/F) was 1. The age of diabetes was 3.2±4years, with inaugural diabetes in 20% of cases. 70% of patients had normal initial weight (-1DS≤Weight≤+1DS) and 68% had normal height(-1DS≤height≤+1DS). 15% of our patients had a weight ≥2DS, and only 15% had a weight below -2DS. In terms of stature, 17% of patients had a height ≥2DS, and stature retardation was noted in only 15% of cases (≤2DS). Mean HbA1C was 12.2±2.5%. In our series, we found a statistically significant correlation between diabetes imbalance and growth anomalies, on the other hand, we did not find a correlation between diabetes age and growth anomalies.

Conclusions: Poorly controlled diabetes in the past was a predictive factor for stunted growth, so careful monitoring of growth in young diabetics is essential, and good glycemic control must be maintained.

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Uncontrolled type 1 diabetes mellitus and lipodystrophy

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Introduction: Type 1 diabetes mellitus is a chronic disease. Lack of metabolic control leads to the progression of micro and macrovascular complications reducing the quality of life of those patients.

Objectives: In this study, we aimed to evaluate the contribution of lipodystrophy in uncontrolled Type 1 diabetic patients.

Methods: This is a retrospective, descriptive study including a total of 280 children and adolescents with Uncontrolled T1DM, followed in the Department of Endocrinology-Diabetology and Nutrition, from 2014 to 2023. All the patients in our study received a clinical examination, biological evaluation included HbA1c. Statistical analysis was performed using SPSS version 21.

Results: The mean age of our study group was 18 ± 11 years old, with a sex ratio (M/F) :0,72. Seventy five percent of the patients their a disease duration was > 5 years.The mean of HbA1c was 10±6 %. Sixty-five percent of the patients were overweight or obese. In our study, the factors of uncontrolled diabetes were: 77% of the patients had lipodystrophy, 25% inappropriate treatment, 20% dietary errors, 10% non-adherence to medication. The macro-and-microvascular complications were detected in 7%. Lipodystrophy had a negative impact glycemic control. However a statically significant was found between lipodystrophy and disease duration.

Conclusions: Lipodystrophy is one of the factors of Uncontrolled T1DM with negative influence on insulin therapy, hence the importance of inspection and palpation of the insulin injection sites.

P-360

Improving type 1 diabetes care access through an innovative school-based mobile clinic

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Introduction: Good glycemic control is key for preventing long-term complications of of type 1 diabetes (T1D). Previous studies have shown attendance at follow up appointments improves long-term disease outcomes.

Objectives: We aim to determine the feasibility of a pediatric mobile diabetes clinic to overcome transportation barriers to improve attendance at regular diabetes visits.

Methods: We conducted a 6-month pilot and feasibility study in three school districts located in under-resourced communities. 17 students with T1D were willing to attend their diabetes appointments on a mobile clinic which travelled to their school. Acceptability and willingness to attend the mobile clinic was assessed. Diabetes clinical outcomes (HbA1C and diabetes-related hospitalizations) were collected at baseline and conclusion of the pilot, as well as in 6 months prior to the first mobile clinic visit. To understand improvement in care access, the number of patients meeting the recommended 4 visits per year were determined.

Results: Patients had an average age of 12.2 ±3.2 years. 13 participants identified as Black, three as Hispanic/Latinx, and one as White. All patients lived in disadvantaged neighborhoods, with average national Area Deprivation Index at the 87 ± 9.2 percentile. 63% were seen twice in the prior 6 months. 94% of patients had 2 or more visits in the 6 months after the initial mobile clinic appointment. Acceptability of the care delivery model was high, with 82% of patients attending a second diabetes visit on the mobile clinic. At this time, demand is also high with 91% (10/11) of approached school districts agreeing to participate in the program.

Conclusions: This data suggests that this innovative model of health care is feasible and comparable to standard clinic visits for youth with type 1 diabetes. Furthermore, it demonstrated acceptability and demand for this program. This pilot study has built the foundation for expansion of the program to 10 school districts, setting the stage for future efficacy testing.

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Feasibility, acceptability, and impact of a type 1 diabetes education curriculum for school nurses

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Introduction: Children and adolescents with Type 1 diabetes mellitus (T1D) spend the majority of their day at school; therefore, school nurses play a vital role in diabetes management. However, few school nurses have received formal diabetes education to adequately care for these patients.

Objectives: This study evaluates the acceptability, feasibility, and impact of a T1D education program for school nurses on diabetes knowledge and self-efficacy.

Methods: In this cohort study, we offered a T1D education curriculum for school nurses that covered: 1) general knowledge of diabetes, 2) blood glucose monitoring, glucose sensors, 3) carb counting, insulin dose calculations, insulin administration, 4) sick day management, insulin pumps, 5) exercise and hypoglycemia, and 6) resilience and disease burnout. Measures of school nurse diabetes knowledge and self-efficacy were captured before and after the curriculum, as well as at 3 and 6 months post-curriculum.

Results: All 6 school districts contacted enrolled. A total of 119 nurses within 103 schools consented to participate. 87 completed all the curriculum. Most nurses had a basic knowledge of T1D. Though knowledge assessment did not change after completing the curriculum their knowledge assessment scores statistically improved at 6 months. Nurses' self-efficacy scores improved immediately following education ($p < 0.001$) with sustained improvement at 3 and 6 months.

Conclusions: This study demonstrates that there is a clear demand for T1D education for school nurses and that a structured T1D curriculum improves nurses' self-efficacy and potentially T1D knowledge in the long run. Further studies are needed to determine the impact of school nurse education on patient health outcomes.

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Predictors of glucose control in children and adolescents with type 1 diabetes

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Introduction: Poor glycemic control is a major health problem that greatly contributes to the development of diabetes-related complications.

Objectives: The aim of our study is to identify the predictors of glucose control in children and adolescents with type 1 diabetes.

Methods: A retrospective study of 527 children, adolescents, and young with type 1 diabetes who had follow-up at the Department of Endocrinology-Diabetology and Nutrition. Data were collected from patient medical files. The Statistical analysis was performed using SPSS version 21 software.

Results: The mean age was 18±11.05 years, with a predominance of women (53.7%) and the mean duration of diabetes was 7.6±6.3 years. The Initial average of HbA1c was 10.9±4.8%. Nearly 64% of patients had inadequate glycemic control (HbA1c ≥7,5 %.). These patients had a low level of education (62%), a fragile socioeconomic status and poor geographical accessibility of the care facility, a high body mass index (41% on overweight). Non-adherence to treatment scheduled was present in 35%, a lack of blood glucose monitoring in 47%, and the presence of lipodystrophy in 52%, celiac disease was present in 12.2%.

Conclusions: Poor glycemic control of patients with type 1 diabetes is multifactorial. These factors require special attention to optimize glycemic control and limit the early onset of complications associated with this disease.

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T1D glycaemic control in immigrant and Portuguese youth

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Introduction: In Portugal, according to 2022 Eurostat data, immigrant citizens reached 7.6% of the resident population, mainly arriving from Brazil and Portuguese-speaking African countries. However, many young immigrants with T1D live in households where their native language is not Portuguese, resulting in communication barriers. Additionally, their relocation makes them face the need to adapt to a different culture.

Objectives: To access glycaemic control in a cohort of immigrant and Portuguese young people with T1D.

Methods: A longitudinal study of youth with >2y of T1D followed in one Paediatric Centre. Collected variables: nationality, native language, household and family educational level, T1D duration, and treatment.

Results: 311 PwD [59.5% males; median age 14.5y(3.3 to 19.7y)] were enrolled: 66.2% Portuguese, 20.3% Portuguese-speaking immigrants, and 13.5% non-Portuguese-speaking immigrants. When compared to native citizens, immigrants had higher mean HbA1c (12.1 vs 9.8%) and DKA at onset (67 vs 32%). On the other hand, they had lower: CSII use (25 vs 78%), daily SMBG (2.9 vs 4.2 pricks), biparental household (25 vs 74%), and parents' educational level (5 vs 12y). There were no differences in mean age at onset (11.1 vs 10.3 y), mean T1D duration (4.8 vs 4.3y), and flash CGM use (79 vs 84%). Immigrants with different native languages had lower mean TIR (49 vs 76%), and higher mean variability (46 vs 35%) when compared to Portuguese speakers.

Conclusions: Immigrant T1D youth have worse glycaemic control, which may be linked to higher vulnerable socioeconomical minorities. On the other hand, despite the similarity in CGM use, non-Portuguese-speakers had poorer TIR and variability results, potentially connected to less efficient communication during diabetes education. Recognizing and addressing these hurdles holds the potential to enhance glycaemic management, improve overall quality of life, and reduce complication rates. Implementing a plan to set strategies to improve care in immigrant PwD is urgent.

P-364

Development and evaluation of Gamellito audiovisual production with children with T1D in the COVID 19 pandemic

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Introduction: The COVID-19 pandemic abruptly changed the routine of children with DM1. Restrictions on social contact made it difficult to carry out physical activities, access medical appointments and supplies to control the disease. Furthermore, the tension and uncertainty of that period could have a negative emotional impact on diabetes control.

Objectives: Develop and evaluate a strategy to approach children and adolescents with T1D that would alleviate the emotional impact of that moment through "diabetes education" activities at the beginning of the Covid-19 pandemic

Methods: The children were invited via social media to illustrate with their drawings the story of Gamellito, an extraterrestrial diagnosed with T1D. The material produced was edited by our

team and, every week, a new episode was published on the Gamellito DM1 YouTube channel. At the end, parents answered a questionnaire to evaluate the project's contribution to their children's lives.

Results: 124 children accepted to participate in the activity for a period of 4 months, 72.6% between 3 and 12 years of age, from 8 different countries: Brazil, Chile, Argentina, Uruguay, Guatemala, Mexico, Colombia and Spain. 12 episodes were developed in Portuguese and 2 in Spanish. According to research with parents, audiovisual production increased knowledge about T1D, based on scientific recommendations in an interactive, playful and educational way; and the children felt represented in the stories and were able to express their view of T1D through drawings in a light and fun way, suitable for this age group.

Conclusions: The restrictions imposed by the pandemic contributed to us seeking creative solutions in the care of children with T1D. Gamellito's audiovisual production actively involved children and brought benefits that went beyond entertainment, as it involved an educational content approach in a interactive and playful format, an activity that can make a difference in the quality of life of children with T1D.

Written informed consent was obtained from the guardians of the individual depicted for publication of this image.

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Sustained improvement of glycemic control in children and adolescents with type 1 diabetes mellitus, 12 months after transitioning from multiple daily injections (MDI) to advanced hybrid closed loop (aHCL), without significant change in BMI-SDS

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Introduction: Recent studies have shown that Advanced Hybrid Closed Loop (AHCL) insulin delivery system offers better glycemic control to children with Type 1 Diabetes Mellitus (T1DM). AHCL is the only AID (automated insulin delivery system) available to date in Greece and is being reimbursed during the last 20 months.

Objectives: In this monocentric prospective study, we compared Continuous Glucose Monitoring(CGM) metrics, HbA1c and BMI- SDS of children with type 1 Diabetes Mellitus(T1DM), (>12 months diabetes duration), previously on MDI and Flash Glucose Monitoring- FGM, before and 3, 6 and 12 months after transitioning to AHCL "auto-mode" function.

Methods: 25 children (6 boys) with T1DM (mean age 12.69 years, mean diabetes duration 3.45 years, 20 pubertal), previously treated with MDI/FGM for at least 6 months, without diabetes complications, were enrolled in the study. There was an open-loop phase between MDI and AHCL phase (median duration 20 days). Reliable FGM and CGM data (sensor use >70%) as well as HbA1c and BMI-SDS were reported before, 3 (n=25), 6 (n=21) and 12 months (n=15) after transitioning to AHCL.

Results: There was a statistically significant decrease in GMI from 7.27% in MDI/FGM to 6.73% (3 months), 6.76% (6 months) and 6.71% (12 months) in AHCL phase ($p<0.002$) and an increase in TIR (61.69% to 78%, 78.24% and 77.8% respectively ($p<0,0001$). TBR decreased from 3.36% (MDI/FGM) to 2.08% after 3 months and 1.33% after 6 months on AHCL ($p<0.05$). HbA1c decreased from 7.62% (MDI/FGM) to 6.82% after 3 months (n=17, $p<0.01$) and 6.96% after 12 months (n=14, $p<0.05$) in AHCL. BMI-SDS has not significantly changed over the 12-month follow- up period.

Conclusions: In this monocentric study, children with T1DM achieved rapid and sustained improvement of their glycemic control, 12 months after initiation of AHCL, compared to previous treatment with MDI and FGM, without significantly increasing their BMI-SDS. These findings encourage health care professionals to transition pump- naive children with T1DM directly to AHCL.

P-366

Integrating depression screening in type1diabetes health care: lessons from rural India

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Introduction: Emerging research indicates that depression exists significantly in Adolescent and young adult [AYA] population living with Type1Diabetes [T1D] and often goes undiagnosed. Adolescents with type 1 diabetes have 5 times the rate of depression than those without. Only 25% to 50% of people with diabetes who have depression get diagnosed and treated.

Objectives: Our objective was to screen for the prevalence of depression using PHQ9 in the AYA living with T1D in rural and low resource settings.

Methods: 215 AYA in age range 13-25years were screened. Informed consent from ethics committee, the PWD and the guardian was obtained. All the AYA are members of UDAAN, a support group where they receive medical care, structured education, peer group support and 24x7 helpline access. All were prescreened for ability to understand the language. PHQ9 [validated version in Hindi] was administered under qualified supervision.

Results: 195 completed the PHQ9. The scores were calculated and are presented in the table below.

Conclusions: Of the 195 AYA living with T1D who took PHQ9, 51[26%] self-reported to have symptoms of moderate to severe depression. Looking at this percentage, we conclude that screening for depression is advisable as a routine step in diabetes care so as to create optimum treatment strategies.

Severity distribution

Row Labels	Number	Percentage
No symptoms reported (0)	8	4.10%
Minimal depression (1-4)	58	29.74%
Mild Depression (5-9)	78	40%
Moderate depression (9-14)	35	17.95%
Moderately severe depression (15-19)	12	6.15%
Severe depression (>20)	4	2.05%
Grand Total	**195**	

P-367

A thematic analysis of factors responsible for complacency in type1diabetes self-care in low resource settings in rural India

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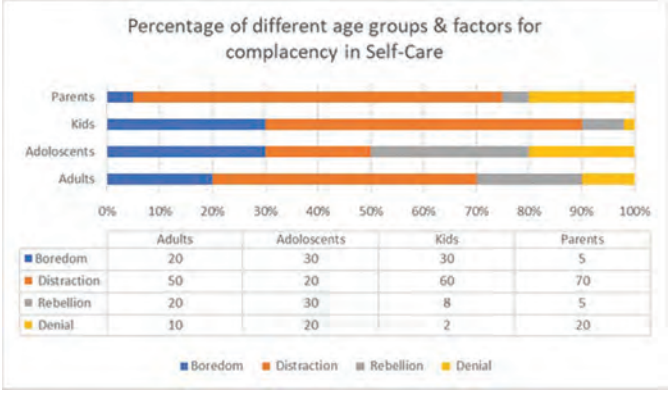
Introduction: Living with chronic disorders can be exhausting and lead to complacency in self-care over time. In low resource rural settings, the reasons and context changes as there is low literacy, the need to work on daily basis to survive, and social stigma.

Objectives: To identify the factors that lead to complacency in self-care for Type1diabetes in low resource rural settings in spite of free of cost medical support and structured diabetes education.

Methods: All the participants were members of UDAAN a support group in western India. 324 PWD of 8-25 years of age and their parents were interviewed with open-ended questions and their responses were recorded. Thematic analysis for the responses was carried out. The responses were tabulated as per age group and frequency of occurrence.

Results: Results indicate that participants had mainly four reasons for being complacent in self-care.1. boredom: tired of doing the same thing every day 2. Distraction: many other more necessary tasks at hand such as play, work, study, and social life.3. Rebellion: desire to resist the compulsion of self-care acts 4. Denial: unwilling to accept the need for self-care. The age-wise distribution of factors leading to complacency is given in the graph below.

Conclusions: **T**he major factor for complacency in parents, adult PWD and kids was distraction. This meant that diabetes self-care could not be prioritized over need to work for livelihood by parents and adult PWD and play by kids. The major factors in adolescents were boredom and rebellion. This meant adolescents were tired of repetition and compulsion of the process of self-care. We conclude that understanding the factors for complacency in self-care in low resource settings can help design strategies in Diabetes self-management education that encourage activities that promote higher levels of self-reflection and critical thinking.



	Adults	Adoloscents	Kids	Parents
Boredom	20	30	30	5
Distraction	50	20	60	70
Rebellion	20	30	8	5
Denial	10	20	2	20

P-368

Initial steps in studying diabetes type in young people at Bach Maihospital

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Introduction: Diabetes mellitus is increasing, appearing at earlier ages and affecting young people, especially in low- and middle-income countries, including Vietnam. The proportion of diabetes at young peole in Vietnam is increasing, but no research has been done on it yet

Objectives: To describe the signs and symptoms of diabetes in young people, and initially identify the type of diabetes and some of its causes in this study group.

Methods: In this follow-up descriptive study, 127 diabetic patients aged from 18 to 40 years old, with a duration of less than 5 years, followed up in the period from July 2021 to August 2022.

Results: Type 1 diabetes and type 2 diabetes had different rates, 24.4% and 67.7%, respectively, and then postpancreatitis diabetes mellitus accounted for 7.9% of all cases. The average age at diagnosis in the study was 29 years old, with the distribution rate in both genders being no different, 53.4% and 46.6%. Most of the young patients included in the study were at the onset of the disease, accounting for 56.7% of the total number of patients. The disease symptoms were different between diabetes types, with statistical significance in patients with type 1 diabetes and type 2 diabetes. Postpancreatitis diabetes mellitus has mainly four T signs of diabetes at the time of diagnosis.

Conclusions: There are differences in the incidence of type 1 and type 2 diabetes in young people. Postpancreatitis diabetes mellitus can also occur in this age group, and screening is recommended when associated symptoms and manifestations are present.

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The role of technology to improve glucose control of migrant children with type 1 diabetes

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Introduction: Migrant status may obstacle the management of type 1 diabetes (T1D) and the use of diabetes technologies.

Objectives: To compare glucose control and treatment choice of migrant children with T1D visited by our center from 2021 to 2023 vs all patients followed at our center in the same period. Patients at our center represent approximately 40% of children with T1D in Lombardy.

Methods: Auxological parameters, HbA1c (%), type of glucose monitoring [by blood (BGM), flash (FGM) or continuous (CGM) glucose monitoring], and treatment modality [multiple daily injection (MDI) insulin therapy, sensor augmented pump (SAP), advanced hybrid closed loop (AHCL)] were recorded. Data were obtained from our hospital record. The statistical method used was the unpaired Welch t-test.

Results: Migrant population: 89 patients (43F, 46M), mean age 13yrs±4.5, mean HbA1c 7.76±1.49. Of these, 70% use MDI (4 use BGM, 58 use FGM) and 30% use pumps (2 SAP, 25 AHCL). HbA1c is significantly different between pump and MDI users (7.19±0.92 vs 8.01±1.62) with pvalue=0.0034. Regarding all the 1012 children (467F, 545M) with T1D followed at our center: mean age 13.4yrs, mean Hb1Ac 7.2±1.3. Of these, 55% are pump users (mean Hb1Ac 7.0±1.3) and 45% are MDI users (mean Hb1Ac 7.6±1.3). HbA1c is significantly different between pump and MDI users (7.0±1.3 vs 7.6±1.3) with pvalue<0.0001. HbA1c is significantly higher in migrant children vs overall (p value=0.0009). There is no significant difference in HbA1c between migrant pump users vs overall. Even if HbA1c is higher in migrant pump users compared to the total sample of patients in our center who use insulin pumps, this difference in not statistically significant.

Conclusions: Technology use in migrant children with T1D is less than desirable due to cultural and linguistic barriers. Our study portrays that migrant children with T1D who use advanced technology show improved glucose control which is comparable to non migrant children, thereby reducing the healthcare gap.

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Improved glucose control by implementing an advanced hybrid closed-loop system in non-compliant adolescents with type 1 diabetes

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Introduction: Disordered eating behaviours and suboptimal adherence to treatment regimens are the main causes of deterioration in metabolic control in patients with type 1 diabetes (T1D).

Objectives: To examine the impact of Tandem Control IQ (CIQ) advanced hybrid closed-loop (AHCL) system on a cohort of adolescents with suboptimal glucose control.

Methods: After 12 months by CIQ AHCL placement we evaluated the glucometrics of 20 non-adherent adolescents with T1D who were using multiple daily injections (MDIs) and flash glucose monitoring (FGM). One patient was excluded from the study 8 months later due to poor acceptance of insulin pump. Glucometrics were assessed at baseline, after 6 months and 12 months of CIQ use.

Results: Time in range (TIR) increased from 27.1% ± 13.7 at baseline to 54.5% ± 14.1 at 12 months. Time above range (TAR) > 250 mg/dL decreased from 46.1% ± 23.8 to 18.7% ± 11.3. No significant difference in TAR 180-250 mg/dL at 12 months. Mean glucose levels improved from 251 mg/dL ± 68.9 at baseline to 184 mg/dL ± 25.1 at 12 months. Comparing the data at 6 and 12 months it was evident a slight decline in glucose control, although not statistically significant. TIR decreased from 60.4% ± 13.3 at 6 months to 54.5% ± 14.1 at 12 months. TAR > 250 mg/dl increased from 15.5% ± 10.5 to 18.7% ± 11.3. TAR 180-250 mg/dL also raised up from 21.7% ± 5.2 at 6 months to 24.8% ± 5.4 at 12 months. Mean glucose levels grew from 175 mg/dL ± 25.5 to 184 mg/dL ± 25.1.

Conclusions: This retrospective observational study demonstrated a substantial improvement in time in range (TIR), decrease in time above range (TAR) and reduction of mean glucose levels after 12 months of AHCL system use, compared to baseline. However, it didn't show an improvement of glucose control between 6 and 12 months. This issue could be overcome with more frequent outpatient check-ups and multidisciplinary approach with both pediatric diabetologists and experts in nutritional and psychological fields.

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Sushi and pizza in type 1 diabetes: just do it

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Introduction: High-fat and high-carbohydrate meals, such as pizza and sushi, can be difficult to manage due to their composition. This is particularly challenging for young people with type 1 diabetes, who often rely on eating out as a social activity. Therefore, it is essential to provide accurate information to help them better control these meals and avoid hyper- or hypoglycemia.

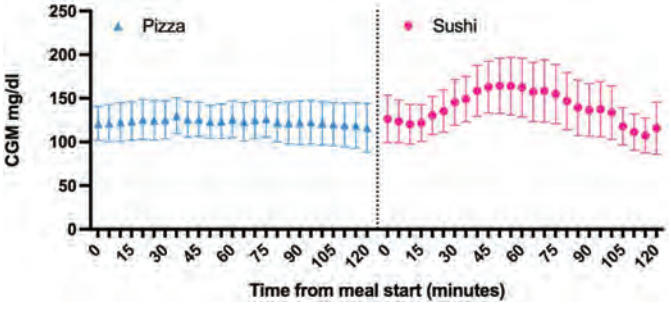
Objectives: This study aims to describe glucose metrics after consuming sushi and pizza in a group of adolescents with T1DM.

Methods: The study included 26 patients with type 1 diabetes, 13 males and 13 females, who participated in a winter diabetes camp. All participants used the same Continuous Glucose Monitoring (CGM) technology, Dexcom G7. The first dinner consisted of sushi with a total carbohydrate intake (CHO) of 120 g, and a single bolus before the meal was chosen as the strategy. For the second dinner, pizza with a total CHO of 160 g was selected, and a split bolus was chosen, with one half taken before the meal and the other half taken an hour later.

Results: The mean glucose levels at the meal start were 126 mg/dl for sushi and 129.4 mg/dl for pizza. After one hour, they rose to 162 mg/dl for sushi and 136 mg/dl for pizza. After two hours, the levels dropped to 115.6 mg/dl for sushi and 128 mg/dl for pizza. Data are presented in graphs as mean with a 95% confidence interval. It is also noticeable that there is a higher variability in sushi than in pizza. Sushi was composed of raw fish and rice added with white sugar, while pizza was a classic Margherita (tomatoes and mozzarella). The trend of hyperglycemia in sushi could be justified by the higher glycemic index and low-fat composition of the meal, compared to pizza, which is a high-carbohydrate and high-fat meal.

Conclusions: Diabetes camps offer children and adolescents with type 1 diabetes an opportunity to learn effective meal management and enjoy a varied diet without fearing more complex food.

General characteristics	n=26
Males *n*	13
Age, *years* (SD)	14,7 (1,4)
BMI, kg/m^2 (SD)	20,6 (2,9)
HbA1c, % (SD)	7,2 (1,2)
MDI, *n* (%)	10 (39)
CSII, *n* (%)	16 (61)



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JENIOus-CwD diabetes in schools research project: a survey from diabetes study group in Italy on the management of type 1 diabetes in children and adolescents in schools

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Introduction: Managing type 1 diabetes (T1D) in schools is challenging, and related publications are usually regional with few participants.

Objectives: The primary aim is to evaluate the experiences of families of children and adolescents with T1D during the school term on a national basis.

Methods: This multicenter cross-sectional study is based on a 41-question online survey targeting families of children with T1D. This questionnaire is related to the JENIOUS-CwD school project, translated into Italian, and then distributed through the centers of the Italian Society for Pediatric Endocrinology and Diabetes (ISPED). Inclusion Criteria: Have a 1st-degree relative with T1D aged <18 years attending the school.

Results: 1536 responses were analyzed from preliminary data collected between December 2023 and April 2024. The mean age was 12±3.71 years, with a duration of 6.91±3.82 years. The answers came mainly from Northern Italy (64.6%), while primarily mothers (76.2%) filled out the questionnaire. It emerged that the number of households in which at least one member had to reduce working hours or abandon work was equal to 52.1%. 17.2% said they had to follow their child in extra-curricular activities (e.g., school trips), while students suffered discrimination due to diabetes, 16.8% by their peers and 9.8% by school staff. In 39.1% of cases, no person is trained at school, even though 50.3% of schools have received a training course, done mainly by their Diabetes Center (42.1%). Overall, 52.8% of caregivers are satisfied with their care in the school setting but believe more can be done.

Conclusions: In this preliminary multicenter evaluation of school attendance in subjects with T1D in Italy it was found that, despite an overall fair satisfaction with the care received, more than half of the parents had to reduce their working hours to care for their child.

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Providing education on visual impairment and the importance of retinopathy screening and process for children and young people

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Introduction: In the UK, diabetic retinopathy affects a significant portion of individuals with type-1 diabetes, leading to visual impairment in 98% within 15 years of diagnosis. This project is aimed at enhancing accessibility to diabetes education in UK hospitals, particularly for visually impaired patients. Through adaptable educational materials and innovative resources like Retinopathy glasses and 3D eye models, the project aims to improve patient understanding and prevent future complications associated with diabetic retinopathy.

Objectives: This project seeks to enhance inclusion and understanding among visually impaired patients through accessible diabetes education. By creating audio recordings, large print versions, and varied formats for educational materials, the project ensures effective information dissemination. Aiming to introduce novel resources like animated videos tailored for patients, promoting early engagement with diabetic eye screening.

Methods: Implementation of accessible diabetes education initiatives, development and distribution of resources such as audio recordings, large print materials, Retinopathy glasses, and 3D eye models are integral. A bespoke animated video for paediatric patients will be created to deliver engaging education. Feedback mechanisms, including patient feedback sheets and questionnaires for hospital teams, will assess the initiatives' impact.

Results: The project will measure resource uptake and effectiveness through post-implementation analysis, evaluating their impact on patient engagement and understanding. Qualitative feedback from patients and healthcare professionals will provide insights into effectiveness and improvement opportunities.

Conclusions: This project addresses the need for accessible diabetes education and support for visually impaired patients in UK hospitals. By providing tailored resources and educational materials, it aims to empower patients to manage their condition better, reducing the impact of diabetic retinopathy and enhancing patient care.

P-374

Habits and safety issues concerning alcohol consumption and gaps in diabetes education in young people with type 1 diabetes – preliminary findings of T1Drink study

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Introduction: There is a scarcity of data on alcohol consumption in People with Diabetes (PwD), which might affect diabetes management and alcohol-related care.

Objectives: To assess knowledge, habits and personal experience concerning safe alcohol use in young people with type 1 diabetes (T1D).

Methods: An international online survey was available from Oct 2022 to Nov 2023, targeting PwD aged 16-35yrs. Multilingual (12 languages) survey questions, developed with input from the JENIOUS group and PwD representatives, collected anonymous data on demographics, T1D duration,

management, education and personal alcohol use experience. The Alcohol Use Disorders Identification Test (AUDIT) was used to quantify drinking patterns.

Results: We received 216 responses from 23 countries (63.4% female; distributed across ages 16-21: 54.2%, 22-26: 21.3%, 27-35: 24.5%; T1D duration <10yrs in 48.1%, 11-15yrs in 22.7%, >15yrs in 29.2%; 63% and 89.9% were pump and CGM users, respectively). Self-reported median HbA1c was 6.9% (IQR 6.4-7.5%). Eighty (40.3%) PwD reported gaps in diabetes education concerning alcohol. Only 115 (53.2%) declared they feel safe when consuming alcohol. In the past 6 months, 20 (9.3%) respondents experienced at least one episode of severe hypoglycemia and 10 (4.6%) experienced diabetic ketoacidosis related to alcohol consumption. Personal experience concerning alcohol's impact on blood glucose varied: 58 (26.9%) reported no effect, 53 (24.5%) hyperglycemia, 31 (14.4%) hypoglycemia, 74 (34.2%) both hypo- and hyperglycemia.Alcohol was most commonly consumed 2-4 times a month [85 (39.4%)] with typically 1-2 [131 (60.7%)] drinks per occasion. Among valid AUDIT respondents (n=202), 25 (12.3%) demonstrated hazardous drinking patterns and 4 (1.97%) potential dependence.

Conclusions: The gaps in diabetes education and frequency of acute complications connected to alcohol use by young PwD are alarming. This indicates an urgent need for targeted educational interventions.

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How to use the MY-Q as a screening tool for psychosocial problems in adolescents with type 1 diabetes?

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Introduction: Type 1 Diabetes (T1D) is a stressful chronic disease. In adolescence T1D associated with decreased health related quality of life (HRQoL) and psychosocial problems. Therefore, the American Diabetes Association (ADA) and International Society for Pediatric and Adolescent Diabetes (ISPAD) recommendations advocate routine monitoring of HRQoL and also screening for symptoms of psychosocial problems. While there are multiple HRQoL questionnaires for adolescents with T1D, there are no specific screening tools for psychosocial problems for adolescents with T1D. This is the first study which combines monitoring and also screening in a single questionnaire.

Objectives: Here we investigated whether the MIND Youth Questionnaire (MY-Q) that is used to monitor HRQoL can be used as a screening instrument for psychosocial problems.

Methods: In this cross-sectional study of adolescents with type 1 diabetes (11-19 years), the My-Q was validated against the Strengths and Difficulties Questionnaire (SDQ) as a gold standard for the existence of psychosocial problems. Area under the receiver operating characteristic (ROC) curve analyses were used to determine cut-off scores for psychosocial problems on the MY-Q total score.

Results: 177 adolescents participated and 167 completed all questionnaires in this study. The median age was 15 years (IQR 3, range 11-19). Total scores on the MY-Q ranged from 43.3 - 97.6 with a mean (SD) of 70.2 (10.8). There was a significant association between higher SDQ total scores and lower scores on the MY-Q total score (Spearman's rho -.61, $p \leq .001$). The ROC curve analyses showed that a cut-off score of 69 on the MY-Q total score proved to be the most optimal score with a sensitivity of .84 and specificity of .74 and an AUC of 0.83.

Conclusions: The MY-Q is a HRQoL monitoring tool that can also be used as a screening tool for psychosocial problems in adolescents with T1D in a patient-friendly and cost-efficient way. A score of 69 or lower on the MY-Q signals the existence of psychosocial problems.

P-376

CFD annual screening in patients with CF

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Introduction: Cystic Fibrosis diabetes (CFD) is a common complication of Cystic Fibrosis (CF). It affects around 50% of the adult population with CF and leads to both insulin deficiency and resistance due to a build-up of thick mucus in the pancreas.

Objectives: This study looked at the change in screening method for CFD in a tertiary respiratory unit from Oral Glucose Tolerance Test (OGTT) to Continuous Glucose Monitoring (CGM).

Methods: Medical records and the Abbott Libreview ™ system were examined for all patients over 10 years who attended CF clinic. This was done for the year 2018 (when patients were screened using OGTT) and 2023 (when patients were screened using CGM). Data collected for each patient included age, BMI, sex, whether they were on Kaftrio and if OGTT or CGM was used to screen (and was this normal or abnormal). CFSPID patients and patients who were already known CFD were excluded.

Results: For the 2018 patients, 16/22 (73%) patients were screened using OGTT and 2/16 (13%) patients had an abnormal test. Insulin was started in 1 patient. None of these patients were on Kaftrio. For the 2023 patients, 29/39 (74%) were screened using CGM and 9/29 (31%) had an abnormal test. 10/39 (26%) of patients were not screened. 15/39 (38%) patients kept a food diary. Of the 9 patients with an abnormal test, 4 patients had 2 or more peaks >11.1mmol/L and 8 patients had 10% of time more than 7.8mmol/L. Of the patients with an abnormal result, dietary advice was given to 6 of these patients and 1 patient started insulin. 31/39 patients analysed were on Kaftrio. The mean BMI was 17.5 in 2018 and 20.5 in 2023.

Conclusions: CGM is increasingly used as a screening tool for CFD. In this cohort, CGM screening identified more CFD than OGTT but that has, in this patient group, not resulted in more patients being started on insulin, as patients have been first managed with dietary advice. There is no clinically validated cut off for the diagnosis of CFD on CGM and further research is necessary in order to establish this.

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Glycemic variability in type 1 diabetics treated with human insulin vs analog insulin in youth with type 1 diabetes in Bangladesh

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Introduction: The clinical utilization of Continuous Glucose Monitoring (CGM) has been progressively rising, yet its implementation in Bangladesh has recently commenced for research purposes.

Objectives: This study aims to evaluate the percentage of time in range (TIR) and glycemic variability in youth with type 1 diabetes (T1D) treated with human insulin vs analog insulin and insulin pump.

Methods: This cross-sectional study was conducted from September, 2023 to December, 2023. Young people with T1D who were treated with multiple daily injections (MDI) of human insulin or analog or on insulin pump were consecutively recruited during follow-up at the BADAS Paediatric Diabetes Care and Research Center (PDRC). They underwent Freestyle libre Pro IQ CGM and downloaded data along with clinical data were analyzed. Time in Range (TIR) 70 to 180 mg/dl, Time Above Range (TAR) >180 mg/dl, Time Below Range (TBR) <70 mg/dl and <54 mg/dl, and glucose variability were analyzed.

Results: Data from 100 children with T1D (51% female and 49% male) revealed a median current age of 14.5 years (range: 9.0-18.0 years). The median duration of diabetes was 5.0[2.0-9.0] years. TIR varied from 3% to 93%, with a median of 51.5% [37.2%—62.0%]. TBR varied from 0% to 29%, with a median of 7.0% [2.0-11.0%]. The median TAR ranged from 4% to 55%, with an average of 23% [16.0-29.0%]. The average glucose variability ranged from 21.7% to 84.8%, with a median of 40.9% [34.3-48.2]. TIR was better in the analog insulin group compared to other groups, though not statistically significant ($p = 0.842$). Glucose variability was higher in the human insulin group (44.1% [36.0-51.5%]) compared to analog (40.3% [33.3-45.8%]) and insulin pump (32.7% [28.2-40.5%]) groups ($p = 0.033$).

Conclusions: Although there was no significant difference in TIR, patients treated with analog and insulin pump exhibited better glycemic variability.

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Clinical profile of type 1 diabetes at the time of diagnosis: a hospital based longitudinal study over a period of ten years

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Introduction: In context of Asian countries including Nepal, Type 1 DM was considered as very rare disease. Since last 10 years Kanti hospital is providing endocrine specialty service including diabetes care service. As diabetes is chronic illness, continue treatment and follow up is mandatory. So far to our knowledge, we do not have any official data on Type 1 Diabetes till date. We conducted this cross-sectional retrospective study at pediatric endocrine unit, Kanti children's hospital to know the clinical presentation, complications, and course of disease of our own diabetic children because of the variation of clinical presentation in different age group and geography.

Objectives: To study the clinical presentation, complications, and course of disease of our own diabetic children

Methods: After the approval from IRB board, the study was conducted at Kanti children's hospital. Every child with diabetes were enrolled to the study. Hospital record file of each of diabetic children was studied. Baseline characteristics, clinical features, investigations findings were recorded in predesigned proforma. OPD record book and diabetic logbook of each patient was also studied. As per need interviewing was done to get further information and clarification.

Results: 150 diabetic children were studied, among which 46.8% were female and 53.2% were male. Mean age at time of diagnosis was 9.64 ± 4.46 years. The presenting complaints at diagnosis were polyuria 92.9%, polydipsia 87.9%, weight loss 78% and polyphagia 66). Presentation in DKA at the time of diagnosis was found in 51% diabetic children. Mean HbA1C was 11.6% ± 2.5 at the time of diagnosis. The mean HbA1C was successively increased with age of patients 11.43(,5 years of age),11.7(5 -10 years of age),12.14(10 -14 years of age) and 12.21(> 14 years of age).

Conclusions: Most common clinical presentation of Type 1 DM were typical osmotic features like Polyuria, polydipsia and most common presented age was 5 to 14 years.

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Switch to an automated insulin delivery system: impact on metabolic control and satisfaction with treatment modality

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Introduction: In recent years, technology applied to diabetes, with new closed-loop hybrid systems, have transformed management of type 1 diabetes with promising results in metabolic control, quality of life and degree of satisfaction of primary caregivers

Objectives: The objective of our study is to assess the impact after the implantation of a hybrid closed-loop system and to analyze the differences between systems and according to previous treatment modality.

Methods: Single center, retrospective and prospective observational study in 67 patients with type 1 diabetes aged 6 to 17 years, followed up for 12 months after the implantation of the new hybrid closed-loop system. Control variables are included, metabolic and insulinometric in the visit before the change and at 3, 6, 9 and 12 months, and degree of satisfaction in main caregivers. A comparison is made between the type of system implemented and the previous treatment used.

Results: At 3 months after implantation we found improvement in metabolic control in glycated hemoglobin (7,33% ± 0,72% vs 6,85% ± 0,51% p<0.001), time in range 70-180 mg/dl (61,03% ±13,87% vs 76,37% ± 9,38% p<0,001), coefficient of variation (37,05% ± 7,57% vs 34,28% ± 6,85%), time above range 180-250 mg/dl (23,73% ± 8,52% vs 16,36% ± 5,30% p<0,001), time above range > 250 mg/dl (11,16% ± 9,70% vs 4,11% ± 3,74% p<0,001) and time below range ≤ 54 mg/dl (0,67% ± 1,51% vs 0,34% ± 0,59% p 0,09). The improvement was maintained at 12 months of follow up. There are no differences between systems or according to previous treatment from the control carried out in the third month of follow up. The main caregivers present a high degree of satisfaction (DTSQs 31,97 ± 3,85; DTSQc 14,82 ± 4,25).

Conclusions: The implantation of an hybrid closed-loop system improves significantly metabolic control of patients and degree of caregiver satisfaction, with independance to system used and previous treatment. This improvement is present in first visit after implantation and is maintained at 12 months of follow up.

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Maturity-onset diabetes of the young (MODY): early recognition is key

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Introduction: Although it accounts for small number (1-2%) of diabetes cases, MODY is important to be picked up by health care providers due to the implications of the correct diagnosis on clinical management and family counselling.

Objectives: MODY should be suspected when a patient <25 years old presents with symptoms of diabetes, who has a family history of diabetes/ MODY, with negative diabetes autoantibodies screen, and/or suboptimal response to insulin.

Methods: **Case 1**: A 15year old girl diagnosed to have Type 1 diabetes after presenting with classical diabetes symptoms with hyperglycaemia, but no acidosis, positive family history of diabetes was started on insulin. Diabetes autoantibodies were negative. On follow up, there was no response to insulin therapy with high blood glucose around 20 mmol/L but low ketones. Urinary C-peptide 7.83nmol/l She scored 7.2% on MODY calculator and monogenic diabetes genetic test was positive for the HNF1A mutation. Glycaemic control improved on replacing insulin with gliclazide.

Results: **Case 2:** 8 year old girl was referred by GP because of an incidental finding of HBA1C of 53. There was strong positive family history of MODY on the maternal side. Her mother had glucokinase mutation. 2 of his maternal uncles aged 28 and 14 years also had a confirmed diagnosis of MODY. She scored 75.5%on the MODY calculator. Her genetics results confirmed Glucokinase mutation. No treatment was required.

Conclusions: MODY is a not-so-rare collection of inherited disorders of non-autoimmune diabetes mellitus that remains insufficiently diagnosed despite increasing awareness.•These cases are important to efficiently and accurately diagnose, given the clinical implications of syndromic features, cost-effective treatment regimen, and the potential impact on multiple family members. A high index of suspicion is required to diagnose cases of MODY as misdiagnosis and inappropriate treatment have a significant impact on quality of life with increased cost and unnecessary treatment with insulin.

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Frequency of diabetic retinopathy and its association with HbA1c in children and adolescent with type I diabetes mellitus

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Introduction: Diabetic retinopathy is considered to be a frequent cause of the preventable blindness among diabetic patients. The objective of this study was to determine the frequency of diabetic retinopathy and its association with HbA1c in children and adolescents having type-I diabetes mellitus (T1DM).

Objectives: To determine Frequency of diabetic retinopathy and its association with HbA1C in children and adolescent with Type I Diabetes Mellitus

Methods: This cross-sectional study was conducted at "National Institute of Child Health, Karachi", Pakistan, from October 2023 to March 2024. Children aged between 5-18 years having known T1DM were analyzed. We enrolled children who had record of HbA1c for the last one year (4 HbA1c readings, 3 months apart). HbA1c was categorized as good (<7%), fine (7-10%), and poor (>10%). Patients were referred to ophthalmologist having more than 5 years of experience to screen for diabetic retinopathy.

Results: n a total of 137 patients, 79 (57.7%) were female. The mean age, and age at time of diagnosis were 13.42±2.48 years, and 7.42±3.60 years. The mean of last 1-year HbA1c (4 separate readings, 3 months apart) was 10.44±2.50%. The HbA1c was found to be good, fine, and poor on the basis of the mean of last 1-year (4 readings apart) as 6 (4.4%), 63 (46.0%), and 68 (49.6%) patients respectively. Diabetic retinopathy was diagnosed among 30 (21.9%) patients. The comparison of mean HbA1c levels between various diabetic retinopathy classification showed that statistically significant relationship of higher HbA1c levels was found with diabetic retinopathy (p=0.011).

Conclusions: The frequency of diabetic retinopathy was high (21.9%) among children and adolescents with T1DM. Higher HbA1c levels correlated significantly with diabetic retinopathy, highlighting the critical role of glycemic management in preventing retinal complications.

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Clinical and biochemical feature of diabetes from the hospital baseline data registry of young people with diabetes in BADAS PDRC, BIRDEM in Bangladesh

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Introduction: Globally, an estimated 1.1 million children and adolescents under 20 years old have type 1 diabetes mellitus, with incidence varying worldwide. Data on youth-onset diabetes are limited in less-resourced countries.

Objectives: This study reports the baseline demographic and clinical characteristics of youth-onset diabetes patients recruited from January to December 2019 at the BADAS Paediatric Diabetes Care and Research Center(PDRC). BIRDEM.

Methods: The newly diagnosed or treated in The BADAS PDRC with age of diagnosis ≤26 years was analyzed. A baseline proforma was used to obtain information on demographic and clinical details at registration. Diabetes was diagnosed according to standard World Health Organization criteria. Determination of the type of diabetes was made by the local investigators according to available clinical features and history and local criteria

Results: Results: The PDRC registry has enrolled 464 patients(42.2%% male; 57.8% female) with youth onset diabetes from regional collaborating centres across Bangladesh during this period. Eighty patients (20.4%) patients were T1 D whereas 45% (52) were T2 diabetes who came from urban area. T1DM (65.6%; n = 297) and T2DM (25.6%; n = 116) were the commonest variants of youth onset diabetes, though there was 2.4% (11) were FCPD and also others types. The median (IQR) age at diagnosis for T1DM was 10.7[8.0- 13.0] years, while that for T2DM was 12.5[11.0-14.0]years. The median Hba1c at registration was 13.2 [10.4 -14.7 in T1 diabetes and was 11.2[8.2-12.5] in T2 diabetes.

Conclusions: This study showed the substantial variation of youth-onset diabetes in Bangladesh and highlights the need for further research and targeted interventions to address this issue effectively.

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Verdi: see children's diabetic retinopathy

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Introduction: Diabetic retinopathy (DR) is a chronic complication of diabetes, initially described as a microvascular complication, there is currently evidence that there are neurodegenerative events in the retina from the early stages of the disease, which is why DR is considered a neurovascular disease. The state of oxidative stress due to hyperglycemia generates toxicity and neuronal death, activation of the local immune system with activation of inflammatory mediators and functional and structural alterations of retinal microcirculation with loss of function.Optical Coherence Tomography allows the observation of incipient microvascular alterations that are not observed in the fundus.

Objectives: Primary objective: To evaluate the prevalence of ocular pathology: diabetic retinopathy, cataract, strabismus and refractive errors; in children and adolescents with type 1 diabetes in a population of patients aged 5 to 19 years cared for by a pediatric diabetes team. Secondary objective: Analyze possible relationships between the presence of early signs of diabetic retinopathy in OCT with clinical variables.

Methods: Descriptive observational study. To analyze the possible relationship between the presence of early signs of diabetic retinopathy in OCT with clinical variables, a Multivariate Analysis was performed. Because there are numerous Qualitative and Quantitative variables, that is, of different natures, within the existing techniques, Multiple Factor Analysis was applied.

Results: A total of 84 children and adolescents with Type one diabetes were admitt in the study.They were between 3 and 18 years of age (average age was 12 years), 48 female and 36 male.The median hba1c was 8.85%.The clinical variables that were positively associated were Age, female sex, Total insulin dose and blood pressure. No significant findings are described in oct and octa,

Conclusions: In children and adolescents with type 1 diabetes of 5 years of evolution, there were no alterations in the oct.

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Clinical profile of children with diabetes mellitus type 1 (T1DM) seen in a state-run tertiary end-referral medical center department of pediatrics in Cebu, Philippines from January 2015- January 2020

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Introduction: Type 1 diabetes mellitus (T1DM) is one of the most common metabolic disorder diagnosed in childhood. The Philippines ranked in the top 15 in the world for diabetes prevalence. Currently, Philippine data on the prevalence or incidence of diabetes mellitus in children is not well established. In this state-run, tertiary end-referral medical center, no previous studies were conducted in pediatric patients with Type 1 Diabetes Mellitus up to date.

Objectives: To determine the clinical profile of children diagnosed with type 1 diabetes mellitus (type 1 DM) seen in a State-run Tertiary End-Referral Medical Center Department of Pediatrics in Cebu, Philippines from January 2015- January 2020.

Methods: This ia a retrospective cross-sectional study. Complete enumeration of type 1 Diabetes Mellitus and Diabetic Ketoacidosis (DKA) patients admitted and consulted was done. The clinical, laboratory profile and outcome of these patients were determined and compared.

Results: T1DM and DKA prevalence were 1.4 and 0.6 per 1000 pediatric patients. The mean age of onset and diagnosis were 10.4 ± 3.72 and 10.6 ± 3.69 years for T1DM while 11.42 ± 4.56 and 11.83 ± 4.76 years for DKA. T1DM patients had normal BMI while DKA

patients were underweight. Family history of DM was seen in 45.5% of DKA patients and 18.2% of those without DKA. Common presenting symptoms were polydipsia and weight loss. The mean duration of symptoms before diagnosis was 15.3 ± 16.41 days for DKA patients and 36.08 ± 36.38 days for those without DKA. DKA patients had mean initial random glucose of 421.9 ± 123.9 mg/dL, mean initial HBA1c of 13.8 ± 2.5% and mean insulin requirement prior discharge of 1.03 ± 0.48 units/kg/Day while T1DM children showed 419.83 ± 157.91 mg/dL, 14.06 ± 3.35 % and 1.28 ± 0.44 units/kg/Day, respectively.

Conclusions: There was no significant relationship between the patient's clinical and laboratory profile and DM and DKA. Common precipitating factors of DKA were infection and previous DKA episodes. Complication rate was at 4.5%.

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Diabetes education, empowerment and advocacy in a limited-resources setting: are we following the right track?

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Introduction: A patient-centered educational program plays a crucial role in enhancing treatment satisfaction, emotional well-being, and overall quality of life for people with type 1 diabetes (PWD). However, the accessibility and availability of a personalized and comprehensive educational program pose significant challenges, particularly in settings with limited resources.

Objectives: Therefore, the objective of this study was to assess the efficacy of a tailored educational program that focuses on the needs and preferences of the patients.

Methods: The effectiveness of a patient-centered educational program was assessed in 500 PWD (9.3±3.2 years) completing the program. The glycemic control and participants' self-efficacy with managing diabetes was assessed before and after completing the program. The Perceived diabetes self-management scale (PDSMS) was used to assess self-efficacy, an Arabic version was created utilizing a forward and backward translation process. HbA1C was used to assess the glycemic control. The study is a part of a local initiative "Ehlam" aiming to reach all 29 governorates in Egypt. The program ensures continuous participants' engagement through providing a blind between physical training and regular follow up through a mobile application. The application shares daily tips and tricks and includes an insulin bolus wizard calculator.

Results: After completing the educational program, PWD showed more confidence in self-managing their diabetes with a total PDSMS scores increasing from 29.4 ± 10.5 to 59.3 ± 18.3 % (P<0.01). This improvement in self-efficacy was coupled with a significant reduction in HbA1c with mean HbA1c decreasing from 8.6 ± 1.3 to 7.4 ± 0.7 % (P<0.01).

Conclusions: Diabetes education is a key fostering the empowerment of PWD, supplying them with the needed knowledge and skills that increases diabetes self-efficacy.

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New international recommendations for monitoring type 1 diabetes (T1D) - are European laboratories prepared for it? The experience of a polish tertiary reference hospital

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Introduction: Guidelines of early screening for T1D have not yet been introduced. However, diabetes experts are developing international guidelines. Screening of children (measurements of autoantibodies against islet cells antigens) should be expected in the near future. Until recently, these tests were available only using manual methods, including radioimmunoassay (RIA).

Objectives: The aim of the discussion is to assess whether European laboratories are ready in terms of equipment and tools to perform of tests on such a scale.

Methods: Results from the DAISY Denver cohort were analyzed to determine the best age for screening. To estimate the potential population required for screening, data from the Statistics Poland were used. The equipment capabilities were estimated based on the number of using analyzers enabling the measurement of autoantibodies, installed in the country. Data on external quality assessment (EQA) were based on the organizers' websites.

Results: The DAISY Denver cohort showed that screening was most effective at ages 2-9 years but that optimal screening ages are differ by country. To make an estimate, you need to analyze the average age of T1D diagnosis in a given country. If screening were to be performed in 2024, over 2.5 million children would need to be tested in Poland. According to the manufacturer data, there are currently approximately 1,000 analyzers on the European market enabling these tests (most in Italy, Greece, Poland), including approximately 80 centers in Poland. Therefore, one laboratory would perform over 30,000 tests. tests of all types annually, i.e. over 2.5 thousand tests per month. Additionally, you should take into account participation in an external quality control program, which is currently offered by only 3 organizers in Europe (CTCB, Instand, NEQAS).

Conclusions: These findings may help design of population-based screening of children for islet autoantibodies, based on proven methods with confirmed diagnostic quality, cost-effective and safe for the patient.

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Features of the immune system in children with primary diabetes mellitus type 1

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Introduction: Air of current study was investigation of features of the immune system in children with primary diabetes mellitus type 1

Objectives: 128 children primary diabetes mellitus type 1 and 15 healthy children were examined. 46.8% (n=60) of the patients were boys, and 53.2% (n=68) were girls. The average age of the children was 8.7 years.

Methods: Monoclonal antibodies of the identified membrane markers of immunocompetent cells (indicators of cellular immunity - T-lymphocytes (CD3+), T-helper (CD4+), T-suppressor (CD8+), Natural Killer (CD16/CD56+) and B-lymphocytes with an indicator of humoral immunity (CD19+)) was studied by the flow cytometry method "Epics XL" ("BECMON COULTER France").

Results: The average value of glycohemoglobin in patients was 12.1% (n=128), and 10.2% (n=63) in those who had been ill for several years (p<0.0001). The relationship between CD indicators of healthy children and children primary DMT1 was studied. It was found that only B-lymphocyte, % CD19+ indicators showed significant difference (p<0.05). Among other indicators, there was no difference. The normal distribution of carriers of CDs was studied in both groups. Since the distribution in the groups is normal, the T-Student method was used. Only immunoregulatory index (IRI) CD4+/CD8+ indicators have abnormal distribution, so Kolmogorov-Smirnov non-parametric method was used.

Conclusions: There was no correlation between CD and age in patients with primary diabetes, only B-lymphocyte, % CD19+ (r=-0.40, p<0.05) and lymphocytes (r=-0.43, p<0, 05) found a negative correlation between age. On the primary DMT1 children between glycohemoglobin HbA1c and T-lymphocyte, % CD3+ (r=-0.28, p<0.05), T-suppressor, % CD8+ (r=-0.40, p<0, 05) there was a correlation. Was a negative correlation between T-helper, % CD4+ and GAD65 autoantibody (r=-0.38, p<0.007). It is known that T-helper, % CD4+ cells are actively involved in the destruction of pancreatic beta cells. Increased levels of GAD 65 antibody result in decreased T-suppressor, % CD4+ cells.

P-388

Severe pediatric hypoglycemia - caregivers knowledge and attitudes

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Introduction: Type 1 diabetes (T1D) is a common chronic disease in pediatric age, accounting for 95% of pediatric diabetes cases and 5% of all diabetes. Hypoglycemia is the most frequent acute complication and severe hypoglycemia is rare but life-threatening complication of T1D, which requires immediate treatment.

Objectives: The aim of this study is to understand the caregivers' knowledge about severe hypoglycemia and the procedures for its treatment.

Methods: After informed consent, participants were invited to take part in the study by accessing the digital questionnaire with 20 multiple-choice questions regarding "Procedures in severe pediatric hypoglycemia".

Results: The questionnaires were replied by T1D caregivers, related to 63 T1D children or adolescents, with a mean age of 13,2 years and a mean T1D duration of 5 years. 95% use continuous or intermittent glucose monitoring and 61% an insulin pump. - 74% chose the correct definition of severe hypoglycemia, although all the participants considered they knew what it was. - 20% would not be able to administer injectable glucagon and identified the nuclear family and school staff as the most competent to do treatment. - 76% have glucagon at home and 36% carry it daily to school and activities.

Conclusions: Although participants were routinely empowered to recognise and treat severe hypoglycemia, a significant percentage selected the wrong definition and didn't feel able to administer injectable glucagon. Therefore, it is essential to identify educational needs and comprehend the knowledge and practices related to severe hypoglycemia. To obtain this data, two focus groups for caregivers/children with T1D and one focus group for adolescents with T1D, are in progress. Caregivers of children and adolescents with T1D should be empowered, overtime, in the prevention, early identification, and practices related to severe hypoglycemia.

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Clinical phenotype of two sisters affected by generalized congenital lipodystrophy (Berardinelli-seip syndrome) type 1 (bscl1): a case report

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Introduction: Lipodystrophy syndromes are characterized by a progressive metabolic impairment secondary to adipose tissue dysfunction and genetic background. The evidence regarding metreleptin effectiveness in children is limited.

Objectives: Describe the characteristics of children with BSCL1 and evaluate treatment efficacy with metreleptin.

Methods: Two siblings (P1 13 years, P2 10 years) with BSCL1 caused by a homozygous variant c.194G>A (p.Trp65Ter) of the AGPAT2 gene were identified and followed (P1) after starting of leptin treatment. We collected auxological, metabolic, nutritional parameters, at baseline and every 3 months for the next year.

Results: At baseline, P1 (13 years), height + 0.60 SDS, weight -1.10 SDS, BMI -1.83 SDS, ongoing puberty. Recent diagnosis of non-autoimmune diabetes mellitus, multi-injection insulin therapy (max 1.6 U/kg/day). P2 (10 years), height +0.52 SDS, weight -0.51 SDS, BMI -1.02 SDS, prepubertal. Both presented hyperphagia, reduced subcutaneous fat, muscular hypertrophy, venomegaly, distinct facial features. P1 atrophy of the mammary gland. P1: severe mixed dyslipidemia (total cholesterol 325 mg/dl, triglycerides 2056 mg/dl), AST 127 U/L, ALT 131 U/L, proteinuria (0.36 g/24H), undetectable leptin and adiponectin levels. Abdominal ultrasound: hepatomegaly with steatosis; densitometry (DXA): fat mass (FM) -1.7 Z-score, total body less head (TBLH) -1.7 Z-score.

P2: less impaired metabolic profile, hepatic steatosis; DXA: FM -1.2 Z-score, TBLH -1.4 Z-score. A low-fat diet with MCT oils was started, associated with Metreleptin (5 mg/day) in P1. After starting Metreleptin therapy, all metabolic parameters improved: triglycerides -90%, HbA1c -30%, proteinuria resolution, no more hyperphagia.

Conclusions: BSCL1 has heterogeneous clinical manifestations and complications, and if not promptly treated, it can reduce life expectancy. Metreleptin therapy was effective in treating metabolic abnormalities and, together with early diagnosis, can significantly improve quality and prospects of life.

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Illustrating the division of labor between parents of children with type 1 diabetes: development of a dialogue tool and preliminary results

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Introduction: Illustrating the division of labor between parents of children with type 1 diabetes: development of a dialogue tool and preliminary results

Objectives: The purpose of our study is twofold: to develop a dialogue tool together with our participants, and to use the tool to generate knowledge on the distribution of caregiving labor between parents. The reflections elicited from these discussions can help parents acknowledge the contribution each of them makes towards the care of their child with T1D and the household in general. Results can aid healthcare providers in identifying areas of concern and develop strategies, both at home and in clinical settings, to prevent caregiver burnout.

Methods: We employ participatory, exploratory methods in this anthropological study. Participants are recruited from an outpatient diabetes hospital and by word of mouth. The developed tool helps illustrate how much of the burden of care lies with each parent. Each participant rates the level of mental, physical, and temporal burden of tasks - and states who is responsible for that task. The answers are discussed together. Results from the discussions are entered into a REDCap database to facilitate analysis.

Results: Preliminary results show that discrepancies in parents' perception of task ownership is common and may reflect the collaborative dynamic within the relationship, providing recognition for involvement in tasks previously thought to be unappreciated, as well as substantiating concerns expressed in the interviews.

Conclusions: Results indicate that the tool is useful for parents as well as for healthcare providers to be aware of how parents perceive the amount and the distribution of labor they engage in as part of their role as caregivers to a child with type 1 diabetes.

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SLC29A3 spectrum disorder in a Libyan girl with antibody negative autoimmune disease

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Introduction: SLC29A3 spectrum disorder is an autosomal recessive autoinflamory multisystem disorder. GEN'GRØŹÁ"ws syndrome and pigmented hypertrichosis with insulin dependent diabetes melitus, histocytosis, However all these disorders with thier different names and terminology are actually the same entity termed GEN'GRØŹÁ"ws syndrome

Objectives: To explore a genatic cause of diabetes and atypical comorbidities

Methods: WES gene in 1 yr old libyan girl with challanging clinical picture (pure red cell aplasia, hypothyrodisim, IDDM, chronic diarrhea, recurrent fever with very high inflamatory markers

Results: homozygous pathogenic variant of SLC29A3 mutation with a diagnosis of histocytosis - lymphadenopathy plus syndrome, seronegative diabetes, hypothyrodisim, caeliac disease, well managed with chemothearpy, insulin pump, l thyroxine ' glutien free diet

Conclusions: First recorded case in libya which demonestrate that SLC29A3 spectrum disorder should be included in the differential diagnosis of antibody negative insulin dependent diabetes mellitus, hypothyrodisim and atypical comorbidities in the abscence of distinctive dermatological markers

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Rapid improvement of glycemic control in adolescent with type 2 diabetes (T2D) after treatment with a SGLT2i inhibitor: a case report

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Introduction: Type 2 diabetes (T2D) in pediatric patients represents a globally growing concern, necessitating effective therapeutic strategies. Empagliflozin, a sodium-glucose cotrasporter 2 inhibitor (SGLT2i), has shown promising results in adult populations with T2D. However, its use in pediatric patients with T2D remains relatively unexplorated.

Objectives: Here, we present a case report of a 14-year-old female patient with T2D who was treated successfully with empagliflozin therapy.

Methods: A 14-year-old female presents with sub-optimal controlled T2D requiring MDI therapy since diagnosis at age 10 years. In her past medical history, a diagnosis of T2D was performed in November 2019 with typical autoantibodies of T1D negative; genetic mutations for monogenic diabetes were not described. During follow-up, her mean value of HbA1c was 8.5% on MDI

therapy (insulin degludec and insulin aspart). Successively a mild improvement of her glycemic control has been described (HbA1c decreased to 7.4%) (Time in Range was of 61%) after taking metformin (2 g daily progressively); insulin was decreased and then stopped. In the second time, since glucose values remained suboptimal, empagliflozin therapy was started (10 mg/daily; 13 mg/kg/d); patient continued treatment with metformin.

Results: Data from a continuous glucose monitor and HbA1c levels were evaluated before and after treatment with empagliflozin. After 2 months, Time in Range significantly improved (from 61% to 91%) and HbA1c reduced (from 7.4% to 6.1%). DKA or other adverse effects were not recorded.

Conclusions: This case underscores the potential efficacy and safety of empagliflozin in pediatric T2D management. However, further research and clinical trials is needed to elucidate its role in this population.

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Type 1 diabetes in children - a diagnostic problem in the primary care setting

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Introduction: Diabetic ketoacidosis (DKA) is the primary cause of death for children with type 1 diabetes mellitus (TID). Several studies indicate that DKA is associated with delay in diagnosis and many children presenting with DKA have had a medical consultation before diagnosis.

Objectives: The aim of this work is to evaluate the current prevalence of diabetic ketoacidosis (DKA) at the time of diagnosis of type 1 diabetes in children in Western Bulgaria and to analyze the reasons for delayed diagnosis.

Methods: A retrospective review of all 100 children aged 0 - 18 years, hospitalized with newly diagnosed type 1 diabetes mellitus for a one-year period in the Department of Diabetes in the University Pediatric Hospital - Sofia, Bulgaria. Data were retrieved from the medical notes, laboratory and instrumental records.

Results: Diabetic ketoacidosis was observed in 49 (49%) of the 100 subjects studied. Thirty seven of the patients (37%) had moderate and severe DKA (venous pH <7.20 or bicarbonate <10 mmol/L) requiring intensive care treatment. Twenty-four (65%) of all 37 children with severe DKA had had at least one previous medical consultation with a different initial diagnosis by a primary care physician. Four of them had even had a second visit at an Emergency room and had been sent back home. The mean delay of diagnosis after the first medical examination was 2.84 days (range 1-8 days).

Conclusions: There is a significant delay in the diagnosis of diabetes mellitus among the child population in Western Bulgaria, compared not only to other developed countries, but also to our previous data from 2015. The prevalence of DKA at the time of presentation of T1D has increased – up to 49%. That unfavorable tendency requires continuous re-education of the primary care physicians.

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Hybrid diabetes mellitus: MODY 5 and type 1 in an adolescent in Kinshasa. Diagnosis difficulty in an under-equipped environment

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Introduction: Hybrid diabetes is a rare type of diabetes mellitus. its global prevalence is not well known to date. The cases reported in the literature were often made of associations of type 1 and type 2 diabetes. Associations of type 1 with monogenic diabetes have not yet been described particularly in Central Africa, to our knowledge.

Objectives: Discribe a probable hybrid diabetes MODY 5 and T1D in an adolescent in Kinshasa/central Africa emphasizing the diagnostic difficult.

Methods: We report a case of probable hybrid diabetes MODY 5 and Type 1 diabetes mellitus.

Results: He is 15 years old, born with full Prune Belly Syndrome associated with pancreatic atrophy. At 11 years old, he had moderate hyperglycemia, anti-insulin autoantibodies (IAA) and normal C-peptides. These characteristics suggesting MODY 5 but sequencing of the HNF1B gene was not performed. Treatment with oral antidiabetics was started with a good glycemic control. 5 years later, he had severe hyperglycemia, the cardinal signs of diabetes and ketoacidosis. In the blood, two additional autoantibodies (anti- GAD and anti-IA2) and low C-peptides was founded, suggesting Type 1 diabetes mellitus.From then on, insulin therapy had started and glycemic control was good.

Conclusions: MODY 5 can be associated with Prune Belly Syndrome, both caused by mutation of the HNF1B gene. In our case, this association could be probable but the presence of autoantibodies was a confounding factor about the type of diabetes. The 2 other autoantibodies discovered later and low levels of C peptides had characterized type 1 diabetes mellitus. In our patient, the clinical characteristics of MODY 5 and type 1 diabetes mellitus were founded. Due to lack of resources, genetic sequencing was not carried out. For this case, is it a coexistence or an association?

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Glycemic control and adherence to mediterranean diet in African and Italian youths with type 1 diabetes: a cross-sectional observational multicenter study in Emilia-Romagna region (Italy)

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Introduction: Alongside insulin therapy, nutrition and physical activity are pillars of type 1 diabetes (T1D) care. Youths with T1D who adhere to the Mediterranean diet have a better metabolic control

Objectives: To determine whether glycemic control and adherence to Mediterranean diet (AMD) in T1D subjects can be influenced by African ancestry status

Methods: Patients with T1D were consecutively recruited into the study by 5 Pediatric Diabetes Centers in Emilia-Romagna region (Italy). The KIDMED Quick Nutrition Test was used to evaluate the AMD. Data on auxological parameters, insulin therapy, and glycemic control were collected at the same time of the questionnaire

Results: Four hundred and thirty-six children and adolescents with T1D were recruited [52.3% male; median age (CA) 13.5 yrs and T1D duration 5.16 yrs; 38.5% were insulin pump (CSII) users (AHCL systems 78.6%)]. 113 out of 436 patients (25.9%) were Africans which, respects to Italians, were younger and had a lower T1D duration. BMI z-score and obese/overweight prevalence were comparable between groups. African patients had (Table): lower prevalence of CSII use, worse glycemic control, higher total daily insulin dose (TDD), lower weekly hours spent in exercize. Both the KIDMED score and the frequency of excellent AMD were higher.

Regression analysis revealed that in Africans MDI was associated with A1c (β=0.352, p<0.001); in Italians variables associated with A1c were MDI (β=0.348, p<0.0001) and TDD (β=0.128, p=0.019)

Conclusions: In our study African patients had a worse glycemic control and a lower use of CSII compared to Italian ones. However, the significant effects of insulin delivery method on A1c values was found for all studied population. AMD was not optimal, but it was not associated with glycemic control, as well as T1D duration and exercise were not. We need strategies to increase the use of technology to improve metabolic control in T1D pediatric patients, mainly in those with a migration background

Variables/Groups	Africans (n. 113)	Italians (n. 323)	p	χ^2
CA (yrs)	11.8 ± 4.17 (11.7)	13.4 ± 3.60 (13.8)	<0.001	NA
T1D duration (yrs)	5.18 ± 3.85 (4.27)	6.04 ± 4.01 (5.43)	0.041	NA
Insulin delivery type (%; n.)				
MDI	78.8 (89)	55.4 (179)		
CSII	21.2 (24)	44.6 (144)	<0.0001	19.3
A1c (%)	7.67 ± 1.25 (7.5)	7.07 ± 0.97 (7.0)	<0.0001	NA
TDD (IU/kg/day)	0.88 ± 0.31 (0.85)	0.81 ± 0.31 (0.82)	0.049	NA
Exercize (h/week)	1.94 ± 2.91 (0.0)	3.15 ± 3.02 (3.0)	<0.0001	NA
KIDMED score	6.72 ± 2.52 (7.0)	5.79 ± 2.13 (6.0)	<0.001	NA
AMD group (%; n.)				
Poor (score ≤3)	9.7 (11)	13.3 (43)		
Moderate (score 4-7)	53.1 (60)	65.3 (211)		
Excellent (≥8)	37.2 (42)	21.4 (69)	0.004	11.1

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Knowledge, attitudes and practices of primary school teachers on childhood diabetes in the city of Yaounde-cameroonepidemiological and clinical aspects of diabetic ketoacidosis at the emergency department of angre university hospital center, medical pediatric in Abidjan

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Introduction: The prevalence of diabetes, long the prerogative of developed countries, is rising steadily everywhere, particularly in low middle-income countries. Children and adolescents account for the majority of cases of type 1 diabetes. As children spend most of their time at school, they also need to be managed in the school environment in order to achieve optimal control of their condition, which is diabetes.

Objectives: To assess the knowledge, attitudes and practices of teachers, who will be involved in the management of childhood diabetes in the school setting, to ensure a secure continuum of care.

Methods: A descriptive and analytical cross-sectional study was carried out over a 6-month period. A questionnaire was made available to the teachers of primary schools to assess their knowledge, attitudes and practices. We used an α-error threshold of 5%, the mean values were expressed with 95% confidence interval and the probability value of $P < 0.05$ were considered statistically significant.

Results: The study involved 387 teachers, 275 women and 112 men. The 25-30 age group (29.45%), the secondary school education level group(65.37%) and less than 5 years of seniority group (42.28%) were the most represented. 33.6% of teachers declared that television was their main source of information on diabetes. We noted an insufficient knowledge and practices on childhood diabetes, 46% and 27% respectively, a mean average for attitude of 59% towards an unconscious child and 96.4% of teachers said there is a need to raise awareness about childhood diabetes at school. Having a friend or a relative with diabetes shows significant association with knowledge on diabetes($p=0.02$).

Conclusions: Our study highlighted a level of awareness and/or training in our primary school structures that is unsatisfactory for the development and security of a diabetic child at school. It is very essential and crucial to provide additional practical training to school teachers on a growing public health problem that is childhood diabetes.

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Awareness and prevention of type 1 and type 2 diabetic complications among patients in Asokoro district hospital, Abuja

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Introduction: Diabetes mellitus, both Type 1 and Type 2, poses a significant health burden globally, with its complications contributing to morbidity and mortality among affected individuals. The study assesed the level of awareness and preventive measures regarding diabetic complications among patients attending Asokoro District Hospital in Abuja, Nigeria.

Objectives: To assess the level of awareness of the perceived complications of diabetes type 1&2 among diabetic patients in Asokoro district hospital, Abuja To assess the level of knowledge of the preventive measures for complication of diabetes among diabetic patients in Asokoro district hospital, Abuja To find out the common diabetes complications among diabetic patients in Asokoro district hospital Abuja To identify factors influencing adherence and non-adherence to diabetes complications preventive measures among diabetic patients in Asokoro district hospital, Abuja. To identify the perceived benefits of the awareness for complications of diabetes among diabetic patients in Asokoro district hospital Abuja.

Methods: A descriptive research design was used for the study and a random sampling technique was used to distributes questionnaires to the respondents in the various wards/units in Asokoro district hospital Abuja.

Results: Findings of the study shows that the respondents have good awareness level on the perceived complications of diabetes, good knowledge of the preventive measures for complication of diabetes with an aggregate score of 1.6 and 1.7 respectively.

Conclusions: Enhancing awareness and implementing effective preventive strategies are crucial in mitigating the burden of diabetic complications among patients. Healthcare providers should prioritize patient education and promote healthy lifestyle choices to minimize the risk of complications associated with diabetes mellitus. Additionally, community-based interventions and policy initiatives will address systemic barriers to optimal diabetes management and prevention of associated complications.

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Single centre experience on the use of the Omnipod 5 automated insulin delivery system

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Introduction: The Omnipod 5 automated insulin delivery (AID) system has been shown to be effective at improving glycaemic control[1]. The system first became available in Scotland in June 2023. At the Royal Aberdeen Children's Hospital, we have a catchment area covering the North East of Scotland. In this study, we would like to find out the insulin dosage and the glycemic control when using the system.

Objectives: To determine the insulin requirement on the Omnipod 5 AID system and the change in glycaemic control.

Methods: A prospective study of all patients switched to the system between June 2023 to Dec 2023. Basic patient demographics, duration of Type 1 diabetes, HbA1c and total daily dose (TDD) before treatment were collected. Data on HbA1c and TDD were collated at clinic at 3,6 and 9 months. Eligibility criteria: Patients with a Time in range of approximately 50% and average TDD <65 units

Results: 30 patients (F:M=1:1) were included. Median duration of diabetes was 1.52(0.34- 12.99) years. The median age was 12.7 (2.9 – 16.8) years (Table 1).

There is no significant change in the TDD or improvement in the HbA1c for the whole population.

Conclusions: In our study, there was no significant improvement in HbA1c during the study period. Patients with a high starting HbA1c demonstrated the most reduction which was previously demonstrated[2].Most of the patients were switched to pump therapy within 2 years of diagnosis and still in the honeymoon period. This might explain the lack of significant improvement in HbA1c. It is not possible to determine a trend in insulin requirement in such a short study period. Further studies involving a larger patient cohort and a longer follow up period is required.One of the main advantages of the system is the reliability of automatic data upload even for patients on remote islands. The ease of use of this system has improved accessibility to patients from more deprived background.

Table 1: Changes in HbA1c and TDD during the study period

Number of patient (N)	Before switch N= 30	3 months N=21	6 months N=19	9 months N =11
Median HbA1c (mmol/mol)	56.5 (36-104)	51	48	54
Average Total daily dose (units)	35.9	34.2	32.3	33.7

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Metformin use in Rabson-mendenhall syndrome: a case report and treatment considerations

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Introduction: Rabson–Mendenhall syndrome (RMS) is a rare autosomal recessive disorder characterized by severe insulin resistance, resulting in early-onset diabetes mellitus, often before puberty.

Objectives: The role of metformin in glycemic control in Rabson Mendenhall syndrome

Methods: a case report, Consent were obtained

Results: we report the case of a 7-year-old boy born to consanguineous parents, initially admitted for diabetes. The patient presented with pigmented skin on his neck and lower limbs, dysmorphic features, skeletal muscle hypertrophy, abnormal growth patterns including growth retardation and skeletal abnormalities, hypertrichosis, generalized lipoatrophy, and severe hypertriglyceridemia. Genetic analysis of all the coding regions and exon/intron boundaries of the monogenic diabetes genes by targeted next generation sequencing at the Exeter genomics laboratory identified a homozygous missense mutation in the Insulin receptor gene (INSR), confirming the diagnosis of Rabson-Mendenhall syndrome. The management of RMS poses particular challenges in children, and the use of metformin is often limited for its side effects. While insulin therapy remains a cornerstone in controlling blood sugar levels, additional interventions may be considered to optimize treatment outcomes. Metformin has been explored as an adjunct therapy in the case of our patient with insulin injections; he is taking 500mg three times a day, with a good control of his blood sugar levels.

Conclusions: Further research is crucial to establish the effectiveness and safety profile of metformin for RMS treatment. Comprehensive management strategies, including genetic counseling and a multidisciplinary approach, are essential to optimize outcomes and to improve quality of life for individuals diagnosed with this rare condition.

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National and regional trends in diabetic ketoacidosis at type 1 diabetes diagnosis over a 10-year period

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Introduction: Diabetic Ketoacidosis (DKA) at diabetes onset is an avoidable life-threatening complication of type 1 diabetes (T1D), recognised to be associated with adverse long-term metabolic outcomes.

Objectives: The objective of this study was to report the occurrence and trends in DKA at diabetes onset, nationally and regionally, over a 10-year period.

Methods: The long established Irish childhood diabetes national register (ICDNR) monitors the clinical, laboratory and demographic characteristics of those newly diagnosed (incident) with T1D aged under 15 years at diagnosis in Ireland. This prospective register, was employed to explore the frequency, age and severity of DKA at diabetes onset in children aged under 15 years of age, nationally and by the 6 new Slaintecare healthcare regions, in the period 2011-2021. Incident cases were categorised by year, age and severity of DKA classified using the ISPAD definition of DKA.

Results: In the period, 3,186 (1,683 male, 52.8%) newly diagnosed children completed full registration with the ICDNR. Of these, biochemical data to define DKA status were available for 2,888 (90.6%). Overall, in the 10 year period, 37% of children presented in DKA with 16% and 27% having moderate or severe DKA respectively. The proportion presenting in DKA varied over time and by region, and were: 43.4%; 37.2%; 34.5%; 39%; 30.4%; and 33.4% in Slaintecare regions A to F respectively. The proportion of children presenting in DKA by age category was highest in those 10-14.99 years (41.2%), and 0-4.99 years (39.3%) and lowest in those aged 5-9.99 (31.6%) years.

Conclusions: The rate of DKA at diabetes diagnosis in those under 15-years is unacceptably high in Ireland. Preventing DKA at diagnosis is a key therapeutic target. These register data provide important information nationally and regionally to guide targeted interventions to reduce the frequency of life-threatening DKA in our population.

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Factors associated with the use of Traditherapy for diabetes among children and young people followed-up in the CDiC Guinea program

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Introduction: Type 1 diabetes (T1D) is increasing worldwide, particularly among children. The implementation of the Changing Diabetes in Children (CDiC) program has significantly improved access to care in several countries, including Guinea. However, despite free access to insulin and diabetes treatment devices, the use of traditional treatments was reported in a previous study.

Objectives: We sought to analyze the prevalence and factors associated with the use of traditherapy among patients enrolled in the CDiC Guinea.

Methods: We conducted a cross-sectional study in 8 diabetes clinics in Guinea from january to june 2022. Patients enrolled in the CDiC program were included. Sociodemographic and clinical data were collected, as well as information on traditherapy use. Consent was obtained from patients or their legal guardians. Logistic regression was used to identify factors associated with traditherapy, with significance at $p<0.05$.

Results: A total of 583 patients were included. Mean age was 18.46 ± 4.59 years, with a slight female predominance (51.3%). Seventy-two percent were in school. The majority (75%) had an HbA1c ≥ 8%. The prevalence of traditherapy use was 55.4%. In multivariate analysis, rural residence (ORa: 1.67[1.15; 2.44]; p = 0.007) and male gender (ORa: 1.65[1.19; 2.30]; p =0.03) were the factors associated with the use of traditherapy.

Conclusions: In addition to conventional T1D treatment, a high rate of traditherapy is reported in this study. Rural residence appears to be a barrier to access to modern treatments. Other factors such as gender and cultural background need attention in the management of diabetes.

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Access to treatment of diabetes mellitus type 1 in Latin American children

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Introduction: In Latin America there are different realities in the care of type 1 diabetes at the pediatric level, given different health systems and economic realities. These countries are defined as an area of limited resources from the point of view of ISPAD guidelines, however the treatment level can be variable depending on the country.

Objectives: To know the access "in the real world" to the treatment of DM1 in children and adolescents in Latin America

Methods: Survey with 50 "multiple choice" questions conducted to doctors who care for children with diabetes through the Latin American Society of Pediatric Endocrinology (SLEP).

Results: 166 doctors responded to the survey, 91% pediatric endocrinologists from 15 different countries (Mexico, Peru, Argentina, Chile, Colombia, Ecuador, Brazil, Uruguay, Dominican Republic, Venezuela, Nicaragua, Honduras, Panama, Bolivia and Paraguay).71% work in the public and private system, 54% have 25-49 years of age, 23% 50-60 and 19% > 60 years old, 28% have > 20 years of profession and 56% work in centers with more than 100 patients. In 23% of the centers, more than 75% of patients present with ketoacidosis. In 86% of the centers It is used intensified

	Yes (%)	No (%)	Partial (%)
Nurse	20,5	60,8	18,7
Nutricionist	27,9	19,4	49,6
Psycologist	15,7	36,7	47,6
Social Worker	34,3	65,7	
Insulin analogs	75,3	3,6	21,1
Glucose test strips	48,8	51,2	
Continuous monitoring	13,3	70,3	16,4
Insulin pumps	20	63	17
Glucagon kit	41,6	58,4	

treatment and I 12% it is used a fixed dose. The following table evaluates availability of professionals and financing of inputs

Conclusions: An average access to insufficient treatment is confirmed, but there is great variability both in available professionals and in supplies for the treatment of diabetes Mellitus in Latin America.

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The hybrid closed loop (HCL) system with data sharing through a cloud-based platform - an influencer of users' acceptability of a mixed service delivery model that incorporates virtual and face-to-face (f2f) consultation in transition diabetes clinic – a rural Lincolnshire experience

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Introduction: The use of technology assisted monitoring could influence opinion of the user while participating in new service delivery model.

Objectives: To explore the user's opinion on the influence of the HCL system for implementing a mixed service delivery model in the transition diabetes clinic in rural setting.

Methods: This qualitative project involved interviews of participants recruited from the transition diabetes clinic (n=15; 16-19 years) using opportunity sampling. The collected data was thematically analysed.

Results: The commonest identified theme was the ease of automatic data sharing of the HCL system through a cloud-based platform, making it user-friendly. It helped the participants get review and advice without initiating the data download. They felt that attending F2F clinics on a regular basis may be unnecessary, as was the case previously when the patient/clinician-initiated pump download was needed to review the data. In their opinion, it would reduce the user and their carer's stress of attending a F2F clinic at the expense of education/working time loss, long-distance travel time, financial burden, etc. They commented that virtual clinic consultation would be more acceptable with their HCL system and could reduce clinic non-attendance rate further. They also could participate in the decision-making process through regular virtual support from the diabetes team. Participants felt more reassured and empowered because of the dual "fail-safe" mechanism in the HCL system due to real-time data monitoring by both the user and the clinician. In the participants' opinion, using the HCL system could safely reduce the need for regular F2F consultation, and better acceptance of virtual consultation could make the mixed service delivery model of the transition clinic more resource-effective.

Conclusions: The HCL system could positively influence users' acceptance of effective care delivery through integrated virtual and F2F clinic consultation in the mixed service delivery model of the transition diabetes clinic.

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Neonatal diabetes mellitus: clinical case in center of the hospital Sacre Coeur, Haiti

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Introduction: Neonatal diabetes is most often diagnosed in the first 6 months after the birth of the infant. It is also called congenital diabetes and the diagnosis is based on genetic testing. Unfortunately, underdeveloped countries lacking strong health programs and countries with limited resources are not really able to carry out genetic tests, predict the clinical evolution of the form of neonatal diabetes, prevent complications of the disease and to carry out appropriate treatment.Developed countries have the means to produce data relating to neonatal diabetes and Haiti is a country with limited resources so a case of neonatal diabetes cannot be a reference for healthcare providers.

Objectives: Demonstrate the limitation of in-depth diagnosis of neonatal diabetes in resource-limited settings.

Methods: In a group of 75 patients with diabetes following at the Sacre-Coeur Hospital. One case of neonatal diabetes was suspected.This is a 3 month old infant who was presented to the hospital emergency department with signs of dehydration, notion of vomiting, dyspnea and unconscious.The infant was hospitalized in the intensive care unit. He received treatment to correct the deshydration and hydro-electrolytric disorders. He received antibiotics to control infections and hyperglycemia was put under control with insulin.This is a case of decompensated ketoacidosis in a 3-month-old infant.Others diagnostics have been mentioned before knowing the diabetes.

Results: For arriving at a diagnostic approach, lab examinations were requested

According to the clinical approch, the case was reported as a case of neonatal diabetes mellitus.

Urinalysis	Glycosuria 3+
Blood sugar	High
A1C	14%
Ketonuria	Large

Conclusions: Neonatal diabetes is not a common case among diabetic patients attending the Sacre-Coeur Hospital in Haiti; he is the youngest patient in the group of children enrolled in the diabetes care program. He is currently 2 years old and he has not had the opportunity to benefit from any genetic testing in relation to his case.

P-405

Re emergence of a rare syndrome- clinical profile and biochemical parameters of Mauriac syndrome in a tertiary pediatric endocrinology unit in south India

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Introduction: The Mauriac syndrome is a rare metabolic complication of Type 1 Diabetes mellitus due to chronic under-insulinization. It is characterized by short stature, growth and pubertal maturation delay, dyslipidemia, moon facies, protuberant abdomen, hepatomegaly with elevated transaminases. It has become even less common after the emergence of advances on diabetes treatment. Clinical, laboratory and histological abnormalities are reversible with appropriate glycemic control.

Objectives: To describe the clinical features and biochemical parameters in Mauriac syndrome in children presented to a tertiary care center in South India.

Methods: A retrospective study conducted in a tertiary pediatric endocrinology unit in South India. All cases of Mauriac syndrome admitted in ward or intensive care unit were included. Their clinical presentation, laboratory investigations, duration, dose and compliance to treatment were recorded.

Results: Seven patients presented to us with features suggestive of Mauriac syndrome. Median age of diagnosis was 7.2 years; median insulin requirement was 1.3 units/kg/day; median HbA1c was 13.1. Growth impairment and hepatomegaly were universally present. Transaminases were abnormal with elevated aspartate transaminase and gamma glutamyltransferase. Abnormal lipid profile was seen in 4 out of 7. At follow up with strict glycemic control they had improved and normal laboratory parameters and better growth.

Conclusions: Even though Mauriac syndrome is an uncommon condition since the emergence of intensive insulin therapy which allowed achieving ideal glycemic targets, many patients are still in resource poor settings and have poor glycemic control. Strong suspicion should be maintained by the treating physicians to identify the key signs such as brittle glycemic control and hepatomegaly in T1DM thereby allowing prompt diagnosis of this rare entity. Unnecessary investigations can be avoided in these patients as strict glycemic control alone is sufficient in resolving all, if not most of the symptoms.

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Therapeutic approaches in glucocorticoid-induced diabetes mellitus in children

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Introduction: Craniopharyngioma is a benign tumor of epithelial origin in wihic the main therapeutic attitude is surgical intervention, followed by radiotherapy, with multiple secondary implications. Glucocorticoids have metabolic effects (impairment of glucose homeostasis, insulin resistance, central adiposity increase, hepatic steatosis, osteoporosis) and can cause the development of "corticosteroid-induced diabetes".

Objectives: Glucocorticoids have metabolic effects (impairment of glucose homeostasis, insulin resistance, central adiposity increase, hepatic steatosis, osteoporosis) and can cause the development of "corticosteroid-induced diabetes".

Methods: We present a 14-year-old male patient, with double-operated craniopharyngioma (2019 first operation to remove the tumor, re-intervention in august 2023), ventriculo-peritoneal drainage in 2020, panhypopituitarism in substitution, optochiasmatic syndrome, behavior disorder is presented at the emergency department for sleepiness and vomiting.

Results: The clinical examination at admission reveals a weight of 46 kg, cortisone-like face, polyuria, polydipsia, divergent strabismus, drowsy. Laboratory tests revealed inaugural diabetic ketacidosis and a low c-peptide=0.996 ng/ml, HbA1c 9.4%, negative type 1 diabetes specific antibodies, hypertriglyceridemia (1455 mg/dl), ketonuria. The diabetic ketoacidosis treatment protocol was applied replaced after 72 hours of intensive basal-bolus insulin treatment with 4 injections per day, with good evolution of the glycemic profile. The patient was discharged after 1 month of hospitalization, with progressive decrease of insulin doses, until the stop of insulin therapy, due to the present hypoglycemias.

Conclusions: In conclusions, craniopharyngioma is a benign tumor, due to its location and evolution, it can have important implications in the patient's prognosis and quality of life, requiring a multidisciplinary medical team consisting of a multidisciplinary plan for monitoring.

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What impact does functional insulin therapy have on quality of life and the progression of diabetes?

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Introduction: Functional insulin therapy is the most physiological educational therapeutic method, it allows insulin doses to be calculated more precisely based on the dietary choices and lifestyle of the diabetic child.

Objectives: To evaluate the impact of functional insulin therapy (FI) on glycemic control, HbA1c and quality of life in type 1 diabetic children.

Methods: A cross-sectional study extended between July 1 and December 31, 2023 in diabetic children aged 2.5 to 15 years, hospitalized for inaugural diabetes or metabolic decompensation in a known diabetic with an HbA1C outside the target, for which the FI was implemented based on a well-structured therapeutic education program with evaluation during close controls.

Results: 25 children aged between 2.5 and 15 years old (14 girls and 11 boys) and their mothers were trained in functional insulin therapy following a therapeutic education program including dietary workshops on carbohydrate counting. 100% of mothers and children declared a good level of satisfaction, more food freedom with improvement in the quality of life which was strongly expressed by diabetic adolescents, glycemic balance was obtained after an average duration of 5, 5 days of FI, with good accuracy of carbohydrate-insulin ratios for each meal after 5-6 days, 19 children (76%) had an HbA1C < 7% after three months of FI, and 6 had an HbA1C between 7-7.6%.

Conclusions: At the end of our results, we were able to conclude that functional insulin therapy should be generalized for all our diabetics under a basal-bolus regimen, because it alone would make it possible to guarantee all the expected objectives of the management of diabetic children in resource-limited countries with limited access to new technologies.

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Type I diabetes and associated autoimmune diseases; what clinical and progressive features?

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Introduction: The association of autoimmune diseases is more common in young people with type I diabetes than in the general population because of a common genetic background with diabetes. The most common autoimmune diseases associated with diabetes are thyroiditis and celiac disease; more rarely vitiligo, alopecia, adrenal insufficiency, hypoparathyroidism and Biermer anemia…

Objectives: To study the risk factors for associated autoimmune diseases and their chronology of onset in type I diabetic children followed in consultation.

Methods: Descriptive cross-sectional study carried out on a population of 80 children with type I diabetes followed in consultation in whom systematic screening for celiac disease and thyroiditis was carried out at the time of diagnosis.

Results: Age from 18 months to 16 years, with a male predominance (sex ratio 1.2). 1/8 of our type I diabetic patients have an associated autoimmune disease (celiac disease and / or thyroiditis), celiac disease was associated with diabetes in 7.5% of patients and thyroiditis in 5% with only one case of Graves' disease. Celiac disease preceded the onset of diabetes in one patient, diagnosed at the time of the diagnosis of diabetes in 5 patients, however for thyroiditis was already present in two patients with Down's syndrome 21 before the diagnosis of diabetes, and diagnosed at the same time as diabetes in 2 patients. The family history of celiac disease represents a predisposing field for type I diabetes: in the case of two of our patients, thyroiditis in the mother is a risk factor for thyroiditis in the diabetic girl (case of two patients). The female sex is more at risk (8/10 are girls).

Conclusions: The search for associated autoimmune diseases in diabetic children is systematic even in the absence of warning signs according to European recommendations; however this association is more noted in the female sex, with family history of auto -immunity or predisposing context.

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Childhood diabetes: a two-year epidemiological study (2022-2023) at Batna university hospital (Algeria)

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Introduction: The incidence of childhood diabetes is increasing annually throughout the world, with a high incidence in Algeria (26 new cases/100,000 children and adolescents under 20 years of age). More and more of these new cases are among young preschool children, whose treatment is proving difficult because of the lack of new technological resources.

Objectives: To determine the epidemiological, clinical, therapeutic and evolutionary profile of childhood diabetes in the paediatric department of Batna University Hospital in 2022-2023.

Methods: A retrospective descriptive study carried out on the records of patients hospitalised for diabetes (former diabetics or inaugural diabetics) in the paediatrics department of Batna University Hospital over a two-year period (01 January 2022 to 31 December 2023).

Results: We had 228 hospitalisations for diabetes during the two years with a hospital prevalence of 2.63%, 111 cases of inaugural diabetes (48.7%) and 117 hospitalisations among former

diabetics for metabolic complications (76% ketosis, 10% DKA, 10% hypoglycaemia and 4% for glycaemic imbalance), the age range varying between 7 months and 15 years and 6 months with an average age of 6.7 years. Ketoacidosis was the mode of diagnosis in 70.8% of pre-school children. Type 1 diabetes predominated (97.3%), with three cases of type 2 diabetes. A history of autoimmune pathology included three cases of coeliac disease, two cases of autoimmune thyroiditis, two cases of psoriasis and one case of vitiligo. The mean HbA1C at the stage of diagnosis of diabetes was 9.7%, celiac serology was positive in three cases, thyroid function tests were disturbed in three girls, and vitamin D was reduced in 76.5%. 100% of our patients progressed favourably, with the basal bolus regimen prescribed in 96.4% and the conventional regimen in 3.6%.

Conclusions: The incidence of diabetes in children is on the increase and is also affecting young people, which is why it is important to advance research into the aetiopathogenic factors involved.

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Diabetes in pre-school children, diagnostic and therapeutic features

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Introduction: The incidence of childhood diabetes is increasing annually throughout the world, with a high incidence in Algeria (26 new cases/100,000 children and adolescents under 20 years of age). These new cases increasingly concern young children of preschool age, whose management seems difficult in view of the non-availability of new technological means.

Objectives: To describe the diagnostic and therapeutic features of new diabetics of pre-school age.

Methods: A retrospective descriptive study carried out on the records of patients hospitalised for diabetes (former diabetics or inaugural diabetics) in the paediatrics department of Batna University Hospital over a two-year period (01 January 2022 to 31 December 2023).

Results: We had 228 hospitalizations for diabetes during the two years, including 111 cases of inaugural diabetes, among which 48 cases of children aged less than 5 years (43.2%) with an average age of 2.9 years, of which 08 cases had an age ≤ 02 years, of which the youngest was 07 months old. Inaugural diabetic ketoacidosis was reported in 70.8%, with 6 cases of severe ketoacidosis requiring hospitalisation in an intensive care unit. Anti-β-cell antibodies were tested in 9 patients, with positive results dominated by anti-GAD and anti-insulin antibodies. The Lestradet regimen was prescribed in 28 cases, ISPAD 2018 in 6 cases and fractionated regimen in 14 cases. The outcome was favourable in all children, with the basal bolus regimen prescribed in 91.66% and the conventional regimen in 8.33%. Average glycaemic control was good for three months in 85% of children (HBA1C 7.5%).

Conclusions: Diabetes in young pre-school children is characterised by its high frequency, with cases reported in very young infants associating positive anti β-cell autoantibodies, raising the hypothesis of genetics and autoimmunity. It is vital to raise awareness of the importance of early diagnosis in order to reduce the mortality risk associated with inaugural ketoacidosis, which can be very severe.

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Prevalence of vitamin D deficiency in new diabetics in the Batna paediatric ward (Algeria)

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Introduction: Vitamin D deficiency is one of the most common nutritional disorders in adults and children, but it is also a potentially modifiable risk factor involved in many infectious, dysimmune and neoplastic diseases.

Objectives: to assess the prevalence of vitamin D deficiency in children hospitalised for inaugural diabetes.

Methods: A retrospective descriptive study, carried out in the paediatrics department of the Batna University Hospital, on the records of children hospitalised for inaugural diabetes during the period from 01/01/2022 to 31/12/2023, in which vitamin D dosage was systematically carried out in all children.

Results: 228 hospital admissions involved diabetics admitted for acute metabolic complications, 111 of whom were inaugural diabetics, with an age range of 07 months to 15 years and 03 months. Type 1 diabetes was the dominant type, with only 3 cases of type 2 diabetes in obese adolescents, and one case of mitochondrial diabetes. Vitamin D measurement was included in the routine check-ups of our diabetics, with a prevalence of 76.5% of vitamin D deficiency defined by a 25 OH vitamin D level < 30 ng/ml, of which one third were in severe deficiency (25 OH vitamin D < 10 ng/ml) represented essentially by children aged over 12 years and obese adolescents.

Conclusions: Vitamin D deficiency in our new diabetics appears to be very frequent (>70%), and seems higher than the prevalences reported in healthy children and adolescents in various studies, and could reinforce the hypothesis raising the probable role of vitamin D deficiency in the aetiopathogenesis of autoimmune diabetes. Puberty and obesity were remarkably more associated with severe deficiency, which is in line with the data in the literature.Our results lead us to encourage the search for a causal link through larger comparative case-control studies.

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A Muslim girl with a Berardinelli Seip syndrome

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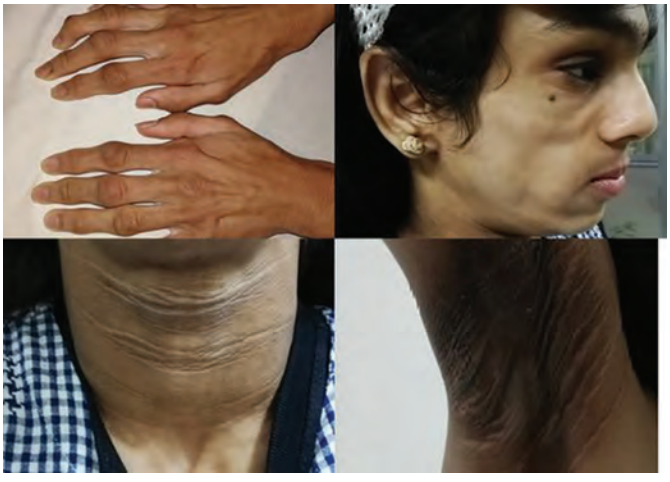
Introduction: Congenital generalized lipoatrophy or Berardinelli Seip Syndrome is characterized by generalized absence of fat at birth or within 1 year of life.Its Incidence is 1:10 million births.It is an autosomal recessive condition caused by 4 gene mutations AGPAT2, CAV1, BSCL2 and PTRF gene.Clinical features include food seeking behavior,generalized absence of fat,recurrent pancreatitis,acanthosis nigricans and Type 2 diabetes,non alchoholic steatohepatitis(NASH),hypertension, and kidney failure.Other features include acromegaloid features, bony abnormalities,hirsutism in females,hypogonadotropic amenorrhea.Treatment of diabetes includes Metformin,Thiazolidinediones and extremely high doses of insulin.Statins for dyslipedemia. Nowadays leptin is the drug of choice.

Objectives: We discuss a case report of a girl who is presented in endocrine clinic due to voracious appetite.

Methods: Our 8 year old patient presented with polyphagia,polydipsia and polyuria and was diagnosed as Diabetes Mellitus.At 12years of age she got readmitted due to acute pancreatitis and managed conservatively. At 22 years of age she again presented due to absence of menarche.On examination,she has coarse acromegaloid facies,hirsutism,large hands and feet with loss of subcutaneous fat.She had hypertension,acanthosis nigricans, and marked hepatomegay. SMR stage shows Tanner stage 2. Fundoscopy shows non proliferative retinopathy.Investigations show HbA1c 8%. hypertriglyceridemia,hyperglycemia,derranged liver function tests and renal function test USG abdomen shows Fatty hepatomegaly.

Results: She has been enrolled for genetic studies and and result came out to be BSCL-2 gene.Our diagnosis is **Berardinelli-Seip syndrome (BSCL)**.Treatment includes Insulin 8U/kg/day and Poiglitazone.For dyslipidemia Low fat diet, fish oil, statins were given.

Conclusions: A girl with dysmosphic facies, diabetes,pancreatitis and delayed puberty should be looked for syndromes like Berardinelli Seip Syndrome.



Written informed consent was obtained from the guardians of the individual depicted for publication of this image.

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Abstract Withdrawn

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Glycemic control in pediatric patients of a level ii hospital - life before and after MiniMed 780g™

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Introduction: Due to constant physiologic changes during growth, glycemic control in pediatric patients might be challenging. MiniMed 780G™ is an insulin pump with an automatic insulin delivery (AID) system that autocorrects glycemia by self-adjusting basal insulin levels and administering correction boluses when occasionally needed, thus potentially further helping the patient in their glycemic control.

Objectives: We aim to study this technology's effects on the glycemic control of the pediatric patients of our level II hospital.

Methods: In this observational retrospective study, we included pediatric patients with MiniMed 780G™, collected their demographic variables, information about disease evolution and data related to glycemic control (median glycemia, HbA1c, time in range, time below range) before the implementation of the AID and at 1-, 3-, 6-, 12- and 15-months after, whenever possible. Data was analyzed using two-tailed paired t-tests.

Results: Of a total of 25 patients, 52% were female; the median age at diagnosis of Type 1 Diabetes Mellitus was 6 years old. The MiniMed 780G™ pump was implemented after a mean of 5,79 years of disease. There were significant improvements in different glycemic control indicators: more patients achieved mean values of glycemia between 70 to 140 mg/dL at 1-, 3-, 6- and 12-months post-pump ($p < 0,05$); there was also a significant increase in the number of patients with Time in Range (TIR) ≥ 70% and with glycated haemoglobin (HbA1c) < 7,5% at 1-, 3-, 6-, 12- and 15-months. In terms of Time Below Range (TIB) ≤ 5% there were only significant differences at 3 and 6 months. The observed effect in HbA1c values tends to be bigger with time, but there wasn't a clear tendency with the other variables.

Conclusions: We observed a significant and beneficial impact of the MiniMed 780G™ pump with an AID system in the glycemic control of our pediatric patients. However, we have a small sample size and a short follow-up period, thus limiting our results and requiring further studies.

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Deaths review in a pediatric diabetology service in Cameroon

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Introduction: Despite easier diagnosis and free insulin therapy for type 1 diabetes (T1DM) in Cameroon, mortality among children and adolescents living with T1DM remains high.

Objectives: Describe mortality of T1DM

Methods: At Mother and Child Welfare Center of Chantal Biya Foundation, we did a retrospective observational study of all patients who died of diabetes during a ten years period. From their files, we extracted age, sex, family type, level of education of both parents and patients, distance from the diabetic clinic, Metabolic control workups, family adherence to treatment and death circumstances. Calculations made with Excel.

Results: We found 10 deaths, with a 60% female predominance. The average age was 11years for both sexes. 90% of these children attended school, 50% came from single-parent homes, and 50% were cared for by their mother. The primary caregiver's level of education was low in 40% of cases, and 50% was known non-compliant to insulin therapy. Mean blood glucose level was 350mg/l. Regarding the circumstances of death, 60% died outside the hospital (40% at home and 20% in alternative medicine). 90% with diabetic ketoacidosis.

Conclusions: Mean age of deceased patients was 11 years, predominantly female in a context of family instability, low educational level of caregiver; low compliance to insulin therapy and deaths occurring out-of-hospital.

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Bone health index shows impaired bone mineral density in children with type 1 diabetes in Hong Kong

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Introduction: Emerging evidence showed that diabetes impacts bone quality in adults. Given the peak incidence of T1D coincides with crucial period of bone accrual, children with T1D may also be susceptible to bone fragility. Traditional DXA is costly and not widely available. BoneXpert, applied to hand radiography, has been adopted for bone age assessment recently and provides simultaneous bone mineral density measurement, expressed as Bone Health Index (BHI),offering an easy technique for bone health assessment.

Objectives: To evaluate correlation between BHI and DXA indexes and to assess bone health of children with T1D

Methods: This was a cross sectional study performed in the Hong Kong Children's Hospital from June 2023 to April 2024.

Results: 47 children with T1D (M 40.4%) with mean age of 12.3 ± 3.7 years, median disease duration 4.7 (IQR 1.4 to 6.8) years and mean HbA1c 7.2% ± 0.8% were included. 8.5% of them had history of fractures. The median TBLH Z-score was -1.0 SD (IQR -1.7 to -0.4), LS Z-score was -0.3 SD (-0.7 to 0.7) and BHI-SDS was -0.6 (IQR -1.5 to 0.2). There was significant positive correlation between BHI-SDS and TBLH Z-score (r=0.53, p <0.05) and LS Z-score (r=0.3, p <0.05). 84.2% of the children had BHI-SDS below the reference population, with 18.4% having BHI-SDS < -2. 18.2% of children had TBLH Z-score < -2 SD, while only 2.1% had LS Z-score < -2 SD. Children who did regular exercise had significantly higher TBLH Z-score (-0.7 vs -2.6 SD, p < 0.05.). LS Z-score and BHI-SDS were also higher, though the differences were not significant. No significant correlations between any DXA/BHI parameters with BMI, disease duration, HbA1c, vitamin D and calcium levels were found.

Conclusions: BHI is a promising method in bone health assessment in children with diabetes. A significant proportion of children with T1D had impaired bone quality, though there was no association with metabolic control. Physical activity could potentially improve skeletal health in this vulnerable population and should be encouraged.

P-417

New-onset type 1 diabetes in children before, during and after the COVID19 pandemic: were there any significant changes?

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Introduction: Type 1 diabetes (T1D) is a complex chronic disease with an underlying auto-immune pathogenesis in which viruses may play a role. Restrictions during the Covid19 pandemic may have influenced prompt access to healthcare and diagnosis.

Objectives: To compare new-onset T1D incidence, presentation, treatment and follow-up in children before, during and after the Covid19 pandemic in a Portuguese hospital.

Methods: Retrospective study of the new T1D cases admitted in our hospital before (Group I: March 2016 to February 2018), during (Group II: March 2020 to February 2022) and after (Group III: March 2022 to February 2024) the Covid19 pandemic. We reviewed patients' demographics, severity of presentation, hospitalization, follow-up and metabolic control.

Results: Across the 3 periods (Group I vs. II vs. III) there were: n=16 vs. n=19 vs. n=20 new T1D patients. At diagnosis, mean(±SD) age: 10,9(±3,6) vs. 10,2(±4,6) vs. 10,9(±5,0) years; duration of symptoms: 15,0 (4-120) vs. 17,5 (7-90) vs. 15,0 (4-180) days; type of

presentation: hyperglycemia/ketosis in 56 % vs. 58% vs. 60%, DKA 44% vs. 42% vs. 40%. Transfer to intensive care units (PICU): 0% vs. 15% vs. 5%. Duration of hospitalization: 9,4(±3,67) vs. 9,0(±2,5) vs. 7,3(±2,5) days, with major social issues in 12,5% vs. 10,5% vs. 25% cases. Time to first outpatient appointment: 9,1(±5,8) vs. 5,1(±2,8) vs. 6,6(±2,9) days (telemedicine in 0% vs. 21% vs. 15% patients). HbA1c at diagnosis (Group II vs. III): 10,5(±4,9) vs. 12,5(±2,3) %, 3-6 months after: 6,9 (±0,9) vs. 6,4 (±0,6)%.

Conclusions: No significant differences in number of new patients, age of onset, or duration of symptoms were found. Although we had a small progressive decrease in DKA as type of presentation there was increased necessity of intensive care during the covid19 period. Despite the restrictions during the pandemic and the significant increase in major social issues after the pandemic we managed to have a shorter length of stay at diagnosis and better metabolic control after the diagnosis.

P-418

Assessment of continuous glucose monitoring user experience in pediatric inpatient diabetes management

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Introduction: Guidelines endorse CGM use in hospitals for diabetes management, but many pediatric hospitals lack the necessary structural support.

Objectives: We aim to develop and implement hospital-wide policy and procedures to support inpatient CGM use in a large academic pediatric hospital.

Methods: We surveyed patients/caregivers, nurses, and providers for baseline assessment of user experiences with inpatient glucose monitoring process during multidisciplinary development of hospital CGM policy and procedures.

Results: At baseline, all surveyed patients felt satisfied with the general hospital glucose monitoring workflow (n=7). More than 50% of patients used CGM-guided insulin dosing with twice daily fingerstick blood glucose (FSBG) for CGM accuracy monitoring. Baseline preferences for using CGM instead of FSBG, trust in CGM, and confidence in RN/provider's ability to use CGM for insulin dosing were established for each user group (n=7 patients/caregivers, n=8 RNs, n=6 providers). The policy and procedures included 7 key components: 1) workflow for ongoing CGM accuracy validation, 2) requirements and contraindications for CGM use, 3) patient agreement, 4) orders and documentation flowsheets integrated into the electronic health record (EHR), 5) clinical pathway for providers, 6) pediatric endocrinology consultation by default, 7) and an awareness and education campaign for hospital staff.

Conclusions: Some pediatric patients have already used CGM-guided insulin dosing with high level of satisfaction. However, nurses and providers have variable preference for CGM, trust in CGM accuracy, and confidence in using CGMs for insulin dosing. To address these gaps, a hospital-wide CGM policy has been developed and approved, with EHR-based tools and education materials under development. Together, these interventions will integrate real-time feedback about CGM accuracy in the EHR, aiming to improve patient and hospital staff experience while minimizing safety events associated with hospital CGM use.

P-419

Early onset of diabetes in Cameroon: challenges of comprehensive care

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Introduction: There is a higher incidence of type 1 diabetes in younger children. The challenges of care are numerous in low and middle income countries where there is no access to different technologies in management of the disease. With few data available in Cameroon, we aimed to described as a first step the clinical aspects and therapeutic options proposed in this specific population in a single center in Cameroon

Objectives: To describe clinical and therapeutical aspects of early onset diabetes in a LMIC

Methods: We did an observational study, including patients aged less than 7 years at diagnosis. From patients files, we assessed, sociodemographic aspects, anthropometric parameters, diagnosis circumstances, clinical presentation at diagnosis, insulin requirements and protocols used. Data are from a single paediatric diabetes clinic and the sampling was consecutive. Statistic analysis was done with Microsoft Excel.

Results: We included 16 patients, median age 4.3 years with 68.7% (n=11) boys. Delay between first complaint and diagnosis varied from 7 to 30 days (median 9 days). DKA was the initial clinical presentation in 7 patients (44%) and the DKA was severe in a patient (Blantyre score of coma 1, severe dehydration with 12% weight loss). An infection was associated in 56% (n=9): severe sepsis (n=2), pneumonia (n=2), malaria (n=3), measles (n=1), UTI (n=1) patients. Type I diabetes was evoked in 14 patients, neonatal diabetes in one patient and MODY in the other one. Insulin requirements varied from 0.3 to 1 U/Kg/ day. All the patient had regular insulin, in addition to glargine in 44% (n=7) patients and NPH in 56%. No patients had an insulin pump. The choice of the type of intermediate or long acting was based on financial constraints

Conclusions: Diagnosis of diabetes in young children is made around 9 days after beginning of complaint and DKA at diagnosis is found in 4 patients on 10. Infections are also common at diagnosis in half of patients. Choice of therapeutic option depends on financial constraints.

P-420

Glycemic control and associated factors in children and adolescents with diabetes at a tertiary hospital, Addis Ababa, Ethiopia

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Introduction: The incidence of Type I diabetes mellitus (T1DM) is increasing globally. Various risk factors and challenges are associated with inadequate glycemic control and early complications involving multiple organ systems in T1DM. Data on glycemic control and associated factors is scarce among children and adolescents in Ethiopia.

Objectives: To determine glycemic control and associated factors in children and adolescents seen at Tikur Anbessa Specialized Hospital (TASH) in Addis Ababa.

Methods: This is a cross-sectional analytical study conducted from May 1, 2020, to September 30, 2020, at TASH, a tertiary teaching hospital**.** The study included 158 children and adolescents with T1DM who were under follow-up at the endocrinology clinic of the hospital. The sample was randomly selected using the list in the clinic register as a sampling frame. Descriptive statistics were used to summarize the data and bivariable analysis and multivariable logistic regression models were used to determine the associated factors.

Results: Mean (SD) hemoglobin A1c (HgbA1c) was 9.7 (±1.98%) and only 17.6% of the children achieved the HbA1c level of <7.5%. The odds of poor glycemic control in children in the age group of 10-15 is 1.8 times (AOR,1.8, *P*=0.021) that of being in the other age groups.

Conclusions: Poor glycemic control is significantly high among children and adolescents with T1DM in TASH. Older age and long duration of DM after diagnosis are factors significantly associated with poor glycemic control

P-421

Case report of two Ethiopian infants with neonatal diabetes successfully treated with oral hypoglycemic drugs from a tertiary hospital in Addis Ababa

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Introduction: Neonatal diabetes is when there is onset of diabetes before six months of age. It is rare but with life-threatening metabolic complications. Two main types are described transient and permanent neonatal diabetes based on the duration of insulin requirement. Transient neonatal diabetes which accounts for more than 50% of neonatal diabetes is caused by problems in insulin production and resolves in the first year of age to the contrary permanent neonatal diabetes doesn't go into remission after the diagnosis in neonatal age. Most permanent neonatal diabetes is secondary to ABC8 and KCJN11 mutations can be safely shifted to oral sulphonylureas like glibenclamide.

Objectives: To describe the diagnosis and management of neonatal diabetes in a resource-limited settings

Methods: case report of two Ethiopian infants who were diagnosed with diabetes after they presented with diabetic ketoacidosis on their 7th week of age for whom we shifted successfully from insulin to an oral hypoglycemic drug, glibenclamide after a genetic test revealed ABCC8 de novo mutation.

Results: two infants who had ABCC8 de novo mutation were treated with oral hypoglycemic drugs and they had excellent metabolic control on follow-up

Conclusions: The fact that we were able to do genetic tests for these infants has changed the lives of these two infants otherwise, we could have put them on lifelong insulin injection which is less effective than sulphonyl urea and with a higher risk of hypoglycemia.

P-422

Changes in insurance policy help to increase continuous glucose monitoring (CGM) use in youth with type 2 diabetes (T2D)

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Introduction: CGM use has been demonstrated to improve HbA1c in adults with T2D and adults and children with type 1 diabetes (T1D), but data for CGM efficacy in youth with T2D is limited. One potential reason for the paucity of data could be inadequate CGM access for youth with T2D. In January of 2022, Medicaid California (government subsidized insurance) changed its policy and approved CGM coverage for any patient with T2D taking any type of insulin without requiring minimum blood glucose logs.

Objectives: The objectives of this study are: 1. Evaluate the impact of the policy change in usage of CGM in youth with T2D, and 2. Evaluate if CGM usage improves HbA1c in this population.

Methods: Retrospective data from electronic medical record (EMR) database was collected at an urban children's hospital from January 2020 to December 2023. Data was collected for any patient with a diagnosis of T2D who had a clinic visit during this time. We reported summary statistics to compare CGM use rates. To explore the effect of CGM use on HbA1c we fit a mixed effect linear regression model for repeated measures over time. Statistical analyses were performed using R (version 4.3.2).

Results: Medical record data was available from 1162 unique patients over 4907 visits, whose median (IQR) age was 16.0 [14.1, 17.6] years old, with a diabetes duration of 1.5 [0.5, 3.1] years. Of our sample 91% were publicly insured, 53% identified as Hispanic, 51% identified as female, and 39% preferred a language other than English. Pre and post policy change data was available for 594 patients. CGM usage increased from 16 patients (2%) before the policy change to 148 (16%) after the policy change. CGM use predicted 0.39% lower HbA1c, 95% CI [-0.65% – -0.13%].

Conclusions: Change in insurance policy may help decrease disparities in treatment and improve patient outcomes in youth with T2D. Future studies are needed to elucidate if CGM alone helps to improve HbA1c in youth with T2D, or if other confounders affect the improvement in HbA1c.

P-423

Young adults with type 1 diabetes: prevalence of, and associations with, atypical complications

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Introduction: The prevalence of, and associations with, hearing loss, oral and olfactory disease, frozen shoulder, trigger finger, and hair loss in type 1 diabetes is unclear.

Objectives: Our review aimed to determine, in young adults with type 1 diabetes (mean age±1SD 18–30 years), the reported prevalence of, and associations with such complications.

Methods: We conducted a quantitative systematic review. PubMed, CINAHL, and Cochrane were searched (January 2000–February 2024) using Medical Subject Headings and keywords; the reference lists of all eligible records were also hand–searched. Overall, 28 records were retrieved. Quality appraisal was undertaken, with data generally of high quality.

Results: Findings underscore a relatively high prevalence of hearing loss and oral disease in the study population. For example, in a Chinese study 48% were reported to have hearing loss, while Brazilian studies reported 52.9% xerostomia and 40.8% hyposalivation. Data pertaining to associations with hearing loss were limited. Regarding oral diseases, findings largely suggested that there was no relationship with glycaemic control. Findings relating to the impact of diabetes duration were more inconsistent. No data were available concerning frozen shoulder, trigger finger, and hair loss.

Conclusions: Hearing loss and oral disease should be considered in consensus clinical practice guidelines relating to type 1 diabetes. Informed by such guidelines, healthcare professionals can assist in screening for, management and secondary prevention of these complications in this population. Related healthcare should involve optimal communication between all applicable providers and be underpinned by knowledge around atypical type 1 diabetes–related complications.

P-424

Does insulin Bolus delivery speed influence insulin absorption and action? Comparing a standard and quick insulin Bolus by a euglycemic clamp study

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Introduction: Numerous factors impact the rate of insulin absorption and action from the infusion site during insulin pump therapy. However, there is little data on how the speed of insulin bolus delivery impacts insulin action and absorption.

Objectives: The objective of this study was to compare the pharmacokinetic and pharmacodynamic differences between a quick 'Q' and standard 'S' bolus speed through an insulin pump.

Methods: We conducted a randomized crossover, single-blinded trial of adults (ages 18-30) with T1D to compare the pharmacokinetic (PK) and pharmacodynamic (PD) properties of insulin aspart (0.2 U/kg) infused during a "quick, Q" bolus (15 U/min)versus a "standard, S" bolus (1.5 U/min) through the MiniMed 670G insulin pump. Paired, standardized euglycemic insulin clamp studies were performed on 2 separate occasions.

Results: Eight youth with T1D (ages 22 +/- 3.2 yrs, 63% F, A1c 7.7 +/- 1.1%) completed the study. Linear mixed effects models were used to compare PK and PD variables and LS means were reported. When comparing Q vs S, time to reach max glucose infusion rate (T_{GIRmax}) was 57 minutes faster for Q, but did not reach statistical significance (116 vs 173 min, p=0.09). GIR_{max} was similar when comparing Q vs S (8.4 vs 7.5 mg/kg/min, p=0.36) as was the total area under the curve for GIR ($AUC_{GIR300min;}$ 1219 mg/kg vs 1226 mg/kg, p=0.96). The time to reach 50% max insulin concentration ($T_{50\%Cmax}$) was 15 min shorter in the Q vs S interventions (20 vs 35 min, p=0.007). Time to reach 50% of the max GIR

Table. Pharmacodynamic parameters based on bolus speed. Data are reported as LS mean (95% CI).

	Quick	Standard	Difference	*P*
$AUC_{GIR300min}$ (mg/kg)	1219.34 (697.75, 1740.93)	1226.52 (704.93, 1748.11)	7.18 (-333.82, 319.47)	0.96
GIR_{max} (mg/kg/min)	8.40 (4.93, 11.88)	7.54 (4.06,11.01)	0.86 (-1.25, 2.98)	0.36
$T_{25\%GIRmax}$ (min)	41.96 (22.08, 61.84)	44.29 (24.41, 64.17)	-2.33 (-30.46, 25.80)	0.85
$T_{50\%GIRmax}$ (min)	54.96 (40.24, 69.68)	71.29 (56.57, 86.01)	-16.33 (-36.27, 3.60)	0.092
T_{maxGIR} (min)	116.33 (74.87, 157.80)	173.67 (132.20, 215.13)	-57.33 (-126.49, 11.82)	0.089
$AUC_{insulin270min}$ (mg/kg)	11272 (8326.00, 14218)	11120 (8256.28, 13984)	152.07 (-1987.49, 2291.63)	0.86
$Insulin_{max}$	69.48 (53.87, 85.08)	67.74 (52.14, 83.35)	1.74 (-19.84, 23.31)	0.85
$T_{50\%insulinmax}$ (min)	20.17 (11.32, 29.02)	34.83 (25.98, 43.68)	-14.67 (-23.50, -5.83)	0.0066
$T_{insulinmax}$ (min)	64.92 (47.51, 82.32)	77.58 (60.18, 94.99)	-12.67 (-41.61,16.28)	0.33

was 16 minutes faster with Q vs S, but did not reach statistical significance (55 vs 71, p=.09).

Conclusions: Pharmacokinetic and pharmacodynamic properties were similar between Q and S bolus speeds other than $T_{50\%Cmax}$. Larger studies are needed to examine if accelerated absorption and action of insulin can be altered by changing the speed of an insulin bolus.

P-425

Therapeutic compliance in a context of subsidizing care for diabetic children in Cameroon

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Introduction: In the poorest countries in the world, it was noted that therapeutic compliance among children with diabetes is a major challenge due to various economic and socio-cultural contextual factors.

Objectives: Our study aims to identify the factors influencing therapeutic compliance in children living with diabetes in a context of low-cost care thanks to the Changing Diabetes in children program.

Methods: A non-experimental cross-sectional study was undertaken in the 3 regional hospitals in northern Cameroon: Ngaoundéré, Garoua and Maroua over a period of 4 months. It was a question for us of carrying out a survey by questionnaire established by us, written and completed using the answers obtained during discussions with patients and their families and also certain information obtained in medical files. Therapeutic compliance was assessed in this questionnaire using the TEO and GIRERD questionnaire as well as some factors that could influence compliance. The data was entered and processed by IBM SPSS 20 software.

Results: During the study period, we recruited 35 children. The age extremes were 06 and 15 years, with a majority in the group of 11-15 years. Boys were the majority (sex ratio of 1.05). The majority of patients (97.1%) had unbalanced diabetes (glycated haemoglobin ≥ 7,5%). Only 28.6% of patients had good therapeutic compliance according to the TEO and GIRERD questionnaire; 31.4% had a minimal compliance problem; and 40% had poor compliance. The factors linked to poor compliance that were found are: delay in taking medication (P=0,001), forgetting to take medication (P=0,002), absence of a glucometer for self-monitoring of blood sugar (P=0,04) and stock shortage of drugs (P=0,022).

Conclusions: Therapeutic compliance is poor in our children living with diabetes and is influenced here by four factors linked to treatment. Hence the importance of raising awareness among guardians/parents, program partners to think about the use of insulin pumps in our environment.

P-426

Navigating dual challenges: a qualitative study of adolescents and caregivers perceptions in managing type 1 diabetes and neurodiversity

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Introduction: Neurodiversity is an umbrella term encompassing multiple diagnoses including ADHD and autistic spectrum conditions. Current research is limited but highlights the complexities faced by caregivers who often face unique challenges in managing type 1 diabetes (T1D) due to difficulties with communication, sensory sensitivities, adherence to medical routines and increased risk of admission with diabetes related problems.

Objectives: This study aims to understand the perceived burdens of neurodiversity for adolescents and their caregivers in managing their T1D and whether paediatric diabetes units can develop a framework to support these families within a solution focused approach.

Methods: A qualitative methodology of semi-structured in-depth interviewing was used to explore the barriers, challenges, perceptions and impact on quality of life managing diabetes with neurodiversity. A thematic analysis was used to analyse the data.

Results: 10 parents and adolescents (12 to 15 years) were interviewed. Common themes identified were related to support structures, sleep, diabetes technology, hypoglycaemia fear, worries for the future and relationships with professionals. Both parents and adolescents noted that diabetes technology such as continuous glucose monitoring (CGM) reduced their anxiety of hypoglycaemia and improved sleep. Children felt that their teams were supportive and that neurodiversity did not adversely impact their T1D management. Parents noted that easy access to the psychologists was important but there was a lack of general resources on neurodiversity with T1D.

Conclusions: Caregivers demonstrate resilience in navigating challenges and adolescents did not see their neurodiversity as a barrier to managing T1D. Diabetes technology were viewed as improving quality of life. Effective T1D management with neurodiversity necessitates that healthcare providers are trained to understand the specific needs of neurodiversity. This includes adapting communication strategies and developing individualised care plans.

P-427

Permanent neonatal diabetes in resources limited setting

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Introduction: Neonatal Diabetes (NDM) is a rare form of monogenic diabetes, present within six months of age, severe hyperglycaemia require insulin therapy. The diagnosis of NDM is very challenging in Myanmar.

Objectives: Day 55 old baby girl was referred to our hospital from Delta Area of Myanmar for hyperglycaemia. She was lethargic, increased urine output, vomiting and reduced sucking for two weeks. She was a product of elective caesarean section, birth weight was 5 lb and no eventful perinatal conditions, She is the third child of the unrelated marriage. The is not relevant family history regarding diabetes. When admission, she was too ill, lethargic, severely dehydrated and acidosis. The blood glucose level was high. Her weight was 3.5kg, height was 56cm, both were less than third centile. The lab results were Sodium 165mmo/L, potassium 4.5mmol/L, chloride 103 mmol/L urea 109mg%, bicarb 3 mol/L, HbA1C 6.8%, Cpeptide 0.238ng/ml (1.1-4.4), AntiGAD IA2 (IgG) negative. The diagnosis of NDM with severe diabetes ketoacidosis, hypernatraemic dehydration was made. The insulin infusion, fluid

management, electrolytes correction were very challenging. The insulin infusion was needed for more than 10 days, then changed to SC insulin. The genetic testing was sent. During admission the baby suffered bile stained vomiting several times a mass around umbilicus was found. The USG showed volvulus around jejunum, the resection and anastomosis was needed. The KCNJ11 mutation was identified, confirming permanent NDM. Transition to oral sulphonylurea after genetic confirmation, gradual increased in sulphonylurea dosage under close monitoring.

Methods: case report of PNDM

Results: Now she is six months old, growing well, having appropriate development and good glycemic control.

Conclusions: . She is the first case of PNDM having KCNJ 11 mutation diagnosis in Myanmar.The diagnosis and management of NDM is very challenging in our setting.

Fig. 4 months old baby at follow up Written informed consent was obtained from the guardians of the individual depicted for publication of this image.

P-428

The effect of residual insulin secretion on glycaemic control among young patients with type 1 diabetes in Cameroon

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Introduction: The effect of residual insulin secretion on glycaemic control among young patients living with type 1 diabetes in sub-Saharan Africa is unknown.

Objectives: To determine the effect of residual insulin secretion on glycaemic control among young patients with type 1 diabetes in Cameroon.

Methods: The residual insulin secretion was determined among a group of young patients with type 1 diabetes attending the children diabetes clinic of the Yaoundé Central Hospital, by measurement of the concentration of non-fasting C-peptide after a mixed meal tolerance test. The patients were then divided into two groups, those with residual insulin secretion (C-peptide ≥ 200 pmol/mL), and those without insulin secretion (C-peptide < 200 pmol/mL). The two groups were compared for the mean HbA1c, body mass index (BMI) and reported episodes of hypoglycaemia for the past three months. C-peptide levels were measured by ELISA method, and HbA1c by a point of care device (HemoCue HbA1c 501).

Results: Forty-two patients, mostly children or adolescents (24, 57%), with a median age of 18.5 [16-24] years, a median duration of diabetes of 3 [2-10,2] years, and a median HbA1c of 8,4 [6.9-11.3] % were included in the study. Twelve (29%) patients had residual insulin secretion. Compared to those without residual insulin secretion, they had lower median age (18 vs. 20) and significantly a higher BMI (26.1 vs. 22.9 kg/m^2), a shorter median duration of diabetes (2 vs. 6 years), lower median insulin doses per day (0.7 ui vs. 0,9 ui/kg/day) lower median HbA1c (7 vs. 9%) and lower reported episodes of hypoglycaemia for the past 3 months. The proportion of patients with residual insulin secretion on intensive insulin regimen (≥ 3 injections/day) was significantly lower compared to those without residual insulin secretion (67% vs. 93%).

Conclusions: Despite the small sample size, this study tends to show that residual insulin secretion is the main determinant of good glycaemic control among young patients living with type 1 diabetes in Cameroon.

P-429

Real-life experience of liraglutide treatment and weight control in obese adolescents: a preliminary study supported by psychoanalysis

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Introduction: The use of glucagon-like peptide-1 (GLP-1) agonists for the medical treatment of childhood obesity was approved by the FDA four years ago; however, clinical experiences are limited.

Objectives: Our study aims to present the clinical data of obese adolescents receiving liraglutide treatment in our clinic, providing preliminary insights into its efficacy and potential benefits.

Methods: We retrospectively evaluated data from patients treated for obesity in our clinic who failed to achieve weight loss through diet and exercise and subsequently received liraglutide treatment. Monthly evaluations of Body Mass Index (BMI), body measurements, and body compositions were conducted. All cases underwent semi-structured interviews using the "Schedule for Affective Disorders and Schizophrenia for School- Age Children, DSM-5" and were assessed the "Beck Depression Inventory and Suicidal Ideation Scale" by a child psychiatrist.

Results: Nineteen patients (M:F=8:11) were included in the study. The mean age was 15.9±2.6 years, and the mean treatment duration was 5.0±3.1 months. Hepatosteatosis was detected in all patients, and impaired glucose tolerance was observed in one. An average weight loss of 4.92±4.7% (4.5±4.1kg) was achieved within the first three months of treatment. Treatment was discontinued early in 5 patients due to financial constraints and in two due to severe vomiting. A positive correlation was found between body fat mass and trunk fat ratio with depression scores, emphasizing the psychological burden of obesity (p=0.009, r=0.792 and p=0.024, r=0.717).

	Baseline	Follow-up	p
Body Weight (kg)	101,5±20,2	95,2±23	**<0,001**
BMI-SDS	3,32±0,45	2,91±0,71	**0,002**
HOMA-IR	6,3±3,4	3,3 ±1,6	**0,010**
Body Fat Mass (kg/%)	43,3±9,7 / 45,5±3,6	37,8±12,6 / 42,3±4,7	**0,012 / 0,022**

Conclusions: This preliminary study demonstrates the efficacy and side effects of liraglutide in obese adolescents. Significant improvements were observed in body weight, BMI, insulin resistance, and body fat percentage. The depression rate among study participants was higher compared to the literature, although a definitive cause-effect relationship could not be established due to the study's limited size and cross-sectional design.

P-430

Sexuality of adolescents with type 1 diabetes in comparison with their healthy peers

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Introduction: Adolescents with type 1 diabetes mellitus (T1DM) may differ from their healthy peers with respect to sexual behavior.

Objectives: To explore sexual behaviors of T1DM adolescents in comparison with healthy peers.

Methods: The study population included 174 adolescents, of whom 58 T1DM adolescents (mean±SD age 16.3±2.0 years, disease duration 6.7±3.5 years and HbA1c:8.0±1.3%) and 116 healthy controls (matching 1:2 for school, class and gender). Anonymous, self-reported questionnaires were used to evaluate sexual education and behaviour.

Results: T1DM adolescents had a sexual experience at a significantly lower percentage than healthy peers (74.1% vs 87.4%, p=0.033). The average age of first sexual intercourse was similar for both groups (15.9±1.8 years vs 15.2±1.5 years for T1DM and controls respectively). In the control group boys had sexual intercourse twice more frequently than girls and in the T1DM group three times more frequently. Maternal education level (β=-1.47, p=0.014) and HbA1c (β=-0.63, p=0.49) were independently negatively associated with the age at 1st sexual experience and 1st sexual intercourse (maternal education: β=-1.53, p=0.003, HbA1c: β=-0.92, p<0.001) respectively.

Conclusions: A significant percentage of the T1DM adolescents of the present study had sexual experience or intercourse. However, fewer T1DM adolescents had sexual experience than their healthy peers and girls less frequently than boys. Maternal education level and glycaemic control were negatively associated with age at sexual debut. The above underline the need for early sexual education of adolescents with or without diabetes for the prevention of unfavourable outcomes.

P-431

Society's perception of young persons living with diabetes

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Introduction: Society plays an important role in helping young people with type1 diabetes live positively and fight against stigmatization. This role is often compromised by poor diabetes awareness.

Objectives: To understand the society's perception of young persons living with diabetes.

Methods: Diabetes Awareness and Support Initiative (DASI), a type 1 diabetes-led association, engaged members of the society on the topic of diabetes in young people. Community members, parents of persons living with diabetes, Friends of Diabetes were invited to participate in a public forums organized in four regions in central Kenya. The participants were interviewed individually using a questionnaire to assess their perceptions. Responses were documented, collated and feedback to the participants in plenary during which misconceptions of diabetes were discussed and correct information disseminated.

Results: A total of 350 participants, aged 15 to 80 years participated. Majority of participants had basic level education. 60% believed diabetes was a curse in the family; 20% a disease of the rich in society; 10% an inherited condition; while the remaining 10% were not aware and had no information at all. 50% of the participants believed that children cannot have diabetes and do not live long if they become diabetic. Such participants indicated that young people with diabetes should not marry because they are impotent and will die young. Participants residing areas closer to Nairobi were more aware about diabetes. The majority of participants aware of type 1 diabetes believed that it is cured after several injections of insulin. Only a small fraction of the participants indicated a willingness to assist young persons with diabetes.

Conclusions: These findings highlight need for masive forums and strategies to enhance diabetes awareness especially type1 diabetes in the society; dispel diabetes myths and misconceptions; and reduce stigmatization of youth with diabetes, due to lack of society's awareness of information on diabetes in children.

P-432

Setting up a national type 1 diabetes register in Cameroon: steps and considerations

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Introduction: **Introduction:** Type 1 diabetes is a chronic disease requiring continuous monitoring. Through the Changing Diabetes in Children (CDIC) project, Cameroon was able to set up 11 clinics which care for 1,197 children. A national registry makes it possible to collect accurate data on health indicators, thereby facilitating better healthcare planning and epidemiological research.

Objectives: **Step-by-Step Implementation Needs assessment and planning:** a situational analysis was carried out with the expertise of a partner, it enabled the identification of potential gaps in the CDIC project's data collection system. With respect to our findings, we layed out our objectives and developed our framework with the help of different stakeholders.

Methods: **Registry design and hosting:** a proposal of IT solution was done and reviewed with various stakeholders to ensure it was applicable to our context and met the needs. A data management agreement was then signed between the technical partner and the Cameroon MOH. The Electronic register will be hosted on the MOH's central server.

Results: **Pilot implementation:** prior to implementation a training session has to be organised, during which a number of healthcare workers working at the clinics with be capacitated. A representative number of clinics will be selected to enable feedback within a given period. Evaluation and adjustment of the software will be done hereafter. **Roll-out and ongoing monitoring:** the roll-out will ensure complete coverage and active participation of all clinics. A monitoring and evaluation system will be put in place to assess the quality of the data and the impact of the register on the management of type 2 diabetes.

Conclusions: **Conclusion:** Setting up a national registry for type 1 diabetes in Cameroon is an essential process for improving the management of the disease. By following a methodical and collaborative approach, it is possible to create a valuable tool for epidemiological surveillance and healthcare planning.

P-433

Comparison of metabolic control in children and adolescents treated with personal insulin pumps

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Introduction: Type 1 diabetes (T1DM) is the most common disorder of glucose metabolism. It is treated with functional intensive insulin therapy, which aims to supplement near-physiological amounts of exogenous insulin subcutaneously. In Poland, the most common treatment for children and adolescence is insulin pump. The devices differ from each other in terms of connection between insulin pump and CGM.

Objectives: The aim of our study was to compare metabolic control in patients with T1DM using the Medtronic 720G, Medtronic 640G/740G and Medtronic 780G.

Methods: This was a retrospective, observational single-centre study. We randomly selected 90 children with T1DM according to pump category (Medtronic 720G without PLGS), Medtronic 640G or 740G with PLGS, Medtronic 780G). The study group was characterized by age, weight, height and duration of diabetes type 1. All data were collected from on-site medical documentation or for CGM data. All statistical analyses were performed in STATISTICA 13.1 (DellInc., Round Rock, TX, USA).

Results: Median age of study group was 12.9 (11–15) years. The total dose of insulin of patients was 0.8 (0.7–1) units/kg, BMI at 58th (35–79) percentile. Children using Medtronic 720G had the longest T1DM duration. However, those using Medtronic 640/740G presented lowest insulin requirements, but also lowest effectiveness of CGM use.Those treated with Medtronic 780G most often achieved target TIR≥80% [13 (43.3)%], followed by Medtronic 640/740G [10 (33.3)%, p=0.2980 vs Medtronic 780G) and Medtronic 720G [4 (13.3)%, p= 0.0102 vs 780G]. Target for CV< 36% was met similarly by 19 (63.3%) of Medtronic 780G users, 18 (60%) of Medtronic 640/740G users (p>0.9999 vs Medtronic 780G) and 9 (30%) of Medtronic 720G users (p=0.0199 vs Medtronic 780G).

Conclusions: We observed that any kind of connection between insulin pump and continuous glucose monitoring can give patients better metabolic control of disease. Therefore, a prolonged study is required, which could show more advantages of closed loop pumps into the quality of life.

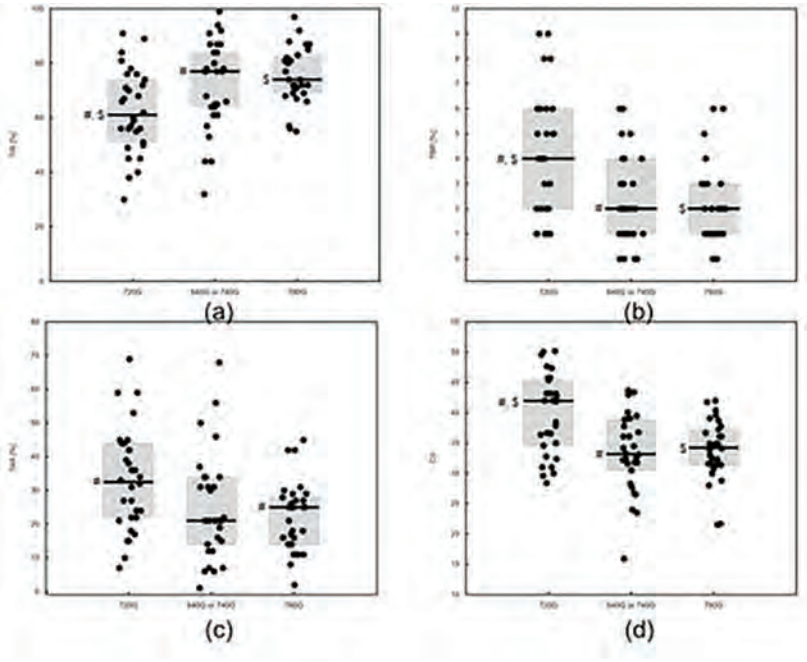

Figure 1. (a) Time in range in 720G, 640G/740G; 780G (b) Time below range in 720G, 640G/740G; 780G (c) Time above range in 720G, 640G/740G; 780G (d) Coefficient of variation for glucose in 720G, 640G/740G; 780G.

P-434

How digital health and artificial intelligence applications impact the management of diabetes

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Introduction: Individuals living with diabetes require continuous monitoring and management to prevent complications and improve patient outcomes. Traditional methods of diabetes care often fall short in providing the necessary real-time, personalized support. This study explores the integration of telemedicine, digital health, decision support systems, and artificial intelligence (AI) to improve diabetes management, enhance patient outcomes, and optimize healthcare delivery.

Objectives: The primary objectives include:

- Analyze how telemedicine improves access to care and patient engagement.
- Evaluate the effectiveness of digital health tools in real-time monitoring and patient self-management.
- Examine the utility of decision support systems in clinical decision-making.

Methods: 1. Quantitative analysis of the patient outcomes 2. Qualitative assessments of patient and provider experiences.

Results: The integration of telemedicine and digital health tools has shown a significant reduction in HbA1c levels as a patient is able to improve from >14% level to below 10, improved medication adherence, and enhanced patient engagement. Decision support systems have provided healthcare providers with critical insights, leading to more accurate and personalized treatment plans. Collectively, these technologies have contributed to reduced hospitalization rates, lower healthcare costs, and improved quality of life for patients with diabetes.

Conclusions: The results highlight how telemedicine, digital health, AI, and decision support systems have revolutionized the treatment of diabetes. In order to maximize the benefits of these technologies across a range of patient groups, future research should concentrate on improving the scalability of these technologies, addressing data privacy concerns, and guaranteeing fair access. An important step toward providing diabetes care that is more effective, efficient, and patient-centered has been taken with the incorporation of these cutting-edge technologies.

P-435

Infant with hyperglycemia: a clear case of neonatal diabetes?

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Introduction: The initial diagnosis of diabetes in infants presents an extremely rare and challenging situation. This case presentation reports on a four-and-half-month-old infant with an initial manifestation of type 1 diabetes mellitus. The child was presented

to an external hospital due to fever following vaccination, where a high concentration of glucose and ketones was incidentally detected in the urine. A comprehensive history revealed excessive drinking, increased urination, and weight loss. Initial laboratory results showed a pH of 7.16, pCO2 of 19 mmHg, blood glucose of 628 mg/dl, lactate of 2.8 mmol/l, and a base excess of -21 mmol/l.

Objectives: The child was promptly stabilized in our pediatric intensive care unit through rehydration and intravenous insulin administration according to ISPAD guidelines.

Methods: In infants < 6 months of age, genetic causes for neonatal diabetes must be considered in the first place. Two elevated diabetes-specific antibodies were detected, confirming the diagnosis of autoimmune type 1 diabetes. The incidence of diabetes in infants is 1:20,000 to 1:500,000 in infants under 6 months of age. Approximately 90-95% of these cases are genetically determined and correspond to neonatal diabetes, while only 5-10% can be attributed to autoimmune type 1 diabetes.

Results: The young age of these patients poses significant challenges for the managing department, especially in calculating infant nutrition intake, managing the very low insulin requirements of these patients, and closely monitoring blood glucose levels.

Conclusions: This case study underscores the importance of early diagnosis, timely initiation of treatment and care in a specialized department to provide comprehensive education and support to parents for the child's well-being.

P-436

No child should die from diabetes – changing diabetes in children CDiC in Sudan

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Introduction: In Sudan, the CDiC program has been established in March 2017 and till now. Agreement has been signed between Novo Nordisk A/S and local parties represented by Diabetes Care Organization DCO, Sudan Childhood Diabetes Association SCDA and the federal ministry of health FMOH

Objectives: To highlight the role of CDIC in improving the diabetic children' lives and empowering human resources before and after the war in Sudan

Methods: most of the data were lost because of the war but these are retrieved from the e-mail communications

Results: ***Twelve*** diabetes clinics have been established, with about **4,421** beneficiaries. Almost all of the milestones have been met in the allocated period of time including empowering health care professional ***(264*** HCPs have been trained) and educating diabetic children about their disease and how to live with it through five camps, group sessions and 20 youth clubs (***424*** children have attended those activities). Through the supervisory visits, ***80%*** of children were enrolled under the umbrella of the national health insurance coverage (which helps in sustainability). More than ***80,000 vials of insulin*** have been donated among other commodities. Comparing data from the beginning of the program till the end of 2022, just before the war, the following was observed: new case detection rate has increased ***from 9.8% to 15.9%***. Diabetes ketoacidosis rate has increased from ***1.2% to 5.9% and 60%*** of which were newly discovered diabetics. Mortality rate has reduced from ***0.24% to 0.13% in 2021, and then increased to 0.4% in 2022 because of the Dengue fever***. Because of the current fragile situation in Sudan, most of the activities have been suspended. The donation is only for insulin and that faces a lot of struggles in clearance and distribution because of safety issues

Conclusions: CDiC has a great role in supporting diabetic children in an optimum care and the war is currently ruined every effort spent to improve the quality of lives of diabetic children and their health care providers

P-437

Issues facing a single mother with multiple diabetic children- case report

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Introduction: The management of Type 1 diabetes in children poses significant challenges, which are compounded when a single parent must care for multiple diabetic children. This case report explores the multifaceted issues faced by a single mother, MM, who is raising three children diagnosed with Type 1 diabetes.

Objectives: The objective of the study are to examine the emotional, social, logistical, and financial challenges encountered by a single mother with multiple diabetic children and to identify strategies for managing these challenges including use of modern technology.

Methods: A qualitative case study approach was used, involving detailed interviews with MM and a review of her daily management routines for three children with type 1 diabetes and support systems. The participant was selected based on selection criteria (single mother, with more than two diabetic children and under our care for more than two years). Data were collected on psychological impact, social impacts, emotional stress, logistical complexities, financial burdens and impact on glycaemia control.

Results: Mrs. MM has facing many challenges (summarized in the table below) including emotional, so she had, logistical, nd financial. She has experiences high levels of stress, anxiety and

I- Emotional Challenges

1. **High Stress Levels: MM reports constant anxiety over her children's fluctuating blood sugar levels, occasional pump or sensor failure, worrying about Diabetic ketoacidosis and potential hypoglycemic episodes, especially during the night.**
2. **Emotional Exhaustion: She experiences burnout due to the relentless nature of diabetes management, including insulin administration, frequent blood sugar monitoring, dietary planning and usual care for the other heathy children.**
3. **Tiredness and lake of sleep: MM need to wake up in the middle of the night to respond to alerts and alarms of the insulin pumps and sometimes she needs to change the cannula, reservoir and quick set.**
4. **Emotional Support for Children: the three children struggle with feelings of being different from their peers. Over the last year and upon the diagnosis of her third child Mother has started showing signs of emotional distress and depression, required psychological referral and support. Recently S started expressing signs of frustration and anger about his diabetes.**

II- Financial Challenges

1. **Medical Expenses: MM spends most of her time measuring blood glucose levels and giving insulin or changing the pump sites and accessories. She also spent a significant portion of her income on diabetes supplies, including insulin pump accessories, glucose monitors, test strips, and emergency glucagon kits.**
2. **Lost Income: Due to the demanding care schedule, MM had to reduce her working hours, resulting in a substantial loss of income and occasional struggle to meet basic living expenses.**
3. **Additional Costs: The mother incurs additional costs for special dietary needs, such as low-carbohydrate foods, gluten free food which are not covered by the insurance.**

III- Social Challenges

1. **Stigma and Misunderstanding: MM encounters misunderstanding about diabetes and social stigma, facing judgment from others who often incorrectly attribute the condition to family genetics and poor lifestyle choices.**
2. **Support Networks: MM finds it difficult to build and maintain a broader support network. But luckily her parents and one of her friends live nearby.**
3. **Isolation: Demands of caregiving, limited her ability to engage in social activities or maintain relationships with friends and extended family. Feeling of social isolation is there from time to time.**

IV- Impact on Family Dynamics

1. **Parent-Child Relationship: MM sometimes finds it hard to maintain a positive demeanor and patience due to the stress of constant caregiving affects.**
2. **Emotional Support: MM struggles to provide balanced emotional support to three diabetic children and other two healthy once, and often prioritizing medical over emotional needs.**
3. **Sibling Jealousy and Rivalry: Mu and Me Emma occasionally express rivalry and jealousy, competing for their mother's attention and reacting to the differential attention necessitated by their diabetic siblings.**

V- Logistical Challenges

1. **Coordination of Care: Managing the healthcare needs of three diabetic children on insulin pumps requires meticulous coordination. MM must respond to three pumps alarms and alerts and keep track of multiple medical appointments, prescription refills, and school communication regarding her children's condition and academic performance.**
2. **Time Management: It was extremely difficult for MM to Balance the daily care routines, medical appointments, part time job and other responsibilities. MM finds it challenging to keep up with the intensive diabetes management routine for three children. This includes regular blood sugar monitoring, meal preparation, carbohydrate counting, changing pump cannula sies and sensor changing.**
3. **Emergency Preparedness: MM lives in constant stress and readiness for potential pump failure and diabetic emergencies, educating school staff about her children's needs and carrying emergency glucagon kits at all times.**

emotional exertion. She encountered social stigma and feeling of isolation at the same time. Education and school attendance was hugely affected as well.

Conclusions: Single mothers managing multiple children with Type 1 diabetes face a complex array of challenges that impact their emotional well-being, social interactions, logistical management, and financial stability. Effective strategies, including structured routines, professional support, community engagement, and financial assistance, are vital for improving their quality of life and preventing diabetes complications. This case underscores the need for comprehensive support systems from health authorities, governments and diabetes Society.

P-438

Prevalence of diabetic nephropathy using urine albumin-creatinine ratio and estimated glomerular filtration rate among children and adolescents with type 1 diabetes in Dakar

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Introduction: Diabetic nephropathy (DN), one of the microvascular complications, is the main cause of end-stage renal disease worldwide and can remain asymptomatic for a long time. Early detection and management help to reduce morbidity and mortality.

Objectives: We aim to evaluate the prevalence of DN using urine Albumin-creatinine ratio (uACR) and Glomerular filtration rate (GFR) in the pediatric population with T1D followed in Dakar.

Methods: We conducted a prospective cross-sectional descriptive and analytical study over a one year period (November 2022 - October 2023). It concerned children and adolescents with T1D followed in the 4 sites in Dakar. A form was designed to collect sociodemographic and clinical variables and for each patient urine was collected on an CBEU jar for uACR, and venous blood taken for creatininemia and HbA1c. GFR was calculated by Schwartz formula. DN was defined as a uACR ≥ 30 mg/g and/or GFR < 90 mL/min/1.73 m^2. The data were entered using the Epi info software version 7.2.5.0. The analysis was carried out using STATA 2015 software.

Results: A total of 229 patients were included with female predominance. Mean age was 14.78 ±4.63 years. Diabetes duration was less than 5 years in 76.96% and 80% had poor glycemic control. The mean GFR was 76.6±21.27ml/min/1.73m^2 and 79.09% had renal insufficiency. According to the uACR 35% of patient microalbuminuria. There was no correlation between reduced GFR and microalbuminuria (p=1.27) and only 38.02% with reduced GFR had elevated uACR vs 27.78% with normal GFR. Patients with poor glycemic control (p=0.04) and those with age of onset of diabetes greater than 10 years (p=0.001) were 3 times more risk to have a significative microalbuminuria.

Conclusions: Diabetic nephropathy is common in children and adolescents with T1D in Dakar, especially when diabetes occurred after the age of 10. It is favored by a poor glycemic control. FGR seems more sensible and uACR more specific for detecting DN.

Keywords: Diabetic nephropathy, urine Albumin-creatinine ratio, Dakar

P-439

Coeliac disease screening in type 1 diabetes mellitus –should national screening guidance be re-evaluated? Insights from a university teaching hospital in the UK

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Introduction: Type 1 diabetes mellitus (T1DM) and celiac disease (CD) are two of the most well-known linked autoimmune illnesses based on their shared genetic background, which can be identified in the HLA genotype DQ2 and DQ8 molecules.In children diagnosed with T1DM, National Institute for Health and Care Excellence (NICE) guidelines recommend initial screening for CD at the time of T1DM diagnosis and thereafter if the patient is symptomatic.

Objectives: Our project sought to evaluate the associations between T1DM and CD diagnosis in patients attending the Hull Paediatric Diabetes service and review the latest screening guidelines.

Methods: To identify those with CD, we conducted a cross-sectional review of children and young people with Diabetes receiving care from the Hull University Teaching Hospital Paediatric Diabetes Service.

Results: 17 out of 280 (6.1 %) children within our diabetes service have a diagnosis of CD. One child was already known to have CD at the time of T1DM diagnosis. 10 out of the remaining 16 (63 %) were identified with CD by initial screening bloods done at time of TIDM diagnosis. 6 (38 %) were diagnosed on further annual screening. 5 of the 6 (83%) children were identified to have CD within 5 years of their diagnosis of T1DM. One child was diagnosed after 6 years with T1DM. Only one child of this cohort (16 %) had symptoms.

Conclusions: Our results show higher number of CD cases diagnosed on routine annual screening of children with T1DM. Majority were asymptomatic at diagnosis. Those with undiagnosed CD are at a higher risk of long term complications like suboptimal growth, delayed puberty, osteopenia, poorer psychological wellbeing, increased risk of bowel malignancy etc.Hence we suggest re-evaluating current NICE guidelines to recommend ongoing annual screening for CD in children and young people with T1DM, at least for the first ten years following diagnosis and thereafter at regular intervals /if symptomatic.

P-440

Glycemic and psychosocial outcomes with automated insulin delivery system use in adolescents and young adults with type 1 diabetes over 12 months

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Introduction: Automated insulin delivery (AID) technology may be particularly helpful for adolescents and young adults with type 1 diabetes (T1D) who struggle to meet glycemic goals, though data on these populations are sparse.

Objectives: Evaluate glycemic outcomes and psychosocial outcomes after AID initiation in adolescents and young adults with T1D.

Methods: This was a prospective, single center, observational study. Data were collected during routine clinical care for young adults (18-30 yo) and adolescents (13-17 yo) from AID initiation to 12 months. Glycemic variables included hemoglobin A1c (HbA1c), % time below range (TBR) (<70 mg/dL), % time in range (TIR) (70-180 mg/dL), % time above range (TAR) (>180 mg/dL), and % time in automated mode (AM). Psychosocial variables included Hypoglycemic Fear Survey (HFS) and Problem Areas in Diabetes (PAID) scores. Linear mixed models were fit, adjusting for sex, diabetes duration, insurance type, and random intercept for subject.

Results: Young adults (N=48, mean age 19 ± 1.5 years, 50.8% female, baseline HbA1c 7.9 ± 1.8%) and adolescents (N=138, mean age 14 ± 1.3 years, 47.2% female, baseline HbA1c 7.7 ± 1.4%) were started on Tandem Control IQ (N=39 and 87, respectively) or Omnipod 5 (N=9 and 51, respectively) systems. Glycemic outcomes post-AID initiation are summarized (Table). Young adults had a greater decrease in AM use at 12 months compared to adolescents (P=0.003), with no significant difference in glycemic metrics. There were improvements in TIR and HbA1c over time, but the difference between groups did not meet statistical significance. Scores on HFS and PAID improved from baseline to 12 months for young adults (25.0 to 33.3 [p=0.01] and 31.8 to 39.1 [p=0.03], respectively).

Conclusions: AID use improved psychosocial outcomes in young adults with T1D. Young adults and adolescents experienced modest improvements in glycemic outcomes. Research into reasons for the decrease in AM use in young adults and discontinuation rates is needed.

P-441

Mortality among children and young adults with type 1 diabetes mellitus in Ghana, a ten year review

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Introduction: Despite advances in management of type 1 diabetes mellitus (T1DM), mortality remains unacceptably high among affected children and young adults in resource-constrained settings. Acute complications of diabetes, particularly diabetic ketoacidosis (DKA), can be fatal if misdiagnosed and hence mismanaged.

Objectives: To determine the mortality over a 10-years period of children and young adults with T1DM attending Pediatric Diabetes clinic at Komfo Anokye Teaching Hospital (KATH), Kumasi, Ghana.

Methods: A 10-year longitudinal study to assess mortality of children and young adults with T1DM attending clinic at KATH from January, 2012 to December, 2021. All patients were followed up and defaulted ones were tracked to their homes and so all mortalities were captured. Stata SE 17, (Texas 77845 USA) was used for data analysis.

Results: A total of 14 patients out of 355 died within the 10-year period giving a mortality rate of 3.9%. Ten (71.4% [10/14]) of them were females. The mean age at diagnosis was 12.9 5.2 years (Range: 8-14years). The mean duration of diabetes before mortality was 7.4 2.7 years (Range: 2-13 years). The mean age at death was 19.7 3.8 years (Range: 15-28 years). Most patients (50%) died at home and no specific cause could be assigned. A significant portion of in-patient mortalities (35.71%) was due to misdiagnosis of DKA as infections.

Conclusions: Mortality among T1DM occurs at all levels of health care with misdiagnosis as a major cause.

Table: Insulin pump and CGM metrics from AID use up to 12 months

	Baseline		Month 1		Month 6		Month 12	
Outcome	Adolescents	Young Adults	Adolescents	Young Adults	Adolescents	Young Adults	Adolescents	Young Adults
Automated Mode*	NA	NA	83.6 ± 6.0	84.8 ± 8.2	81.8 ± 5.7	68.0 ± 6.3	81.4 ± 5.7	66.1 ± 6.3
TBR (<70 mg/dL)	2.4 ± 0.7	1.9 ± 0.7	1.5 ± 0.7	1.2 ± 0.8	1.7 ± 0.7	1.3 ± 0.7	1.7 ± 0.7	2.2 ± 0.7
TAR (>180 mg/dL)	56.9 ± 5.6	55.4 ± 6.0	48.3 ± 5.6	52.4 ± 6.3	49.9 ± 5.6	51.9 ± 5.9	51.2 ± 5.6	48.5 ± 6.0
TIR (70-180 mg/dL)	39.4 ± 7.6	42.5 ± 9.2	48.3 ± 7.9	44.9 ± 10.7	48.6 ± 7.6	49.9 ± 8.8	54.1 ± 7.6	49.9 ± 9.2
HbA1c	8.6 ± 0.4	8.4 ± 0.4	8.4 ± 0.4	8.4 ± 0.4	8.3 ± 0.4	8.2 ± 0.4	8.4 ± 0.4	8.0 ± 0.4

Values are % ± Standard Error. *p=0.003 for change at 12 months between groups

Abbreviations: AID, automated insulin delivery; CGM, continuous glucose monitoring; TBR, time below range; TAR, time above range; TIR, time in range; HbA1c, hemoglobin A1c; NA, not available

P-442

A survey on the uptake and progress of diabetes treatment technology in paediatric diabetes units of northwest region United Kingdom

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Introduction: National Paediatric Diabetes Audit (NPDA) monitors the care received and outcome achieved by Children and Young people (CYP) with Diabetes in England and Wales. NPDA published in April 2024 (2022/23 data) reported lower HbA1C was associated with progressive use of technology (rt CGM or closed loop system). Equitable access to technology and appropriate care in CYP living with Type 1 Diabetes is one of NHS England (NHSE) priorities

Objectives: The objective of this project was to assess the uptake and progress during 2023/24 in the implementation of treatment technology in CYP with Type 1 Diabetes Mellitus across Northwest region of UK

Methods: The National Institute of Health Care and Excellence (NICE) approved the National Health Service (NHS) roll-out of the Diabetes treatment technology in December 2023. The Northwest region of UK has 21 Paediatric Diabetes units with 4224 (12.29%) CYP living with Diabetes out of 34,371 nationally (NPDA). The region has 3 Integrated care systems (ICSs) areas which includes Cheshire and Merseyside, Greater Manchester and Lancashire and South Cumbria. Paediatric Diabetes Units (PDU) in Northwest across the 3 ICS areas were sent a survey (opened 10/04/2024 and closed 11/06/2024) to assess the progress made in 2023/24.

Results: 27.9% of CYP in Northwest were on rt CGMS and 6.1% on HCL in 2021/22 (NPDA). The CYP on rt CGMS had increased to 49% and HCL to 11.6% in 2022/23 NPDA report. All 20 PDUs completed the survey which is 100% return rate. The CYP living with Type 1 Diabetes using rt CGMS in Cheshire and Merseyside, Greater Manchester and Lancashire and South Cumbria ICS regions of UK were 88%, 88% and 96.3% respectively. The percentage of CYP using HCL were 50%, 42.5% and 54.2% respectively. Overall, 90% of CYP were on rt CGMS and 49% were using HCL treatment technology.

Conclusions: Progress has been made across Northwest UK Paediatric Diabetes units in embracing diabetes treatment technology. CYP on rt CGMS doubled and on HCL quadrupled in 2023/24.

Diabetes treatment technology	NPDA 21/22 (NW)	NPDA 22/23 (NW)	Survey 23/24 (NW)
rt CGMS	27.9%	48.6%	90%
HCL	6.1 %	11.6%	49%

P-443

Implementation of quality of life screening to help triage referrals for youth with obesity and prediabetes

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Introduction: Children with obesity and prediabetes are at greater risk of metabolic co-morbidities as well as mental health conditions and reduced quality of life (QoL) **(Fox et al., 2016)**. Triage processes in outpatient clinics focus primarily on metabolic criteria to determine patient's urgency. An improved understanding of patient QoL through a pre-clinic screening process may prioritize care needs at the time of initial consultation.

Objectives: The primary objective of this project was to determine the impact of using this tool to triage new patient consultations.

Methods: After a new referral, patients aged 5 to 18 years, were screened using the PedsQL 4.0, a validated tool assessing QoL **(Hayes et al., 2023).** If the patient scored less than one standard deviation below the mean, an earlier clinic appointment was offered. The impact on referral wait times and clinic scheduling was then examined.

Results: The PedsQL screening tool was completed by 22 new patients and their caregivers. Of these 22 patients, 7 (31%) scored below average QoL in either the psychosocial, physical, or the total score sections. Of these 7 patients, 5 (23%) were offered an expedited clinic appointment. Of the 22 new patients, an additional 5 patients (23**%**) were offered a earlier appointment based on clinical assessment. Highest needs were mental health. Mean wait time went from 130 days to 59 days.

Conclusions: Integration of a RN-led, pre-clinic screening assessment tool to measure QoL for patients with obesity and prediabetes is a feasible intervention to triage new referrals.

P-444

Lifestyle strategies for nutrition and exercise in diabetes management

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Introduction: Diabetes is several syndromes of abnormal carbohydrate metabolism characterized by elevation of blood glucose levels. Effective management of diabetes is key to prevent complications and improve quality of life. Lifestyle strategies, particularly nutrition and exercise, plays a major role in diabetes management.

Objectives:

- Evaluate the effectiveness of different nutritional strategies in managing blood glucose levels in people living with diabetes.
- Assess the role of various forms of physical exercise in improving glycemic control and overall health.
- Identify the combined effects of diet and exercise on diabetes management.
- Provide practical recommendations for integrating these lifestyle strategies into daily routines for people living with diabetes.

Methods:

- **Literature Review:** A comprehensive review of existing literature conducted and focusing on clinical trials.
- **Outcome Measures;** Changes in HbA1c levels, fasting blood glucose, body weight, and lipid profiles.

Results: The review found that dietary interventions consistently improved glycemic control and reduced HbA1c levels. These diets also enhanced weight loss and improved cardiovascular health markers. Exercise interventions, especially those combining aerobic and resistance training, were effective in lowering blood glucose levels and enhancing insulin sensitivity. Patient adherence to lifestyle changes was influenced by factors such as motivation, socioeconomic status, and access to resources.

Conclusions: Effective management of diabetes through lifestyle strategies requires a holistic approach that includes tailored nutritional plans and regular physical activity. The integration of a balanced diet with consistent exercise routines can lead to significant improvements in glycemic control and overall metabolic health and healthcare providers should emphasize on them as a cornerstone of diabetes management. Further research is needed to refine these strategies and explore their long-term benefits and sustainability.

P-445

Stigma experienced by adolescents with type 1 diabetes: a systematic review and meta-synthesis

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Introduction: Adolescents with Type 1 diabetes are subjected to stigmatization, leading to negative psychological outcomes and poorer clinical outcomes. Understanding stigma experiences of adolescents with Type 1 diabetes can help interpret the claims of this population and develop anti-stigma interventions.

Objectives: The systematic review sets out to review and synthesize qualitative evidence on the stigma experiences of adolescents with Type 1 diabetes.

Methods: Studies published in English were identified by conducting electronic searches in databases, including PubMed, Cochrane Library, CINAHL, MEDLINE, Embase and PsycINFO to February 2024. Two independent reviewers assessed the methodological quality and extracted data from the included studies. Thomas and Harden's methodology of synthesizing qualitative studies was used.

Results: A total of seventeen studies were included in the meta-synthesis. The findings are organized into two overarching themes and five sub-themes: living in stigma (individual perceived and internalized stigma, stigma in interpersonal interactions, implicit stigma in the social structure) and coping with stigma (active stigma coping and escape-avoidance), which reflected how adolescents with Type 1 diabetes were stigmatized and how they coped with these stigma experiences.

Conclusions: This is the first meta-synthesis to specifically explore stigma experiences among adolescents with Type 1 diabetes, and the stigma at the individual, interpersonal and structural levels in different countries reported in this review is beneficial to the development of culturally informed and multi-tiered anti-stigma interventions for adolescents with Type 1 diabetes.

P-446

Impact of 24/7 helplines on type 1 diabetes care delivery in low resource setting in rural India

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Introduction: Children and adolescents living with Type 1 Diabetes in low-resource and rural population In India, do not have access to Health Care Providers[HCP] and their self-care capabilities are limited by low literacy. This leads to repeated emergencies and hospitalization. We present the use of 24x7 helplines to provide the unmet need.

Objectives: To study the use and impact of 24x7 phone helplines run by diabetes educators for 2 years on 1000 PWD living in rural and low literacy areas and do not have access to qualified HCPs.

Methods: 1000 PWD are enrolled in a support program in UDAAN, an NGO for Type 1 diabetes working in Aurangabad, Western India. The PWD are in the age range of 2 years to 25 years. These PWD come from an average family literacy level of 7th grade, with 10% illiteracy. The average income for a family of 4 is 96 USD. The average distance from the nearest HCP is 70 km, with no private transport.

1. Each PWD receives medical supplies and basic education at NGO.
2. Each family has a phone for communication [provided by the NGO if needed] and is given the helpline numbers.
3. Four 24x7 help lines are operated by trained diabetes educators.
4. Logs of the purpose of the call and advice given are kept and analyzed weekly.
5. Data analyzed from January 2022 to March 2024

Results: The average number of calls received per week on 4 helplines was 1256. The purpose of the call and their percentage are shown in the table below.

Conclusions: Problem solving at early stages in the PWD's home using helplines prevented escalation to emergencies. The impact is few episodes of DKA [0.04%], severe hypoglycemia [0.2%], and, in turn, low hospitalizations and missed workdays. It was observed that those who called for DKA, or severe hypoglycemia, were among those who did not use the helpline for other purposes. We conclude that 24x7 helplines operated by diabetes educators are a powerful tool for Type 1 diabetes care delivery in limited resource settings.

	Purpose of Call	Percentage of Total Calls
1.	Insulin dose adjustment [hyperglycemia]	57.66%
2.	Hypoglycemia	4.0%
3.	Severe Hypoglycemia	0.2%
4.	Ketosis & sick day	0.5% + 4.2%
5.	DKA	0.04%
6	Nutrition related query	7.0%
7	Psychological support	3.8%
8	Insulin & glucometer related issues	5.6%
9.	Follow up calls	17.0%

P-447

Hyperuricemia in Indian children with normal BMI

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Introduction: Metabolic health of the children is deteriorating all over the world. Serum uric acid which has been used as a surrogate marker for metabolic syndrome is often raised in children with deranged metabolic profile. We estimated serum uric acid levels in apparently healthy Indian children along with other metabolic parameters.

Objectives: To study serum uric acid levels in children with normal BMI and to compare metabolic profile in children with and without hyperuricemia

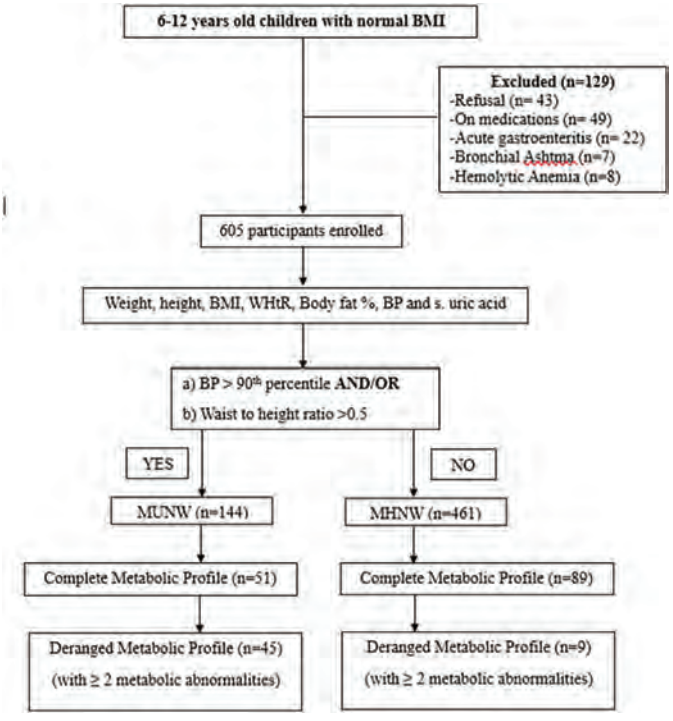
Methods: 605 children aged 6-12 years with normal BMI were enrolled. Weight, height, body fat percentage, BMI, serum uric acid, blood pressure (BP), and waist-to-height ratio (WHtR) were recorded. 144 children were classified as Metabolically Unhealthy Normal Weight (MUNW) if either BP and/or WHtR were raised while the remaining 461 children were classified as Metabolically Healthy Normal Weight (MHNW). Complete metabolic profile (lipid profile, fasting blood glucose & serum insulin for HOMA-IR) was assessed in 89 MHNW and 51 MUNW participants after 10-12 hours of fasting.

Results: The mean age of our participants was 8.83 ± 1.67 years. Hyperuricemia was noted in 131 (21.6%) participants. Children with hyperuricemia had significantly higher BMI Z score, waist circumference, WHtR, BP, body fat %, FBG, fasting insulin and HOMA-IR as compared to children without it. 15.04% participants overall had a deranged metabolic profile and these participants also had a significantly higher s uric acid.

Conclusions: Hyperuricemia and other metabolic syndrome defining abnormalities are highly prevalent in 6-12 year old urban Indian children having normal weight and BMI. Hyperuricemia, though not a part of definition of metabolic syndrome currently, can be a good surrogate marker for assessing metabolic healthiness in young children.

S.no.	Parameters	Children without hyperuricemia	Children with hyperuricemia	p value
1.	BMI Z score	-0.75 ± 0.61	-0.53 ± 0.70	0.001[2]
2.	Waist Circumference (cm)	55.68 ± 4.79	61.83 ± 6.47	<0.001[1]
3.	WHtR	0.43 ± 0.03	0.48 ± 0.04	<0.001[1]
4.	Body Fat %	17.17 ± 1.90	21.77 ± 5.07	<0.001[1]
5.	Systolic BP (mm Hg)	101.37 ± 6.39	110.71 ± 5.70	<0.001[1]
6.	Diastolic BP (mm Hg)	62.16 ± 6.11	73.39 ± 6.83	<0.001[1]
7.	Fasting Blood Glucose (mg/dL)	76.56 ± 11.12	84.55 ± 11.25	0.001[1]
8.	Fasting Insulin (μU/ml)	8.44 ± 6.81	14.63 ± 15.53	<0.001[1]
9.	HOMA-IR	1.62 ± 1.47	3.21 ± 3.87	<0.001[1]

Significant at p<0.05, 1: Wilcoxon-Mann-Whitney U Test, 2: Fisher's Exact Test



P-448

Investigating serum interleukin-6 and Oncostatin-M levels in patients with type 1 diabetes mellitus and its relationship with glycemic indexes compared with the control group

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Introduction: Type 1 diabetes (DM1) is an autoimmune disease that results in the activation of inflammation. Some cytokines, including interleukin-6(IL-6) family members like Oncostatin M

(OSM), may contribute significantly to inflammation in early stages of disease progression and later complications. There is limited knowledge about the levels of inflammatory factors and glycemic indices, particularly in children.

Objectives: This study aimed to investigate the serum level of IL-6 and OSM and its relationship with glycemic indicators in children with DM1.

Methods: In this study, 80 patients aged 3-18 years were enrolled in two groups: 40 children with DM1 who had been diagnosed over a year, and 40 healthy children. A fasting blood sample was taken to measure IL-6, HbA1C, FBS, and OSM. All demographic information, DM1 complications (nephropathy, retinopathy), and blood pressure were recorded in the checklist.

Results: Patients with diabetes had higher serum OSM levels compared to normal children (P-value 0.0001). serum level of IL-6 levels was not different in the two groups(P-value of 0.135). Neither group showed a significant relationship between OSM or IL-6 and glycemic indices and DM1 complications. Serum IL-6 levels in patients with recent diabetes ketoacidosis (DKA) during the previous 6 months ago were found to be significantly higher than the normal group (P=0.022). Logistic regression analysis demonstrated that the serum level of OSM was a reliable predictor of type 1 diabetes. (Odds ratio: 3.894, P<0.0001). Moreover, ROC curve analysis revealed a significant diagnostic value for OSM marker in discriminating DM1.

Conclusions: This study showed the potential of OSM as a marker in the diagnosis and follow-up of children with diabetes and its value as a sensitive and specific indicator for differentiating children with type 1 diabetes from healthy children. It was also shown that the IL-6 marker can be useful in predicting the risk of occurrence of DKA in children with DM1.

P-449

Abstract Withdrawn

P-450

Understanding the connection between Cystic fibrosis-related diabetes and bone disease

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Introduction: The incidence and importance of endocrine comorbidities related to cystic fibrosis,including cystic fibrosis-related diabetes(CFRD) and cystic fibrosis-related bone diseases(CFRBD), increase with age. Recent studies have indicated that insulin deficiency in type 1 diabetes mellitus(T1D) may be associated with an increased risk of osteoporosis and bone fractures. There are few studies in the literature about the relationship between CFRD and CFRBD.

Objectives: Our study aims to evaluate the potential relationship between impaired glucose metabolism and bone health in cystic fibrosis patients.

Methods: The medical records of 74 CF patients were reviewed retrospectively. Demographic and clinical data were recorded, including fasting blood sugar, insulin and C-peptide levels, HbA1c levels, OGTT results, calcium metabolism tests, bone mineral density and spirometry results. The cases were grouped based on OGTT results, according to the ISPAD 2022 Consensus on CFRD: Normal, indeterminate, impaired glucose tolerance (IGT), and CFRD.

Results: In our study, 67.5% of patients were classified as normal,9.5% indeterminate, 16.2% IGT, and 6.8% CFRD group.The demographic and clinical characteristics of the groups are detailed in Table1. Age, fasting blood sugar and C-peptide,25-OHD3, parathormone levels, and FEV1/FVC ratio were similar across all four groups. However,BMI SD(p<0.001), insulin levels, and DEXA-z scores were significantly higher in the normal group compared to the others.HbA1c levels were higher in the CFRD group than the normal group and similar to the IGT and indetermine groups.

Parameters	Total (n=74)	Normal (n=50, %67.5)	Indetermine (n=7, %9.5)	IGT (n=12, %16.2)	CFRD (n=5, %6.8)	p value
Age	14.9±3.9	14.5±4.1	16.8±3.3	15.2±.3.2	15±3.6	0.529
BMI SDS	-0.6±1.5	0.1±1.2	-2.2±1.2	-1.3±0.9	-0.7±2	**<0.001**
FPG	74.1±10	72.4±8.8	76.5±10.5	78.5±12.4	76.7±12.4	0.327
Insulin (IQR)	5.8 (1.7; 9)	7 (3.1;10.3)	3.3 (0.4; 8.5)	3.6 (0.7;6)	2.2 (1.6;2.6)	**0.011**
HbA1c%	5.5±0.6	5.3±0.5	5.7±0.5	5.8±0.7	6±0.2	**0.01**
PTH	40.3±15.2	38±12.2	36.1±22	50.3±12.2	32±20.3	0.071
25OHD3	24.3±12.1	24.1±12.1	22.6±13.2	25±12.1	2815.7	0.88
DEXA z-score	-1.3±0.9	-1±0.8	-1.9±0.7	-2±0.7	-1.87±1.1	**<0.001**
FEV1/FVC	0.89± 0.13	0.91±0.12 51.5	0.89±0.11 7.7	0.88±0.09 11.64	0.85±0.18	0.075

Conclusions: As a result, insulin deficiency-related osteoporosis, which has been observed in T1D, may contribute to CFRBD. CF patients with impaired glucose metabolism had higher HbA1c levels but lower BMI SD, DEXA z-score, and predicted FEV value. In conclusion, a comprehensive and large-scale study is necessary to establish the relationship between CFRD and CFRBD.

P-451

Increased access to diabetes treatment technology across paediatric diabetes units in England and Wales and its impact on median HbA1c - an observational study

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Introduction: National Paediatric Diabetes Audit (NPDA) monitors the outcome achieved by Children and Young people (CYP) with Diabetes in England and Wales. NPDA 2022/23 report was published in April 2024. One of the recommendations of this report was to improve the equity of access to diabetes treatment technology

Objectives: To assess whether the increase in Diabetes treatment technology (rt CGMS and pumps) in Children and Young people living with Type 1 Diabetes Mellitus correlate with the improved median HbA1C in Paediatric Diabetes units (PDU) across England and Wales

Methods: The data was obtained from NPDA online report. Total of 185 Paediatric Diabetes Units (PDU) were identified. Median HbA1c outcome measure from individual PDU for 2021/22 were compared with the corresponding year taken from NPDA 2022/23 report. Any improvement in the median HbA1C between the two consecutive years were taken as significant. CGMS and pump treatment technology percentage change between the two years were analysed.

Results: From the total of 185 PDUs, 15 had insufficient data and excluded.170 units were analysed. 91 PDUs (53.5%) had improvement in median HbA1C, out of which 84 PDUs (92.3%) had increased CGMS and 80 PDUs (88%) with access to pump technology. Median increase in technology access for rt CGMS was 14.6 % more and pump 5.6% more compared to the previous year. Of the total 79 PDUs which did not show improvement in median HbA1c outcome measure, 74 (93.67.%) and 67 (84.81%) PDUs had increased patients on rt CGMS and pump respectively. The rt CGMS access was 16% more and pump 4.1% from the previous year in this group of PDUs showing no improvement in median HbA1c.

Conclusions: Increased access to rt CGMS and pump treatment has improved median HbA1c only in just more than half of the PDUs. The percentage of increased access to rt CGMS and pumps between both the groups were not much different. Further analysis and research is required to understand variation in outcomes between the paediatric units despite access to technology.

P-452

No difference in thyroid or celiac disease prevalence in children with antibody positive and negative type 1 diabetes

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Introduction: Type 1 Diabetes Mellitus (T1D) results from an autoimmune destruction of pancreatic β-cells, leading to absolute insulin deficiency. Individuals with T1D are at increased risk for other autoimmune disorders, such as autoimmune thyroid disease (ATD) and celiac disease (CD). While most T1D patients have β-cell autoantibodies, approximately 5-10% do not, classifying them as idiopathic T1D. It is unknown whether the rates of other autoimmune diseases are different between the two types of T1D.

Objectives: To compare the prevalence and distribution of autoimmune diseases association (celiac disease or hypo- or hyperthyroidism) with idiopathic T1D compared with T1D with circulating islet autoantibodies.

Methods: We retrospectively reviewed medical charts of children aged 6 months to 18 years diagnosed with T1D between January 2010 and June 2023 with subsequent long term insulin requirement. The cohort was divided into two groups based on the presence (AB+) or absence (AB-) of islet cell antigen, insulin, GAD-65, or Zinc transporter 8 autoantibodies at diagnosis. For each AB- patiente we included two age- and sex-matched AB+ patients, diagnosed within 2 years as controls.

Results: Of the 149 cases with AB- T1D, 9 had CD and/or ATD, while among 298 patients with AB+, 26 had one or both conditions (p=0.319). Additionally, 5 of 149 AB- and 15 of 298 AB+ patients had CD. (p = 0.419). ATD was present in, 4 of 149 AB- children, and 13 of 298 children with AB+, (p=0.382).

Conclusions: This study demonstrates no significant difference in the prevalence of autoimmune diseases between patients with idiopathic T1D and those with β-cell autoantibodies positive T1D. These findings imply that idiopathic T1D is likely still autoimmune in nature. Therefore, surveillance methods for autoimmune diseases should not differ between idiopathic T1D and antibody positive T1D.

P-453

Identification of learning keypoints needs in medical science students for the design of an Erasmus+ blended intensive program on diabetes

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Introduction: Diabetes is a complex disease requiring professionals with multidisciplinary knowledge and soft skills for personalized care and treatment.

Objectives: To assess the needs of medical science students to design a blended intensive program (BIP).

Methods: Study participants were recruited from seven European universities (medicine, nursing, nutrition, and sports science) to participate in a BIP with a distance learning followed by a face-to-face phase. To assess the requirements of a BIP with impact on knowledge and soft skills, a survey was conducted to assess (i) socio-demographic data, (ii) perceptions of distance learning, (iii) diabetes knowledge through 20 multiple-choice questions, and (iv) life effectiveness skills measured by the 24-item self-report Life Effectiveness Questionnaire Version H (LEQ-H) on a scale of 1-8.

Results: There were 27 students (59.3% female); 40.7% studied medicine and 25.9% nutrition, mainly in their first year (33.3%). Most participants were from Lithuania (40.7%), Portugal, Spain, and Poland (14.8% each). Regarding online learning, 55.5% were willing to spend 1-6 hours/week, but 74% felt that online sessions limited interactivity. Of note, 51.9% did not believe online learning replaced clinical experience, and 62.9% believed they could learn practical skills to some extent. Only 14.8% had participated in diabetes-related programs. Overall percentage of correct answers to diabetes knowledge-based questions was high (86%). The most common responses (mode) indicated confidence in planning/time management (7), social success (6), achieving the best results (8), adaptability (8), leadership (6), overall confidence (8), and proactivity (8).

Conclusions: The study highlights the need for a comprehensive BIP to effectively improve diabetes knowledge. High self-assessments in planning, leadership, and adaptability, along with an 86% correct response rate for diabetes knowledge, indicate student readiness but also the need for more interactive, clinically integrated learning experiences.

P-454

A case report: hyperglycemic hyperosmolar syndrome in an infant with neonatal diabetes mellitus

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Introduction: Neonatal diabetes mellitus (NDM) is a rare disorder present in infants <6 months, caused by mutations in genes that affect pancreatic beta-cell function. Pathogenic mutations may be present in around 50–60% of cases. Hyperglycemic hyperosmolar syndrome (HHS) is a rare complication of diabetes mellitus among pediatric patients. Since its treatment differs from diabetic ketoacidosis (DKA), pediatricians should be aware of its diagnosis and management. We report a case of hyperglycemic hyperosmolar syndrome in an infant with neonatal diabetes mellitus.

Objectives: A 5-month-old boy was brought to the Children's Hospital No. 2 in Ho Chi Minh City, Vietnam

Methods: Case report. The clinical data of a patient admitted to Children's Hospital 2 were collected and analyzed.

Results: A 5-month-old male patient was admitted to the hospital with right-sided focal seizures occurring multiple times a day, decreased consciousness, and dehydration. Laboratory tests revealed hyperosmolar hyperglycemia, mild metabolic acidosis, elevated HbA1c, decreased C-peptide levels. Genetic testing revealed heterozygous mutations in the *INS* and *ABCC8* genes, and MRI of the brain identified abnormalities. We promptly managed the hyperosmolar hyperglycemic coma with rapid fluid administration, totaling 50 mL/kg, and initiated delayed and low-dose insulin infusion. Fluid deficits in this HHS patient are 15% and need to be corrected gradually and uniformly over 48 hours. Moreover, neuroprotection was initiated (head of bed elevation to 30 degrees, respiratory support ensuring adequate oxygenation and hemodynamic stability, and aggressive fever control). He is gradually stabilizing. Currently, the patient is 11 months old and achieving age-appropriate developmental milestones. He is currently being treated with insulin.

Conclusions: The two most important points in HHS management are fluid replacement and gradual reduction of serum osmolality and sodium levels. Genetic testing is very important for planning treatment afterward.

P-455

Insulin Glargine U300 experiences in children diagnosed with type 1 diabetes: early results

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Introduction: Insulin glargine U300 molecule is thought to cause less glycemic fluctuation and hypoglycemia than other long-acting insulin analogs, with its effect lasting up to 36 hours.

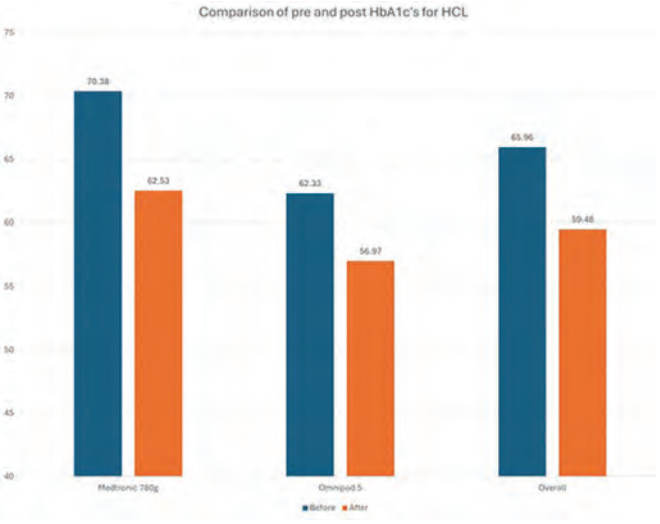
Objectives: We aimed to evaluate the frequency of hypoglycemia and its effect on the glycemic status of children diagnosed with type 1 diabetes who used insulin glargine U300

Methods: Children who were followed up in our department with a diagnosis of type 1 diabetes and who had been using insulin glargine U300 treatment for at least three months were included in the study. The findings of the cases during the transition to U300 and at the 3rd month of follow-up were compared. Results are presented as median (minimum-maximum) value.

Results: The median age of the 10 patients included in the study was 14.9 (7.6-17.8) years. Two of the cases were newly diagnosed. Insulin glargine U300 was started in two patients due to

frequent hypoglycemia and in eight patients because of difficulty in controlling glycemic fluctuations with hyperglycemia. At the beginning of treatment, the HbA1c value of the cases was 8.6% (5.2-12.8), basal and total insulin doses were 0.42 (0.23-0.64) and 0.96 (0.56-1.60) IU/kg/day. Insulin glargine U300 was started at a dose of 0.38 (0.20-0.64) IU/kg/day. There was a hypoglycemia period during the last week in seven patients before treatment and in five patients at control (p=0.500). The number of patients experiencing hypoglycemia more than five days a week decreased to one in five patients, but no statistically significant difference was found (p=0.125). Basal and total insulin doses at the beginning of treatment and the last follow-up were found to be similar (p=0.889 and p=0.507). In previously diagnosed patients (n=8), HbA1c decreased, no significant difference was detected (median 8.2% vs 7.9%; p=0.735).

Conclusions: In light of these preliminary results, it was thought that an effective difference in glycemic control might emerge with glargine U300 when long-term results were evaluated with more patients.



P-456

Good clinic and family experience of hybrid closed loop systems in a northern English town

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Introduction: Wigan is a post industrial town with poor health profiles eg dental disease, breast feeding, adult diabetes care. HBA1C rates are above average in the RCPCH audit. Pumps and sensors have been used for the last 15+ years. More recently we introduced Hybrid Closed loop systems(HCL). 165 young people with type 1 diabetes attend the clinic.

Objectives: Our objective was to study the outcomes - HBA1C, diabetes keto-acidosis(DKA)and severe hypo-glycaemia in patients on HCL before and after starting HCL. We also sought to obtain child and family views on HCLs.

Methods: Electronic records were retrospectively audited. Average HBA1C for up to 12 months prior to HCL; and up to 12 months post HCL were obtained. Records were searched for DKA or hypo-glycaemia. Data was not used on children newly diagnosed or who had just commenced HCL. An ms questionnaire was sent to families. We only use two HCL systems - Medtronic 780 and Omnipod 5.

Results: 71 patients were included. Age range 2-18(average 11.9) 33 males/38 females.

The average HBA1C prior to HCL was 65.96 and post HCL 59.48. An improvement of 6.48.

Improvement was better in the 32 patients on Medtronic 780 (70.38 to 62.53- a drop of 7.85) than the 39 patients on Omnipod 5 (62.33 to 56.97 - a drop of 5.36).

45 decreased their HBA1c, 21 increased and 5 no change.

There were 54/71 responses to the questionnaire. 88.5% felt that the burden of diabetes had been reduced. 86.8 % felt that their child had become more independent.

Positive factors: blood levels, night time, feeling better

Challenges : sensor, **none**, highs, over correction

There was one episode of DKA in the post HCL group and 1 severe hypoglycaemia in the post HCL group. There were 2 DKA in the pre HCL group and 1 severe hypoglycaemia.

Conclusions: Our results in a deprived community show improved HBA1C on HCL- better with Medtronic 780. No increase in DKA or severe hypo. The HCL are clearly very well received by children and families.

P-457

Comparative accuracy of glycemic parameters in identifying Dysglycemia in obese Indian children and adolescents

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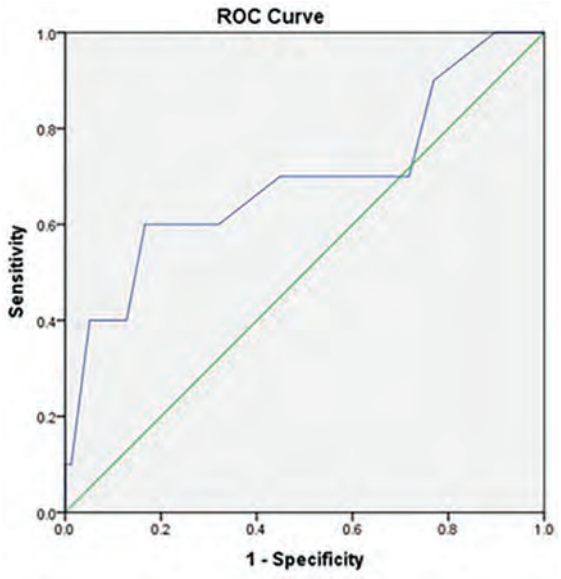
Introduction: Dysglycemia is a significant cause of concern in children and adolescents with obesity. The current diagnostic cut-offs for dysglycemia based on adult recommendations have not been validated in Indian children and adolescents.

Objectives: To compare the diagnostic accuracy of glycemic parameters (glucose tolerance test, HBA1C, and continuous glucose monitoring measures) in identifying dysglycemia in obese Indian children and adolescents.

Methods: An oral glucose tolerance test and HbA1C were performed in 102 obese children and adolescents (64 boys; age 11.6 $\pm$ 3.2 and BMI SDS 2.4 $\pm$ 0.6). Twelve subjects also underwent 14-day ambulatory blood glucose monitoring. The prevalence of dysglycemia according to different measures and the correlation between different parameters were compared. A ROC curve was generated to determine the diagnostic cutoff of HbA1C to identify glucose tolerance test-detected dysglycemia.



Results: Dysglycemia was identified by five subjects according to fasting glucose (all pre-diabetes,5.7%),eleven as per 2-hour value (9 with prediabetes, 2 with diabetes;10.8%), and 19 by to HbA1C (18 with pre-diabetes and 1 with diabetes,18.6%).Thirteen subjects identified as pre-diabetes by HbA1C had normal glucose tolerance tests. Average blood glucose in CGM data correlated with fasting (r=0.9, p=0.001) and 2-hour blood glucose (r=0.8, p=<0.001) with no correlation with HBA1c (r=0.5, p=0.09).The ROC curve for diagnostic efficacy of HbA1C in identifying dysglycemia had an area under the curve of 0.730 (P =0.02). An increase in HBA1C cutoff to 6% would have avoided the diagnosis of dysglycemia in 10 subjects with normal glucose tolerance tests.

Conclusions: Dysglycemia is common in Indian children and adolescents, highlighting the need for early identification.HbA1C tends to overestimate dysglycemia, suggesting the need for higher cutoffs. ABGM is a promising tool for screening dysglycemia but needs further exploration before widespread use.

P-458

Incidence of type 1 diabetes in Lombardy and COVID-19 vaccination coverage

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Introduction: It is debated whether SARS-CoV-2 pandemic (2020-2023) has influenced the incidence of type 1 diabetes (T1D) in pediatric populations and whether the introduction of COVID-19 vaccination has changed the epidemiology of the disease.

Objectives: Examine the trend in T1D cases from 2020 to 2023; asses COVID-19 vaccination coverage among patients aged 0-17 at the onset of T1D, compared to the vaccination rates of the pediatric population residing in Lombardy.

Methods: Data were extracted from Lombardy database, including the number of T1D onsets among individuals aged 0-17 from 2020 to 2023 and the number of pediatric patients vaccinated during that period. The incidence in 2020, prior to the availability of vaccination, was compared to subsequent years. A separate analysis was conducted for the 12-17 age group, which was the first to be eligible for vaccination.

Results: A total of 1333 T1D onsets were recorded. The distribution of cases showed no significant annual variation by sex (p trend=0.179), mean age (10 years, p=0.209), age group distribution (p trend=0.376). The incidence of T1D [95% CI/100,000 persons] did not significantly change compared to 2020 (19.74/100,000-CI 17.64-22.02), with a minor increase in 2021 (21.82/100,000-CI 19.60-24.23) and 2022 (21.84/100,000 CI 19.60-24.25). In 2023, the incidence was comparable to 2020 (19.82/100,000-CI 17.68-22.15). No significant differences in incidence were observed in the 12-17 age group during 2021-2023 when COVID-19 vaccination was available vs. 2020 (p wald >0.05). Children who developed T1D during this period exhibited lower vaccination coverage compared to the general population (38% vs 42%).

Conclusions: The incidence of T1D among those aged 0-17 remained stable, regardless of COVID-19 vaccination status. Despite equal opportunities for vaccination, patients at the onset of T1D were less vaccinated than the general population. Further research is warranted to explore the reasons for their reduced access to preventive healthcare measures.

P-459

Prevalence of obesity and associated comorbidities in children with type 1 diabetes in a single tertiary centre in Hong Kong

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Introduction: With escalating prevalence of obesity, there is increasing report of excess weight gain among children with type 1 diabetes (T1D). However, the prevalence of obesity among children with T1D in Hong Kong is unknown.

Objectives: This study aims to assess the prevalence of overweight and obesity in children with T1D in Hong Kong. We also examined the association between obesity and glycaemic control as well as metabolic comorbidities.

Methods: This was a retrospective cross-sectional study conducted from 2021-2023 at the Hong Kong Children's Hospital. All children with T1D were included. Anthropometric measures and biochemical data were extracted from medical records and the prevalence of metabolic complications were compared between children with normal weight vs children with overweight/obesity.

Results: 126 children (41.3% male) with median age of 12.8 (IQR 10.1-16.6) years and median disease duration of 4 (IQR 1.9-8) years were included. 17.5% of the study population were either overweight or obese, with median BMI z-score of 1.82 (IQR 1.5-2.1). There were no significant differences in gender, ethnicity or disease duration between the 2 groups. Children with overweight/obesity were more likely to have hypertension (OR 13.3, 95% CI 3.0-59.1) and hypertriglyceridaemia (OR 3.5, 95% CI 1.3-9.9). The group also exhibited significantly higher ALT levels (median 18 (IQR 15-30) vs.14 IU/L(IQR 10-19)), lower HDL-C levels (median 1.4 (IQR 1.2-1.7) vs 1.6mmol/L (IQR 1.4-2)) and higher non-HDLC levels (median 3.3 (IQR 2.8-3.7) vs 2.9 mmol/L (IQR 2.5-3.3)). There were no significant differences in HbA1c levels between the two groups.

Conclusions: Prevalence of overweight and obesity in children with T1D was comparable to the general paediatric population in Hong Kong. While glycaemic control was similar, metabolic comorbidities were more prevalent among those with overweight or obesity despite similar disease duration.

P-460

Autoimmune diseases associated with type 1 diabetes in children and adolescents from a tertiary care centre in south India

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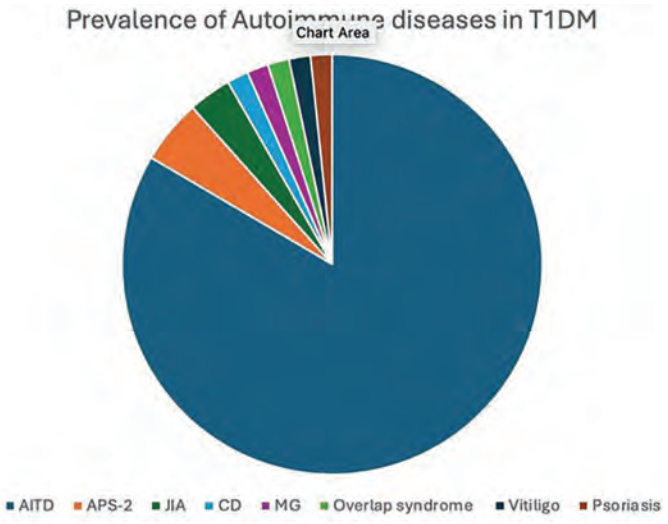
Introduction: Type 1 diabetes mellitus(T1DM) is associated with other autoimmune disorders due to multifactorial reasons, including genetic, environmental triggers, and immune dysfunction that contribute to the development of these disorders.

Objectives: To study the profile of autoimmune diseases associated with type 1 diabetes in children and adolescents.

Methods: The medical records of 550 children and adolescents, under 18 yrs with T1DM between January 2012 to March 2024 were reviewed. Their data on association with other autoimmune disorders were analysed. Data included demographic details, presentation, biochemical values, screening antibodies and follow up details. Patients with incomplete medical records were excluded. Statistical analysis was done using SPSS Statistics,version 29.0

Results: 550 children and adolescents with T1DM were reviewed for association with other autoimmune diseases, total of 60(10.9%) were included in the study with 81.6% females and 18.3% males. Autoimmune thyroid disease(AITD) was the most prevalent condition associated with T1DM seen in 9.09% (n=50) patients, followed by autoimmune polyglandular syndrome type 2 (APS-2) in 0.54% (n=3), juvenile idiopathic arthritis (JIA) in



	AITD	APS-2	JIA	Celiac disease	Myasthenia gravis
Age at diagnosis of type 1 diabetes (years) (Mean ± SD)	7.57±4.20	11.67±4.93	9.75±0.77	14.0±0.0	10.3
HbA1c at diagnosis of T1DM (%)	13.13±2.72	9.6±2.56	14.3±1.55	8.5	17.7
Age at diagnosis of disease (years) (Mean ±SD)	10.2±4.05	10.0±4.0	10.3±0.42	14	10.9
Symptoms	Goitre 8% (n=4)	Hyperpigmentation 100% (n=3)	Arthritis 100% (n=2)	Loose stools 100% (n=1)	Ptosis 100% (n=1)
Laboratory values:	TSH (mIU/ml) 131.2 ± 260.5 fT4 (ng/dl) 0.7±0.3	Cortisol (mcg/dl) (2.12±1.49) TSH (mIU/ml) (523±846.4) fT4 (ng/dl) (0.49±0.19)		SGOT/SGPT(IU/ml) 36.4/23.9	
Antibodies:	Anti thyroid peroxidase antibody(IU/ml) 504.4 ± 448.9 Anti thyroglobulin (IU/ml) 786.4 ± 294.13	Anti thyroid peroxidase antibody 401±522.24	Antinuclear antibody (n=2) Rheumatoid factor (n=1)	Anti tissue transglutaminase: 291 IU/ml	Anti Acetylcholine receptor antibody: 1.85 nmol/l

0.36%(n=2), celiac disease(CD), myasthenia gravis(MG),overlap syndrome(scleroderma, rheumatoid arthritis, myositis), vitiligo and psoriasis with psoriatic arthritis in 0.18% (n=1). After treatment for the underlying condition, patients showed a good glycemic control(HbA1c 3.29±3.309;p=0.005)

Conclusions: Indian studies show that the most common associated autoimmune disease is Hashimoto thyroiditis with prevalence of 4-18% as also seen in our study. Early detection and appropriate treatment of these autoimmune conditions can help mitigate the impact on children and improve their overall health. Consequently, antibody screening at the time of diagnosis and during subsequent follow-up is crucial.

P-461

Reduced meal Bolusing burden and improved sleep for caregivers during pediatric use of the MiniMed™ 780g advanced hybrid closed-loop (aHCL) system with ultra-rapid insulin lispro-aabc

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Introduction: Multiple daily injection therapy with ultra-rapid insulin lispro-aabc (URLi) is safe and provides good glycemic control in pediatric type 1 diabetes (T1D) (Wadwa et al. *Diabetes Obes Metab*. 2023;25:89-97).

Objectives: Evaluate parent/caregiver responses to a post-study questionnaire in a pediatric trial of MiniMed™ 780G system (MM780G) use with URLi.

Methods: Children and adolescents (N=120, 7-17 years) with T1D were enrolled in a 12-site single-arm study of the MM780G system (with the Guardian™ 4 sensor and extended infusion set) and used open loop or HCL with a rapid acting insulin during a run-in period (~21 days) followed by a 3-month study period of AHCL+URLi. We analyzed parent/caregiver (N=47) responses to six Likert-based queries (5-point scale) regarding insulin use, mealtime management and sleep that ranged from "strongly agree" to "strongly disagree". Complete glycemic metrics and safety outcomes are reported elsewhere.

Results: The percentage of mean time spent in, below and above target range was 74.9%, 1.8% and 23.2%, respectively, when a glucose target of 100 mg/dL and an active insulin time of 2 hours were used. There were 14 infusion site adverse events (10 participants), 13 of which were related to pain (9 participants). There were no severe hypoglycemia or diabetic ketoacidosis events. The majority (>75%) of parents/caregivers agreed or strongly agreed that participant-bolusing with URLi at mealtime was easier and more convenient than bolusing 15 minutes prior to mealtime and liked faster-acting insulin use (3/6 queries). Additionally, >75% agreed that faster-acting insulin use with the system was simple and easy to manage (2/6 queries). More than half agreed they slept better at night knowing the MM780G would help decrease interruptions and disruptions (1/6 queries).

Conclusions: The majority of parents/caregivers of children and adolescents using the MiniMed™ 780G system with URLi reported easier mealtime bolusing and better sleep overnight.

P-462

Impact of a personalized digital intervention on the wellbeing of caregivers of children with type 1 diabetes and diabetes management

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[1]Hospital Universitario Miguel Servet, Zaragoza, Spain. [2]Adhera Health, Santa Cruz, United States. [3]Adhera Health, Seville, Spain. [4]Adhera Health, Valencia, Spain

Introduction: The wellbeing of caregivers plays a crucial role in managing the health of children with T1D.

Objectives: Evaluate a personalized digital intervention designed to improve the wellbeing of caregivers, and identify family wellbeing patterns.

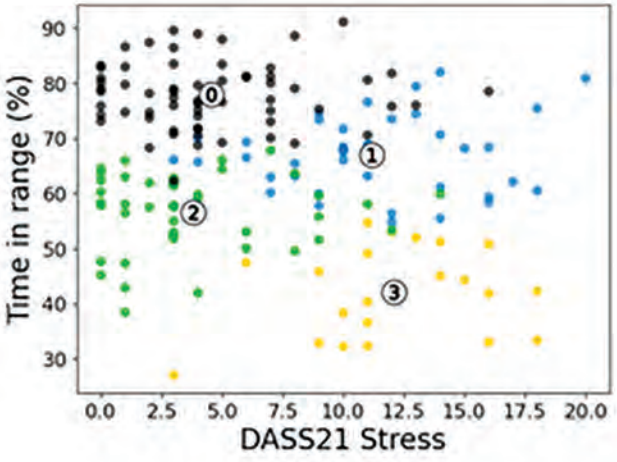
Methods: Prospective observational study with 90 families of children with T1D. Psychometrics were performed before and after the intervention, covering emotional and behavioral aspects of both parents (Positive and Negative Affect Scale, Depression Anxiety Stress Scales (DASS21), Mental Health Continuum) and children (KIDSCREEN10). The digital health intervention was based on emotional and behavioral change techniques, providing caregivers personalized emotional and self-management support. Continuous glucose monitoring data were analyzed 1-month before and after the intervention. Glycemic control metrics such as time in range and time >180 mg/dl were extracted. K-means clustering, an unsupervised classification technique, was implemented to cluster families according to metabolic control and emotional wellbeing.

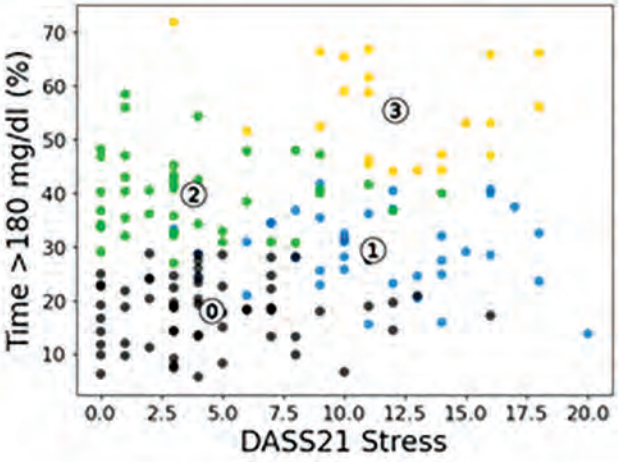
Results: Many aspects of caregiver's wellbeing were significantly correlated with children's wellbeing, e.g. caregiver's stress (DASS21) was associated with worse children's wellbeing (KIDSCREEN10) ($r=-0.37$, $p<0.001$), highlighting the importance of considering the whole family unit. Four distinct groups were identified through clustering (Fig. 1a). The values of each group's representative points for some of the most important variables are presented in Fig. 1b, showcasing common and differential group traits. Post intervention, there was an increase in families with good wellbeing (G0: 31.8% to 43.4%), as well as a reduction in families with poor caregiver wellbeing (G1: 38.8% to 9.6%) (Fig. 1c).

Conclusions: Automatic stratification provides a valuable tool for effective assessment of overall family wellbeing. This study also highlights the positive impact of a digital intervention on the parents' wellbeing.

(a)

	0	1	2	3
Glycemic control	Good	Suboptimal	Suboptimal	Poor
Parental wellbeing	Good	Poor	Good	Poor





(b)

	0	1	2	3
Time in range	77.9%	67.0%	56.6%	42.1%
Time >180	18.1%	37.8%	39.7%	55.5%
Glycemic variability	34.1	37.8	39.5	37.5
PANAS Positive	38.6	29.3	40.2	30.6
PANAS Negative	19.2	29.1	18.2	30.7

(c)

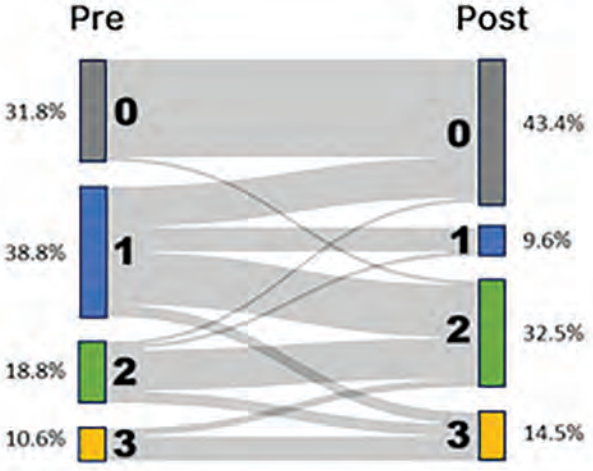


Figure 1. (a) Visualization of the 4 groups in terms of time in range of the child (70-180 mg/dl) and caregiver stress, (b) visualization of the 4 groups in terms of time above 180 mg/dl and caregiver stress, (c) values of the representative points of each group for 5 variales in the top 10 of most important variables of the k-means model, (d) Sankey diagram that represents which group each family belonged pre- and post-intervention.

P-463

Pediatric safety and glycemic outcomes using the MiniMed™ 780g advanced hybrid closed-loop (aHCL) system with ultra-rapid insulin lispro-aabc

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Introduction: Multiple daily injection therapy with ultra-rapid insulin lispro-aabc (URLi) is safe and provides good glycemic control in pediatric type 1 diabetes (T1D) (Wadwa et al. *Diabetes Obes Metab*. 2023;25:89-97).

Objectives: Evaluate the safety, glycemic and postprandial outcomes in a pediatric trial of MiniMed™ 780G system (MM780G) AHCL use with URLi (AHCL+URLi).

Methods: Children and adolescents (N=120, 7-17yrs) with T1D were enrolled in a 12-site single-arm study of the MM780G with the Guardian™ 4 sensor and extended infusion set. Open loop or HCL with rapid-acting insulin aspart or lispro (RAI) was used in a run-in (~21days), followed by AHCL+URLi use in a 3-month study period. Safety, overall-day glycemic metrics, carb intake and delivered insulin were compared between run-in and the last ~6 weeks of study. Outcomes during use of recommended optimal settings (ROS; a glucose target [GT] of 100mg/dL with an active insulin time [AIT] of 2hrs) were assessed. Postprandial percentage of time in range (%TIR) during a missed meal bolus challenge was determined for participants using a 100mg/dL GT with any AIT setting.

Results: AHCL+URLi significantly improved %TIR and %TITR by 17.4% and 16.0% ($p<0.001$), respectively, without changing A1C or increasing %TBR (Table). With ROS, %TIR and %TITR were further increased and all CGM-derived metrics met international consensus recommendations. Use of the 100 mg/dL GT, irrespective of AIT setting, increased postprandial %TIR after a missed meal bolus, compared to open loop or HCL with a RAI. There were 14 infusion site adverse events (10 participants), 13 of which were related to pain (9 participants). There were no severe hypoglycemia or diabetic ketoacidosis events.

Conclusions: Pediatric use of the MM780G with URLi was safe. A majority of children and adolescents achieved sensor glycemic targets with ROS. Additionally, postprandial %TIR after a missed meal bolus was increased compared to open-loop or HCL therapy with RAI.

Table. Glycemic outcomes and insulin delivered during MiniMed™ 780G system use with ultra-rapid insulin lispro-aabc by children and adolescents with T1D

	Run-in[a] (N=101)	Study[b] (N=98)	ROS[c] (N=25)	*P*
Overall (24-hour day)				
Time in AHCL, %	--	90.3 ± 13.6	94.0 ± 8.8	--
A1C, %	7.6 ± 1.1	7.5 ± 0.9[e]	7.2 ± 0.9	0.400
Mean SG, mg/dL	183.6 ± 30.2	158.3 ± 18.2	149.0 ± 15.7	<0.001[h]
CV of SG, %	35.7 ± 5.1	37.4 ± 5.5	35.2 ± 5.3	<0.001
%TBR <70 mg/dL (3.9 mmol/L)	2.3 ± 2.2	2.0 ± 1.8	1.8 ± 1.8	0.147[h]
%TITR 70-140 mg/dL (3.9-6.7 mmol/L)	30.1 ± 14.4	46.1 ± 9.7	51.8 ± 10.1	<0.001
%TIR 70-180 mg/dL (3.9-10 mmol/L)	51.2 ± 17.2	68.6 ± 10.3	74.9 ± 9.4	<0.001
%TAR >180 mg/dL (10 mmol/L)	46.5 ± 18.0	29.4 ± 10.5	23.2 ± 9.7	<0.001
Daily CHO, g	186.2 ± 76.3	161.4 ± 70.9	184.4 ± 96.9	<0.001
Daily CHO entries, N	5.0 ± 2.2	4.6 ± 2.2	4.8 ± 2.4	0.003[h]
TDD, U	52.4 ± 23.0	57.5 ± 22.5	57.9 ± 19.9	<0.001
Total basal, U	20.9 ± 9.8	23.6 ± 9.9	22.0 ± 8.3	<0.001[h]
Total bolus, U	31.5 ± 16.6	34.0 ± 13.9	35.9 ± 12.6	0.010[h]
User meal bolus, %Total bolus	80.8 ± 15.5	61.0 ± 13.6	61.7 ± 14.1	<0.001
Auto bolus, %Total bolus	--	36.5 ± 13.2	36.7 ± 13.3	--
Auto bolus, %TDD	--	21.1 ± 6.8	22.4 ± 7.6	--
Missed meal bolus challenge[d]	**Run-in[a] (N=59)**	**Study[c] (N=50)**	--	--
Prior to meal TIR, %	79.9 ± 32.6	82.0 ± 32.8	--	--
2-hr post-meal TIR, %	30.4 ± 45.4	42.8 ± 44.0	--	--
4-hr post-meal TIR, %	28.7 ± 43.2[f]	63.3 ± 42.9	--	--

Data are shown as mean ± SD.
P-values indicate difference between the run-in and the study period.
There were N=12 screen failures and N=7 withdrawals before study period entry.
During run-in, AHCL was inadvertently (temporarily) enabled on 4 systems.
[a]Open loop or HCL (Auto Basal only) use.
[b]The last ~6 weeks of the study with glucose target (GT) and active insulin time (AIT) set at investigator's discretion.
[c]GT of 100 mg/dL and AIT of 2 hours used independently for >95% of the time.
[d]Prior, -30 min to 0 min of meal; 2-hr, -30 min to 30 min of 2-hr post-meal; 4-hr, -30 min to 30 min of 4-hr post-meal.
[e]N=97. [f]N=58. [g]GT of 100 mg/dL with any AIT setting. [h]Wilcoxon signed-rank test, otherwise paired *t*-test.
AHCL, Advanced hybrid closed loop; CHO, Carbohydrate; CV, Coefficient of variation; PP, Postprandial period; SG, Sensor glucose; TAR, Time above range; TBR, Time below range; TIR, Time in range; TITR, Time in tight range; TDD, Total daily insulin dose.

P-464

Hispidulin is an insulin secretagogue targeting the AKAP9-mediated PKA signaling pathway

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Introduction: Inadequate insulin secretory impairment in response to high glucose is considered predominant in Asian non-obese type 2 diabetic subjects. Hispidulin, a natural flavone, was identified as a new insulin secretagogue that enhances insulin secretion in response to high glucose and seems a better drug candidate than synthetic marketed drugs.

Objectives: Here, we explored the insulinotropic mechanism(s) of hispidulin.

Methods: Secreted insulin and intracellular cAMP contents from batch-incubated C57BL/6 J mice islets and INS-1 832/13 cells were measured using an AlphaLISA kit. Preparation of hispidulin-immobilized beads and affinity purification with hispidulin-immobilized beads were performed. INS-1 832/13 β-cells were transfected with the AKAP-9 siRNA or scrambled siRNA using Lipofectamine RNAiMAX reagent. AKAP-9 knockdown was confirmed by western blotting.

Results: Hispidulin showed insulin secretory potential in INS1832-13 cells and isolated mice islets in response to high-glucose. Furthermore, hispidulin amplified glucose-induced insulin secretion in depolarized and glibenclamide-treated islets. Hispidulin showed no effect on intracellular cAMP concentration; however, showed an additive effect in both forskolin and IBMX-induced insulin secretion. Among the inhibitors of major signaling pathways, H89, a PKA inhibitor, completely inhibited hispidulin-induced insulin secretion. Hispidulin showed a strong binding affinity with A-kinase anchoring protein 9 (AKAP-9). Interestingly, in AKAP-9 knock down β-cells, hispidulin-mediated glucose-induced insulin secretion was further amplified. Interestingly the intracellular PKA signaling was further increased using hispidulin alone and AKAP-9 knockdown β-cells.

Conclusions: Hispidulin increases intracellular PKA concentration and inhibits the negative regulation of AKAP-9-cAMP-PKA signalosome, enhancing glucose-induced insulin secretion. The promising glucose-dependent insulin-releasing mechanism makes hispidulin a potential anti-diabetic drug candidate.

P-465

Perspectives of clinic and school-based healthcare providers for a program using specialized community health workers (CHW) for underserved youth with type 1 diabetes (T1D)

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Introduction: CHWs can reduce inequity in diabetes technology uptake and use for underserved youth with T1D. However, little is known about clinic and school-based provider perceptions on integration of CHWs into clinic and school settings.

Objectives: To describe and merge perspectives of clinic and school-based providers on a CHW intervention to increase diabetes device use for underserved youth with T1D in clinic and school settings.

Methods: Using human-centered design methodology, we conducted four virtual workshops with 17 providers from pediatric endocrinology and school-based clinics to provide feedback and co-design a novel CHW intervention. Three independent coders thematically analyzed the workshops using an inductive coding approach.

Results: Most providers agreed that a T1D CHW model across school and clinic settings would be beneficial, but key areas for success were identified. Potential benefits included assistance with health-related social needs and resources for mental health; diabetes education for school personnel and communities; enhanced communication between families and providers; personalized, family-centered care coordination; and reduced workload for the primary care team. Areas of concern included variable levels of CHW knowledge of diabetes devices; increased burden for providers; mistrust between CHWs and families; and potential for CHW burnout.

Conclusions: Clinic and school-based healthcare providers are amenable to a T1D CHW program to address diabetes device inequity for underserved youth with T1D. Offering personalized, family-centered care coordination and support will be crucial while ensuring that CHWs are diabetes tech-savvy and assimilate into the care model. CHWs can achieve trust and reduce burden on providers by providing administrative support related to diabetes device onboarding and personalized care-coordination for families.

P-466

Effect of new therapeutic program (adodiab-1) on the self-care skills of adolescents living with type 1 diabetes

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Introduction: Therapeutic education has been the «cornerstone» in the management of patients living with type 1 diabetes(T1DM). Its added value would be the help to the patients, their families and/or those surrounding them «understanding the illness and its treatment, taking charge of their health status, maintaining and /or improving the quality of life». It is therefore an important determinant for self-care skills, since it makes reducing hospital admissions rates for acute complications related to diabetes. It is on this basis that a new therapeutic education program specific to adolescents was developed.

Objectives: To test the effect of the new therapeutic program (AdoDiab-1) on the self-care skills of adolescents aged 13 to 18 year old living with type 1 diabetes.

Methods: A random sampling using the criteria as age and disease duration was done. 18 adolescents followed up at the CDiC clinic of the Central Hospital of Yaounde were selected and distributed randomly and equally into control group and experimental group. An experimental design made possible the assessment of the AdoDiab-1 program on self-care skills of adolescents in the experimental group.

Results: The comparison of the means of the total scores of the self-care competence scales (t = 8,39; p < 0,001; dm = 0,98; *IC* à 95% = [0,74; 1,23]) at post-intervention showed a statistically significant difference between the 2 groups. Similarly, the effect of the program on self-care skills (t = 11,86; p = 0,000; dm = 0,95; *IC* à 95% = [0,80; 1,09]) revealed a statistically significant improvement in the total scores of adolescents who participated in the program.

Conclusions: The implementation of the new therapeutic program can be of great benefit for adolescents living with T1DM.

P-467

Type 2 diabetes diagnosed under 10 years of age: are there unique characteristics?

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Introduction: Manitoba has the highest incidence of childhood onset type 2 diabetes (T2D) in Canada. It is our impression that we are seeing increasing numbers of children diagnosed under the age of 10.

Objectives: To compare the clinical characteristics of children < 10 years vs ≥ 10 years at diagnosis of T2D.

Methods: Clinical characteristics of children diagnosed < 10 years of age vs ≥ 10 years were extracted from the clinical database at the Diabetes Education Resource for Children and Adolescents in Winnipeg from 2019 to 2023. Descriptive statistics and Chi-square tests to compare categorical variables were used.

Results: Between 2019-2023, there were 571 incident cases of T2D. 57/571 were < 10 years at diagnosis (9.98%).

Female predominance was greater in the < 10 year group compared to the ≥10 year group (68.4% vs 44.5% respectively, p<0.0002). In addition, children diagnosed < 10 years were more likely to carry the HNF-1α G319S variant and be exposed to diabetes in utero compared to those diagnosed ≥10 years of age (44% vs 22%, p=0.0003; 75% vs 41%, p<0.0001 respectively). Urban residence and ethnicity did not differ between the groups.

Conclusions: The unique characteristics of youth diagnosed with T2D < 10 years can be used to inform prevention initiatives, screening guidelines, program development and potentially treatment strategies.

P-468

Impact of low carbohydrate diet among tenagers in management of type 1 diabetes attending CDiC clinic _the study aim to determine the effect of a low carbohydrate diet and standard carbohydrate counting on glycemic control, glucose excursions and daily insulin use compared with standard carbohydrate

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Introduction: Type 1 diabetes is an autoimmune condition characterized by pancreatic beta cell destruction and absolute insulin deficiency leading to an inability to regulate blood glucose levels effectively (American Diabetes Association, 2022). Low carbohydrate diets restrict the intake of carbohydrates, typically to less than 20-120 grams per day, aiming to minimize postprandial hyperglycemia and reduce insulin requirements. The strongest predictor of diabetes complications is glycemic control and achieving HbA1c ≤ 7.0% is the primary management target. However, standard treatment appears to be lacking and adjunctive strategies require consideration.

Objectives: To evaluate the impact of low carb diet on glycemic variability, incidence of hypoglycemia, and patient-reported quality of life To compare changes in HbA1c levels To assess the differences in total daily insulin dose between the two dietary groups.

Methods: Participants (n=30) with type 1 diabetes using a basal; bolus insulin regimen, will be randomly allocated (1:1) to either a standard carbohydrate counting course or the same course with added information on following a carbohydrate restricted diet (< 120 g per day). Participants weight, height, blood pressure, HbA1c, Self monitoring of Blood Glucose, lipid profile and creatinine will be taken & they will also complete a 7-day food record. The study will employ a randomized controlled trial (RCT) design.

Glycaemic Control	Pre-control	Post-control	Post intervention
HbA1c (%)^	7.8 (0.6)	7.9 (0.8)	7.5 (1.1)*
Fasting blood glucose (mmol/L)	9.0 (3.5)	8.9 (3.5)	6.8 (3.3)*
Time in range (%)	54.8 (16.3)	56.2 (19.1)	68.7 (23.2)*
Mean glucose (mmol/L)	9.8 (1.8)	9.7 (2.0)	8.6 (2.3)*
MAGE (mmol/L)	8.0 (2.0)	7.3 (1.1)	5.7 (1.7)*
Standard deviation of blood glucose	3.1 (0.6)	2.8 (0.5)	2.2 (0.6)*
Hypo frequency (episodes/day)^	0.3 (0.3)	0.3 (0.6)	0.3 (0.7)
Total daily insulin (units/day)	63.0 (21.2)	62.2 (22.1)	49.3 (19.2)*

Results:

Conclusions: The findings suggest that a professionally supported LC diet may improve markers of blood glucose control and quality of life with reduced exogenous insulin requirements and no evidence of increased risk of hypoglycemia or ketoacidosis in T1D. Given potential benefits of this intervention, larger, longer-term randomized controlled trials are needed to confirm these findings and examine clinical endpoints to better demonstrate the efficacy of LC diets in T1D management.

P-469

Hybrid closed loop therapy in an infant with postnatal onset of insulin dependent mitochondrial diabetes due to Pearson syndrome

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Introduction: Pearson syndrome is a rare mitochondrial deletion syndrome. Patients present with anaemia, exocrine pancreas insufficiency and failure to thrive. Diabetes can arise in affected patients, but to our knowledge has never been reported in the neonatal period.

Objectives: The aim of the present work is to raise awareness of mitochondrial diabetes as a differential diagnosis for neonatal diabetes. For the first time in this context data from hybrid closed loop therapy were assessed.

Methods: Data from the patients electronic health record were assessed. Genetic testing was performed by next generation sequencing with virtual panel analysis of genes causing neonatal diabetes.

Results: The boy presented postnatally with hyperglycemia, lactic acidosis and anaemia. Genetic testing revealed a de novo large-scale deletion in mitochondrial DNA. Management included insulin therapy and supportive care with pancreatic enzyme replacement, regular blood transfusions and G-CSF therapy. Intravenous infusion of regular insulin was initiated postnatally and switched to insulin pump therapy (CSII) with fast acting insulin following genetic diagnosis at 6 weeks of age. At the age of 8 months hybrid closed loop therapy (HCL) with the CamAPS FX system (my life Ypsopump, Dexcom G6) was started. Time in range (3.9-10.0 mmol/l; 70-180 mg/dl) with CSII was 48% versus 69% after HCL start. Time above range (TAR) (>10.0mmol-13.9 mmol/l; 181-250 mg/dl) was 32% with CSII and 23 % with HCL, TAR (>13.9 mmol/l; >250 mg/dl) was 17% with CSII and 3 % with HCL. Time below range (TBR) (3.0-3.9 mmol/l; 54-69 mg/dl) was 2 vs. 1 % and TBR (<3.0 mmol/l; <54 mg/dl) 3 vs. 1 % with CSII and HCL.

Conclusions: Pearson syndrome is a rare, but important differential diagnosis in patients with neonatal diabetes. Therefore physicians have to ensure that the used sequencing method detects variants in mtDNA, as methods may vary. In our patient HCL therapy could significantly improve glycemic control and TIR by reducing TAR without increase of hypoglycemic episodes.

P-470

Enhancing the diagnosis and care of type 1 diabetes mellitus in children and adolescents through training of paediatric endocrinologists and the multidisciplinary teams in Kenya

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Introduction: Type 1 diabetes mellitus (T1DM) is one of the common endocrine disorders among children and adolescents globally. There has been a rising trend in the past few decades. Many countries have extensive data on prevalence and treatment however, Sub-Saharan Africa lacks information. It is estimated that 127,000 children live with T1DM in Kenya, but only 5,000 are on treatment.

Objectives:

1. Highlight ways of improving early diagnosis of T1DM in children and adolescents
2. Enhance management of T1DM

Methods: Clinton Health Access Initiative, in collaboration with Ministry of Health trained 2 Paediatric Endocrinologists, who developed the first-ever guidelines for management of TIDM in children and adolescents and corresponding training materials. Training of HCWs targeted ~380 hospitals. Between Jan-June 2024, 704 HCWs from 262 facilities were trained for 3 days on screening, diagnosis/differentiation from common childhood

illnesses. The trained nurses, clinical officers and doctors were tasked with identification, management and referral while pediatric endocrinologists were to set up specialized clinics and mentor other HCWs.

Results: Results indicate improvement in diagnostic accuracy and patient outcomes, demonstrating the effectiveness of a comprehensive integrated approach in T1DM management. This enhances quality care and promotes a collaborative healthcare environment. Out of 32 trained counties, two pilot counties with 83 trainees from 12 hospitals had 6 months post-training experience. Overall, 1,792 children were screened, 65 diagnosed with T1DM and 18 diagnosed with Diabetes Ketoacidosis (DKA). All 65 children were enrolled in care and followed up.

Conclusions: Embedding management of T1DM in children and adolescents in Child Health interventions is critical in raising the index of suspicion and improving screening and identification. Moreover, investments in sub-specialty and in-service training are necessary for establishing the right policies and clinical guidelines for strengthening T1DM services.

P-471

Comprehensive epidemiological analysis of type 1 diabetes mellitus: a single-center study from south-central India

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Introduction: Type 1 Diabetes Mellitus (T1DM) is a chronic autoimmune disease requiring comprehensive management, with its prevalence and incidence varying across regions. Understanding its epidemiological patterns is crucial for targeted interventions and health care policies.

Objectives: This study aimed to analyze the epidemiological data of T1DM patients from a single center in the south-central region of India.

Methods: This retrospective study analyzed the records of 375 T1DM patients at Gandhi Medical College & Hospital from 2020 to 2024. Data collected and statistical analysis was performed.

Results: Out of 375 T1DM patients, 212 (56.5%) were female and 163 (43.5%) male, with a median age of 15 years (SD 8.1). Most, 240 (64%), lived in urban areas, with a mean BMI of 18.7 kg/m^2 (range 10.3 to 34.4, SD 4.08). The mean age at diagnosis was 10.4 years (range 0.5 - 24 years, SD 6.35). Seasonal diagnosis varied: 136 (36.3%) winter, 107 (28.5%) summer, 74 (19.7%) monsoon, and rest in spring. Initial DKA was seen in 153 (40.8%), with an average symptom duration of 7 weeks before diagnosis (range 0 - 24 weeks, SD 8.5). Patients had an average of 1 DKA episode per year (range 0 - 15, SD 1.29) and 0.88 severe hypoglycemia episodes per year (range 0- 20, SD 2.22). Post-diagnosis, 269 (71.7%) had DKA episodes, due to non-compliance (52.6%) and infections (29.6%). Hospitalizations due to DKA is 210 (56 %) patients, hypoglycaemia 34 (8.8%), and 23 (5.9%) for both. Hypothyroidism was the most common autoimmune disease (18.4%). Initial treatments included basal-bolus for 266 (70.93%), premixed for 94 (24.80%), rest were on basal or bolus. The mean bolus dose was 0.58 IU/kg (range 0.05 to 2.4, SD 0.267) and the mean basal dose was 0.41 IU/kg (range 0.04 to 0.97, SD 0.156).

Conclusions: The study reveals seasonal variations in T1DM diagnosis, high initial DKA presentation, and frequent subsequent episodes due to non-compliance and infections, highlighting the need for targeted region specific epidemiological data.

P-472

Participatory research to understand the needs of diverse Latinx families of children with type 1 diabetes and obesity

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Introduction: Chronic condition-related fatigue (CCrF) deeply impacts families touched by type 1 diabetes (T1D) and obesity. In the United States, Latinx populations are disproportionately affected by CCrF and contributing factors like health inequities and stigma. While the biopsychosocial model provides a framework for addressing CCrF, there is a lack of digital solutions using it.

Objectives: To adapt a bilingual (SP/EN) 12-week digital health program (BDHP) to better serve the Latinx population experiencing CCrF by 1) Assessing the acceptability of BDHP, and 2) Designing an implementation strategy for urban Latinx communities.

Methods: We held participatory workshops with over 150 families and stakeholders. Aim 1 involved contextualizing, conceptualizing, and validating the adapted BDHP through both quantitative (e.g., System Usability Scale) and qualitative evaluations. Aim 2 focused on pre-onboarding adoption, digital health literacy, and integration into healthcare facilities. We collaborated with a children's hospital and a diverse panel of US Latinx individuals, clinicians, and equity experts to explore implementation strategies using the Nominal Group Technique.

Results: The adapted BDHP received "good" to "excellent" ratings, and target users responded positively to AI-based personalization. Thematic analysis of over 10 hours of conversations revealed stigma as a significant concern, particularly the conflation of T1D and obesity with type 2 diabetes, often perceived as preventable through lifestyle changes. This stigma affects multiple generations. Another critical issue identified was the lack of information available shortly after a T1D diagnosis.

Conclusions: The adaptations made to the BDHP for addressing T1D and obesity were well received by the US Latinx community. There was notable stigma interaction between T1D and obesity. If recommended by a clinician, AI based personalization was favorably viewed.

P-473

Impact of tele-health on glycemic control in a child with type 1 diabetes in a remote area: a case report

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Introduction: Children with Type 1 Diabetes (T1D) residing in remote areas face significant challenges in accessing regular clinical care, which can adversely affect their glycemic control. This case report explores the use of tele-health interventions to manage T1D in a child living in a remote location, evaluating its impact on the patient's clinical outcomes.

Objectives: To evaluate the impact of tele-health on glycemic control in a pediatric T1D patient in a remote location.

Methods: A CDiC listed pediatric patient with T1D in a remote area was unable to visit the clinic due to geographical constraints. Healthcare providers used tele-health platforms like Facebook Messenger, Viber chat, and video calls to monitor and manage the patient's condition. An endocrinologist and a pediatrician provided specialized care via Viber video calls. The CDIC team, serving as diabetes educators, discussed the child's condition monthly and advised on physical exercises and dietary adaptations. The patient's mother actively learned about T1D and supported her child. The CDIC team also coordinated the delivery of insulin and other supplies to prevent shortages.

Results: After 12 to 18 months of tele-health intervention, the patient's glycemic control significantly improved. Average weekly random blood sugar (RBS) levels decreased from 300 mg/dL to 140 mg/dL, and HbA1c values improved from 13.5% to 7.5%. These results indicate better diabetes management and adherence to treatment. Additionally, the child's height, as reported by the parents, showed significant improvement, indicating enhanced overall health and well-being.

Conclusions: This case report demonstrates that tele-health effectively manages T1D in pediatric patients in remote areas. Using online communication platforms and timely delivery of medical supplies, healthcare providers can significantly improve clinical outcomes and enhance patients' quality of life. Further studies are recommended to explore the long-term benefits and scalability of tele-health in similar settings.

P-474

Importance of molecular genetic testing to identify novel disease-causing mutations - first case report of pax4 gene mutation from Georgia

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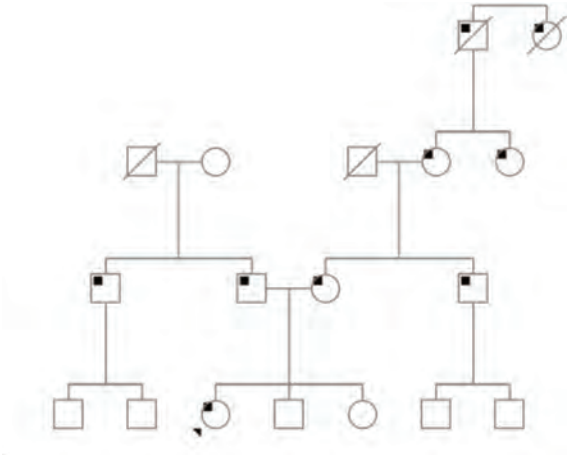
Introduction: Maturity-onset diabetes of young (MODY) is a monogenic disorder with autosomal dominant pattern of inheritance diagnosed during adolescence. The majority of the patients are initially misdiagnosed as having type 1 or type 2 diabetes mellitus. MODY 9 is extremely rare form of MODY subtypes. There is limited reports of MODY 9 and this is the very first case of PAX4-MODY in Georgia.

Objectives: To classify the type of diabetes in a 14-years old girl with a strong family history of type 2 diabetes. The goal of accurately defining the type of diabetes is to optimize personalized treatment approaches.

Methods: A female proband of Caucasian ethnicity was diagnosed with diabetes at the age of 14 years (high HbA1c and insulin), verified to be insulin antibodies negative. Physical examination revealed a slim girl with central obesity. Family history is positive for type 2 diabetes in both of the parents as well as in first degree relatives of affected parents (see the pedigree). Each of them were diagnosed after the age of 25. None were on insulin treatment or obese. Due to the significant family history of diabetes in parents and first-degree relatives of the affected parents who lack the characteristics of T1D and T2D molecular genetics of monogenic diabetes was performed.

Results: Genetic testing identified a novel heterozygous mutation of PAX4, p.Leu7fs variant in proband. From the 14 subtypes of maturity onset diabetes of young (MODY) the incidence of MODY 9 accounts for less than 1%. MODY 9 is the rare subtype of MODY and this variant has not even been reported in the literature and clinical significance is not currently known.



Conclusions: The genetic testing of a patient who does not exhibit the typical characteristics of T1D/T2D, has negative insulin antibodies, and has a strong family history of diabetes definitely needs genetic testing not only for a proper management plan but also for identifying new mutations associated with MODY.

P-475

A severe emergency: hyperosmolar hyperglycemic state as an initial manifestation of type ii diabetes mellitus in adolescents

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Introduction: Type II diabetes mellitus (T2DM) in children and adolescents is increasingly prevalent, with a notable rise in incidence over the past two decades. This case study examines the severe complications of hyperosmolar hyperglycemic state (HHS) as an initial manifestation of T2DM in a 15-year-old girl, underscoring the critical nature of this condition.

Objectives: To illustrate the severity and complexity of HHS as an initial presentation of T2DM in adolescents and to discuss the treatment challenges and potential life-threatening complications.

Methods: A 15-year-old female patient, weighing 105 kg, was admitted to the pediatric intensive care unit (PICU) with HHS. Initial laboratory tests showed a pH of 7.39, hypernatremia at 167 mmol/L, blood glucose at 676 mg/dL, and HbA1c at 18.7% (180.87 mmol/mol). Following ISPAD guidelines, the patient underwent rehydration and gradual correction of hyperglycemia and hypernatremia. Insulin was administered via perfusion pump. During treatment, the patient developed acute respiratory distress syndrome (ARDS) and renal failure. Clinical data, including laboratory results, treatment measures, and patient responses, were systematically collected throughout hospitalization and retrospective.

Results: The patient required intubation for 3.4 weeks due to ARDS and temporary hemodialysis for 8 days due to renal failure. Despite the severe initial presentation and complications, the patient was successfully managed and discharched after 74 days.

Conclusions: This case underscores the critical severity and high complexity of HHS in adolescents as an initial presentation of T2DM. The significant risk of life-threatening complications, such as ARDS and renal failure, highlights the need for prompt and meticulous management. Early recognition and treatment following established guidelines are crucial in improving outcomes for adolescents with severe T2DM manifestations.

P-476

Increased incidence rate of type 1 diabetes in children under 18 years of age and differences in phenotype during the COVID-19 pandemic in Sweden

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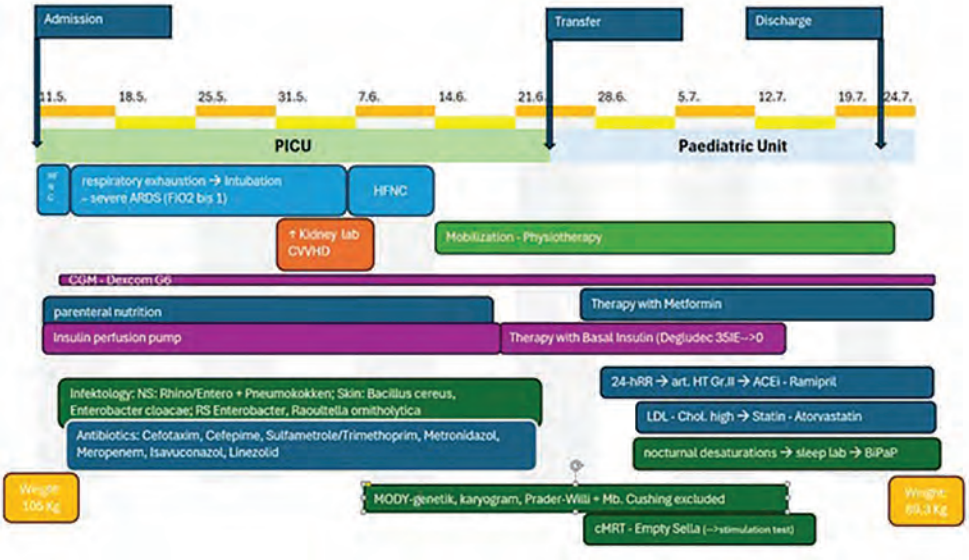
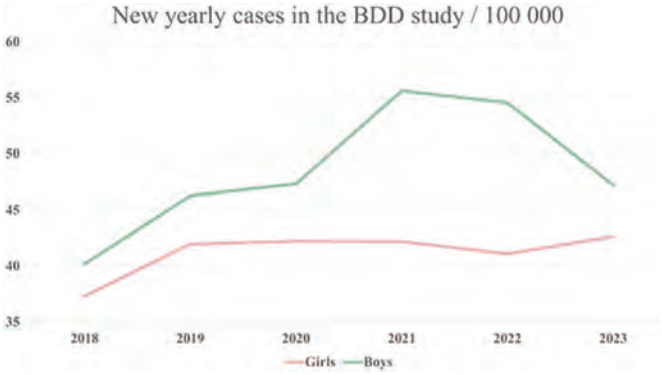
Introduction: Recent studies worldwide have reported an increased incidence of type 1 diabetes (T1D) during the COVID-19 pandemic in 2020-2022. Sweden adopted a distinct strategy by not enforcing a strict lockdown, in contrast to other countries.

Objectives: The difference in public health strategy provides a unique opportunity to study potential effects on T1D. We aimed to investigate if there was a change in incidence rate during the pandemic in Sweden and to determine if clinical characteristics were affected in children diagnosed with T1D.





Methods: The incidence rate was calculated between 2018 and 2023 in children <18 years. Clinical differences were observed focusing on two groups: children diagnosed with T1D before (2018-2019) and during the pandemic (2021-2022). Year 2020 was considered a gap year since the pandemic began in March. Annual incidence data was obtained from the national Better Diabetes Diagnosis (BDD) study where >95% of all children with newly diagnosed T1D are registered. Clinical data was obtained from BDD and from the National Diabetes Register.

Results: Number of new yearly cases included in the Better Diabetes Diabetes (BDD) study per 100 000 children under 18 years of age in Sweden. More than 95% of children with newly diagnosed T1D in Sweden are registered in the BDD study. The incidence rate was 41.50/ 100.000/ year before the pandemic 2018-2019 and stayed the same in 2020 but increased by 17.0% to 48.55/ 100.000/ year in 2021-2022. A higher proportion of boys were diagnosed 2021-2022, they had an increased frequency of autoantibody negativity (p=0.002) and exhibited a different distribution of HLA genotypes compared to boys diagnosed before the pandemic with a decrease in DQ2/DQ8 and DQ2/DQX and a rise in DQ8/DQX and DQX/DQX (p=0.001). BMI in children diagnosed during the pandemic was higher compared to 2018-2019 (p=0.018), particularly in boys (p=0.05).

Conclusions: Our findings indicate that the pandemic affected the clinical characteristics of children diagnosed with T1D in Sweden and influenced the incidence rate of T1D. The increased incidence rate seemed to primarily reflect an increased incidence in boys. It is possible that boys were more susceptible to certain environmental triggers during the COVID-19 pandemic.

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Glycemic control in youth diagnosed with diabetes mellitus (DM) during the COVID pandemic: reason for concern

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Introduction: Studies conducted during the COVID-19 pandemic have reported improvements in glycemia in children with type 1 diabetes (T1D). However, these included youth with variable T1D duration and used continuous glucose monitors' (CGM) parameters, limiting the conclusions to those with access to technology. Data are even more limited in youth diagnosed with type 2 diabetes (T2D).

Objectives: We evaluated glycemia (by hemoglobin A1c, HbA1c) at 1 year after onset in youth diagnosed with DM during 2020 and compared characteristics between those that achieved recommended glycemic target (HbA1c < 7%) vs those that did not.

Methods: Retrospective chart review of White and Black youth < 21 years diagnosed with DM in 2020 in a large, academic diabetes center. Clinical parameters were extracted at onset and 1 year ± 3 months follow up (FU).

Results: Overall, 263 youth were diagnosed with DM, 206 (78%) T1D (44% female, 92% White, HbA1c at onset 12.1±2.7%, 30% overweight (BMI ≥ 85%ile), 41% in DKA) and 57 (22%) T2D (60% female, 56% White, HbA1c at onset 10.7±2.8%, 98% overweight, 10% in DKA). Overall, 65% of youth (T1D and T2D) had HbA1c above target at 1 year FU (out of 240 with available HbA1c data). Patient characteristics by HbA1c outcome at FU and type of DM are presented below. No significant differences in patients' characteristics were seen between HbA1c categories within DM type.

Conclusions: Around 2/3 of youth diagnosed with DM during the COVID pandemic had HbA1c above target at 1 year FU. There were no differences in patient characteristics at onset and 1 year FU between those that achieved target HbA1c vs those that did not irrespective of DM type. Other factors not routinely assessed (e.g., social determinants of health, residual insulin secretion) may play a role. Further assessments to determine contributing factors and health outcomes in this high-risk group are needed.

Variables	T1D N=193			T2D N= 47		
	HbA1c < 7% at 1 year FU N= 73 (38%)	HbA1c ≥ 7% at 1 year FU N=120 (62%)	P value	HbA1c < 7% at 1 year FU N=11 (23%)	HbA1c ≥ 7% at 1 year FU N=36 (77%)	P value
Sex (%female)	31 (42%)	55 (46%)	0.65	6 (55%)	22 (61%)	0.69
Race (%White)	68 (93%)	111 (92.5%)	0.87	7 (64%)	20 (55%)	0.64
Age (years) at onset *	10.3±4.6	9.5±4.2	0.27	12.9±3.9	14.4±3.1	0.21
Overweight at onset (%)	22 (34%)	32 (29%)	0.40	11 (100%)	35 (97%)	0.58
HbA1c (%) at onset*	11.9±2.9	12.3±2.6	0.36	10.1±3	10.6±2.3	0.59
Diabetes ketoacidosis (DKA) at onset (%)	26 (36%)	52 (45%)	0.24	1 (11%)	3 (13%)	0.97
CGM use at 1 year FU (%)	55 (75%)	85 (70%)	0.50	8 (72%)	26 (72%)	0.97

*mean ± SD

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Five-year evaluation of the use of Accucheck-spirit combo in T1D children and adolescents treated in a specialized outpatient clinic in the public health care system in Brazil

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Introduction: The Continuous Subcutaneous Insulin Infusion (CSII) is effective in glycemic control in children and adolescents with Type 1 Diabetes Mellitus (T1D) in the short term, but there is a lack of studies in the Brazilian pediatric population, in the medium and long term, in the Public Health Care System (SUS).

Objectives: To evaluate the impact of Accu-chek insulin pump on glycemic control, self-care management and quality of life in T1D children followed during 5 years in the public health care system.

Methods: In a population of 20 children/adolescents (6 to 13 years old) undergoing multiple daily insulin injections (MDI), an analysis of the variables glycated hemoglobin (HbA1C), number and percentage of hypoglycemia, glycemic variability, self-care management (DSMP) and quality of life (PedsQLTM 3.0 Diabetes) was performed before and during transfer to SICI associated to an educational program.

Results: Eighteen patients completed the study. There has been a drop in HbA1C (initial average 8.52 ± 0.74%; at 6 months 7.95 ± 0.66%; at 15 months 8.21 ± 0.9; at 30 months 7.97 ± 0.85%; at 60 months 7.61 ± 0.79%; reduction in the percentage of hypoglycemia (initial average 8.3% ± 7.7; at 15 months 5.75% ± 2.75; at 60 months 5.58% ± 3.3) and in the number of severe hypoglycemia (initial mean 3.2 ± 3.0; mean at 15 months 2.8 ±2.2, mean at 60 months 2.2 ± 2.0; p=0.51); glycemic variability didn't change (initial mean 47% ± 6.9; mean at 15 months 51.4% ±1.8; mean at 60 months 46.1% ± 7.2).There were no differences in the scores on the questionnaires relating to quality of life and self-care management. There was one brief hospitalization for SICI-related ketoacidosis.

Conclusions: The use of Accuchek Spirit Combo in this population was effective in reducing HbA1C and the frequency of hypoglycemia, but did not reach the goals proposed by international societies.The sample size and heterogeneity of the population may have contributed to the results, reinforcing that the indication of this therapy must be individualized.

P-479

Transition between pediatric and adult diabetes healthcare services: an online global survey of experiences and perceptions of young people with diabetes and their carers

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Introduction: Young adults with diabetes face a double challenge: managing their condition during a period of significant life changes.

Objectives: To assess the experiences of people living with diabetes in transition from pediatric to adult care.

Methods: Survey-based cross-sectional study via Google Forms developed by the research team, translated into 7 languages, promoted in social media. Inclusion criteria: person with diabetes/carer of someone with diabetes aged 14-25yr.

Results: Respondents(n=146) from 29 countries, 52.1% high-income, 25.3% upper-middle-income, and 22.6% middle-lower and low-income countries. Of all, 90(61.6%) were PwD 14-25yr, and 56(38.3%) were adult carers of a PwD14-25yr; female(54.1%), mean age 18.5 yrs(±-3.6), diagnosed at 9yr(±4.4), and A1C 8.39%(±2.2). Most(67.1%) received care at specialized diabetes centers with multidisciplinary team, 55.2% on MDI, 24.2% on AID system, and 20.7% on pump therapy alone. Most centers had a fixed age for transfer(58.9%), mainly after 18 yrs(65.1%). Only 38.4% received information about the transfer, the majority at the age of 15-17 yrs(53.6%), and only verbally(82.1%). Of those who had already transferred, transition readiness was mainly supported by family (47.3%) and the diabetes team(38.4%). Only 45.2% had discussed transfer-related concerns/questions, and less than half(44.3%) felt their psychosocial needs were adequately addressed. 84.2% received education on managing diabetes independently, but 24.7% felt unprepared for some areas of self-management. The overall median rating for the transfer experience was 3 out of 5 (interquartile range). About what should be

offered during the transition, 56.2% suggested combined pediatric and adult diabetes clinics, 50.7% psychologist support, 46.6% improved communication between pediatrics and adult services, and 42.5% between the diabetes teams and the patient/family.

Conclusions: Knowledge about transition experiences helps develop guidelines focused on the needs of people living with diabetes.

P-480

Glycaemic control of children and adolescents in the United Arab Emirates with type 1 diabetes: a narrative review

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Introduction: Diabetes is the fastest-growing chronic disease in the world with increased morbidity and mortality associated with a diagnosis at a young age. The landscape of glycaemic control of children and adolescents aged ≤18 years in the United Arab Emirates, a dynamic and fast evolving country in the Middle East, is unknown, potentially limiting decisions around patient care, health system planning and efforts around advocacy.

Objectives: To determine the reported glycaemic control of this vulnerable population, exploring factors such as HbA1c and approaches used in blood glucose management.

Methods: A quantitative epidemiological narrative review was conducted using PubMed, CINAHL and Cochrane databases, searched from 2012 to 2023. English studies involving the study population were included and appraised.

Results: Overall, 16 studies were included, mainly heralding from Abu Dhabi and involving Emirati nationals. Reported mean HbA1c ranged from 7.9-9.6% (63-81mmol/mol) and diabetes-related technology use was high. Themes identified were diabetes and technology, education, psychology and Ramadan.

Conclusions: Glycaemic control was suboptimal, with mean HbA1c being hyperglycaemic across these included studies, despite a high use of diabetes-related technology. Unless change is made, children and adolescents with type 1 diabetes will likely experience unnecessary morbidity and mortality.

P-481

Prevalence of insulin resistance, contributing factors and its association with metabolic profile in children with type 1 diabetes

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Introduction: While insulin resistance (IR) is traditionally associated with Type 2 diabetes, it is increasingly recognized as a complication in T1D, affecting metabolic control and increasing the risk of cardiovascular diseases. The estimated glucose disposal rate (eGDR) is a validated measure of IR in T1D.

Objectives:

- To determine the prevalence of insulin resistance in children with T1D using the eGDR formula.
- To identify potential risk factors for IR in this population.
- To assess the association between IR and metabolic profiles in children with T1D.

Methods: Single Centre, cross sectional study from medical records of T1D patients managed at the Pediatric and Adolescent Endocrinology clinic (IGICH, Bangalore, India). Inclusion criteria-5-18 years age, duration of diabetes >2 years. We collected demographic variables, documented clinical and biochemical parameters including anthropometry, blood pressure, insulin dose, HbA1c, microalbuminuria and lipid profile. eGDR was calculated using the formula eGDR = 21.158-(0.09×WC) -(3.407×HTN) -(0.57×HbA1c), where HTN status as 0/1, WC in cms. eGDR <8 is considered as insulin resistant.

Results: There were total 150 patients out of which 58 were males and 92 females, with mean age-12.98±3.27, duration of diabetes 6.1±3.46, WC-70.78±10.21, BMI-18.26± 3.37 and eGDR 9.05±1.84. Using spearman correlation there was significant negative correlation between eGDR and study parameters.

Comparison of various characteristics of patients in relation to eGDR

Variables	eGDR <8 (n=28)	≥8(n=122)	P value
Age in years	15.21±2.18	12.42±3.26	<0.001**
Duration of Diabetes	6.23±3.09	6.07±3.56	0.819
Body mass index (kg/m^2)	20.72±3.94	17.64±2.91	<0.001**
Waist Circumference in cm	79.25±9.14	68.67±9.34	<0.001**
MEAN HbA1C	11.94±1.6	9.47±1.7	<0.001**
TOTAL CHOLESTEROL	204.76±38.76	155.37±26.09	<0.001**
TRIGLICERIDES	199.57±69.34	108.39±51.9	<0.001**
HIGH DENSITY LIPOPROTEIN	38.33±8.22	49.22±8.76	<0.001**
LOW DENSITY LIPOPROTEIN	125.18±32.44	98.91±19.3	<0.001**

Conclusions: Our findings indicate that a substantial proportion of children with T1D exhibit IR. Additionally, the presence of IR is associated with increased lipid abnormalities and hypertension, suggesting a heightened cardiovascular risk in these patients. This underscores the need for routine screening for IR in pediatric T1D and highlight the importance of early interventions, lifestyle modifications and adjunctive pharmacotherapy, to mitigate long-term complications.

P-482

Asymptomatic diabetes among secondary school adolescents

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Introduction: Diabetes is said to be asymptomatic when the individual has a dysglycemia within diabetic range without any clinical manifestation.

Objectives: To determine the prevalence and associated factors of asymptomatic diabetes among school age adolescents in Abakaliki, Ebonyi State.

Methods: A cross sectional analysis of 787 secondary school adolescents within the age of 10-19 years via a simple and stratified sampling method was carried out. The prevalence of asymptomatic diabetes was analysed using frequency counts and percentages with 95% confidence interval calculated. Diabetes was defined as fasting blood glucose(FBG) ≥125mg/dl (≥ 7mmol/l) or HbA1C ≥6.5% or random blood glucose ≥200mg/dl (≥11.1mmol/l). Statistical significance of P value set at <0.05.

Results: The mean age was 14±2 years (females were 63.1% and males 36.9%). Asymptomatic diabetes in the adolescents using FBG and HBA1c was 3% and HbA1C was 7% respectively. Age was statistically significant with 50% of adolescents aged 10-13 years, 42.9% (14-17 years), 7.1% (18-21 years), p=0.04. Significant associated factors were frequent consumption of snacks (75%, p=0.03), puberty (84.2%, p=0.005), body mass index with 92.9.% overweight, 7.1% normal weight and 3.5% underweight (p=0.03), positive family history of hypertension (92.2%) p=0.03, and systolic and diastolic hypertension (p=0.02 and 0.009) respectively in the study participants. Asymptomatic diabetes was common among adolescents of the upper social economic class (64.3%) and those living in the urban (84.2%).

Conclusions: Asymptomatic diabetes is prevalent among adolescent children in Abakaliki especially those within the pubertal period with overweight and family history of hypertension as associated factors. Blood glucose check is advocated as part of routine school health package.

P-483

Diabetic ketoacidosis as the initial presentation in newly diagnosed type 1 diabetes mellitus: a single center retrospective analysis from south central India

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Introduction: Diabetic ketoacidosis (DKA) is a severe and potentially life-threatening condition that often serves as the initial presentation in individuals diagnosed with type 1 diabetes mellitus (T1DM). This study investigates the prevalence and characteristics of DKA as the initial presentation in newly diagnosed T1DM patients in the south central region of India

Objectives: To compare the demographic clinical and biochemical parameters between T1DM patients presenting with and with out DKA at initial diagnosis

Methods: A retrospective analysis was conducted on 375 T1DM patients from Gandhi medical college & hospital in the south central region of India. Patients were divided into two groups: those presenting with DKA and those without DKA. Data was collected and analyzed using chi-square and t-tests

Parameter		Initial DKA presentation (n= 153)	Non DKA presentation (n=222)	Test of significance	Values	p-value
Sex	Female Male	90 63	122 100	Chi-square test	-0.41	0.52
Age at diagnosis(year)		7.4	9.8	T -test	-2.81	0.0053
History of recurrent DKA	No Yes	6 147	100 122	Chi-square test	73.53	<0.005
Basal dose U/KG		0.5	0.4	T -test	-2.12	0.035
Bolus dose U/kg		0.4	0.3	T -test	-2.05	0.041
BMI Kg/M^2		19.3	18.5	T -test	-1.98	0.049

Results: Among 375 patients, 153(40.8%) had initial presentation as DKA and rest 222(59.2%) presented with other osmotic symptoms. Patients with initial DKA presentation had significantly lower age of diagnosis, higher BMI and higher recurrent DKA episodes. Regarding biochemical parameters, although not statistically significant, patients with initial DKA presentation tended to have lower mean FPG (206.5 vs. 229.8 mg/dL, p=0.14), higher mean PPPG (280.5 vs. 249.7 mg/dL, p=0.2), and higher mean HbA1c (10.3% vs. 9.7%, p=0.17) compared to those without DKA, on followup monitoring.

Conclusions: DKA is a common initial presentation in newly diagnosed T1DM patients in south central India, affecting 40.8% of cases. Patients with DKA were significantly younger, had a higher BMI, experienced a higher rate of recurrent DKA episodes (96.1% vs. 54.9%), and required higher doses of basal (0.5 vs. 0.4 units/kg/day) and bolus (0.4 vs. 0.3 units/kg/day) insulin. Subcategorizing T1DM patients based on their initial presentation with or without DKA is important, as it helps in better management and tailoring of treatment strategies.

P-484

Addressing equity in type 1 diabetes services in the Philippines: a multisectoral, inclusive development approach

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Introduction: There is an estimated 16,443 people living with Type 1 Diabetes (T1D) in the Philippines. Children with T1D lose 46 years of healthy life due to illness, disability or death because of the lack of access to timely diagnosis, insulin, glucose testing and self-management education. For children with disabilities, access to these health services is 7 times less likely than others. Barriers include the high cost of treatment and transportation, physically inaccessible health facilities and lack of appropriate health promotion.

Objectives: The Changing Diabetes in Children (CDiC) project aims to demonstrate the effectiveness of the multistakeholder, disability inclusive approach in improving access to T1D services.

Methods: A steering committee was organized in Valenzuela City composed of local government agencies, policy makers, and support groups. The needs and gaps in accessing services and the key roles of each stakeholder to address these gaps were identified. The City Health Office provided leadership and health services including monitoring and education sessions. The Persons with Disability Affairs Office, Federation of Persons with Disabilities and caregiver support groups conducted social orientation to encourage enrollment into the city's T1D Program. Tertiary care specialists referred the diagnosed and initially-managed children to the program to ensure continuum of care. A city council resolution was passed to ensure sustainability of project interventions.

Results: Within 3 months of implementation, 200 children with T1D, including 20 with disabilities were enrolled in the program so they can access insulin, glucose monitoring kits, education sessions, a network of health service providers and other social services.

Conclusions: The collective effort of different stakeholders including organizations of persons with disabilities to work on social determinants is key to addressing equity in health care services especially is a decentralized, low resource setting.

P-485

Diabetes mellitus in a boy with Kearns Sayre syndrome

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Introduction: *Kearns Sayre* syndrome (KSS) is a mitochondrial cytopathy characterised by progressive external ophthalmoplegia [PEO], pigmentary retinopathy, onset uder 20 years of age and a pathogenic mitochondrial DNA variant. Common additional features include deafness, cerebellar ataxia and cardiac conduction defects.KSS is also a rare cause of diabetes in children.

Objectives: By describing this case, we would like to highlight that the mutations in mitochondrial DNA may involve the pancreatic islet cells.

Methods: A 17-year old boy was admitted to hospital because of polydipsia, polyuria, weight loss, fatigue, muscle pains. He had history of KSS with PEO, pigmentary retinopathy, cerebral ataxia, status post implantation of cardioverter-defibrillator due to atrioventricular block, cochlear implant due to deafness. Family history of autoimmune and genetic diseases was negative. At admission, the patient was in a good general condition, slightly dehydrated. Physical examination revealed cafe au lait spots on the skin, postural defect, wide stance gait, hand tremor, bilateral facial muscle weakness, oculomotor paresis with ptosis, nystagmus, hearing loss.

Results: Laboratory tests showed hyperglycemia, elevated HbA1c, decreased c-peptide level and lack of autoimmunity. Hybrid closed-loop (HCL) insulin delivery was initiated. After the introduction of insulin treatment diabetes is continuosly well controlled with HbA1c 5.6%, average glucose level of 120+-25 mg/dl, and time in range 70-180mg/dl of 96%. Daily insulin requirement is 0.25U/kg body weight.

Conclusions: We would like to emphasize that children with KSS and other mitochondrial DNA defects may develop a diabetes so they also need a screening into carbohydrates metabolism abnormalities.

P-486

Demographic, clinical, and psychosocial predictors of diabetes self-management trajectories over 9-years in adolescents with type 1 diabetes

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Introduction: Self-management behaviors typically decline in adolescents with type 1 diabetes (T1D), but pre-adolescent factors predictive of outcomes have not been clearly identified.

Objectives: This study identified diabetes self-management (DSM) trajectories over 9 years and examined baseline demographic, clinical, and selected psychosocial factors that predict these trajectories during adolescence.

Methods: Latent profile analysis was used to identify DSM trajectories in 175 adolescents with T1D (51% female, 22% single parent families, 11% Hispanic and 9% Black) who were followed for 9 years beginning at a mean age of 10 (range 9-11) years at three diabetes clinics. Data on DSM was collected yearly by parents with the Diabetes Self-Management Profile. Several demographic (child sex, parental education, family income, marital status), clinical (diabetes duration, insulin regimen), and psychosocial factors (parent-rated diabetes conflict and autonomy support) were measured at baseline to predict DSM trajectories.

Results: Three distinct DSM trajectories were identified (High: M = 65.98, SD = 1.63, 24.4%; Medium: M = 50.31, SD = 6.55, 48.7%; and Low: M = 47.90, SD = 7.92; 26.9%). Logistic regression analyses predicted these trajectories, indicating that: girls had higher odds of being in low DSM classes (OR = 3.2); higher autonomy support was associated with decreased odds of being in the lowest DSM class (OR = 0.86); and increased diabetes conflict was associated with greater odds of being in the lowest class (OR = 1.29).

Conclusions: Only one-quarter of adolescents were able to maintain high levels of DSM behaviors throughout adolescence. Being a female, having greater diabetes-related family conflict, and less parental support of youth autonomy at baseline predicted lower levels of DSM behaviors over 9 years, suggesting that interventions to promote DSM during adolescence begin early by reducing family conflict and enhancing support for youth autonomy.

P-487

Exploring MODY phenotypes worldwide in the SWEET database

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Introduction: Maturity-onset diabetes of the young (MODY) is an infrequent but medically significant monogenic form of diabetes. Despite prior localized investigations, a comprehensive worldwide analysis of MODY is currently lacking.

Objectives: To characterize patients with MODY across various regions globally and to define trends in clinical care and outcomes for these patients.

Methods: Patients diagnosed with MODY, between the ages of 0 to 21 years, in the SWEET database were included in this study. Regions of interest for this study included Asia/Middle East/Africa, Australia/New Zealand, Europe, North America, and South America. A cohort of patients with diagnoses of MODY was analyzed, including 646 patients with data at MODY diagnosis and/or follow up at 1 year and 206 patients with data at MODY diagnosis and follow up at 1 year. Patient demographics and treatment were evaluated for each region of interest.

Results: Across all regions, GCK-MODY was the most common diagnosis. Mean age and HbA1c at diagnosis was 10 years (SD 4.61 years) and 7.2% (SD 1.73%) respectively. At 1 year follow up, mean HbA1c significantly decreased by 0.7% (p=0.01). At diagnosis of diabetes, 7% of patients presented in diabetic ketoacidosis. At diagnosis of MODY, 7.8% of patients were on oral anti-diabetes medications or GLP-1 receptor agonists which then significantly increased to 16.5% at 1 year ($p < 0.05$.) Use of insulin treatment increased by 7.8% at follow up. At diagnosis and follow up, Europe had significantly lower HbA1c compared to North America, South America, and Asia/Middle East/Africa. There was no significant difference in BMI across all regions.

Conclusions: At diagnosis of MODY, HbA1c is moderately elevated, but presence of DKA does not preclude the diagnosis of MODY. Interestingly, there was a higher HbA1c at diagnosis in Asia/Middle East/Africa. Average HbA1c at diagnosis and follow up was lower in Europe, with the latter perhaps due to relatively higher usage of insulin.

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Pathways for type1 diabetes care in Tanzania: a qualitative study

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Introduction: The number of people affected by Type 1 Diabetes (T1D) is growing globally, with an estimated 8.4 million individuals diagnosed. Nearly one-third of these individuals reside in low- and middle-income countries (LMIC). However, there is limited evidence available about the experiences and quality of life of patients living with T1D (PTLWT1D) in LMIC.

Objectives: This exploratory qualitative study, supporting the HumAn-1 human/analogue insulin trial, sought to examine patient, caregiver, and provider experience of T1D in Tanzania, including impact on daily life, self-care and treatment satisfaction.

Methods: We conducted 26 semi-structured interviews with 11 patients (12-25 years), 5 caregivers, and 6 providers at a diabetes tertiary referral centre in Mwanza, Tanzania. Purposive sampling ensured diversity of age, gender, socioeconomic background and provider cadre. Data were analysed thematically, drawing on deductive and inductive approaches.

Results: We used patient pathways for NCD care as our analytical lens. Findings were categorised under three major themes: (1) initial contact with healthcare, (2) treatment initiation and diagnosis, (3) retention in care. The below table provides details on each of these themes.

Conclusions: We demonstrate that geographical and structural inequities affect patients' and caregivers' experiences navigating pathways for T1D care in lower resourced settings. Future policy and programming could consider community-based diabetes management and telecommunication, addressing social stigma and enhancing patient-community knowledge, while reflecting the Tanzanian cultural context.

1. Initial contact with healthcare	2. Treatment initiation and diagnosis	3. Retention in care
• Delay in diagnosis 1. Limited family knowledge of T1D early symptoms 2. Lack of community awareness about T1D 3. living in rural setting and the cost of transportation 4. attendance at traditional healers, 5. diabetes-related myths and stigma 6. Facilitators for help seeking behavior (Personal networks, prior experience of diabetes, and parents' education)	• Limited capacity at primary health centers • Lack of diagnostic tools & skills • Multiple referrals &additional cost.	• Frequency of follow ups and attendance at clinics hindered by indirect/direct costs, distance and diagnosis acceptance. • Skipping insulin doses at school/work for stigma and fear of disclosure (impact of diabetes control) • Following diet and exercise instructions hindered by complicated instructions, costs of recommended foods, and gender) • Economic advantage and supportive family/caregiver facilitated the retention. • Attrition among teenagers & poor access to insulin for patients>25y • Mental health a cross-cutting theme (fear and despair)

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Progression of diabetes in a patient with a de novo tnfaip3 mutation

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Introduction: The TNFAIP3 gene, located at 6q23, encodes protein A20 which inhibits the nuclear factor-κB pathway. Mutations in this gene have been linked to autoimmune diseases, including type 1 diabetes mellitus (T1DM).

Objectives: To discuss the progression of diabetes in a patient with a de novo TNFAIP3 mutation.

Methods: 15-year-old male presenting with an incidentally elevated HgbA1c of 7.7% in the context of severe insulin resistance (insulin: 399mIU/L, plasma glucose: 243mg/dL) and steroid course for the management of autoimmune lipoatrophic panniculitis. T1DM antibodies (Ab) were negative. He was then also diagnosed with lipodystrophy, autoimmune hepatitis and Hashimoto thyroiditis. Genetic testing revealed a de novo TNFAIP3 mutation. A1c and blood glucose spontaneously normalized while off steroid therapy and remained normal after re-initiation of low dose daily steroid therapy for his autoimmune hepatitis. On subsequent follow up, A1c rose to 6.6%, with a non-fasting glucose of 134 mg/dL and a significantly elevated insulin of 285.1mIU/L. Repeat T1DM antibodies, including Zinc Transporter 8 Ab, remained negative. Metformin was initiated and titrated to 1500mg daily with improvement of A1c to 5.7% and fasting insulin of 21.1mIU/L.

Results: He then presented with worsening hyperglycemia (blood glucose: 459 mg/dL, A1c 11.8%) and positive Zinc Transporter 8 Ab (23.2 U/mL), confirming the diagnosis of T1DM. Insulin therapy with multiple daily injections along with metformin stabilized his blood glucose.

Conclusions: TNFAIP3 gene mutations are associated with autoimmunity and T1DM. However, patients can also present with a T2DM phenotype and severe insulin resistance, especially in the setting of steroid treatment for autoimmune disease. This case report highlights the importance of close blood glucose monitoring and the utility of repeat T1DM antibody measurements.

Table. Clinical course

Dates	A1c	Glucose	Insulin	T1DM Ab	Steroid Dose	Treatment
1/26/2021	7.7%	235	399.2	Neg	S/p steroid taper, 121 mg/m^2/day	-
8/26/2021	5.1%	87	-	-	Off	Diet modifications
1/20/2022	5.6%	-	-	-	55 mg/m^2/day	Diet modifications
10/31/2022	6.6%	134	285.1	Neg	26.5 mg/m^2/day	Diet modifications
9/9/2023	6.5%	114	74.4	-	Off	Metformin
1/6/2024	5.7%	92	21.1	-	Off	Metformin
4/26/2024	11.8%	472	-	Pos	Off	Metformin

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Comparative evaluation of HbA1c before and after introduction of hybrid closed loop (HCL) systems in paediatric diabetic patients at Doncaster royal infirmary (DRI), UK

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Introduction: HCL system is a "life changing" technology that uses an algorithm to deliver insulin automatically in response to continuously monitored interstitial fluid glucose levels. NICE TA Guidance 943 recommends its use. At DRI, we were early adopters of HCL systems. Our first cohort of patients on HCL commenced in April 2022. We had 61 patients on the HCL by Dec 2022. We analysed HbA1c in these patients before and after HCL.

Objectives:

1. Comparison of mean HbA1c in our patients before and after HCL
2. HbA1c at 3, 6, 12, 18 and 24 months after HCL (to see for sustained improvements in HbA1c)
3. Percentage of patients who attained target HbA1c of 48 mmol/mol or less following HCL

Methods: 61 patients were put on the HCL system between April 2022 & December 2022. 58 patients (95%) have completed 18 months on the HCL. 29 patients (47%) have completed 24 months on the HCL. We evaluated the mean HbA1c measurements of these patients for six months before they were put on HCL and compared it to mean HbA1c at 3, 6, 12, 18 and 24 months post HCL. We looked at the percentage who attained HbA1c of 48mmol/mol or less post HCL. We compared the mean HbA1c to our previous NPDA (National Paediatric Diabetic Audit) results for our unit from 2020-2021.

Results: The mean HbA1c for patients in the six months prior to HCL was 57.6 mmol/mol. Following the HCL, the mean HbA1c are 51.9 at 3 months, 53.0 at 6 months, 52.9 at 12 months and 55.2 at 18 months. Target HbA1c of 48mmol or less was achieved by

30% of patients at 12 months and 24% at 18 months of HCL use. Mean HbA1c overall has improved from 62.7 in 2020-21 to 60.6 in 2022 and 59.5 in 2023 (NPDA data)

Conclusions: HCL systems have shown improvement in HbA1c measurements in our patients, which is maintained at 18 months after HCL use. Our overall HbA1c has improved in the most recent NPDA, with an increasing number of patients achieving a target HbA1c of 48 mmol/mol or less.

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Prevalence of type 1 diabetes (T1D) among siblings of index cases attending tertiary care setting

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Introduction: T1D is the most common form of diabetes in children, accounting for >90% of childhood diabetes. Anyone with a parent or siblings with T1D has a slightly increased risk of developing the condition, with lifetime risk for siblings is 6%–7%; children of a mother with T1D are 1.3%–4%, father with T1D 6%–9%, and the risk in non-identical twins is similar to that of siblings, it exceeds 70% in identical twins. Having two siblings with T1D has a significant impact on physical, psychological, and financial well-being of the family

Objectives: To study the prevalence of T1D among siblings of index cases in our cohort

Methods: A cross-sectional retrospective review of excel sheet data of all children with T1D below 18 years registered at our tertiary center. We analyzed percentage risk of sibling developing T1D, order of diagnosis of T1D among siblings, mean age of diagnosis and mean time gap of diagnosis between the siblings

Results: 1254 children with T1D below18 years registered. Among them 24 families (1.9 %) had both siblings with T1D. Elder siblings (M 37.5 %, F 62.5 %) with 62.5 % and younger siblings (41.5 % M, 58.5 % F) with 37.5 % were first in the order of diagnosis. Mean age of diagnosis was 9 yr (7 months to 16 yr) and 7.5 yr (7 months to 13 yr) for elder and younger sibling respectively. The mean time gap of diagnosis between the siblings were 4 yr (3 months to 12 yr). There were three twin siblings and mean time gap between diagnosis is 2.6 yr (1 to 4 yr)

Conclusions: Our study shows the sibling risk of developing T1D is 1.9 %, which is much less than several studies reported 5.8 to 15.9 %. Females were predominant, with 62.5 % of elder sibling and 37.5 % of younger sibling were first in order of diagnosis. Mean age of diagnosis was lesser in younger sibling. Mean of time gap between diagnosis was less in twin siblings (2.6 years) compared to non-twins (4 years). Knowing the sibling risk in respective local population would help in designing need for proactive screening for T1D in siblings

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Extending the treatment limits for T1D and obesity in adolescents - case presentation

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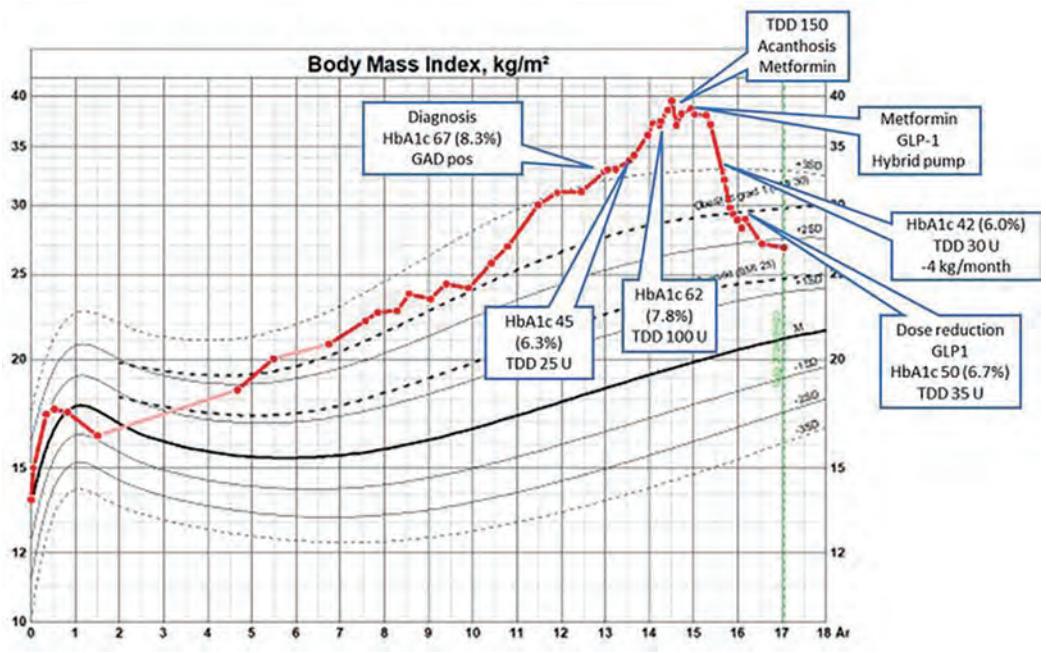
Introduction: Long acting GLP-1 agonists are widely used for treatment of T2D in adults. However, obesity and insulin resistance are increasingly common among the adolescents with both T2D and T1D, leading to similar treatment challenges. When all availble treatment options fail, trying novel treatment approaches becomes necessary. We present a case where treatment options for T1D, T2D and obesity were combined using hybrid closed loop insulin pump treatment and long lasting GLP-1 agonist for adolescent with T1D and obesity.

Objectives: To evaluate GLP-1 agonist treatment for achieving better glycaemic control and weight loss in adolescent patient with T1D and obesity.

Time after diagnosis	HbA_1c mmol/moL (%)	Weight (kg)	TDD U (U/kg)	Mean glucose (SD)	Time in Tight range (3.9-7.8 mmol/moL; 70-140 mg/dL) (time below range %)	Treatment
1 month	53 (7.0)	83.6	50 (0.6)	5.8 (1.4)	82 (3)	Basal and bolus injection
3 months	46 (6.4)	84.9	25 (0.3)	8.9 (2.5)	57 (2)	Basal and bolus injection
7 months	45 (6.3)	87.1	35 (0.4)	9.7 (3.2)	32 (1)	Basal and bolus injection
12 months	62 (7.8)	93.5	80 (0.9)	11.1 (3.8)	18 (1)	Basal and bolus injection
17 months	64 (8.0)	99	150 (1.5)	10.3 (3.6)	23 (2)	Insulin, Metformin, GLP-1 start
2 - 2.5 years	52 (6.9)	100	89 (0.9)	7.7 (2.8)	61 (1)	Hybrid closed loop, GLP-1 ↑
2 years 10 months	42 (6.0)	83	28 (0.3)		51 (0)	Hybrid closed loop, GLP-1↓
3 years	51 (6.8)	75.6	33 (0.4)	9.4 (2.7)	51 (0)	Hybrid closed loop, GLP-1 →
4 years	53 (7.0)	70.4	35 (0.5)	10.2 (2.6)	29 (0)	Hybrid closed loop, GLP-1 →



Methods: Clinical follow-up data were collected from patients medical records.

Results: Diabetes diagnosis at 13 years age without ketoacidosis, BMI 32,4 kg/m^2, HbA1c 67 mmol/moL (8.3%), GAD positive, C-peptide (1.1, reference 0.37-1.5). Family history of T2D, obesity and CVD in 3 generations. Younger brother with obesity and T1D. Mother had gastric bypass surgery. During the 1st year low insulin requirement and good glycaemic control, but after the end of the remission rapid increase in weight, insulin requirement and HbA_1c occurred. During the 3rd year after the diagnosis we started long acting GLP-1 agonist and hybrid closed loop insulin pump enabling the patient to achieve 30 kg weight loss during 18 month follow-up period.

Conclusions: Using long acting GLP-1 agonist for treatment of adolescent with T1D, obesity and insulin resistance in combination with hybrid closed loop insulin pump therapy allowed to achieve and maintain a remarkable weight loss and improvement of glycaemic control without increasing hypoglycaemia. GLP-1 agonist therapy was safe in adolescent with T1D. The major side effect of the GLP-1 agonist treatment was nausea.

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Approaches of pediatric diabetes team members regarding the treatment, monitoring and supporting children with type 1 diabetes in Turkey

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Introduction: One of the most important factors in improving childhood Type1 Diabetes(T1D) care in a country is the capabilities and clinical practices of pediatric diabetes teams.

Objectives: This study aims to make a situation assessment and identify the issues that need to be prioritised to provide a basis for a new initiative focusing on childhood diabetes in Turkey.

Methods: The 42-question questionnaire developed by the diabetes working group of TSPED (Turkish Pediatric Endocrinology and Diabetes Association) was sent via Qualtrics to 650 pediatric

diabetes team members including physicians, nurses and dietitians.The survey covered a wide range of topics including the time the teams allocated to T1D treatment and follow-up, training programs, attitudes towards carbohydrate(CHO) counting, compliance with diabetes at school program, technology use, HbA1c targets and challenges.

Results: The survey was responded to by 284 people.Of the respondents, 62% were physicians,25% were nurses,11% were dietitians.The majority worked in centres which take care of a total of 100-1500 children with T1D. Only 47% of the respondents stated that they devote sufficient time to diabetes in their clinical services, while 57% stated to have a comprehensive education program. 54% of the participants stated that they did not provide CHO counting training or that the training they provided was not sufficient. The main reason for not being able to perform CHO counting was the absence of a dietitian working only with the diabetes team (50%). Of the respondents, 47% stated that the frequency of sensor use in their clinic was <30% and 60% stated that the frequency of pump use in their clinic was <10%.Only 8% of the respondents stated that the HbA1c range in their centre was between 6.5-7.5%.

Conclusions: The reported mean HbA1c range is far from ISPAD targets.Most pediatric diabetes teams do not have dietitians, CHO counting training is inadequate. These data indicate that a Program to Improve Childhood Diabetes Care" should be developed in Turkey.

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Effect of age, period, and birth cohort on diabetes mellitus mortality rate in Colombia, 1983-2022. An analytical cross-sectional study

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Introduction: Mortality from diabetes mellitus (DM) has experienced a wide variation over time in Colombia. However, the factors influencing this trend have not yet been fully explored.

Objectives: To estimate the contributions of the effects of age, period, and birth cohort on the trend in the mortality rate due to DM in Colombia during the years 1983-2022.

Methods: Analytical observational study, with pooled cross-sectional data, using mortality records and population projections from the National Department of Statistics. The count of deaths due to DM for each age group, period and cohort was organized in quinquennia. A multiple quasi-Poisson model was applied using the intrinsic estimator method with collapsing intention to solve the no identifiability problem. The mortality rate ratio (MRR) of each age group, period, and cohort compared to the overall average rate was reported, along with the 95% confidence interval (CI).

Results: There were a total of 234,117 deaths attributed to DM, of which 57.02% corresponded to the female sex. In general, it was observed that as age increased, mortality due to DM increased. The lowest mortality was observed in the age group 5-9 years (MRR 0.04; 95% CI 0.03 to 0.06), while the highest mortality occurred in the age group 85 years and older (MRR 18.49; 95% CI 16.88 to 20.25). With respect to the cohort effect, a lower MRR was found as birth cohorts get younger, with an MRR for the 1898-1902 cohort of 1.58 (95% CI 1.42 to 1.77) and 0.11 (95% CI 0.05 to 0.25) for the 2018-2022 cohort. However, at the period level, an increase in the MRR was observed between 1983-2002, followed by a stabilization between 2003-2007 and a decrease between 2008-2017. Moreover, between 2018 and 2022, a further increase was recorded.

Conclusions: Public health actions focused on reducing mortality from DM in Colombia should guarantee healthy aging. Continuous control of complications and comorbidities in patients and awareness of health care in the new generations are needed.

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Behavioral self-control and glycemic control in adolescents with type 1 diabetes: serial mediation by family conflict and self-management behaviors

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Introduction: In adolescents with type 1 diabetes (T1D), better behavioral self-control (BSC), lower family conflict (FC), and increased diabetes self-management behaviors (SMB) are associated with improved glycemic control.

Objectives: This study examined the mediating roles of FC and SMB in the relationship between BSC and glycemic control. We predicted that BSC would improve glycemic control directly as well as indirectly by decreasing FC and by increasing SMB in cross-sectional and longitudinal models.

Methods: A cohort of 170 adolescents (M age=16 years) with T1D were followed for three years at three university-affiliated medical centers. Blood samples were obtained yearly and analyzed for HbA1c in a central laboratory. The Behavioral Self-Control Scale was completed by youth, and the Diabetes Family Conflict Scale and Diabetes Self-Management Profile were completed by youth and parents at baseline, 12, 24, and 36 months.

Results: Preliminary analyses showed most of the bivariate correlations significant and in expected directions: HbA1c had positive correlations with FC and negative correlations with BSC and SMB; SMB was positively correlated with BSC and negatively correlated with FC; FC was negatively correlated with BSC. Ten

independent models were tested (five for self-reported and five for parent-reported FC and SMB). One model in each category estimated longitudinal serial mediation, i.e., baseline BSC to 12-month FC to 24-month SMB to 30 and 36-month HbA1c. The remaining four models in each category estimated serial mediations cross-sectionally for each timepoint (i.e., baseline, 12, 24, and 36 months). All models supported significant serial mediations indicating that BSC decreases HbA1c through decreased FC and increased SMB.

Conclusions: BSC has substantial potential for influencing glycemic control as it is directly associated with lower HbA1c and it also helps to optimize glycemic control by decreasing FC and increasing SMB during late adolescence.

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Feasibility of Evisits for routine blood glucose review at a large pediatric medical center in the USA

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Introduction: We piloted the implementation of electronic visits (eVisits) for routine blood glucose review at a large pediatric diabetes center to support self-management between visits.

Objectives: Technology advances enable continuous data sharing between patients and clinics. Electronic visits (eVisits) are asynchronous, non-face-to-face patient-initiated interactions where an established patient requests medical advice and receives a written response through a patient portal.

Methods: eVisit implementation involved developing questionnaires, eligibility criteria, understanding licensing limitations, revising workflows, establishing billing codes, and communicating with patients and staff. Team members included endocrinology advanced practice nurses, physicians, the digital health team, a parent of a patient with diabetes, and a clinical informatician. Feasibility and acceptance measures include volume of requested eVisits, patient satisfaction, and glucose outcomes.

Results: From launch in November 2023 until May 2024, over 249 eVisits (avg. 36/month) have been completed. In the 7 months since the launch, patients opting to participate in eVisits have shown an average A1C of 7.8% compared to 8.2% who have not had any follow up between clinic visits. Time in range (TIR) on CGM report revealed similar with 57% TIR for eVisit participants compared to 52% TIR for nonparticipants.

Conclusions: We successfully demonstrate the ability to use asynchronous patient-initiated encounters for routine blood glucose review within the electronic health record. Ongoing barriers include licensing limitations, patients declining to use portals, and patient communication preferences. We will continue to evaluate the clinical impact and access to care as we scale this pilot.

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Evaluation of the follow-up of 90 young people withdrawn from the CDiC program in Guinea

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Introduction: Diabetes in children and adolescents is underdiagnosed, with high mortality rates in developing countries due to inadequate access to care. In 2010, the Novo Nordisk laboratory, in partnership with the Guinean government, launched the CDIC program in Guinea. It provides free care for diabetic children. In 2016, given the age of the patients, some were withdrawn from the program.

Objectives: The objective was to evaluate the follow-up of these adolescents five years after their exit from the program.

Methods: This was a descriptive cross-sectional study lasting 3 months from January 1 to March 31, 2022. It covered the 90 children withdrawn from the CDiC program, who were being followed up. A survey form was used to collect data, which was completed with the verbal consent of the participants. Data were entered and analyzed using SPSS version 22.

Results: A total of 90 adolescents were withdrawn from the program. These included 54 males and 36 females. Of these, 25.5% had been lost to follow-up and 16.7% had died. Sixty percent of deaths occurred at home. A presumed cause of death was found in 46.6% of cases. It was dominated by diabetic ketoacidosis in 38% of cases, followed by chronic renal failure in 25%. When the roll out was announced, 82.5% of participants were concerned. Despite this, 37.5% of them continued to come to the CDIC centers for follow-up, and 90% mentioned difficulties in accessing insulin and HbA1c. There was a significant reduction in the frequency of HbA1c testing, self-monitoring of blood glucose and the number of blood glucose tests. Self-monitoring of blood glucose levels fell from 85% at discharge to 25%. The number of balance participants (HbA1c < 7.5%) rose from 48% at discharge to 35%.

Conclusions: Roll out from the program has negative repercussions on the quality of care, particularly in terms of access to monitoring equipment and insulin. Accompanying measures should be envisaged to ensure that the program's achievements are sustained over the long term

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Difficulties and constraints in the management of type diabetes in children and adolescents in Niger

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Introduction: Diabetes mellitus constitutes a public health problem worldwide. In developing countries, the management of childhood diabetes still faces challenges making its implementation difficult

Objectives: identify the constraints and difficulties in diabetes care for children in Niger

Methods: This was a prospective, descriptive multicenter study, lasting from March 24, 2019 to March 23, 2022, i.e. 3 years. Included were diabetic children aged 0 to 20 years, collected in Endocrinology-Diabetology consultation or hospitalized during the study period in 8 hospitals in the Niger regions.

Results: Out of 5878 diabetic patients, 124 were aged between 0 and 20 years, i.e. a frequency of 2.34%. The average age of the patients was 14.90± 4.48.The sex ratio (M/F) was 0.52. A low socioeconomic level was found in 61% of cases and 19% of patients were uneducated. Family history of diabetes was found in 62%. The average duration of diabetes was 4.33 ± 1.7 years.The mode of discovery was in 51.6% due to ketoacidosis. The average body mass index (BMI) was 20.56 kg/m^2± 6.85, of which 17.7% were overweigh. The average glycemic level was 4.16±1.2 g/liter. In total 82.9% of patients had type 1 diabetes mellitus and 17.1% of cases had type 2. Insulin therapy was prescribed in 93 .6% and 4.8% of patients were treated with Oral drugs. The injection schedule was 95% made up of 2 injections of mixed human insulin. Insulin injections were provided by the patient himself in 71.4% of cases, 18.5% of patients with the help of those close to them. Insulin was kept in the fridge in 56% of cases, 32% in thermoses with ice and 12% in canaries in the shade. Only 18% of patients had a blood glucose meter and 45% had a monitoring log. Glycemic control was inadequate in 84.7% of cases (Table 1)

Conclusions: There are many difficulties in providing care, linked to precariousness and the level of education. However, therapeutic education is necessary for better care

Table I: Main difficulties and constraints

Difficulties and constraints	Frequency
Socioeconomic level Low	62%
Not educated at school	16%
Mixed insulin regimen	95%
Injection autonomy	71,4%
Conservation in canaries	12%
Possession of blood glucose meter	18%
Possession of tracking log	45%
Frequency of inadequate control	84,7%

P-499

Challenges in the diagnosis and management of type 1 diabetes in children in Colombia

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Introduction: In Colombia, various challenges complicate the diagnosis and effective management of T1D in children, including the lack of precise epidemiological data, the scarcity of specialized pediatricians, and the frequent misdiagnosis of signs and symptoms.

Objectives:

Know the challenges that Colombia presents for the diagnosis and adequate approach to type 1 Diabetes.

Methods: Review of national statistics regarding the experience of diagnosed people and their main challenges for access to health services. Review of findings on technical and approach gaps

Results: **Implications and Recommendations:** To address these challenges, it is crucial to implement several strategies at the national level. First, the creation of a national diabetes registry and detailed epidemiological studies are essential to obtain precise data to inform policy and resource planning. Second, increasing the number of pediatric endocrinologists through specialized training programs and ensuring a more equitable distribution of these professionals across the country is vital. Additionally, awareness and training campaigns for health professionals on the early recognition of T1D signs and symptoms should be developed. Implementing standardized protocols for T1D diagnosis and management can also improve care quality. Finally, improving access to insulin and monitoring technologies, along with creating diabetes education programs for patients and their families, can significantly transform the experience of children with T1D and their long-term health outcomes.

Conclusions: The diagnosis and management of type 1 diabetes in children in Colombia face numerous challenges, including the lack of epidemiological data, the scarcity of specialized pediatricians, and the misdiagnosis of signs and symptoms. Addressing these issues requires a multifaceted response, including improvements in data collection, health professional training, and access to treatment and education for patients.

P-500

Survey on the medical management of diabetes in Guinea

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Introduction: Control of blood glucose and other cardiovascular risk factors is the cornerstone of diabetes management.

Objectives: The objectives of our study were to assess the control of diabetes and other associated cardiovascular risk factors, and to report on chronic complications of the disease

Methods: This was a one-year multicenter descriptive cross-sectional study, carried out in the seven specialized diabetes management sites in Guinea. It covered diabetic patients followed up at these sites for at least one year. Data were collected based on an interview, a physical examination and patient records.

Results: A total of 630 diabetic patients were enrolled. The mean age of the patients was 55.4±12.3 years. Type 2 diabetes was present in 97.1% of cases. The average known duration of diabetes was 5.56 years. Mean values for HbA1c, fasting plasma glucose and postprandial plasma glucose were 9.5%, 1.92 g/l and 2.57 g/l respectively, with only 23.4% of patients achieving the glycemic targets recommended by the ADA or IDF. Over half the patients (57.8%) were being treated with oral antidiabetics (biguanides alone in 56.7%, biguanides and hypoglycemic sulfonamides in 37.7% and hypoglycemic sulfonamides alone in 5.6%). A third of patients (33.5%) were on insulin. In the previous year, 36.0% of patients had experienced a break in treatment, and over two-thirds (70.8%) had received at least one education session. Hypertension was the most frequent risk factor (44.6%), with only 6.4% of patients achieving the recommended blood pressure targets. Hypertension was treated with calcium channel blocker monotherapy at 56.2% of cases. The main complications of diabetes were diabetic polyneuropathy (39.4%), diabetic retinopathy (6.5%) and chronic renal failure (20.9%). Ischemic heart disease was found in 15% of cases.

Conclusions: Glycemic control in Guinean diabetics is poor. Treatment should be initiated earlier and made more intensive, targeting both hyperglycemia and other associated cardiovascular risk factors

P-501

ConnecT1D continued: quality improvement (QI) care model interventions designed to achieve excellent and equitable glycemic and psychosocial outcomes for youth with type 1 diabetes (T1D)

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Introduction: Profound health disparities exist amongst youth with T1D in the United States by insurance status, race, and ethnicity. Purposeful interventions focused on medically and socially vulnerable youth are needed to prevent disproportionate access and benefit of advanced diabetes technology and psychosocial support.

Objectives: ConnecT1D is a multi-faceted QI project that aims to reorient diabetes care from episodic visits to a continuous model through three primary drivers: 1) enhanced access in clinic and between visits 2) uptake of diabetes technology and 3) psychosocial and community interventions.

Methods: An interdisciplinary team of people with T1D, caregivers, medical and mental health clinicians, educators, social workers (SW), community health workers, QI specialists, and data analysts meet weekly. QI methodology is used to identify and test interventions related to the primary drivers. A dashboard was developed using Power-BI for data visualization of key process and outcome metrics that can be segmented by insurance type, age, duration of diabetes, and race/ethnicity. New measures include automated insulin delivery (AID) and time in range (TIR) to complement existing measures of continuity of care, continuous glucose monitor (CGM), social work/psychology visit, and HbA1c.

Results: After 2 years, across insurance status and race, > 90% of youth with T1D have consistent clinic visits and use CGM reflecting closed equity gaps. Youth with public insurance have higher rates of visits with SW or psychology (77%) than private insurance cohort (54%). Uptake of AID systems is increasing in both groups and associated with > 1% lower HbA1c amongst users compared to not using AID, yet mean TIR remains below target for both cohorts. Community events have attracted hundreds of youth participants.

Conclusions: Sustained multi-faceted QI interventions can reduce health disparity gaps for youth with T1D. Optimizing continuous use of AID systems and ongoing psychosocial support is essential to achieving equitable outcomes.

P-502

Feasibility of CGM use in youth with type 2 diabetes prescribed infrequent glucose monitoring: a randomized controlled trial

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Introduction: The utility of continuous glucose monitoring (CGM) in Y-T2D on infrequent self-monitoring blood glucose (SMBG) regimens is not confirmed and device usage could increase diabetes distress.

Objectives: We assessed feasibility (recruitment >60%) and acceptability (wear time >60%) of CGM compared to usual care and explored the change in glycemia, device-related distress, and adverse events.

Methods: This was a 12-week randomized 2:1, two arm parallel pilot trial of CGM vs fingerstick monitoring (Con) in Y-T2D prescribed SMBG <3 times daily (not on multiple insulin injections) with optional 4-week extension period for Con to use CGM. The change in Diabetes Distress Scale (DDS) score, the CGM benefit/burden scale score, and glycemic variables were assessed.

Results: Between August-March 2024, recruitment rate was 54% [50 screened, 18 CGM and 10 Con enrolled (79% female, 64% Black, 14.9±3.8y, BMI: 36.2±7.7 kg/m^2, HbA1c: 7.3± 2.6%

(mean±SD)]. Reluctance to wear a device was the most common reason for declining to participate (50%). Study retention in CGM and Con arms were 100% and 90%, respectively. CGM acceptability was 83% at 4 weeks and 59% (10/18) at 12 weeks with sustained wear time [71±18%]. Only 22% of Con reported blood glucoses. Non-severe sensor adhesion problems were the most common adverse event (71%). CGM benefit/burden and DDS scores were unchanged. HbA1c tended to decrease (7.2±2.9 to 6.6±1.6, *P*=0.12), but there was no change from first 6 weeks to final 6 weeks for time in range, mean glucose, or coefficient of variation of glucose, *P>0.6*.

Conclusions: CGM use was acceptable and did not increase distress in >50% of Y-T2D with severe obesity. Unwillingness to wear a device and social stigma were common reported barriers to use. CGM in Y-T2D may be a useful adjunct to diabetes self-care among interested users but additional research is needed to mitigate high rates of adhesion-related adverse events in this group.

P-503

Using carbohydrate counting is associated with lower HbA1c, independent of time of commencement

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Introduction: Advanced carbohydrate counting (ACC) is recommended from diabetes onset.

Objectives: The purpose of the study was to explore if learning ACC from diabetes onset had an impact on glycemic outcomes over time. A secondary purpose was to examine if ACC was still used, and if it affected HbA1c after long duration of diabetes (> 9 years).

Methods: In January 2012, ACC was introduced as a standard nutrition intervention with all newly diagnosed children and adolescents with type 1 diabetes, at the largest pediatric diabetes clinic in Sweden. Using registry data from the Swedish National Diabetes Registry (NDR) a comparison between those with diabetes onset 2010 - 2011, prior to the introduction of ACC, was made to those with diabetes onset 2012-2013 who were taught ACC. The method was also routinely implemented to all families after 2012. In 2018 ACC was added as a variable and reported to NDR. Independent sample T-test was used to compare HbA1c at 1, 2 and 5 years after diabetes onset between the two groups. Use of ACC or not at the last registered visit in NDR for the whole cohort was used and compared to HbA1c using independent sample T-test.

Results: 479 individuals were identified, n=225 (47%) with fixed doses from onset and n=254 (53%) using ACC, with similar demographics. ACC taught from onset, did not result in improved HbA1c at any time point (p=0.330, p=0.457, p=0.395). However, after long duration of diabetes 67% of (n=268) used ACC, irrespective of the method taught at onset, and had significantly lower HbA1c (56.5 vs. 65.0 mmol/mol, p=<.001).

Conclusions: Carbohydrate counting is associated with a positive effect on HbA1c in those with long duration of diabetes. When carbohydrate counting is introduced may not be as important as a consistent team approach to mealtime bolusing. Further analysis to explore the relationship between carbohydrate counting and glycemic outcomes are planned.

P-504

Analogue vs human insulin for youth with type 1 diabetes in low-resource settings: an explanatory qualitative study of human1 trial

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Introduction: Diabetes is increasing globally, yet there is limited evidence-based around the effectiveness of long-acting insulin analogues in reducing hypoglycaemia events for people living with type1 diabetes (PLWDT1) in low-and-middle income settings (LMIC).

Objectives: This qualitative study explores patient, caregiver, and provider experiences of switching from human (NPH) to analogue (glargine) insulin in the HumAn-1 randomised controlled trial (RCT) in two LMIC.

Methods: We conducted 72 semi-structured interviews with 43 PLWDT1D(aged 12-25), 16 caregivers, 13 providers at diabetes tertiary referral centres in Tanzania and Bangladesh. Purposive sampling ensured diversity in age, gender, socioeconomic status, and provider cadre, weighting towards the glargine arm. Thematic analysis combined deductive and inductive approaches.

Results: Most (67%) respondents were in the glargine arm; 64% were female. Participants in both arms described better adherence to insulin, glycaemia measurement, diet & exercise. They reported improved experiences of care, better diabetes control with fewer hypo/hyperglycaemia symptoms, and improved quality of life, including better school and peer engagement, and less family stress. Reduced reports of hypoglycaemic events and related anxiety were more notable in the glargine arm.

Conclusions: The RCT's enhanced participant and provider education, home visits and phone advice clearly contributed to

Facilitators of better adherence to Diabetes Type 1 Management for HumAn-1 Trial participants

Changes to care during HumAn-1 RCT	Impact
Paid transport, and improved insulin supply at clinic level	More regular access to insulin, glucometers, and strips
Reminders calls facilitating regular clinic attendance	More regular clinical contacts with treating providers
Switching from syringes to pens	Reduced pain and stigma
Use of blinded continuous glucose monitors	Promoted adherence(Hawthorne effect)
Increased follow-up, home/school visits, phone access to team members, and education sessions	Improved knowledge and empowerment, Personalised and contextualised care, Increased provider-patient trust, "Feeling cared for"
Enhanced provider education through T1D refreshing course, more human resources	Improved patient education with more time per patient.

improving diabetes control, enabling better quality of life at home/school and among peers. A switch from human to analogue insulins was associated with reports of less hypoglycaemia and related anxiety, although these findings must be confirmed by the main trial results. A transition to glargine insulin should be accompanied by access to pens, monitoring tools and a comprehensive care package, including community-based/remote care, improved primary care capacity and provider training to manage T1D, enhanced education and empowerment of families and communities.

P-505

Is migratory background associated with less favorable care and outcomes in young people with type 1 and type 2 diabetes in Germany?

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Introduction: Recent data on diabetes care and outcomes in young people with migration background in Germany are lacking.

Objectives: Using data from the DPV registry of 2022-2023, we aimed to investigate differences in people aged 16-25 years with type 1 (T1D) or type 2 diabetes (T2D) with vs. without migration background from different regions.

Methods: With Chi^2-tests or Wilcoxon-tests adjusted for multiple testing, we compared age, use of diabetes technology, BMI-SDS (for age <18 years) or BMI (for age ≥18 years), HbA1c, and percentage of smokers.

Results: Of 15,080 young people with T1D (median age: 16.9 years, 54.8% male), 24.9% were migrants (2nd generation: 17.7%, 1st generation: 7.2%). Of 626 young people with T2D (median age: 17.2 years, 43.9% male), 34.3% were migrants (2nd generation: 23.6%, 1st generation: 10.6%). Most 1st generation migrants with T1D were born in Ukraine (14.5%), Syria (12.0%) or Poland (7.3%), most of those with T2D in Syria (19.0%), Turkey (7.9%), Afghanistan or Iraq (both 6.3%). Compared to their non-migrant-peers, migrants with diabetes were younger (mean in migrants vs. non-migrants, T1D: 16.9 vs. 17.4 years, T2D: 17.1 vs. 18.7 years, both p<0.001). Migrants with T1D, but not with T2D, had a higher HbA1c value (T1D: 8.0 vs. 7.8%, p<0.001, T2D: 7.5 vs. 7.5%, p=1.00) and a higher BMI-SDS (T1D: 0.52 vs. 0.41, p<0.001, T2D: 2.04 vs. 2.16, p=0.046) than non-migrants. Compared to non-migrants, migrants with T1D used less often an insulin pump (50.9 vs. 57.5%, p<0.001) and less often an AID-system (26.5 vs. 30.0%, p<0.001), but migrants with T2D used more frequently a CGM-system (36.7 vs. 26.0%, p<0.001). BMI (T1D: 24.8 vs. 24.6; T2D: 35.3 vs. 33.5) or smoking (T1D: 8.8 vs. 9.9%, T2D: 12.1 vs. 14.4%) were not significantly different.

Conclusions: A quarter of young people with T1D and one third with T2D documented in the DPV registry are migrants. Migration background is associated with a less favorable diabetes outcome in young people with T1D, but not in those with T2D.

P-506

Extending the treatment limits for T2D in adolescents - case presentation

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Introduction: Long acting GLP-1 agonists are widely used for treatment of T2D in adults, but experience is lacking in adolescents. When all availble treatment options fail, trying novel

treatment approaches becomes necessary. We present a case where treatment with hybrid closed loop insulin pump and GLP-1 agonist was combined for adolescent with T2D.

Objectives: To try combination treatment with hybrid closed loop insulin pump and long acting GLP-1 agonist in a non-compliant adolescent with T2D.

Methods: Clinical follow up data were collected from medical records.

Results: 14.5 years old girl with obesity and attention deficit disorder, T2D diagnosed at 10 years age. Inadequate glycaemic control during the course of diabetes due to high insulin requirement >2 U/kg and non-compliance. HbA_1c increased over time 55 - 66 - 73 - 89 mmol/moL (7.2 - 8.2 - 8.8 - 10.3%, respectively), accompanied by increase in BMI 28 - 32 - 34 - 36 kg/m^2. Metformin and long acting GLP-1 agonist was started during the 3rd year. During a 4-month period a team came home every morning to ensure administration of long acting insulin, Metformin and GLP-1 agonist with modest improvement of HbA_1c. GLP-1 agonist was temporary not available leading to increase in weight to 104 kg (BMI 35.8 kg/m^2). During the spring 2024 we decided to try hybrid closed loop insulin pump treatment while keeping the dose of long acting insulin. At the same time GLP-1 agonist became available and the combination resulted in remarkble improvement of glycaemic control. Patients motivation was boosted by the results and she started carb counting.

Conclusions: Combination treatment with hybrid closed loop insulin pump and long acting GLP-1 agonist in adolescent with T2D, obesity and insulin resistance led to remarkable improvement of the glycaemic control and boosted patients motivation for treatment. Unconventional solutions may be necessary to achieve good glycaemic control in some patients.

P-507

Assessment of knowledge about diabetes in children and adolescents followed in the paediatrics department of the chu de Yopougon and in the diabetes clinic of the chu Treichville Abidjan-Côte d'Ivoire as part of the CDiC project

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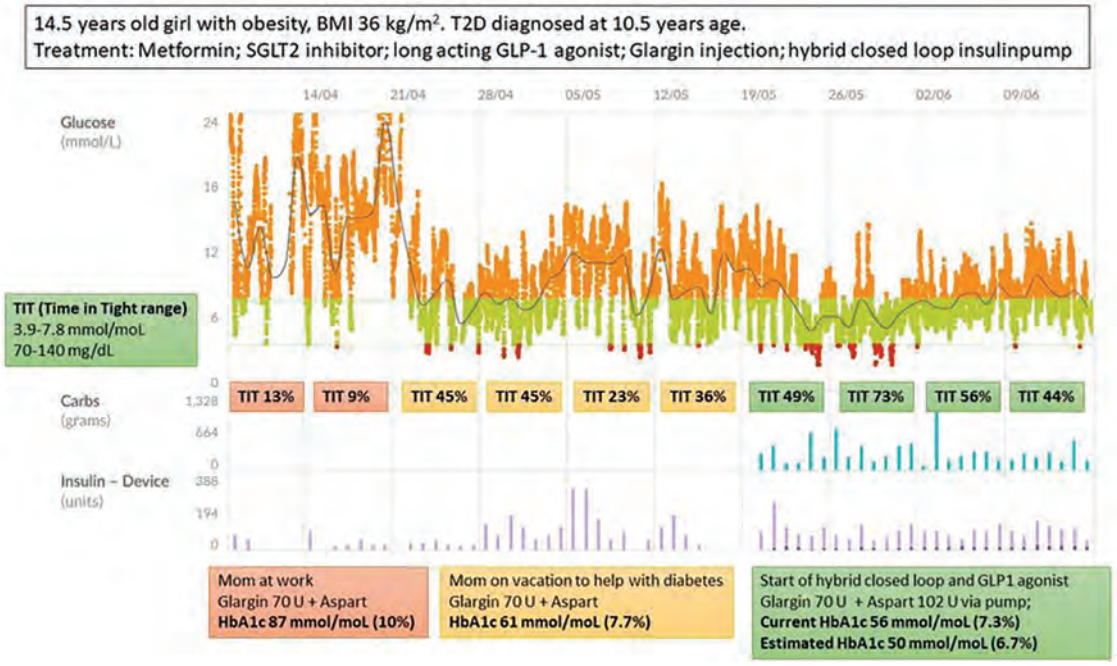
Introduction: The quality of life of children with diabetes depends on good knowledge of the disease l of the disease and its complications.

Objectives: The aim of this study was to assess the knowledge of children and adolescents living with type 1 diabetes (T1DM) in order to improve their management.

Methods: This was a three-month descriptive cross-sectional study involving 100 diabetic patients aged between 10 and 18 years, followed up in the paediatrics department of the Yopougon University Hospital and the diabetes clinic of the Treichville University Hospital in Abidjan, Côte d'Ivoire, as part of the CDiC project. Knowledge was assessed using a standardised fifty-question questionnaire on general knowledge of diabetes.



Results: There were 100 patients, 48 boys and 52 girls. The mean age was 14.7±2.4. The sex ratio was 0.92. The mean duration of diabetes was 4.55 ± 2.54 years. Patients had attended at least 1 group therapeutic education (TVE) session in 90.62% of cases. The assessment of knowledge about diabetes revealed correct knowledge about : the disease in general in 53.1% of cases, signs of hypoglycaemia in 75% of cases, signs of hyperglycaemia in 68.82% of cases, injection technique and self-monitoring of blood glucose in 65% of cases, the different types and actions of insulin in 60% of cases, adaptation of insulin doses in 40.2% of cases, acute complications of the disease in 56.25% of cases and chronic complications in 46.87% of cases.

Conclusions: Patients' knowledge of the disease still needs to be improved, and this will require therapeutic education sessions
Key words: knowledge, children and adolescents, type 1 diabetes.

P-508

In the search for the beginning of metabolic memory - reanalysis of public and single reference center glucose control data in the first 5 years after type 1 diabetes diagnosis

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Introduction: Type 1 Diabetes (T1D) is characterized by the chronic dysregulation of blood glucose due to the destruction of insulin-producing beta cells, usually early in life. The therapeutic goal of T1D is to maintain strict blood glucose control through intensive insulin therapy. However, the effectiveness of this approach varies among individuals. Initiating intensive glucose control early in the disease course may reduce the risk of long-term complications, a phenomenon referred to as 'metabolic memory'.

Objectives: The aim of this study is to describe changes in glucose control in the five years following a T1D diagnosis.

Methods: The data was collected from three cohorts: a retrospective cohort (2016-2019) and a prospective cohort (2020-2024) from a diabetes reference center in central Poland, and an international cohort based on open-access patient-level data. Only participants under 18 years old with a T1D duration of less than 5 years were included in the analysis. Data analysis was performed using GlyCulator 3.0. To identify distinct trajectories in glucose control across the patient data, K-means clustering and Levene's test were used.

Results: Altogether, 2016 patients with T1D were included in the analysis (330 in the retrospective cohort, 518 in the prospective cohort, and 1168 in the international cohort). The age at enrollment was 7.39±3.24, 10.31±3.86, and 10.17±5.03 years, with diabetes duration of 0.42±1.08, 1.82±1.78, and 2.22±1.45 years, respectively. Overall mean HbA1c [%] was 7.11±0.93, 7.27±1.38, and 7.83±1.22, while Time in Range (TIR, 70-180 mg/dL, 3.9-10 mmol/L) was 65.37±11.65, 67.73±13.76, and 61.90±16.71, respectively. The clustering revealed a distinct group of patients with significantly higher variance in glycemic control trajectories during the first three years post-diagnosis.

Conclusions:

The identified period of increased variance in glucose control early after diabetes diagnosis might be critical for the formation and preservation of metabolic memory in pediatric patients with T1D.

P-509

Development of a patient-driven occupational therapy caregiver support telehealth intervention to improve family participation and diabetes self-efficacy (real-fam)

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Introduction: The rising prevalence of T1D for youth in the U.S. is especially concerning for rural-dwelling caregivers with a child with T1D. Due to their geographical location, they are at risk for healthcare disparities and report challenges with accessing pediatric diabetes healthcare services and providers. This may contribute to significant caregiver burden, reduced psychosocial well-being and family quality of life, and negative child health outcomes.

Objectives: Our interprofessional team of researchers, providers, and community partners adapted the evidence-based Resilient, Empowered, Active, Living with Diabetes (REAL) for rural families with a child living with T1D to promote family participation in meaningful everyday activities, caregiver psychosocial well-being, and child health outcomes (REAL-Fam).

Methods: Utilizing a community-engaged research approach with a shared leadership model, the core team of researchers, providers, and community partners completed a draft REAL-Fam intervention framework. We then interviewed 13 caregivers, providers, and those living with T1D from rural communities to gain further insight and diverse perspectives on the framework. Using thematic analysis, we coded all transcribed interviews, which resulted in 7 intervention modules.

Results: The seven telehealth intervention modules were: Goal Setting; Living with Diabetes; Accessing Care; Roles, Routines, and Habits; Social Networks; Emotions and Well-Being; Planning for the Future.

Conclusions: It is hypothesized that the REAL-Fam intervention will allow rural families who have a child living with T1D to more easily access healthcare in their homes with limited time, resources, and financial burden. Moreover, the REAL-Fam will elevate the quality of services to reflect the most current standards

of care proposed by ISPAD and the ADA and include culturally sensitive models of care, psychosocial considerations, lifestyle behavior training, physical activity recommendations, and school and childcare considerations.

P-510

Magnesium level during diabetic ketoacidosis: its impact on other electrolytes and relation to therapy outcomes

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Introduction: Magnesium (Mg), the second most prevalent intracellular cation, has the potential to be exhausted in cases of diabetic ketoacidosis (DKA). Despite its significant impact on cellular metabolism, it is often overlooked in the management of DKA. The relation of Mg to other electrolyte disturbances and its impact on DKA outcome isn't yet fully understood.

Objectives: The aim of the current study is to assess Mg levels during DKA and highlight its impact on other electrolytes as well as its impact on therapy outcomes and n DKA-associated morbidity.

Methods: An observational cross-sectional study including 100 participants with type 1 diabetes (T1D) complicated by DKA, followed up during the period of DKA, kept on IV insulin. Serum Mg, potassium, calcium, Phosphorus and sodium were evaluated serially among other routine investigation. Participants were followed for the clinical and therapy outcomes.

Results: Hypomagnesemia was elicited in 43% of the studied cohort. Participants with hypomagnesium had significantly lower serum values of potassium, calcium and Phosphorus ($P<0.01$), Furthermore, a significant positive correlation was found between magnesium levels and potassium, calcium, Phosphorus levels ($R= 0.33, 0.44, 0.42$ respectively, $P<0.05$). Participants with low Mg levels spent more time on IV insulin before closing the anion gap ($P= 0.023$).

Conclusions: Hypomagnesemia was found to be associated with derangement of electrolytes including hypokalemia, hypophosphatemia, and hypocalcemia. Mg is one of the electrolytes that are depleted during DKA and associated with other electrolyte disturbances and could impact the therapeutic outcomes in DKA. Hypomagnesemia is overlooked in many settings, yet it may serve as a significant factor in the management of DKA.

P-511

Improved glycemic control in adolescents and young adults with type 1 diabetes (T1D) is associated with less diabetes distress and positive glucose monitoring perceptions

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Introduction: Despite advances in diabetes technologies, adolescents and young adults (AYA) with T1D continue to display suboptimal glycemic control. In addition to technologies such as continuous glucose monitors (CGM), psychosocial factors likely contribute to self-care and ability to improve A1c in AYA.

Objectives: Using a Precision Medicine approach, we sought to examine psychosocial factors and person-reported perceptions associated with an improved A1c over six months in both CGM and non-CGM users.

Methods: We performed post-hoc analyses on a publicly available dataset from the CITY Study (Clinical Trials.gov NCT03263494), a Randomized Clinical Trial (RCT) of CGM vs. traditional BG monitoring, which randomized, 1:1, 153 AYA with T1D, ages 14 to 24 years. The 6-month end-point data included 92% (n=142) of the sample, with 41% improving their A1c by 0.5% or more. Multivariable regression models assessed several diabetes-specific psychosocial measures comparing those with improved A1c ≥0.5% vs. those without this improvement, with adjustment for baseline A1c, baseline survey scores, and device group assignment.

Results: AYA were 50% female, aged 17±3 (M±SD) years, T1D duration 9±5 years, with a baseline A1c 9.1±1.1%. The mean diabetes distress score was 25±22, diabetes technology attitudes (DTA) score 22±4, glucose monitoring self-efficacy (SE) score 78±27, and glucose monitoring benefits and barriers scores 1.8±0.6 and 4.3±0.6, respectively. Models revealed that AYA with improved A1c reported reduced diabetes distress (β=-8.9; p=.001), greater perceived benefits (β=-.23; p=.02), and fewer monitoring barriers (β= .22; p=.01), independent of monitoring group. DTA and SE scores were no different between groups.

Conclusions: AYA with T1D reported significantly lower diabetes distress and improved perceptions of glucose monitoring in association with clinically relevant A1c lowering. Future research can address the potential bi-directional relationship between A1c lowering and psychosocial perceptions.

P-512

Are Australian students with type 1 diabetes safe at school? A consumer perspective

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Introduction: The death of an Australian student whilst in the custody of the school in 2019 has led to workplace safety regulators examining management of Type 1 Diabetes (T1D) in schools.

Objectives: To seek consumer views on safety concerns for students with T1D during school time and school-related activities.

Methods: Consumers were invited to partake of a deidentified on-line survey on school safety incidents in April 2024 using Typeform software. Participants were sourced from the community of Australia's largest independent consumer organization, the Type 1 Foundation. Results were quantified and qualitative responses about safety concerns were categorized by the authors into medical safety (risk of harm), workplace safety (lack of requisite training), discrimination (lack of equal opportunity) and negligence (lack of execution of duty of care). Qualitative responses could be classed on more than one category.

Results: 652 people responded from all Australian States comprising parents (84%), students (6%) and teachers (6%). 65% of respondents expressed safety concerns about a student with T1D. Of those reporting safety concerns, there was no significant State based difference nor significant differences between students attending a public school (64%), catholic school (66%) or independent school (56% p=0.052). The most common source of guidance for all respondents was the student's medical team (33%) followed by the national "Diabetes in Schools" program (26%). Qualitative responses of safety concerns were categorized by medical safety (69%), workplace safety (73%), discrimination (38%), and negligence (64%).

Conclusions: Consumers have significant concerns about safety of students with T1D in Australian schools, especially related to medical safety, compliance with workplace safety, duty of care and discrimination.

An Australian "comprehensive" national program for students with Type 1 Diabetes has failed to satisfactorily address safety issues.Schools rely primarily on medical teams to advise school staff.

P-513

Co-designing a hybrid closed loop values-based shared decision-making AID

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Introduction: Hybrid Closed Loop (HCL) recommendations in England and Wales empower Paediatric Diabetes Units (PDUs) to provide technologies that meet patient needs and lifestyles, and improve glucose management and quality of life.

Objectives: To co-design a Shared Decision Making (SDM) aid for HCL to capture views, preferences, values and beliefs as part of matching HCL technologies to individual patients and families.

Methods: CYP with type 1 diabetes and families were asked for their reasons for being on, or considering, HCL, exploring their perception of how choice was offered, what features were important, and if they had concerns around HCL use. These outputs informed a prototype SDM aid, reviewed by families via online focus groups.

Results: 44 CYP (4–18 yo) and families responded. The resulting prototype SDM aid introduced HCL concepts, benefits, limitations, and risks, before recording values, and then specific HCL options. "Values" was placed before presenting HCL choices to establish what's important to them and their expectations around HCL across multiple environments and scenarios. It acknowledges the dynamic nature of technologies, growing CYP and changing family situations during HCL system lifetimes. Prototype feedback commended aiding decisions which honour CYP/ family values. The interactive interface, selectively presenting material, was appreciated. Those not yet on HCL stated the aid generated space to explore options. Several responders requested more material around HCL use at school. The updated HCL pathway, with SDM, also considered survey results, retaining face-to-face HCL discussion (highest rated communication option, n=21/44), and balancing expertise across CYP/families and PDU team. Responders raised the importance of 1:1 and peer support, education and more proactive clinical support.

Conclusions: SDM was welcomed for bringing consistency to communication and opportunities for patient values and knowledge to be shared alongside PDU expertise. Further evaluation is scheduled post clinical use.

P-514

Continuous glucose monitoring metric in children and adolescents with obesity: an observational pilot study

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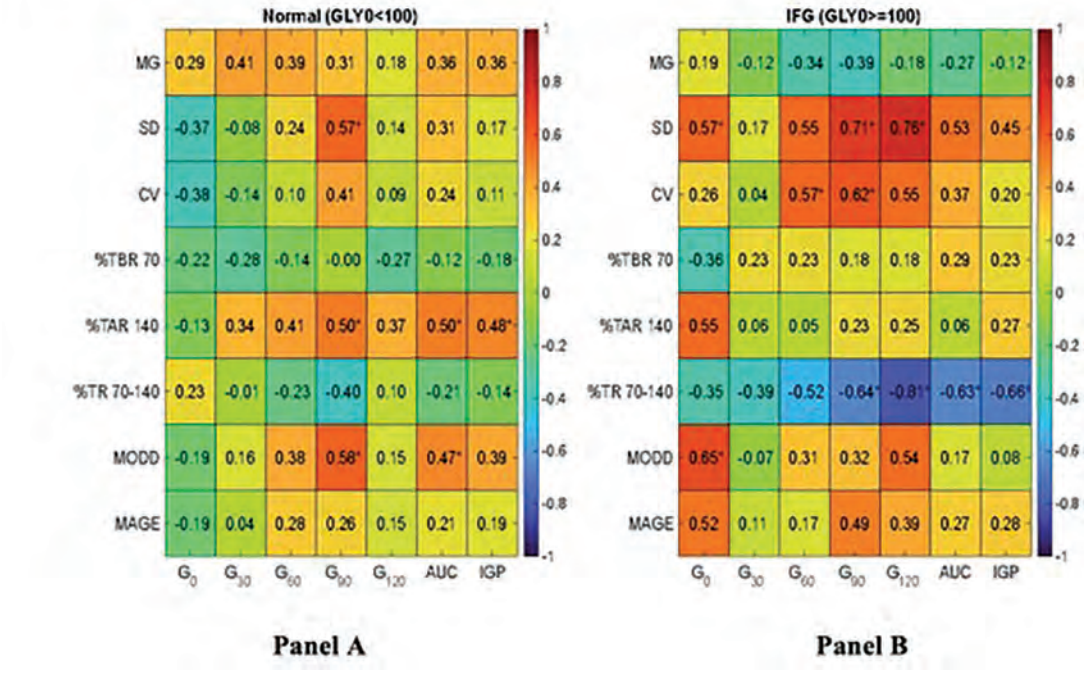
Introduction: Continuous Glucose Monitoring (CGM) offers the chance to early detect dysglycemia in subjects at risk in free living conditions.

Objectives: The objective of this pilot study is to measure CGM metrics in a group of children and adolescents with obesity and calculate the association between CGM metrics and glycemic indices measured during oral glucose tolerance test (OGTT).

Methods: Children and adolescents with obesity, aged 10-18 years, wore a Freestyle Libre 2 CGM sensor for 2 weeks. CGM metrics of mean glucose, glycemic variability (GV), and time in ranges

Figure 1.



were measured. The subjects underwent OGTT, measuring blood glucose values and calculating the area under the curve (AUCgluc). Subjects were categorized as normal glucose tolerance (NGT) and prediabetes. Pairwise correlations between CGM metrics and OGTT's glycemic indices were calculated using Spearman's rank correlation coefficient, and CGM metrics were compared between NGT and prediabetes using unpaired *t*-test.

Results: A total of 34 subjects were included in the analysis (age 12.6±1.9 yrs, 42.4% female, BMI 32.8±6.6 kg/m^2, HbA1c 5.4±0.2%, CGM use>80%). In NGT subjects G90 and AUCgluc correlated with Time Above Range>140 mg/dL and mean of daily differences; G90 correlated also with standard deviation (SD) (**Figure 1,panel A**). In prediabetes subjects, G90 and AUCgluc correlated with Time in Tight Range; G90 and G60 correlated with SD and coefficient of variation (**Figure 1,panel B)**. The comparison of CGM metrics between prediabetes subjects and NGT subjects showed higher mean glucose (106.2±6.4 vs 101.1±8.9) and Time in range (99.1 vs 98.2) although p<0.10 for all comparisons.

Conclusions: This study shows a relationship between CGM metrics and OGTT indices suggesting the potential role of CGM in detecting early glucose alterations in subjects with obesity and prediabetes. The subject's recruitment is still in progress, and a larger sample size is needed for confirming this preliminary results.

P-515

Expression pattern of MicroRNA-155 in patients with type 1 diabetes

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Introduction: Background: Various miRNAs have been associated with the onset, progression, severity, etc. of several inflammatory-autoimmune diseases because they regulate key points of the innate-adaptive immune response. The development of T1DM is slow, providing a potentially long window of time in which it is possible to identify and theoretically treat individuals at risk. Significant association between the expression levels of miR-155 with T1D. In addition, miR-155 could be considered as a possible biomarker to track disease in T1D children.

Objectives: To analyze the expression pattern of miR-155 in the peripheral blood mononuclear cells (PBMCs) of T1D patients compared to healthy controls.

Methods: The included 50 children diagnosed with T1DM for less than six months. Fifty healthy age- and sex-matched healthy children were selected as nondiabetic group (controls).The expression levels of miR-155 was measured in the peripheral blood mononuclear cells. microRNA-155 expression analysis was performed on three steps; total& small RNA extraction, reverse transcriptase reaction and PCR relative expression measurement.

Results: was statistically significantly higher mean miR 155 in diabetic children 1.97±0.76 as compared to 1±00 among control group. There was significant moderate positive correlation between miR 155 and HbA1c r = 0.5 and P = 0.001. There was negative weak correlation between the duration of diabetes. Level of miR 155 at early onset of the disease the level of miR 155 is high with weak correlation r is -0.3 and p =0.041. The mean level of miR 155 within 2 months duration of T1D was 2.3 and at 5 months duration was 1.66. The difference between these level was significant.

Conclusions: miR-155 could be a possible predictor at a preclinical stage of T1D.

P-516

Diabetes mellitus type 1 in Colombia and how it intervenes in the family and educational field

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Introduction: The prevalence of Diabetes Mellitus in Central and South America is approximately 8%, and it is estimated that 0.2% corresponds to patients with Type 1 Diabetes. Although there are no established figures for our region, there are recent studies that warn of an increase in the incidence of type 1 diabetes in childhood compared to recent years, which coincided with the COVID-19 pandemic. A multicenter study in Spain reported an increase of 60.8% compared to 2019 and pointed out the need for monitoring to observe if this trend is maintained over time and identify possible triggering factors.

Objectives: The general objective of any initiative that is developed must be aimed at strengthening the family support network through spaces open to dialogue where mothers, caregivers and the child, adolescent, or young person themselves can be trained so that they can be the protagonists of diabetes management and find motivational tips, therapeutic and nutritional facilitators, solution to acute situations to facilitate optimal quality of life, changing paradigms from an education based only on information, to an accurate and fast education that responds to their concerns and satisfies physical and emotional needs, being possible to access this service at any time.

Methods: Surveys

Results:

Conclusions: According to the results obtained, it is concluded the educational program requires:

1. To include the multiple actors involved in the diabetes care and management, establishing an educational program: EDUCATIONAL COMMUNITY EDUCATED IN TYPE 1 DIABETES. Which would allow educating people, families, and caregivers in the timely management of diabetes.
2. To train the educational community so that they have the skills in the timely management of symptoms and alarm signs that people with T1D require immediate attention in relation to diabetes.
3. To detect warning signs that may affect the health and integrity of students with T1D from their school environment.

QUESTION	NO	YES
Does your child's school have a nurse?	53%	47%
Do you think that the teaching staff of the school know what diabetes is and the differences between type 1 diabetes and type 2 diabetes?	78%	22%
Do you think the school administration knows what diabetes is and the differences between type 1 diabetes and type 2 diabetes?	78%	22%
Do you think that the institution where your child studies is capable of providing timely care in an event of hypoglycemia?	69%	31%
Do you consider that the institution where your child studies is capable of providing timely care in an event of hyperglycemia?	73%	27%
Do you think that the administrative and teaching staff are familiar with the use of glucose meters (glucometers)?	67%	33%
Do you think that the teaching staff and/or monitor who accompany the child know how to interpret the result of the glucometry tests?	67%	33%
Do you think that there are trained personnel in the school in relation to the use of insulin and do you have someone who can accompany your application?	82%	18%
Do you think your child has been restricted from participating in recreational and sports activities because of your diagnosis? E.g.: physical education, pedagogical outings, among others.	78%	22%
Do you consider that your child receives a balanced diet from the school to take care of his diabetes?	76%	24%
Do you believe that your child has been discriminated against by peers and/or teachers because of his or her diagnosis?	82%	18%

P-517

Including patient empowerment in diabetes communication

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Introduction: Type 1 diabetes (T1D) requires individuals to make daily health decisions. People with diabetes (PWD) typically receive consultations with HCPs each 3-6 months, varying on access to support. Many teams are without a psychologist, in addition to primary challenges of high workloads, lack of staff, or relatability skills to support PWD in behavioural changes. If communication is misinterpreted, or ill-received, it risks a PWDs wellbeing in diabetes management.

Objectives: To highlight the importance of effective communication; advocate for wellbeing to be wider considered; identify signs of burnout; provide empowerment to PWD

Methods: We analysed common language used in consultations. Collaborating with a network of PWD, we identified terms that negatively affect PWD's perception of their management capabilities. We implemented sociable approaches in collaboration with paediatric teams, including peer events, card games, and Game Based Learning techniques.

Results: Terms identified as negative:

- "Poor"
- "Control"
- "Patient"
- "Should you…"
- "Why did…"
- "Diabetic"
- "Test"
- "Burden"
- "Concern"

In limited consultation time, choice of words is crucial. Effective communication should focus on listening as much as speaking. Words chosen by HCPs impact emotions and self-management efficacy. Recognising signs of diabetes burnout and distress is essential. Stress, anger and anxiety aren't easily detected, but clinical data highlights areas to approach in an encouraging manner for PWD to speak openly on. Different types of burnout, such as 'nutrition,' should be recognised, rather than a standalone summary. Peer events empowered PWD through sociable approaches and strengthened trust between PWD & HCPs

Conclusions: HCP teams should conduct at least one peer event p/y. Ideally quarterly. In 1:1 consultations, a need for HCPs to be flexible with a humanised approach: understand interests such as hobbies, to advance connection with PWD. Avoid pressuring, enact empowering. Encourage PWD to share suggested answers to questions.

P-518

Expression profile of MicroRNA-21 in patients with type 1 diabetes mellitus

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Introduction: Type 1 diabetes mellitus (T1DM) results from a cellular mediated autoimmune destruction of pancreatic beta-cells, leaving patients insulin-dependent for life, and usually diagnosed when over 80–90% of beta-cells have been destructed. The development of T1DM is slow, providing a potentially long window of time in which it is possible to identify and theoretically treat individuals at risk. There is a significant association between the expression levels of miR-21 with T1D. In addition, miR-21 could be considered as a possible biomarker to track disease in type1 diabetic patients.

Objectives: To assess the levels of circulating miR-21 in children with type 1 diabetes compared with healthy controls.

Methods: Fifty children with type1 diabetes of both sexes between 2-14 years with duration less than six months (recently-diagnosed group). Fifty healthy children with glycated hemoglobin (HbA1c) ≤ 5.7%, age- and sex- matched as a control group. The expression levels of miR-21 was measured in serum in 3 steps; total& small RNA, reverse transcription of microRNA and measurement of the relative expression of microRNA 21.

Results: The study showed that there was significantly higher level of miR-21 of children with T1D (2.58 ±0.99) as compared to control group (1.00± 0.000) p=0.001. miR-21 level in children with 2 months duration of T1D diagnosed was 3.48 as compared to those with longer duration (5 months) which was 2.00. There was strong correlation between miR level and duration of diabetes r 0.6 p=0.000. Three was significant correlation between miR-21 and HbA1c r 0.5 p=0.001.

Conclusions: miR-21 could be a biomarkers in early preclinical T1DM

P-519

Persistent sex differences in cardiovascular disease risk factors: a cohort study in youth with type 1 diabetes

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Introduction: Women with type 1 diabetes (T1D) face a higher risk of cardiovascular events and all-cause mortality compared to men.

Objectives: This cohort study investigated early sex-based disparities in cardiovascular disease (CVD) risk factors among youth with T1D. It aimed to assess the prevalence and interactions of traditional and non-traditional CVD risk factors, exploring whether sex differences manifest early in T1D.

Methods: Involving 311 participants (50.8% female, mean age 12.66±4.32 years, diabetes duration 5.77±3.77 years), the Slovenian nationwide cohort underwent annual assessments. After a mean follow-up of 3.91 +/- 1.72 years, a linear mixed model analyzed associations between covariates.

Results: Females exhibited a more adverse lipid profile ($P < .001$), including total cholesterol, LDL-C, non-HDL-C, and ApoB. Chronic inflammation, measured by high-sensitivity C-reactive protein (hsCRP), was notably higher in females ($P=0.023$). No significant differences in other CVD risk factors were observed, but a trend towards higher multifactorial CVD risk in females emerged ($P=0.04$). Modifiable risk factors associated with reduced hsCRP included lower BMI ($P <0.001$), subcutaneous insulin infusion (CSII) use ($P=0.008$), lower LDL ($P <0.001$), and a higher LDL/ApoB ratio ($P <0.001$).

Conclusions: In this youth T1D cohort, females with relatively good glycemic control displayed persistently increased levels of inflammation possibly linked to an adverse lipid profile and obesity. CSII benefits extended beyond HbA1c improvement. The study emphasizes the need for early, aggressive, and also sex-related multifactorial CVD risk reduction, particularly addressing dyslipidemia, highlighting the potential role of routine CSII use in mitigating excess CVD risk in girls with T1D later in life.

P-520

Developing a pediatric diabetes clinic with a person-centered care model: an experience from a Portuguese hospital

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Introduction: Type 1 diabetes (T1D) requires lifelong monitoring and insulin therapy, multiple hospital visits and ongoing communication between families, providers and community. Until 2019 our hospital provided emergency/inpatient care to T1D children but outpatient care was provided by an external clinic outside the community. In 2020 we developed a pediatric outpatient diabetes clinic in our hospital.

Objectives: To evaluate the development of a pediatric diabetes clinic, with the ability to provide both inpatient and outpatient care and its impact on care access and communication between families, community, and healthcare systems.

Methods: A multidisciplinary pediatric diabetes team, person care centered model and mentoring protocol with a tertiary center in the Lisbon area for CSII therapy were established. Retrospective study of T1D children followed at our clinic (2020-2024). We reviewed patients' demographics, insulin therapy, outpatient visits, metabolic control and readmissions.

Results: Since 2020 we provided care to 59 patients: 43 new-onset T1D admitted to our hospital and 16 patients from other centers/countries (7 immigrants/refugees). We had 412/year outpatient medical visits (37,4% telemedicine), 98% children with continuous interstitial glucose monitoring and 26% started CSII therapy. Regarding new-onset T1D cases, time to first outpatient visit was 6,0(±2,8) days, HbA1c at admission was 12,7(±2,2)% and 3-6 months after 6,6(±0,8)%. Major social issues identified in 28% and readmissions due to inadequate metabolic control in 10% children. 15% were transferred to adult clinic/other centers. We organized 2 courses for healthcare professionals, 14 patient educational courses and multiple informal education sessions for school personnel.

Conclusions: Implementing the pediatric diabetes clinic in our hospital allowed delivering specialized care in proximity to the community with good metabolic control and benefited education of families, community resources and communication between healthcare providers.

P-521

Mercury, lead, and cadmium levels among children with type 1 diabetes in Ismailia, Egypt

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Introduction: Type I DM is multifactorial, with multiple factors contributing to its pathogenesis and beta cell destruction. Heavy metals in foods and water would destroy pancreatic beta cells.

Objectives: To evaluate the association between heavy metal exposure (lead, mercury, and cadmium) and type I diabetes.

Methods: Sixty two children with type I DM were included children. Hair samples were cut to lengths of about 1.5–2 cm. The measurements of the levels of Lead, Mercury, and Cadmium were made by inductively coupled plasma-mass spectroscopy (ICP-MS) (iCAP, Thermo, Germany).

Results: The mean age of the studied population was 12.4 ± 4.25. Most children with T1D (83.9%) had normal hair mercury levels. Eighty two (82%) children had abnormal lead levels and fifty three (53%) had abnormal cadmium levels in their hair. HbA1c level was higher among children with abnormal mercury, lead, and cadmium hair levels than those with normal hair levels. There was significant positive moderate correlation between abnormal lead hair level and HbA1c (r 0.41). More than seventy percent of children with normal cadmium level were female with significant differences (p 0.4). Among children with abnormal hair level 84% had history of paternal smoking with significant difference than those with normal level (p0.001). Comparison of element levels among children with good glycemic control and those with poor glycemic control, the lead level was significantly lower among children with good glycemic control (6.3 ± 0.9) VS (39.6 ± 1.4) among (p0.01). No significant difference in the level of cadmium and mercury between children with good or those with poor glycemic control p (0.8) and (0.4) respectively. Regression analysis of lead hair level demonstrates that lead hair level was significant predictors of the HBA1C% (p= 0.001).

Conclusions: The majority of the children with type 1 diabetes had elevated levels of hair lead and cadmium. Also, there was an association between children with poor glycemic control and increased level of hair lead.

P-522

Frequency of affected siblings with type 1-diabetes and common risk-associated genetic polymorphisms among an Egyptian cohort of children and adolescents with diabetes

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Introduction: Familial clustering of type 1-diabetes (T1D) have been confirmed in several studies, with a significantly higher risk observed in children who have first-degree relatives affected by T1D. This finding emphasizes the crucial role of genetic factors in determining susceptibility to T1D.

Objectives: To assess the frequency of T1D among siblings in an Egyptian cohort and map the role of common risk-associated gene polymorphisms in familial clusters of T1D.

Methods: A two phase cross-sectional study including 1000 participants, registered in the Pediatric and Adolescent Diabetes unit of Ain Shams University Hospitals, was done to identify familial clusters of T1D among siblings. Twelve percent (120 affected siblings) were identified in the first phase. Genotyping by real-time polymerase chain reaction (PCR) based techniques to determine the presence of common risk-associated polymorphic loci in Insulin (INS)(rs689) and Protein Tyrosine Phosphatase Non-Receptor Type 22 (PTPN22) (rs2476601) genes was performed in the second phase for the affected siblings.

Results: The age of affected siblings ranged from 5 to 18 years with female predominance (66.3%) and 41.3% were off springs of consanguineous parents. Regarding INS Single nucleotide polymorphisms (SNP), the frequency of TT (75%) genotype and allelic frequency of T (83.1%) were significantly higher among siblings with T1D compared to healthy controls (P< 0.001). There was no statistically significant difference found regarding PTPN22 genotypes.

Conclusions: The frequency of affected Egyptian siblings was 12%. INS SNP (rs698) A>T gene polymorphism with the T allele was shown to be a possible risk factor for the development of T1D among the Egyptian cohort and could play a role in familial clusters of T1D.

P-523

Frequency of subclinical lipodystrophy among children and adolescents with type 1 diabetes

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Introduction: Lipodystrophy is a common complication in insulin treated patients. Lipodystrophy has an impact on insulin absorption and subsequently on diabetes control. Clinically

detectable lipodystrophy is studied, yet subclinical lipodystrophy and its consequences particularly in Type1 diabetes (T1D) children and adolescents needs further studies.

Objectives: assess the frequency of subclinical lipodystrophy using ultrasonography and evaluate the impact of subclinical lipodystrophy on glycemic control.

Methods: An observational cross-sectional study including 62 participants (11.73 ± 3.85 years) with T1D on regular subcutaneous insulin therapy for at least one year. A lesion was considered as sonographic lipohypertrophic lesion if it met at least four of the following criteria: 1) well circumscribed either by hyperechoic foci with defined borders or a nodular shape with a hypoechoic halo, 2) heterogeneous in echotexture 3) associated with distortion of surrounding connective tissue, 4) absence of vascularity, 5) absence of evidence of a capsule

Results: The frequency of subclinical lipodystrophy among the studied cohort was 57.8%, with more than half of the lesions (58.1%) occurring in the left arm. Regression analysis identifying risk factors for subclinical lipodystrophy, showed that improper rotation of injection site, reusage of needle ≥ 3 times and higher BMI best predicted the occurrence of subclinical lipodystrophy (P<0.05). Glycemic control as evidenced by HbA1c was significantly higher among participants with subclinical lipodystrophy (P< 0.05).

Conclusions: Subclinical lipodystrophy, overlooked complication of insulin injection, impacts glycemic control. Simple maneuvers like proper injection site rotation and frequently changing the needles highly affects the outcome. Screening and handling lipodystrophy should be considered in patients failing to achieve recommended glycemic targets.

P-524

Low-dose versus standard-dose insulin infusion in pediatric diabetic ketoacidosis

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Introduction: Some authors assume that reducing insulin dose may gradually decrease BG and lead to a gentle electrolyte disturbance.

Objectives: To investigate the effectiveness of low-dose versus standard-dose insulin infusion in management of DKA in children as regard both biochemical and clinical parameters.

Methods: A randomized clinical trial conducted in the intensive care unit in pediatric department of Suez Canal University Hospital. A total of 70 consecutive children with a diagnosis of DKA were included. Group 1 (standard insulin dose group) and Group 2 (low insulin dose group). The low-dose group received regular insulin at 0.05 U/kg per hour, whereas the standard-dose group received insulin at 0.1 U/kg per hour. Patients were managed according to ISPAD guidelines for DKA. The primary outcome was the time for resolution of ketoacidosis. The secondary outcome was the rate of decrease in BG until the level reached 200 mg/dL or less. incidences of hypokalemia and hypoglycemia were secondary outcomes.

Results: There were no significant difference between the two groups as regards degree of dehydration, level of consciousness, serum osmolality or degree of acidosis. The 2 study groups had no significant differences in serum electrolytes Na, K, CL, or Ca. No significant difference between the 2 groups as regards the time till blood glucose<200 or time till pH ≥7.3 (p= 0.2 and 0.4 respectively). There was no significant difference in mean length of time for resolution of acidosis which was 10.2 hours in the low-dose group and 11.22 hours in the standard-dose group (P = 0.227). Hypokalemia was significantly higher in the standard dose group than the low dose group (p 0.039). The frequency of hypoglycemia occurrence is approximately double (25.7%) in standard dose group that in low dose group (11.4%). The rate of decrease in blood glucose was significantly higher in standard dose group than low dose group.

Conclusions: Low and standard insulin dose are equally effective and safer to treat most children with DKA.

P-525

The Uganda national type 1 diabetes programme

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Introduction: Conventional methods of establishing national programs are not easily applicable in low-income and middle-income countries (LMICs), because of underdeveloped infrastructure and other local factors

Objectives: To address barriers in digital health in Uganda and provide a window of opportunity for rapid evolution from poor-quality diabetes health services to excellent services

Methods: The Ugandan team developed an electronic medical record (EMR) that comprised of a mobile application and an administrator dashboard. All patients were required to have an analog phone line that is registered with the patient's unique identification number in the digital tool. The digital tool has provision for stock taking. The system has an embedded short messaging system (SMS) to remind patients for upcoming visits. Healthcare workers use a mobile application designed to work offline. QuickCodes (USSD) patient portal for securely self-reporting of blood glucose during the self-monitoring (SMBG) was developed which, together with other parameters like family support, number of daily insulin injections, adherence to clinic visits and last HbA1c are aggregated by the Server to give the healthcare worker a summarized report on every visit.

Results: We innovated a digital tool for the Uganda national type 1 diabetes programme (UTID-HIMAS) that incorporated digital health interventions organised into four overarching groupings: interventions for patients, health care providers, health system or resource managers and data services.There are 50 main clinics distributed across Uganda with the aim of adding on another 100 smaller clinics to achieve our target of less than 50 km

of longest travel for a patient to access care. HbA1c previously at average 10.0% had improved to average 9.0%

Conclusions: Using an analog phone system and employing a USSD-aided patient portal, it is possible to monitor patient real time SMBG in a low-resource setting and monitor stock in low-resource setting

P-526

Challenges of diagnosis and management of infant diabetes: about 4 cases at CHUME N'Djamena

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Introduction: Diabetes in children under 5 years of age is increasingly diagnosed,but poses management challenges. We report 4 cases of diabetes in infants with the aim of describing the challenges associated with diagnosis and management.

Objectives: We report 4 cases of diabetes in infants with the aim of describing the challenges associated with diagnosis and management.

Methods: We report 4 cases of infants under 2 years of age admitted to the pediatric department of CHUME for diabetic ketoacidosis from January 2023 to March 2024.

Results: we found the average age of 12.5 months (8 to 18 months), 3 boys and 1 girl. Diabetes was present in 3 generations in 2 of 4 patients. The mode of onset was ketoacidosis, with a favorable outcome in all patients. Mean blood glucose was 5.81 g/l. Management was based on rehydration and insulin therapy with PES. All patients were placed on subcutaneous analogues in the absence of a pump in our context. Monogenic diabetes was suggested in 02 patients and type 1 diabetes in the other 02, despite the absence of antibody assays.

Conclusions: The mode of onset of diabetes in infants and young children is ketoacidosis. Insulin therapy is administered subcutaneously in the absence of a pump, a real management challenge. The typology of this type of diabetes remains poorly defined.

P-527

Particularities of type 1 diabetes in children under 5 year Dakar

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Introduction: n Africa, data on diabetes are scarce and fragmented. Indeed, more than half of African countries do not have recent data sources. The incidence of T1D is increasing worldwide, especially among young children under the age of 6. In this age group, unpredictable diet, irregular physical activity, dependent eating habits of parents, living with diabetes throughout puberty complicates diabetes management and makes it difficult to achieve good metabolic control.

Objectives: Thus, the main objective of this work is to describe type 1 diabetes in children under 5 years of age in our context of limited resource countries.

Methods: we realized a descriptive and multicenter retrospective study

Results: A total of 22 cases of children aged 0 to 5 years were included, with a prevalence of 7.8% for all children followed in both centres and an annual frequency of 5 cases per year. the age groups included are 1-2 years] and [3-4 years] were predominant (36.36%). the sex ratio was 1. the notion of family diabetes was found in 68% of children. acidocetosis was the main mode of discovery in our patients (86%). among patients, 8% had lipodystrophy. It was located either on the arms or on the thigh. The average duration of diabete was 19 months+/-12 months.the average hba1c was 10.57 0.5%. during the 4 controls, gly hemoglobin was higher 9% in more than half of our patients with respectively 57.14%, 57.14%, 85.71% and 71.43%. Similar insulins were the main insulins used by our patients, 64% with an average daily dose of insulin of 1.08 iu/ kg, the treatment regimen was either a 4-injection regimen in 73% of cases or 3-injections in 27% of cases.

Conclusions: Childhood diabetes is a growing disease in sub-Saharan Africa. she is better known, but her managment is still difficult. children under 5 years of age are a complex entity whose management may be difficult in a context of limited resources

P-528

The DigiBete app; implementation and evaluation for the Scottish pilot

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Introduction: DigiBete is a patient and Clinic support app with educational and peer support videos, translated into 12 languages and accessible to those with low literacy. It can be personalised by diabetes teams for patient communication. The app is widely used in England and Wales.

Objectives: In 2021, the Scottish Government funded DigiBete app licenses for all T1D families in Scotland for a 12-month pilot to test to effectiveness of DigiBete as a self-management resource.

Methods: A primary health board led the pilot and established template documents for information governance (IG) and launched in November 2022. A DigiBete champions network, including representatives from secondary boards, was established. Implementation approaches were shared through regular online meetings. An evaluation subgroup used "contribution analysis" to assess the app's impact.

Evaluation included app usage statistics, user feedback through online questionnaires, healthcare professional (HCP) questionnaires, and structured interviews with stakeholders from different health boards. The time HCPs spent creating and maintaining local online resources was also modelled and translated into NHS costs.

Results:

- DigiBete is now used in 12/14 health boards, 1,075 families and 98 HCPs registered.
- "sick day rules" is the most popular video.
- 20 families responded to the questionnaire, 19 appreciated having resources available on their phone.
- 22 HCPs responded, 18 liked having standardised Scotland-wide resources, and all 22 wanted to continue using the app.
- 9/12 boards used alternative digital resources previously and spent £62,043 in the first year and £41,628 annually to maintain them, 5 boards did not have any access. The cost of DigiBete for the whole Scottish community was less than 50% of this.

Conclusions: Central funding provides an efficient, unified approach for Scotland. The positive evaluation, especially regarding cost savings, secured an additional two years of funding for continued app roll-out, with a future focus on young adults.

P-529

Diabetes distress among adolescents with type 1 DM in tertiary diabetes centers in Nigeria

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Introduction: Mental health has become a recognized aspect of chronic illnesses. The latest WHO release estimated that 0.01% of adolescents aged 10 -14 and 2.8% aged 15 to 19 have depression. Diabetes distress increases the risk of developing a psychological burden and complicates self-management in attaining good diabetes control.

Objectives: The aim is to determine the prevalence of diabetes-related distress among adolescents with type 1 diabetes.

Methods: The study is a cross-sectional study of 150 type 1 DM patients aged 10 to 19 years from 12 diabetes centres in tertiary teaching hospitals from the six geopolitical regions of the country enrolled into the study. A pre-designed proforma was used to collect their demographic and clinical status. The TIDD scale, translated into English, Hausa and pidgin English for ease of administration, was used to determine the diabetes distress. The result was classified according to the tool into mild, moderate and severe.

Results: Out of the 150 enrolled adolescents with type I DM from across the country, 99 (66%) had diabetes-related distress, 60% (59) of these were severely distressed, and 40% (40) were moderately distressed. The feelings of powerlessness, negative social perceptions, eating distress and friend and family distress had the highest moderate to severe distress with a mean score range of 2.58 -2.83. More than 97% had no or mild stress with their health team or management. Duration did not significantly affect the distress level, but the region from which the respondent was affected the distress scale.

Conclusions: The study shows that adolescents with diabetes also experience diabetes-related distress, some more in different parts of the country. Therefore, early intervention in the course of management is necessary to prevent severe distress that may affect the glycaemic control.

P-530

Incidence of type 1 diabetes in children and adolescents during the COVID-19 pandemic: epidemiological and clinical profile at Laquintinie hospital, Douala

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Introduction: Viral infections have been proven to increase risk of developing type 1 diabetes (T1DM).Recent reports suggest that coronavirus 2019 (COVID-19) may have increased the incidence of paediatric T1DM and/or diabetic ketoacidosis (DKA).

Objectives: Compare incidence of paediatric T1DM before and during the COVID-19 pandemic era.

Methods: it's a retrospective cross-sectional study. Two groups of patients were constituted: 2018-2019 and 2020- 2021, grouping the records of children and adolescents under 19 years of age followed for T1DM at the paediatric endocrinology department of Laquintinie Hospital, Douala. The variables studied were age, sex, clinical presentation, frequency and triggers of ketoacidosis, blood glucose and HbA1C. Data analysis was performed using SPSS version 26 software. The threshold of statistical significance was set at 0.05

Results: We included 21 patients in the study. The mean age of our patients was 13±4 years, with a M/F sex ratio of 1.1. Patients aged 15-18 years were the most represented. The incidence rate of T1DM during the pre-pandemic period was 38% (8/21) and 61.9% (13/21) during the pandemic period. The reason for consultation in both groups was dominated by polyuria, dyspnea and hyperglycemia. Ketoacidosis was the most frequent mode of presentation, at 71.4% (15/21). Malaria was the most frequent trigger in 53.8% of cases (7/15).

Conclusions: Incidence rates of type 1 diabetes and DKA at onset in children and adolescents were higher after the onset of the COVID-19 pandemic

P-531

Insufficient sleep in infancy and risk of childhood overweight and obesity

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Introduction: Short sleep duration has been associated with overweight and obesity (OWOB) in childhood and adolescence. However, whether sleep in infancy is associated with childhood OWOB remains unclear.

Objectives: This study aimed to examine the association between insufficient sleep in nine-month-old infants with concurrent or later overweight/obesity.

Methods: This was a secondary analysis of the Growing Up in Ireland (GUI) National Longitudinal Study of Children. Caregivers were interviewed when the child was nine months (n=11,134), three years (n=9,793), five years(n=9,001) and nine years (n=8,032) of age. Sleep duration, among other variables was reported by parents at nine months of age. At all ages, height and weight was measured by interviewers. Associations between insufficient total sleep duration (<12 hours), insufficient night sleep duration (<9 hours), sleep problems and frequent night awakenings with OWOB were examined using multivariable logistic regression models. The analysis adjusted for confounders including sex, ethnicity, caregiver weight status, and socio-economic factors.

Results: Using the WHO growth standard at nine months of age prevalence of OWOB was 11%, while 30% of infants were at risk of overweight. At subsequent ages, using International Taskforce for Obesity (IOTF) thresholds, prevalence of OWOB ranged from 20-23%. Almost one in six infants did not meet recommended sleep duration of 12 hours per day and caregivers reported sleep to be a moderate/large problem in 11% of cases. No association was found between parent reported insufficient total sleep, insufficient night sleep, frequent night awakening, sleep problems with OWOB at any age after adjusting for confounders. There was no evidence for effect modification on the association between sleep and OWOB by sex or ethnicity.

Conclusions: The results from this large nationally representative cohort of children do not support an association between insufficient sleep or sleeping problems in infancy with concurrent or later overweight/obesity.

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Sleep disorders among adolescents with and without type-1 diabetic

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Introduction: Type 1 diabetes mellitus (T1DM) is one of the most encountered chronic diseases in children and adolescents. Sleep as an essential part of life cycles, follows a complicated biological pattern.

Objectives: This study aimed to investigate and compare the sleep disorders between T1DM and non-diabetic children and adolescents.

Methods: **Methods:** This is a cross-sectional study that was conducted in a pediatric endocrinology clinic in Qazvin City during 2018-2019. The participated samples in T1DM and non-diabetic groups were 47 and 44 samples, respectively. The Children Sleep Health Questionnaire (CSHQ) was completed by the parents. Data were analyzed using SPSS software package version 22.

Results: **Results:** The findings showed that the subscales of CSHQ including bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, night waking, parasomnia, and total sleep disorder score of the diabetic patients was significantly higher than that of the control group ($p<0.05$). The total score of CSHQ in the T1DM children group was higher than that the non-diabetic group and this observed difference between scores was statistically significant (49.80 vs. 43.77, $p<0.05$). the odds of the sleep complications in diabetic group (T1DM) is higher more than 3 times of the non-diabetic group controlling the confounding effects of the factors including age, sex, and BMI (OR= 3.16, 95% CI: 1.05 – 9.52).

Conclusions: **Conclusion:** According to the findings of our study, impaired sleep conditions in the T1DM children group were approximately three times the observed ones in the non-diabetic adolescents group. According to our findings, routine evaluation of sleep disorders in diabetic adolescents is recommended.

P-533

Perceptions and challenges of transition from syringes to insulin pen use among young diabetes patients in Bangladesh: a qualitative study

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Introduction: The transition from syringe-administered insulin to insulin pens is aimed at improving the convenience and adherence of young diabetes patients. Despite the potential advantages, the shift has elicited mixed reactions.

Objectives: To evaluate the perceptions, challenges, and benefits of using insulin pens among young diabetes patients, and to assess the overall impact on their diabetes management and quality of life.

Methods: A qualitative study was conducted, involving in-depth interviews with 10 young diabetes patients who recently transitioned to insulin pens. A structured interview guide was used to explore their feelings, experiences, and any difficulties faced with the new insulin administration method.

Results: The study's findings revealed diverse patient responses to the use of insulin pens compared to traditional syringes. While some patients valued the portability and discreteness of insulin pens, particularly for use during school or work hours, others found the increased number of pricks required to be burdensome. This led to a preference among many for the familiarity and simplicity of syringes. Despite these challenges, there was a general acknowledgment of the privilege associated with having access to insulin pens, highlighting a nuanced balance between convenience and comfort in diabetes management.

Conclusions: The study highlights the mixed perceptions among young diabetes patients regarding insulin pens. While some benefits were recognized, the transition also presented significant challenges. Tailored patient education and support are crucial to address these issues, ensuring a smoother transition and better diabetes management outcomes.

P-534

A study on the autoantibody level distribution in type 1 diabetes and its association with clinical characteristics in a tertiary care center in south India

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Introduction: Type 1 diabetes is a complex, chronic metabolic condition which causes hyperglycemia due to autoimmune or idiopathic destruction of the pancreatic beta cells leading to absolute insulin deficiency. Autoimmune markers such as antibodies to GAD65 (glutamic acid decarboxylase), Insulin autoantibody (IAA), Insulinoma-associated antigen (IA-2), Zinc Transporter 8 (ZnT8) assist in the diagnosis of Type 1 diabetes. Here, we study the autoantibody level distribution in Type 1 diabetics, and correlate it with the patients clinical characteristics.

Objectives: To study the prevalence of autoantibodies in Type 1 DM and their correlation with clinical presentation

Methods: A cross sectional study was conducted in a tertiary care center in South India – clinically diagnosed type 1 diabetics were included in the study. 453 patients were included consecutively and the following parameters were studied in them and correlated : Age, Sex, BMI, Duration of diabetes, GAD antibody, IA2 antibody, IAA antibody, HbA1c, non fasting C-peptide levels.

Results: Of the 453 patients, the age range was from 3-60 years, with an average age of 16.7 +/- 7.5 years. 252 (55.6 %) were male and 201 (44.4 %) were female. The mean BMI was 19.6 +/- 4.4 kg/m^2, with 46.4 % having a BMI < 18.5, and 12.1 % were obese with a BMI > 25. The mean HbA1c was 10.3 +/- 2.5 % and mean duration of diabetes was 8.4 +/- 6.5 years. 155 of the total patients (34.2 %) were GAD positive, 145 (32 %) were IA2 positive, and 22 (4.9 %) were IAA positive. Only 13.2 % patients had a positive non fasting C-peptide level. Of those with duration of diabetes less than 1 year, GAD positivity was seen in 48.1 % but decreased to 29.5 % in those with diabetes duration > 10 years. While IA2 positivity was only 18.5 % in diabetes < 1 year, but 32.7 % in diabetes duration > 10 years.

Conclusions: GAD antibody would be a better autoimmune marker in those with newly diagnosed diabetes in suspected type 1 diabetics, while IA2 and GAD antibodies could both be used for diagnosis in those with long standing diabetes.

P-535

Bone health in type 1DM

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Introduction: While there has been a significant decline in microvascular complications resulting in increased life expectancy in T1DM, there is relative paucity of data on bone health in T1DM.

Objectives: To assess the bone health in subjects with T!DM

Methods: Consecutive eligible T1DM patients aged 18 or above, who attended the outpatient department and who gave a consent for the study, were included except those with proven secondary diabetes, type 2 diabetes or other comorbidities or on antiepileptic medications or corticosteroids. Age and sex matched healthy volunteers who consented were taken as controls. A detailed history, examination, anthropometry, and pubertal status assessment of the patients were done by a single examiner. Blood samples were collected for investigations such as Serum Calcium, Phosphorus, albumin, alkaline phosphatase, creatinine and 25(OH)-Vitamin D3 and bone turnover markers such as Osteocalcin, N-Terminal Procollagen I Pro-peptide (PINP) and Beta Cross laps (Beta CTx; Collagen type 1C-Telopeptide). DXA scan was done for each study participant to assess bone mineral density. The BMD was estimated for all the cases and controls by using the Osteosys® Primus DXA machine by a single person to minimise the inter-observer variability

Results: Among 70 subjects 35 T!DM & 35 controls, mean Lumbar AP Spine Z-Score estimated by DXA was lower among T1DM [-1.06±1.63 vs -0.72±1.10] but the difference was not statistically significant.Mean femur neck Z-score and was significantly lower among T1DM [-1.42±0.96 vs-0.61±0.87] mean total femur Z score was lower in T!DM [-1.38±0.97 vs -0.68±0.89]. The mean value of CTX-1 was significantly higher in T!DM vs [9.31±2.19 vs 8.20±1.85 ng/ml], whereas Osteocalcin was significantly lower [11.23 vs 17.57 ng/ml] Subjects with higher HbA1c > 8.5% had lower mean AP Spine Z-Score which was statistically significant.

Conclusions: Bone Health was better among the subjects with Type 1 Diabetes Mellitus with better glycemic control compared to those with poor control

P-536

The effect of diabetes education on knowledge and awareness levels of classroom teachers about type 1 diabetes

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Introduction: It is known that the level of knowledge and awareness about childhood Type 1 diabetes among teachers is limited.

Objectives: This research was conducted to determine the effect of "Diabetes Education for Teachers" applied to classroom teachers on teachers' knowledge and awareness levels of Type 1 diabetes.

Methods: The research, which was conducted in a pre-test and post-test quasi-experimental design in intervention-control groups, was conducted between September and December 2023 with 87 classroom teachers (intervention=42, control=45) in 6 public primary schools (n=87). Diabetes education materials developed by the International Diabetes Federation within the scope of the Kids and Diabetes in Schools (KiDS) project were translated into Turkish and used as educational materials within the scope of this study. Data were collected with "Teacher Information Form", "Type 1 Diabetes Knowledge Test for Teachers" and "Type 1 Diabetes Awareness Scale for Teachers". "Diabetes Education for Teachers" was implemented in two sessions, each lasting approximately 45 minutes.

Results: It was found that the "Type 1 Diabetes Knowledge Test for Teachers" post-test mean rank of the classroom teachers in the intervention group were significantly higher than the control group ($p<0.001$). It was determined that the post-test mean rank of the teachers in the intervention group in the total and all sub-dimensions of the "Type 1 Diabetes Awareness Scale for Teachers" were significantly higher than those in the control group ($p<0.001$).

Conclusions: It was determined that the knowledge level about "Type 1 diabetes and its management" of the teachers in the intervention group was higher than the teachers in the control group after the education. Moreover, the awareness levels about "Type 1 diabetes and students with Type 1 diabetes" of teachers in the intervention group were higher than the teachers in the control group after the education.

P-537

Remission of type 1 diabetes mellitus and associated factors in children and adolescents at a tertiary hospital in a developing African country

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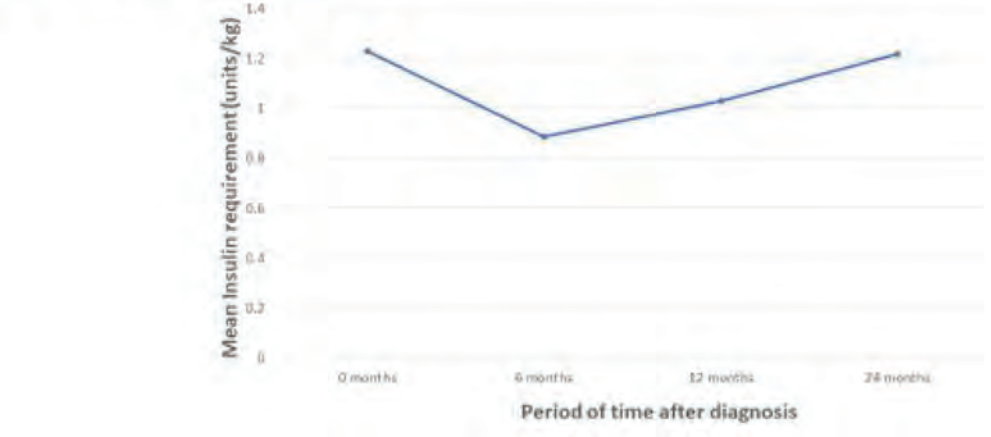
Introduction: Remission occurs in a proportion of children and adolescents with type 1 diabetes mellitus (T1DM). During this period, the residual beta cells of the pancreas produce insulin such that exogenous insulin requirements for good glycaemic control are reduced. Remission has not been extensively studied in children and adolescents.

Objectives: One objective of the study was to determine the pattern of remission of T1DM in children and adolescents. A second was to determine the factors associated with remission.

Figure 1: Mean insulin requirement within the first two years of diagnosis of type 1 diabetes mellitus



Methods: The study was a retrospective chart review of patients diagnosed with T1DM between February 2019 and October 2023 at the Lagos State University Teaching Hospital in Nigeria. Parameters such as age, gender, weight, and blood glucose measurements were extracted from the records. Insulin requirements at initial discharge, and subsequent follow-up visits were also extracted. Remission was defined as insulin requirement less than or equal to 0.5 IU/kg.

Results: A total of 28 patients; 14 male (50%) was included in data analysis. Age ranged between two and 14 years; mean was 8.89 ± 3.0 years. The mean insulin requirement at discharge, six, 12 and 24 months after diagnosis was 1.23 ± 0.7, 0.89 ± 0.5, 1.03 ± 0.5 and 1.22 ± 0.4 IU/kg respectively. Remission was observed in five (17.9%) patients and was more prevalent in males aged ≥ 10years (23.1%). There was no association between remission status and age groups (p=0.50), or gender (p=0.62).

Conclusions: While remission occurred in one out of five patients, the mean insulin requirement decreased sharply in the first six months of diagnosis. Multicenter studies with a longer study period are required to determine if the findings of the present study are truly representative of remission of type 1 diabetes among Nigerian children and adolescents.

P-538

Resilience rising: integrated efforts in pediatric diabetes care in humanitarian setting –the Sudan model

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Introduction: Managing pediatric diabetes (DM) amidst war demands exceptional resilience, especially in a resourced-limiting setting like Sudan. In the challenging landscape of humanitarian crises, a pioneer model developed by the Sudanese Childhood Diabetes Association (SCDA), has emerged as a beacon of resilience and innovation that significantly transformed healthcare delivery for children with DM amidst conflict. This not only ensured that **(No child should die because of DM)** but also strengthened local healthcare systems' resilience to effectively manage diabetic children during times of crisis.

Objectives: To ensure continuous pediatric DM care during the conflict. To enhance community resilience, and capacity building. To develop locally adapted guidelines based on available resources.

Methods:

1. Addressing challenges and restricted access to resources.
2. Use the locally available resources.
3. Coordination with different organizations and policymakers.
4. Supply Chain Management.
5. Community Engagement and Empowerment.
6. Advocacy, training, and Capacity Building.
7. Adopting guidelines for diabetes care during humanitarian settings.
8. Remote and mobile clinics.

Results:

1. SCDA with other stakeholders successfully distributed supplies reaching over 8,000 children with DM in war areas.
2. SCDA maintained operations in 19 clinics across Sudan, staffed by dedicated professionals.
3. SCDA established 4 remote clinics and 2 mobile ones in conflict zones serving> 900 children with DM.
4. A pivotal aspect of the Sudan Model is the development of locally adapted educational resources to empower caregivers with practical knowledge on managing DM in humanitarian settings in addition to remote consultations that bridge the gap in medical supervision.

Conclusions: "Resilience Rising" embodies SCDA's holistic approach in crisis settings. By nurturing local capacity, expanding healthcare infrastructure, and delivering targeted support, SCDA has laid a foundation for sustainable healthcare resilience in Sudan and beyond.

P-539

Epidemiological and clinical aspects of diabetic ketoacidosis at the emergency department of Angre university hospital center, medical pediatric in Abidjan

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Introduction: Diabetic ketoacidosis (DKA) is the most serious complication in children and adolescents living with diabetes in our regions.

Objectives: Our study aimed to describe the epidemiological, clinical, and evolutionary aspects of DKA in the pediatric medical department of the Angré University Hospital Center.

Methods: Cross-sectional study with a descriptive purpose with retrospective data collection over a period of three (03) years from December 2019 to December 2022. Patients aged ≤ 15 years admitted to the emergency department of the Angré University Hospital Center, medical pediatric for acute decompensation of known or inaugural during the study period were included. DKA was retained based on the following criteria: blood glucose above 14mmol/L associated with two-cross glycosuria and two-cross acetonuria. Sociodemographic, clinical, paraclinical and evolutionary variables were collected.

Results: Our hospital frequency of childhood diabetes was 0.1% (12/11566). Diabetes was inaugural or recent in 45% of cases and DKA was present in 80% of cases. The sex ratio was 0.6 and the mean age was 11±3.59 years (extremes 2 years and 15 years). Dehydration was almost constant with collapse observed in 16% of cases. Digestive disorders such as vomiting were found in 54% of cases, announcing ketosis, two weeks to one month before

decompensation. Respiratory disorders such as dyspnea represented 27% and the state of consciousness was altered in 27% of cases. The average blood glucose was 3.80 g/l (21 mmol/L), the average glycosuria was three crosses (3+) and the average ketonuria was three crosses (3+). The average glycosylated hemoglobin (HbA1c) was 10.83 and the average length of hospital stay for patients.

Conclusions: DKA was the major mode of diabetes revelation in children. Dehydration, digestive disorders and cerebral edema did not result in death because management was rapid and adequate in our series.

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A comprehensive understanding of adolescents' and young adults' experiences throughout the stages of healthcare transition in common chronic conditions. A qualitative study

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Introduction: During adolescence, the transition of care for adolescents and young adults (AYAs) with chronic conditions from pediatric to adult settings poses challenges, with up to 40% experiencing disruptions in medical access post-transfer. Gradual implementation of interventions focusing on positive health behaviors is crucial. However, current interventions primarily target complex disease-specific conditions pre-transfer.

Objectives: This study aims to provide an in-depth understanding of AYAs with mild chronic conditions' experiences throughout the stages of transition, as a starting point to the development of a transition program.

Methods: A qualitative approach employing semi-structured interviews and photovoice was utilized. Participants, aged 15-21, diagnosed with asthma, type 1 diabetes, and/or obesity, were either anticipating or had undergone transfer. Thematic analysis, using NVivo, was conducted on audio-taped, pseudonymized interviews and image data.

Results: A total of 18 AYAs (M_{age}=18.11±1.75 years) participated, generating 39 photographs. Five themes emerged, with transition being an individual process as the overarching theme. Additional themes were: setting the expectations, wanting a voice in transition, trust is key, and the importance of a support system. Being well-prepared and encountering mixed feelings were identified subthemes.

Conclusions: Transition-related experiences, needs, and expectations transcend various chronic conditions. This study underscores the importance of continuity of care throughout transition, utilizing photovoice as an age-appropriate participatory method to capture insights across pre-, per-, and post-transfer phases. Tailored, individualized transition programs are advocated by AYAs to meet their diverse needs.

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Fanconi-Bickel syndrome, when should insulin be used?

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Introduction: Fanconi-Bickel syndrome(FBS) is a rare glycogen storage disease characterized by hepatorenal glycogen accumulation leading to severe renal tubular dysfunction and impaired glucose and galactose metabolism.It caused by a recessive defect in the facilitative glucose transporter GLUT2 encoded by SLC2A2 gene and expressed on hepatic,pancreatic,intestinal and renal proximal tubular cells.

Objectives: We describe a case of FBS.

Methods: Kawter is 7, her parents are consanguineous.She had an abdominal distention since the age of 7 months.At 2 years old she had a fractured femur treated orthopedically.Blood gas assay showed metabolic acidosis,plasma tyrosine dosage and urinary succinyl acetone were normal.Over the following years,she had several episodes of respiratory distress.Clinical examination:severe failure to thrive,thin subcutaneous fat,hepatomegaly; chest,spine and limbs deformities,features of rickets.Radiology:diffuse bone demineralization.Low phosphorus,hypercholesterolemia,elevated level of alkaline phosphatase and hepatic transaminases,kaliemia at 3,2mmol/l correctedafterpotassiumintake,urinelaboratorytest:proteinuria,elevated phosphaturia.The patient had polyuria and polydipsia,fasting hypoglycemia,postprandial hyperglycemia exceeding 2g/l,urine analysis:glycosuria without ketonuria,HbA1c was normal.

Results: FBS diagnosis is based on the clinical symptoms,radiologicalandbiochemicalfeaturesofrickets,fasting hypoglycemia,postprandial hyperglycemia and ketonuria; our patient presented the symptoms but without ketonuria. Metabolic acidosis progressed well under sodium bicarbonate. Phosphorus and 1,25OHvitamin D were supplemented. We refrained from putting her on insulin given the absence of ketonuria and normal level of HbA1c. She was initiated on a galactose restricted diet and starchy foods were added to night meals.

Conclusions: We are reporting a patient with FBS.The need to add insulin therapy to bicarbonate intake must be discussed depending on the presence or not of diabetes and ketoacidosis.

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Early glycaemic control in children with type 1 diabetes on a novel early intensive therapy model of care

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Introduction: The Australian Diabetes Data Network (ADDN) registry found that 73% of Australian children and adolescents with Type 1 Diabetes Mellitus (T1DM) did not meet the recommended Haemoglobin A1c (HbA1c) target of <7%. The approach to

management of T1DM is centre-dependent. A novel model of care (MOC) was adapted from an endocrine-led service and implemented in a regional general paediatric-led service, to assess suitability and success in improving glycaemic control in a non-tertiary setting.

Objectives: This study aimed to identify: (1) if the new MOC improves early glycaemic control in children with newly diagnosed T1DM, compared to the preceding protocol, and (2) whether current glycaemic control for newly diagnosed patients within the regional health service meets the recommended target of HbA1c levels <7%.

Methods: The new MOC focuses on the principle of early intensive therapy by way of: aiming for tight glycaemic control, flexible insulin dosing using carbohydrate ratios and correction factors from day of diagnosis, a lower hypoglycaemia threshold, administering insulin for all carbohydrate intake >15g and correcting all day-time sugar levels of >8mmol/L. A retrospective audit of patients aged 1-18 years-old with newly diagnosed T1DM compared those managed on the previous protocol (2018-2019) to those on the new MOC (2021-2022). Early glycaemic control was measured by the average HbA1c across the first year from diagnosis.

Results: A total of 65 patients with newly diagnosed T1DM were assessed, 40 who were managed on the new MOC. Early glycaemic control improved with the new MOC – average HbA1c pre-implementation 7.47% vs post-implementation 6.96% - aligning with the recommended targets of <7%.

Conclusions: Early intensive therapy has improved initial glycaemic control for children with newly diagnosed T1DM in a non-tertiary centre. The lower average HbA1c levels meet the recommended target of <7%. The MOC could be adopted by other general paediatric-led services to improve glycaemic control in their patients.

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A study to evaluate the efficacy, ease, safety, and convenience of insulin pen devices over conventional insulin vials/syringes among patients with type 1 diabetes mellitus in a resource-poor setting

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Introduction: The standard devices used for insulin administration are syringes, pens, and pumps, among them the most commonly used are disposable plastic insulin syringes and insulin pen devices.

Objectives: This study assesses the simplicity, safety, convenience, and efficacy of insulin pen devices over syringes in persons with type 1 diabetes (T1D).

Methods: A prospective cohort study was conducted at the Pediatric Endocrine Clinic, Indira Gandhi Institute, Bangalore, over 6 months among patients with T1D in the age group of 6-20 years, who were on a basal-bolus regimen with regular and isophane insulin administered through an insulin syringe for at least 6 months. All these patients were issued the same insulin formulation through pen devices replacing syringes in October 2022. The HbA1c levels were compared pre and 6-month post-initiation of the insulin pens. A validated questionnaire was administered to each subject in their native language and their response was documented by a doctor twice, once before switching to pens and again six months later. Total scores for simplicity, convenience, and safety were obtained by adding the scores for relevant components, with a maximum of 39 and a minimum of 13. Higher scores indicated a poor response.

Results: The cohort included 78 subjects (boys 47.4%, girls 52.6%) with a mean age of 12.8 ± 3.75. Mean simplicity, safety, and convenience scores with insulin pen usage were 5.34 ± 0.62, 7.4 ± 0.91, and 3.6 ± 0.61, as compared to 9.78 ± 1.64, 9.24 ± 1.22, and 7.07 ± 1.28 with syringes (p=0.001).The HbA1c levels did not differ significantly after changing to pens [(10.3 ± 1.87 vs 10.58 ± 1.84), p=0.078], however, while considering only those patients with HbA1c ≥ 10% (n = 43), showed a significant improvement [(11.7 ± 1.69 vs 11.2 ± 1.87), p= 0.045] with insulin pen usage.

Conclusions: Most of the subjects reported that insulin pen devices were easier, safer, and more convenient to use and also observed to be efficient in improving HbA1c as compared to insulin syringes.

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Looping forward in diabetes

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Introduction: The availability of Hybrid Closed Loop (HCL) automation in diabetes is a fast emerging technology. This technology is not freely available in our centre but a small number of our patients are self-funding. We analysed data from the current cohort of our patients using HCL (up to 31st December 2023), to assess improvements in glycaemic control and quality of life.

Objectives: To assess quantitative improvements in glycaemic control and qualitative improvement in diabetes burden in our current patients using HCL.

Methods: We retrospectively collected clinical data prior to HCL instigation and at a minimum of 3 months post HCL treatment. Prospective patient/parent questionnaires have also been collated.

Results: 42 children and young people (12% of our clinic population) aged between 2 and 18 years were using HCL at the time of study. Results showed:

- a reduction in median HbA1c of 8mmol/mol;
- a reduction of median average glucose of 1.8mmol/l;
- an increase of median time in range of 22% - giving them over 5 hours more each day in target;
- a reduction of median time in hypoglycaemia (0.75%) and time spent very high (9.1%).

These improvements are noted across all age groups (pre-school; primary age and post-primary). There is also a huge improvement in perceived quality of life with a significant reduction in diabetes burden and this has been universal for all patients and their families.

Conclusions: HCL technology has made a remarkable improvement to both glycaemic control and quality of life in all our patients using this modality.

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Epidemiology of type 1 diabetes in Podlasie region, Poland, in years 2010-2022 – 13-years-single-center study, including COVID-19 pandemic perspective

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Introduction: Diabetes is undeniably a pandemic of the 21st century. Although type 1 diabetes (T1DM) only represents 10% of all diabetes cases, it dominates the pediatric population which is the focus of our analysis. The number of T1DM cases is accelerating, and Poland is one of the countries with the highest increase in the number of cases.

Objectives: We analyzed retrospective epidemiological data from the only specialized diabetes center in the region Podlasie, Poland, hospitalizing all newly diagnosed patients with type 1 diabetes under 18 years of age.

Methods: The study included 777 patients (369 girls and 408 boys) under 18 years of age. Incidence rates were calculated and then standardized by selecting an age-matched population from the beginning of the study period (general population of Poland 2010). We compared also DMT1 incidence rates in selected age groups, and in genders in our analysis. Analyses were performed using JASP and Excel software.

Results: We showed an upward trend in the number of morbidity cases during the analyzed period (R2=0.6, p=0.001). The average incidence rate grew during the study period from 19.22/100 000 in 2010 to 34.11/100 000 in 2022, a 1.77-fold increase over the study period. The youngest age group (0-4 y.o.) showed the largest, nearly 2.3-fold increase in incidence, from 9.86 in 2010 to 22.56 in 2022. There was no statistically significant difference in incidence between the age groups or a significant difference in incidence between girls and boys. We have also shown the possible impact of the COVID pandemic period– after an incidence decrease in 2020 we observed an increase of the incidence rate in 2021 up to 38.05/100 000 and in 2022 up to 34/100 000.

Conclusions: The incidence of type 1 diabetes in Podlaskie Voivodeship, Poland, continues its upward trend. Various factors may influence this, but the potential impact of the COVID-19 pandemic is worth considering. The possible relationships between this infection and the occurrence of T1DM require further research.

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Evaluation of emotional and sexual relationships in adolescents and young adults living with chronic illness - diabetes mellitus type 1

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Introduction: While much attention has been dedicated to managing the physiopathological manifestations of Diabetes Mellitus Type 1 (DM1), emerging research suggests a often overlooked aspect: the impact of this chronic condition on sexuality and intimacy.

Objectives: To develop a reliable and valid tool to evaluate the impact of chronic diseases, such as DM1, in the affectionate relationships and sexuality of young adults and adolescents.

Methods: A questionnaire was created and reviewed by 5 experts in the fields of psychology, sexology, child psychiatry, pediatrics, and endocrinology addressing various issues related to DM1, affection and sexuality. The target group of the questionnaire is 14-24 years old patients, with at least 6 months of DM1, followed at the Diabetes outpatient clinic of the Pediatrics Department at a Level I Hospital.

Results: The project comprises 2 stages, development and application of the questionnaire. Questions regarding control of DM1, assistance of caregivers, parenting styles, emotional aspects, social impact and affection and sexuality are included. In the questions related to sexuality, participants are asked about concerns and insecurities. There are questions about disease control when it requires a behaviour change or pharmacological treatment during moments of intimacy (administering insulin, measuring blood glucose, managing hypo/hiperglycemia). There are also questions about the use of contraceptive methods to prevent pregnancy or sexually transmitted infections. Lastly, participants are asked about fears regarding fertility, transmitting the disease to future generations, complications during pregnancy or childbirth and congenital anomalies.

Conclusions: The newly developed and validated questionnaire can be a reliable and useful tool to evaluate the impact of DM1 in their affection and sexuality.

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A systematic review of interventions in general practice to reduce diagnostic delay when diagnosing paediatric type 1 diabetes

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Introduction: Three quarters of Australian children with new-onset type 1 diabetes who present to hospital in diabetic ketoacidosis visited their general practitioner the week prior. Similar trends are observed internationally. This systematic review aims to summarise interventions in general practice that reduce diagnostic and management delay following a visit with a general practitioner, and to evaluate their effectiveness.

Objectives: To summarise interventions in general practice that reduce diagnostic and management delay following a visit with a general practitioner, and to evaluate their effectiveness.

Methods: Six electronic repositories were searched for primary outcomes (a) number of children presenting in diabetic ketoacidosis following diagnostic delay after a visit with their general practitioner, and (b) rate of diabetic ketoacidosis admissions within pre and post intervention windows. The secondary outcome was general practitioner behaviour regarding timeliness of referrals. Two independent reviewers completed title, abstract, full text review, and appraisal of included studies utilising ROBINS-I risk of bias. Any conflicts were resolved by a third reviewer. Meta-analysis was not possible due to high heterogeneity among studies. Structured tabulation was conducted for analysis.

Results: Interventions which actively involve general practitioners through direct communication, education sessions, clinical decision support tools, updated clinical referral pathways and provision of glucose/ketone monitors were associated with an improvement across all outcomes, whereas indirect communication with the GP did not. Only two studies involved general practitioners in implementation design. Paucity of methodological reporting, combined with high variation among study size, intervention period, outcome measures and sample size rendered it challenging to apply conclusions acceptability, effectiveness, and reach.

Conclusions: The interventions outlined are feasible for implementation in the clinical setting.

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First experience in the use of intermittent glucose monitoring during a camp for children and adolescents with type 1 diabetes in Mexico: benefits and challenges

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Introduction: Tonalli is a camp for children and adolescents living with Type 1 Diabetes (T1D) supported by the Mexican Diabetes Association of Mexico City, A.C. (AMD). In 2023, intermittent glucose monitoring was introduced for the first time.

Objectives: Demonstrate that intermittent glucose monitoring (isCGM) combined with blood glucose monitoring (BG), and supported by diabetes education, enhances glycemic management and safety in Tonalli campers.

Methods: 41 participants (16 boys, 25 girls), aged 8 to 15, attended the camp, lasting 4 days. All of them underwent pre-camp assessments 2 days before the camp and received FreeStyle Libre sensors and Accu Chek Guide glucometers. Data were collected via Libreview and RDCP Roche platforms. Staff received 14 hours training including glucose management, decision-making, incorporating BG, isCGM, and trend arrows. Campers received 6 hours of diabetes education sessions during the camp, including instruction on the use of sensors, glucometer apps, and assertive decision-making for glucose management. During camp, BG and interstitial measurements were taken before and after meals, midsleep, before exercise, or if any if any symptoms of disglycemia were present, averaging 12 measurements daily.

Results: No severe acute complications were present.

Conclusions: Camps provide valuable diabetes education spaces. Integrating technologies like isCGM reduces capillary punctures and improves quality of life. isCGM enhances camper care through informed decision-making. Despite the short analysis period, benefits include easier nocturnal readings, preventive measures before sports, and reduced acute risks. Hypoglycemia incidence was low, with no severe events or diabetic ketoacidosis. Challenges include limited access to reading devices, staff training in new technologies for large groups, and skin reactions. While the available technology was utilized to its fullest extent, alarmed devices could enhance decision-making during camp activities.

Ambulatory Glucose Profile Report	BG	isCGM
Glucose average mg/dl	148	172
Glucose variability (%)	42.8	38.3
TAR > 250 mg/dl (%)	10.7	15
TAR 181-250 mg/dl (%)	17.2	22.8
TIR 70-180 mg/dl (%)	65.1	59.4
TBR 54-69 mg/dl (%)	6.5	2.4
TBR < 54 mg/dl (%)	0.5	0.2
Average hypoglycemic events	2	3

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MiniMed 780g system and children with type 1 diabetes followed for one year: lessons learned from diabetes educators

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Introduction: a retrospective evaluation of insulin and glucose metrics over 1-year period post initiating the MiniMed 780G system in children and adolescents with T1D, recruited from Sidra Hospital in Qatar.

Objectives: The main objective of this study is to evaluate the glucose and insulin metrics after 1-year of initiation of AHCL MiniMed 780G system, as well to understand how pump education, as part of diabetes education, could be improved to achieve better glycemic outcomes. Participants in the study were categorized into "engaged" and "non-engaged" individuals. This classification was determined based on the recommended sensor usage time. Specifically, patients with a sensor usage ratio of less than 70 % were classified as "non-engaged" patients.

Methods: 49 MiniMed 780G system users were analyzed as engaged patients (>70 % active sensor time) or non-engaged patients (<70 % sensor usage time), and were followed for a period of 12-months. Data was extracted and analyzed at 3, 6, 9 and 12 months.

Results: In the engaged patient's group (n = 42), rapid TIR improvements were observed between baseline and 3-months' time point (53.1 ± 24.4 % at baseline to 73.7 ± 11.9 %, p =0.0001), and 12-months' time point (53.1 ± 24.4% at baseline to 70.7 ± 10.4%, p = 0.0001). HbA1c decreased from 8.8 ± 1.5 % at baseline to 7.2 ± 0.8% at 12-month end line (p=0.0001), while no significant change in TDD/weight ratio was detected in the patients during the study period.

Conclusions: The rapid glycemic outcomes improvements provided by the AHCL system are maintained over a long-term period (12-months) for the engaged patients, but not in non-engaged patients. In addition, the non-engaged patients also showed intermittent improvements in glycemic outcomes and could be benefited. Using personalized education and regularized follow-up protocols while using AHCL systems can help achieve controlled HbA1C for T1D patients.

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