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POSTER ABSTRACTS

Poster Tour 01 - Associated Disease

P001
Ethnic differences in the development of cardiovascular disease risk factors in children with type 1 diabetes - a prospective longitudinal study in the UK

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Objective: Cardiovascular disease (CVD) is a leading cause of death in diabetes with significant ethnic differences. CVD risk factors develop in childhood and are modifiable. We studied development of CVD risk factors from diagnosis of type 1 diabetes (T1D) in a multi-ethnic cohort of children and young people (CYP).
Methods: All CYP diagnosed with T1D attending three pediatric clinics in London (2005-2015) were included. Clinical and demographic information was collected prospectively during routine check-ups. Linear longitudinal mixed effects modeling was used to analyze ethnic (White, Mixed-ethnicity, Black, Somali, Bangladeshi and Asian) differences in trajectories of risk factors (BMI, blood pressure [BP], lipids and albumin-creatinine-ratio [ACR]) from diagnosis (adjusting for age, gender and clinic).
Results: 565 children were included (48% males, 60% non-white). Mean age at diagnosis was 8.5 years (range 0.9-19.4) and diabetes duration was 4.3 years (0-10.8). 33% of measures showed unhealthy BMI (Z-scores ≥ 85th percentile), 15% showed microalbuminuria, 66% were above total cholesterol targets and 5% reached LDL treatment thresholds. Mean BMI was highest in Black (21 kg/m^2) and Bangladeshi CYP (20.3 kg/m^2 Vs. 19.7 kg/m^2 in White). Black and Asian groups had higher BP ($p < 0.001$). Following diagnosis, there were significant annual increases in BMI (adjusted estimates 1.4 kg/m^2, 95% CI 0.5-2.3) in Somali and total cholesterol (0.35 mmol/mol, 0.2-0.7, Figure) and LDL (0.35 mmol/mol, 0.12-0.58) in Bangladeshi compared to White CYP. Black CYP had significant annual increases of triglycerides (0.14 mmol/mol, 0.25-0.01) and ACR (0.5, 0.66-0.28) compared to White.
Conclusions: CYP with T1D have higher prevalence of CVD risk factors, with worse profiles in Black and Bangladeshi groups. This supports findings of increased CVD risk in ethnic minorities with and without diabetes. Tailored interventions for ethnic minority CYP with T1D are needed to preserve CV health in adult life.

P002
Organ specific autoimmune diseases in type 1 diabetes mellitus

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Objectives: To study the prevalence of organ specific autoimmune diseases especially autoimmune thyroid disease (AIT) and celiac disease (CD) in patients with type 1 diabetes mellitus (T1DM).
Materials and Methods: It was a cross sectional case-control study. Subjects with T1DM (n =139) and otherwise healthy subjects (n = 70) were recruited as cases and controls respectively. AIT was defined as presence of anti TPO or anti TG antibodies (Beckmann access II, chemiluminescence assay). Anti TPO and anti TG positivity was defined by values >3 times of the upper limit of the normal. CD autoimmunity was detected with anti TTG (tissue transglutaminase) antibodies (AESKULISA-ELISA kits) and positivity was defined by values >3 times of the 100th percentile of controls. After taking consent, those who were positive for CD autoimmunity, subjected for intestinal biopsy for confirmation.
Results: Mean age of the cases and controls recruited for the study were 17.6 ± 7.1 and 18.2 ± 7.0 years respectively. Prevalence of anti TPO antibody, anti TG antibody or either of the thyroid antibodies was in 28% (39/139), 11.5% (16/139) and 32.4% (45/139) respectively among cases. Thyroid dysfunction was found in 17.3% of cases. Goiter, serum TSH, thyroid dysfunction and anti TG antibody positivity were high in anti TPO antiboby positive cases compared to negative cases. Anti TTG antibody was positive in 24.5% (34/139) of cases. Among CD autoimmune positive subjects, 23 were given consent for biopsy and 22 (95.6%) cases found to have biopsy proven CD. Glycemic control was better in anti TTG antibody negative group when compared to positive group but there was no difference among patients with or without AIT.
Conclusions: In individuals with T1DM, prevalence of organ-specific autoimmune diseases was high. Presence of thyroid autoimmunity did not have any effect on glycemic control but presence of celiac autoimmunity was associated with poor glycemic control.

P003
25OHD deficiency and insufficiency in obese children and adolescents and its relationship with metabolic parameters

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Introduction: Childhood obesity is increasing reaching an epidemic with the risk of long term metabolic effects.
Objectives: To assess 25OHD deficiency among obese Egyptian children and adolescents, and to investigate association between 25OHD and some metabolic parameters.
Methods: A cross-sectional study was conducted on 60 Egyptian obese children. Children were interviewed to collect personal data, weight, height and waist circumference (WC). 25-OHD and metabolic parameters defined as systolic blood pressure (SBP), fasting serum glucose (FBG), insulin, lipids and hsCRP were measured.

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Results: Majority of the studied obese children were either 25-OHD (20-< 30 ng/ml) or (<20 ng/ml) (45% and 40% respectively). Co-occurrence of severe obesity, insulin resistance (IR), high total cholesterol (TC) and triglycerides (TGs), high FBG or high hsCRP with 25OHD deficiency was encountered among 48.3%, 36%, 66.7%, 81.2%, 72.7%, and 51.4% of obese children, respectively, and all previous variables were significantly associated with vitamin D. Serum 25-OHD had a significant intermediate inverse correlation with BMI, WC and IR (r = -0.471, r = -0.547, r = -0.408, respectively). Almost all children who had low High-density lipoprotein cholesterol (HDL) had 25-OHD <30 ng/ml. After adjustment of confounders the most powerful predictor for explaining 25OHD variation was obesity subclasses.
Conclusions: Within a pediatric obese population, 25OHD deficiency is observed with an association between low 25OHD and unfavorable metabolic parameters.

P004
Effect of micronutrient intake on serum glucose and insulin in adolescents with overweight/ obesity

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Introduction: Several minerals and vitamins play a role in metabolic and hormone signaling pathways.
Objectives: To investigate the effect of dietary intake/ serum levels of selected micronutrients on insulin resistance and blood glucose.
Methods: Overweight/ obese adolescents (n = 214) aged 10 to 16 years were recruited after taking consent. Dietary assessment was done by 24 hr recall and quantitative food frequency questionnaire. The intakes of calcium, magnesium, folic acid, and vitamin B12 were calculated for each subject, and compared to age and gender based recommended daily allowances (RDA) for Indians. As vitamin D is chiefly synthesized in the skin, serum 25 hydroxyvitamin D (25OHD) was measured in a subset of 66 subjects. Blood glucose was measured fasting and after 2 hr of 1.75g/kg oral glucose. Fasting insulin was measured and homeostatic model assessment of insulin resistance (HOMA-IR) was calculated as fasting insulin (μU/ml) × fasting glucose (mmol/L)/22.5.
Results: Vitamin D deficiency (25OHD <20 ng/ml) was present in 74%; dietary calcium and vitamin B12 intakes fell short of the RDA in 39 and 78% of the subjects, respectively. Intakes of magnesium and folate exceeded the RDA in all. The comparison of glucose, insulin and HOMA-IR between subjects with deficient and adequate serum levels/ intakes for Vitamin D and calcium; and those with intakes < or ≥ 200% and 150% of the RDA, respectively, for magnesium and folate is shown in Table 1.

Subjects with vitamin D deficiency had higher fasting glucose, those with low calcium intake had higher insulin and HOMA-IR. Subjects with lower intakes of folate and Mg had higher 2 hr glucose. B12 intake did not have an effect on any of the parameters.
Conclusions: In overweight/obese adolescents, higher levels of Vitamin D and higher dietary intakes of calcium, magnesium and folate have a beneficial effect on glucose homeostasis.

P005
Oral diseases in a young population of patient living with type 1 diabetes in Cameroon: epidemiological and clinical aspects

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Introduction: Diabetes has been unequivocally confirmed as a major risk factor for periodontitis, which amplifies the immune response to pathogenic oral germs and, therefore, lead to the destruction of periodontal tissues. On the other hand, severe periodontal diseases induced by dental plaque will also alter metabolic control by inducing insulin resistance.
Objective: To evaluate the frequency and typology of oral diseases observed in a cohort of patients living with type 1 diabetes in Cameroon.
Methods: Oral diseases were clinically assessed in 101 patients (7-28 years of age) followed up in a project "Changing Diabetes in Children" in Cameroon with diabetes and 101 nondiabetic control subjects (12-29 years of age).
Results: Severe periodontitis was more common in diabetes patients than in controls. The number of teeth with evidence of attachment loss was significantly greater in patients with diabetes 28.8% vs 16.8% p = 0.032. patients with diabetes had significantly higher plaque and gingival inflammation levels compared with control subjects 46 ± 31% vs 24 ± 23% in controls p = 0.001 and 51 ± 30% in T1DM vs 19.2 ± 23% in control p 0.001. Halitosis and coated tongue were more prevalent in diabetes patients 72.3% vs 25% controls, p = 0.001 and 50.5% vs 15% controls, p = 0.03. The prevalence of dental caries was high in both groups. The prevalence of oral diseases was higher in T1DM patients with poor glycemic control. Diabetes was correlated with the onset of oral diseases in our study population.

Parameter (N)	Fasting glucose (mg/dl)		2 hr glucose (mg/dl)		Fasting Insulin (μU/ml)		HOMA-IR	
	Mean ± SD	P	Mean ± SD	P	Median (range)	P	Median (range)	P
Serum 25hydroxyD <20 ng/ml (49)	89.3 ± 10.5	0.017	113.8 ± 16.8	0.124	13.9 (3.3-42.6)	0.618	3.0 (0.7-8.8)	0.883
≥ 20 ng/ml (17)	81.8 ± 12.3		107.1 ± 10.4		15.1 (4.1-36.9)		3.2 (0.8-7.8)	
Calcium intake <100% RDA (83)	82.8 ± 10.5	0.134	107.6 ± 12.5	0.959	17.2 (6.3-55.7)	0.016	3.5 (1.3-10.8)	0.023
≥ 100% RDA (129)	85.2 ± 11.2		107.7 ± 19.1		14.4 (1.3-55.5)		2.9 (0.3-10.7)	
Magnesium intake <200% RDA (14)	87.3 ± 13.9	0.299	120.5 ± 38.3	0.004	17.6 (9.3-40.4)	0.201	3.4 (2.2-8.7)	0.158
≥200% RDA (198)	84.0 ± 11.1		106.0 ± 14.1		15.4 (1.3-55.7)		3.2 (0.3-10.8)	
Folate Intake <150% RDA (49)	85.7 ± 10.2	0.300	112.7 ± 23.1	0.018	17.9 (1.8-41.4)	0.198	3.5 (0.4-9.4)	0.169
≥150% RDA (163)	83.8 ± 11.7		106.2 ± 14.2		14.8 (1.3-55.7)		3.1 (0.3-10.8)	

[*Fasting and 2 hrs plasma glucose, serum insulin and HOMA-IR in overweight/ obese adolescents according to categories of micronutrient intake/level*]

Conclusion: The prevalence of oral diseases was high in our study population, probably reflecting the situation in the general population. These conditions were diagnosed in a context of low consumption of oral health benefits coupled with a lack of knowledge about the two-way relationship between type 1 diabetes and oral diseases.
Keywords: Oral diseases; type 1 diabetes; oral hygiene

P006
Study to evaluate dental caries and its progression by using PRS index in type 1 diabetics

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Objective: To evaluate dental caries and its progression in T1DM using Pulpal involvement -Roots -Sepsis index.
Method: Clinical examination of 55 T1DM was carried out. Data on demography, duration, oral hygiene, brushing frequency and HbA1c status was obtained on these patients & examined for the presence of caries, pulpal involvement(p/P), root stumps (r/R),dental abscess (s/S) and PRS indexing was followed to arrive at score for each patient. PRS index was calculated as the sum of teeth with P, R and S greater than 0.The correlation of PRS index with duration of diabetes and HbA1c level was determined using Spearman's correlation coefficient. The index scores according to brushing frequency as well as oral health status was determined using Wilcoxon's rank sum test. The statistical significance was evaluated at 5% level.
Results: Study sample consisted of 27 males and 28 females. In oral hygiene, 18 had poor hygiene, while 37 had fair. Clinical examination revealed that out of 55 patients, 37 patients had one or more teeth with caries & affected teeth were 113.The prevalence of PRS among type I DM was 61.8% & overall mean was 1.33,while the median score was1. The correlation of PRS with duration of diabetes was 0.11, indicating that as duration of DM increases, there is tendency of increased PRS index, although the correlation was insignificant with P = 0.407.The correlation of HbA1c was studied with PRS index, which resulted into positive correlation of 0.036, but statistically insignificant (P = 0.791).The median index for patients with brushing habit of twice a day was insignificantly different than those with habit of once a day with P = 0.133.
Conclusion: Poor glycaemic control and longer duration of diabetes may increase the risk of dental caries and value of PRS index, but appropriate oral hygiene & metabolic control may prevent the development of dental caries in T1DM. Good preventive care can control this development.

P007
The efficacy and safety of octreotide treatment for diazoxide-unresponsive congenital hyperinsulinism in China

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Background: Octreotide is an off-lable medicine for CHI but widely used nowadays. However, the efficacy and adverse effects have been reported varied in centers.
Objective: To evaluate the efficacy and safety of the subcutaneous octreotide injection for diazoxide-unresponsive CHI in China.
Subjects and Methods: Diazoxide-unresponsive CHI children treated with subcutaneous octreotide injection at an adjusted dosage of up to 50 μg/kg/day were involved in the study. Every 2 hours the blood glucose (BG) was checked after wean-off iv dextrose during 48 hours, if BG was over 3.3 mmol/L means complete effectiveness; if BG < 2.8 mmol/L was detected more than two times means ineffectiveness; if BG between 2.8 mmol/L and 3.3 mmol/L was detected more than twice means partial effectiveness.
Results: Twenty-five Chinese (15 males) children were enrolled in the study. Their median onset age was 1 day (range1-150 days), the median diagnosis age was 7.5 weeks (range 1-24 wk), the mean age of last visit was (1.6 ± 0.9) (maximum 3.3) years old. The effective median dose of octreotide required was 10.0(range 1.2~20.0) μg/kg/d, the mean duration was (8.9 ± 6.3) months (range 1.5-25 mo). Eighty-eight percent (22/25) were confirmed with ATP sensitive potassium channel gene mutation (19*ABCC8*, 3*KCNJ11*). The octreotide was completely effective, partly effective in 12, 9 patients respectively and ineffective in 4 (16%). The effectiveness of octreotide was not different between gene-positive and -negative group. The dose of octreotide was not different between monoalliec and biallelic ATP sensitive potassium channel mutation. Transient elevation of liver enzymes occurred in 20% patients, asymptomatic gallbladder pathology occurred in 1 patient, the mean height SDS was 0.3 ± 1.5 at the last follow-up.
Conclusions: The octreotide was well tolerated, effective therapy for diazoxide unresponsive CHI cases.

P008
Celiac disease autoimmunity in children with type 1 diabetes is associated with longitudinal loss in bone mineral density

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Objective: Evaluate longitudinal changes in bone mineral density (BMD) for children with a history of celiac disease autoimmunity as evidenced by tissue transglutaminase (TG) antibody positivity and type 1 diabetes mellitus (T1D) compared to appropriate control groups.
Methods: BMD was assessed at baseline and 4 years later in 249 children with T1D (120 TG+; 129 TG-) and in 141 children without diabetes (71 TG+; 70 TG-). Of these, 153 and 101 returned for 4-year follow-up, respectively. Comparisons were by chi-square for categorical variables and t-test for comparison of continuous measures. Mean age for at baseline was 14y for all groups and did not differ significantly by TG or T1D status.
Results: T1D Children with TG+ had significantly worse BMD L1-L4 z-score at baseline compared to T1D children who were TG- (-0.4 ± 1.2 vs 0.1 ± 1.1, p < .001) and this was also seen at 4 year follow-up (-0.6 ± 1.2 vs -0.2 ± 1.0, p = .04). There was no difference in HbA1c between TG+ and TG- children. In children without T1D, there was no difference in BMD for TG+ vs TG- children. In TG+ children, those with T1D had lower average BMD L1-L4 z-score than those without T1D at baseline (-0.44 ± 1.22 vs -0.16 ± 1.07, p = 0.11) and 4 years (-0.56 ± 1.22 vs -0.41 ± 1.16, p = 0.44), but this difference was not significant. Of note, the T1D children had shorter duration of known TG positivity than those without T1D (5.5 ± 3.1 vs 8.3 ± 3.4 y, p < .0001). None of the TG- participants avoided gluten, while in TG+ positive groups, a similar number of T1D vs non-T1D were gluten-free at baseline (44% vs 32%, p = 0.12).
Conclusions: Children with both T1D and TG+ showed greater abnormalities in BMD compared to TG- controls at baseline and after 4 years of followup.

P009
Association of T1DM and HLH syndrome- a case report

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Hemophagocytic lymphohistiocytosis (HLH) is a rare, potentially fatal disease characterized by proliferation of activated lymphocytes and

macrophages. Familial HLH syndrome may be caused by Perforin gene mutation, which also predisposes to Type1 Diabetes Mellitus (T1DM).
A fourteen year old born of consanguinous parents presented with fever and abscess in his gluteal region. He was on insulin for T1DM diagnosed two weeks earlier. We initiated antibiotic therapy. High spiking fever persisted. He developed hepatomegaly and skin lesions. Laboratory tests showed pancytopenia, hypertriglyceridemia, markedly elevated ferritin and hemophagocytes in bone marrow. Skin lesion biopsy revealed cytophagic histocytic panniculitis. EB virus PCR was positive. We started steroids for secondary HLH. After initial favorable response he relapsed with pancytopenia, sepsis and multi-organ failure, and finally succumbed.
HLH syndrome in T1DM patient is a red flag for primary HLH. Early referral for stem cell transplantation must be considered.

Poster Tour 09 - Associated Disease

P010
Primary sjogren syndrome, autoimmune hemolytic anemia and thrombocytopenia in a type 1 diabetic child

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We present a 14 years old type 1 diabetic male for 4 years controlled on basal bolus insulin regimen (1.3u/kg/day). One year ago the patient developed generalized lymphadenopathy, polyarthritis and spiky fever. 1st hour ESR (90 mm/hr), rheumatoid factor (Latex) was negative and C3 and C4 were not consumed (C3 91.7 mg/dL, C4 9.1 mg/dL). ANA was positive speckled pattern while antiDNA was negative. Abdominal examination revealed hepatosplenomegally with the liver 5 cm below costal margin and spleen just palpable below costal margin. Pelviabdominal ultrasound revealed hepatosplenomegally, liver 14.6cm and spleen 14.4 cm with right external iliac lymhadenopathy measuring 1.7*1 cm with preserved hilum and normal vascularity. Lymph node biopsy revealed chronic lymphadenitis with reactive follicular hyperplasia and periadenitis. Slit lamp showed no uveitis. The patient was diagnosed as rheumatoid arthritis and started ibuprofen (30 mg/kg/day) with no improvement. Three months later the patient developed parotid and submandibular sialoadenitis, neck ultrasound showed bilateral parotid and submandibular glands heterogenous appearance mostly inflammatory. Antibiotics were given for 2 weeks with no improvement. The patient developed epistaxis, CBC showed anemia (Hb 7.4 mg/dL) and thrombocytopenia (plt 24 $X10^9$), direct and indirect coomb's were positive. 24 hours urinary proteins 0.2gm/24hrs (n < 0.15g/dL), and echo was normal. Anti GAD antibodies were 81 U/ml (n < 1U/ml). So SSA and SSB were done, SSA was strongly positive (90u) and SSB was positive (26U). The patient was diagnosed as primary Sjogren with immune mediated anemia, thrombocytopenia and autoimmune diabetes and started steroids on 1mg/kg/day.

Conclusion: Further studies should be done to explore the relationship between primary sjogren, autoimmune diabetes and autoimmune cytopenias. Physicians should be aware of the possibility of autoimmune cytopenias and sjogren syndrome in pediatrics with autoimmune diabetes.

P011
Polyglandular autoimmune syndrome type II: a rare presentation in an adolescent

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Introduction: The occurrence of two or more endocrine disorders in an individual is called polyglandular autoimmune syndrome (PAS). 2 major types have been described. PAS type I which consists of mucocutaneous candidiasis, hypoparathyroidism, addisons disease, type1 diabetes is common in childhood. On the other hand PAS type II which is characterized by presence of addison´s disease with either thyroid disease or type1 diabetes is usually seen in adults and more commonly seen in females. It is very rare in children and adolescents.

Objectives: We describe a case of an adolescent being diagnosed with PAS II with rare combination of 3 endocrine disorders. A 16 year old boy with known type1 diabetes was subsequently diagnosed with hypothyroidism and addison´s disease.

Methods: This 16 year old boy was diagnosed with type1 diabetes at 2 years age as he presented with classic symptoms of polyuria and polydipsia. He was initially started on twice daily insulin regime. He moved to basal bolus regime when he was 11 years old. He was relatively well controlled. His last HbA1c was 76. He had regular annual bloods.

Results: During his annual review in 2015 his blood tests showed high TSH (22.2) and low T4. His Thyroid Peroxidase Antibody (TPO) was very high(1497). He was diagnosed with hypothyroidism and commenced on L-Thyroxine.

In May 2017 he became increasingly lethargic, anxious with loss of weight and appetite for 3 weeks. His face and arms looked tanned. Further blood tests showed severe hyponatremia (111 mmol/L), hyperkalemia (6mmol/L). His ACTH was very high (691 ng/L, N: 0-46), Cortisol was very low at 281 nmol/L, aldosterone < 50. Synacthen Test (ACTH stimulation test) showed 2 hour Cortisol rise to 284 and he was positive for adrenal antibody. He was diagnosed with addison´s disease and commenced on hydrocortisone and fludrocortisone.

Conclusion: PAS type II is very rare in children and adolescents (1:20000). T4 therapy can precipitate adrenal crisis.

P012
Simultaneous onset of type 1 diabetes mellitus & juvenile dermatomyositis complicated by diabetic ketoacidosis in a girl of 4 y

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A girl of 4y presented with a 4-month history of progressive proximal muscle weakness and photosensitive facial rash. She was unable to stand or walk. Investigations showed high CK and positive anti-Mi-2, anti-NXP-2 myositis-associated antibodies. Muscle MRI showed extensive inflammation of the pelvic and quadriceps muscles. Muscle biopsy showed inflammatory myositis, confirming the diagnosis of Juvenile Dermatomyositis [JDM]. The severity of her disease dictated intensive treatment including IV methylprednisolone, immunoglobulin and weekly SC methotrexate.

On commencing methylprednisolone, she unexpectedly deteriorated with metabolic acidosis (pH 7.2) hyperglycemia (553 mg/dL) and ketonuria consistent with diabetic ketoacidosis [DKA]. HbA_{1c} was 9.2 % [eAG 217 mg/dL], and coupled with severity of hyperglycemia, Type I diabetes [T1D] was suspected. On direct questioning, a history of progressive polyuria and polydipsia was disclosed. She responded to IV fluids and insulin and was converted to high-dose multiple daily injection regime with control eventually achieved with insulin degludec [IDeg] 16u OD, aspart 1u:10g. CHO, [1.81 U/kg/d], combined with Flash glucose monitoring. Glycemic control was very problematic due to steroid-induced insulin resistance and improved as steroids were reduced [currently requiring 0.86 U/Kg/d, on Prednisolone 25 mg]. T1D was confirmed, by positive glutamic acid decarboxylase [GAD65] antibodies. The patient is now much improved, and successfully ambulating.

To our knowledge, this is the only report of the simultaneous occurrence of JDM and T1D. The high HbA_{1c}, positive GAD65 and antecedent polyuria and thirst confirmed new-onset T1D rather than steroid-induced diabetes. The clinical imperative was to manage her severe JDM. IDeg was highly beneficial in countering the steroid-induced insulin resistance due to ease of titration to fasting plasma glucose, and no ketosis has been encountered since starting insulin injection therapy.

P013
High prevalence of obesity among infants presenting with intussusception: findings from an Egyptian cohort

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Introduction: Intussusception is a life-threatening illness,. The causes underlying intussusception are not fully understood, although some predisposing factors are known. Intussusception is frequently seen to occur in well-nourished infants.
Objectives: To determine whether patients presenting with intussusception have a high prevalence of obesity.
Methods: This cross sectional study was conducted in 100 infants presenting with intussusception aged ≤ 2 years at the Pediatric Surgery Department. Anthropometric measures, history of recent upper respiratory tract infection, timing and type of intervention were recorded. A near median split divided the population into younger (aged < 8 months, N = 47) and older (8-24 months, N = 53) groups. Obesity was defined as having a body weight for length ≥ 97.7th centile on WHO growth charts.
Results: The study comprised 58 boys and 42 girls, 31% of whom had upper respiratory infection in the preceding month. Obesity was present in 18% of patients, based on WHO growth charts. There was a trend toward higher percentage of obese infants within the younger (25%) compared to older age groups (12%, *P* = 0.085), but no gender difference. Obesity did not influence the rate of success of hydrostatic reduction.
Based on Egypt-specific growth charts, the percentage of infants with a weight-for-age centile ≥85th was 42%, of whom 7% were ≥97.7th centile. The corresponding percentages for the weight-for -length were 29% and 15% of patients respectively.
Conclusion: There is a high prevalence of obesity in infants presenting with intussusception, more so under 8 months of age. The mechanistic link between obesity and the pathogenesis of intussusception deserves investigation.

P014
Diabetic ketoacidosis (DKA) among patients with young-onset type 1 and type 2 diabetes: results from SEARCH (USA) and YDR (India) registries

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Introduction: There is a significant global variation in the presence of Diabetic Ketoacidosis (DKA) among youth with diabetes.
Objectives: We compared the prevalence of DKA at onset among patients with type 1 diabetes (T1D) and type 2 diabetes (T2D) from the SEARCH for Diabetes in Youth (SEARCH) registry in the US and the Registry of People with Diabetes with Young Age at Onset (YDR) in India.
Methods: We harmonized the SEARCH and YDR data elements to the structure and terminology in the Observational Medical Outcomes Partnership (OMOP) Common Data Model (v5). Data used in the analyzes were from youth with T1D and T2D, aged <20 years and newly diagnosed between 2006 and 2012 in YDR and between 2009 and 2012 in SEARCH. We compared the prevalence of DKA at/near onset across registries using chi-square test.
Results: There were 5,366 SEARCH (4,078 with T1D, 1,288 with T2D) and 1,579 YDR (1,416 with T1D, 163 with T2D) youth. The prevalence of DKA by diabetes type and demographic characteristics are shown in the table. More than one third of T1D youth enrolled in SEARCH reported DKA at onset which was significantly higher than YDR (35.3% vs 22.4%, p < 0.0001). The prevalence of DKA among T2D in SEARCH and YDR were 5.5% and 7.4%, respectively (p = 0.4). The burden of DKA in T1D was significantly higher among younger age groups in both SEARCH and YDR and this relationship was similar across registries (p = 0.4). In all age and gender categories, the proportion of T1D patients with DKA was significantly higher in SEARCH compared to YDR. There was no gender difference in the prevalence of DKA in both SEARCH(p = 0.8) and YDR (p = 0.9).
Conclusions: These data show significant burden of DKA at onset among SEARCH and YDR youth with diabetes, especially among the younger age groups. The reasons behind such high prevalence are largely unknown, but are critical in designing interventions to prevent DKA at onset among young onset diabetes.

	T1D			T2D		
	SEARCH n = 4,078	YDR n = 1,416	p-value	SEARCH n = 1,288	YDR n = 163	p-value
Crude Prevalence n(%)	1440 (35.3)	317 (22.4)	<0.0001	71 (5.5)	12 (7.4)	0.4
Age at diagnosis n(%)						
0-4 yrs	285 (43.7)	55 (26.2)	<0.0001			
5-9 yrs	463 (35.2)	97 (23.5)	<0.0001			
10-14 yrs	525 (35.4)	117 (25.3)	<0.0001	41 (6.9)	4 (10.0)	0.5
15-19 yrs	167 (26.6)	48 (14.5)	<0.0001	29 (4.6)	8 (7.2)	0.2
Gender-Female n(%)	662 (35.1)	152 (22.5)	<0.0001	35 (4.2)	6 (7.4)	0.2
Gender-Male n(%)	778 (35.4)	165 (22.3)	<0.0001	36 (7.8)	6 (7.3)	0.9

[*Crude and stratified prevalence(%)of DKA at onset in SEARCH and YDR*]

P015
Autoimmune polyglandular syndrome: a diagnosis not to miss

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Introduction: Autoimmune polyendocrine syndromes are a heterogeneous group of diseases characterized by autoimmune activity against more than one endocrine organ, although non-endocrine organs can be affected. There are 4 types of APS. Type II APS is characterized by Addison's and thyroid diseases with/without type 1 DM. We describe a case of a 6 yr old girl presenting at an early age as compared to the usual presentation at 3rd to 4th decade.
Case Details: 6yr old girl came with polyuria, polydipsia and polyphagia since 7days and family history of type II diabetes mellitus. Her weight and height at the 50th centile, had generalized pigmentation since 2yrs, more on the lips, gums, tongue, knuckles, nipples and nape of neck. A café au lait spot measuring 7x6 cm was present on the medial side of left thigh**. Systemic examination was normal.**
Investigations: high sugars (HbA1c - 12.1%, GAD antibodies positive), hyponatremia, hyperkalemia (ACTH- 1250 pg/ml), normal calcium profile, hypothyroidism (Anti TPO - 161 IU/ml), low serum cortisol (1.28 **µg/dl**). The symptoms, examination and laboratory investigations

were suggestive of adrenal insufficiency, hypothyroidism and type I DM; a diagnosis of APS II (Carpenters syndrome) was made. Hydrocortisone, insulin and thyroxine were commenced. Child gained good weight with good glycemic control.

Discussion: APS II presents at 3rd or 4th decade of life with female preponderance and defined by the occurrence of 2 or more of the following: adrenal insufficiency, type 1 DM, thyroid disorders and associated with other autoimmune disorders.

Presentation with multiple endocrine problems in the 1st decade is unusual in our case. Functional screening of hormones, electrolytes, glucose should be done first followed by organ-specific autoantibodies. Treatment of APS-II is limited to hormone therapy.

An advance in genetics and research focused on family studies is required. This might offer further knowledge on the inheritance of APS II.

P016
Fecal calprotectin in children with type 1 diabetes mellitus

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Background: Fecal calprotectin (FC) is a potential biomarker of intestinal inflammation. We examined fecal calprotectin concentrations in patients with type 1 diabetes mellitus (T1DM), and also aimed to provide evidence on whether children at risk of gastrointestinal inflammation by measurements of fecal calprotectin.

Methods: We included 26 T1D patients without complications and 15 healthy control subjects matched for age, sex and BMI. Rapid test for the quantitative determination of calprotectin in stool was used for measurement.

Results: The T1DM patients had significantly higher fecal calprotectin concentrations ($p < 0.01$). Of these patients, 15,38% (n = 4) had high cut-off of 100 mg/kg while this ratio was 6,6% of controls. Only one patient of these four diabetics had coeliac disease.

Conclusion: Higher concentrations of fecal calprotectin were associated with diabetes but not coeliac disease. Fecal calprotectin is not able to investigate the subclinical inflammation of coeliac disease and FC should be considered a useless tool in the diagnostic work-up for coeliac disease in T1DM.

P017
Hyperglycaemic hyperosmolar state: a report of two cases in PEG feeding children with underlying neuro-disability

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Background: Hyperosmolar hyperglycemic state (HHS) is characterized by marked hyperglycemia, hyperosmolality and dehydration without ketoacidosis. HHS is a rare diagnosis with a higher morbidity than DKA. We present two cases of HHS in gastrostomy fed children with underlying neuro-disability.

Methods: *R*etrospective chart review of patients with a diagnosis of HHS between 2012 and 2018.

Results: Two Caucasian females (14 and 15 years old) were identified. Both had underlying pre-morbid neuro-disability and were well established on long term gastrostomy feeds. In Case 1, dehydration was secondary to a two week history of gastro-enteritis, PEG site leak and concomitant respiratory illness. Case 2 had preceding polydipsia and dehydration related to travel to a hot climate.

Serum biochemistry for both cases demonstrated marked hyperglycaemia/hypernatraemia (41.6/169 and 54/169 mmol/l respectively), elevated serum osmolality (410 and 413 mmol/kg) and urea/creatinine (19.1/128 and 21.8/103) levels. Both had mildly elevated HbA1C% (6.6% and 6.9 %). Neither had evidence of ketosis. Both had negative T1D auotantibodies and a normal BMI Z-score of 19.5 and 18.

Case 1 was further complicated with multiple infarcts and sinus venous thrombosis on MRI Brain. Case 1 required up to 2units/kg/hr of IV insulin prior to titration and subsequently discontinued four days later. Case 2 remains on multiple dose injection therapy with low dose requirements 0.3unit/kg/day.

Conclusions: HHS can occur in children with non-T2D phenotype causing significant morbidity. Diagnosis can be challenging in children with neuro-disability who may be non-verbal or unable to access water freely. Preservation of intravascular volume can mask the severity of dehydration and result in late presentation. Deranged renal function can impair glycosuria and cause worsening hyperglycemia. Early identification and judicious fluid resuscitation should be a crucial focus for initial management in this subgroup.

P018
Use of home blood ketone meters is associated with a lower degree of metabolic deterioration in DKA

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Introduction: DKA is a potentially life-threatening condition and should be avoided by the use of all available patient education and technology methods.

Objectives: To investigate the use of home blood ketone meters immediately before admission for DKA among patients with known T1DM, and test the hypothesis that pH values were lower in patients with no home ketone measurements before admission.

Methods: All children in Sweden with known T1DM admitted for DKA and their caregivers were invited to participate in a two-year study from Feb 2015 to Jan 2017. Admission parameters and access to and use of home ketone meters immediately before admission for DKA were collected through patient records and questionnaires filled out by the caregivers and the attending physicians. Descriptive statistics were used to investigate proportions and Mann-Whitney U test to compare pH values in patients with or without home ketone measurements.

Results: Data from a total of 67 patients were recorded, corresponding to 56% of the 120 patients with known diabetes and DKA in the SWEDIABKIDS registry. Of these, 60 patients had received a home ketone meter and 36 (60%) patients had used it immediately before seeking medical assistance. Of all the patients, 43 (64%) used CSII and 24 (36%) MDI. In the CSII group, 42 (98%) had access to a ketone meter and 28 (67%) of those had used it. In the MDI group, 18 (75%) had access to a ketone meter and 8 (44%) had used it. The median pH value in the group who had measured ketones at home was 7.25 and in the group who had not measured ketones at home, the pH was 7.17 ($p = 0.009$).

Conclusions: Access to a blood home ketone meter reduces the risk for severe DKA and should be subscribed to all individuals on insulin treatment regimen.

Poster Tour 17 - Associated Disease

P019

Acute kidney injury in children with diabetic ketoacidosis - experience in a tertiary care hospital

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Background: Children with diabetic ketoacidosis (DKA) suffer from several complications like cerebral oedema, electrolyte imbalance, acute respiratory distress syndrome, acute kidney injury ((AKI)) etc., which are responsible for increased morbidity and mortality.
Objectives: To determine the rate of AKI in children (age < 15 years) with DKA and to identify the associated factors related to the development of AKI.
Methods: An observational study was done in Department of Pediatrics, BIRDEM General Hospital, Dhaka from January 2016 to December 2017. Total 73 DKA patients were admitted during this period. Data of all DKA patients were collected from medical records. The clinical and biological parameters were then compared between the patients with DKA who developed AKI and who did not developed AKI by using SPSS version 23.
Results: Among these 73 patients with DKA, 45 (61.6%) children were newly detected DM and 28 (37%) children were known case of DM. Male to female ratio was 1:1.8. Eleven (15%) child were below 5 years of age, 24 (32%) were between 5 to 10 years of age and 38 (52%) were between 11 to 15 years of age. Among them, 16 (21.9%) patients developed AKI. No statistically significant differences were found in demographic features of children with AKI and non AKI group. Low Glasgow Coma Scale (score-< 8), hemodynamic failure, high blood glucose level, severe acidosis and sepsis were significantly present in children with AKI. Among the patients with AKI, 11 children needed intermittent peritoneal dialysis and others responded to volume replacement therapy. Twelve (75%) patients were completely recovered from kidney injury and 4 (25%) patient were died.
Conclusions: This study documented that a high proportion of children with DKA may develop AKI and it is associated with increased morbidity and mortality of these children.

P020

Earlier resolution of ketosis than acidosis in DKA-time to change the goal post?

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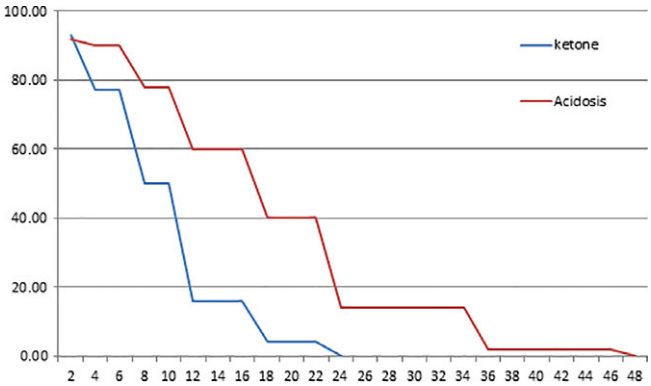
Introduction: Resolution of metabolic acidosis is the pre-requisite for discontinuation of acute therapy in diabetic ketoacidosis (DKA). Use of 0.9% normal saline as hydration fluid in DKA causes hyperchloremic metabolic acidosis, a self-limiting condition that does not require insulin therapy. Moreover, high cost and lack of availability limits repeated use of blood gas under these circumstances. Use of resolution of acidosis as criteria for discontinuation of acute therapy may prolong duration of DKA treatment in presence of hyperchloremic metabolic acidosis. Blood beta hydroxyl butyrate (BOB) level, marker of DKA state and unaffected by chloride levels, may be preferable. Validation of BOB as marker of resolution of DKA would help improve management in these settings.
Objective: To evaluate the role of blood BOB in assessing severity and response to therapy of DKA.
Design: Retrospective study of 93 DKA episodes (51 severe, 20 moderate and 22 mild) from January 2012-2018. Blood gas and BOB were measured at presentation and four hourly till resolution of DKA.
Results: Blood BOB levels were more than 3 mmol/L in all at presentation (5.7 0.9) but did not predict severity of DKA. Survival analysis revealed earlier resolution of ketosis compared to acidosis (10.5 0.7 hours versus 21.2 1.8 hours; Figure 1). Eighty five percent subjects had resolution of ketosis by 8 hours as against 30% for acidosis by this time. No subjects with resolution of ketosis had deterioration on follow-up.
Conclusion: Findings of our study highlight the role of blood BOB in monitoring treatment of DKA. Discontinuation of treatment using ketone as an end point would have reduced time of acute management of DKA by 50% compared to that for acid base parameters. There is a need for prospective study to further explore role of BOB in monitoring treatment of DKA.



[*Time trend showing resolution of ketosis and acidosis*]

P021

High rate of cerebral edema at presentation in Indian children with diabetic ketoacidosis: need for caution

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Introduction: Cerebral edema is the leading cause of morbidity and mortality in diabetic ketoacidosis (DKA). Identification of risk factors would help reduce the adverse effect of the condition.
Objective: To evaluate risk factors and course of cerebral edema in children with DKA.
Methods: Retrospective observational study (January 2012 - March 2018).
Results: Ninety-three episodes of DKA were observed during the period (age 9.1 ± 4.5 years). Twenty-one subjects had cerebral edema at presentation (22.6%) and 3 developed it at 29.6 ± 16.3 hours of treatment (3.2%). All subjects with cerebral edema had severe DKA (pH 6.90 ± 0.12 vs 7.13 ± 0.16; p < 0.001) and were more likely to have received treatment before presentation (odds ratio, OR = 3.9, confidence interval, CI = 1.4-11) and having fresh presentation of diabetes (OR = 3.3, CI = 1.3-10.8) than those without the condition. Base excess (BE) was the best predictor of cerebral edema among acid-base parameters with an OR of 15.3 for levels less than -20. Treatment prior to presentation was the only predictor of cerebral edema on logistic regression (exp B = 4.5, p = 0.04). Mortality was observed in 2 subjects with cerebral edema and severe acidosis (pH < 6.8). The remaining 22 subjects with cerebral edema had favorable outcome with ventilation required in 11. No mortality or need for ventilation was seen in those without cerebral edema. Cerebral edema prolonged the duration of insulin infusion (60.4 ± 22.3 h vs 25.8 ± 12.1 h; p < 0.001) and ICU stay (4.3 ± 2.2 days vs 1.8 ± 0.7 days; p < 0.001).

Conclusion: Findings of our study indicate a high prevalence of cerebral edema at presentation in Indian children with DKA. A high index of suspicion for cerebral edema is required in those with severe DKA and prior outside management. There is a need for early detection and uniform protocol based management of DKA.

P022

Effect of gluten free diet on metabolic control and anthropometric parameters in type 1 diabetes with asymptomatic celiac disease: a randomized controlled trial

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Objective: Effect of gluten free diet (GFD) in patients with type 1 diabetes mellitus (T1DM) and asymptomatic celiac disease (CD) remains unclear. The primary objective was to evaluate the effect of GFD on frequency of hypoglycemia, in patients with T1DM and asymptomatic CD. The secondary objective included effect of GFD on height, weight, glycosylated hemoglobin levels (HbA1c), insulin dose requirement and bone mineral homeostasis.
Design: Prospective open label randomized controlled trial.
Methods: Patients with T1DM and asymptomatic CD were equally randomized to receive either GFD (GFD group) or a normal diet (non GFD group) for one year. Primary outcome measure was frequency of hypoglycemic episodes (blood glucose < 70 mg/dl) as measured by self-monitoring of blood glucose (SMBG) at 6th month in GFD group vs. non GFD group.
Results: 30 patients were randomized to receive either GFD (n = 15) or a normal diet (n = 15). Mean number of hypoglycemic episodes/month as recorded by SMBG and mean time spent in hypoglycemia as measured by CGMS (in mins) in GFD group vs. non GFD group at 6th month was 2.3 vs 3.4 (p = 0.5) and 124.1 vs 356.9 (p = 0.1) respectively. There was significant decline in mean number of hypoglycemic episodes/month in GFD group (3.5 at baseline vs. 2.3 at 6 months, p = 0.03). Mean HbA1c level declined by 0.73% in GFD group and rose by 0.99% in non GFD group, at the end of follow up period. The difference in this mean change in HbA1c level from baseline between the groups was statistically significant (p = 0.02). Significant increase in body mass index was seen at the end of follow up period in GFD group.
Conclusion: This is the first randomized controlled study to assess the effect of GFD on metabolic control in patients with T1DM and asymptomatic CD. There was a trend toward decrease in hypoglycemic episodes and better glycemic control in patients receiving GFD, although this did not achieve statistical significance between the groups.

P023

Dermatological complications in children with type-1-diabetes using continuous glucose monitoring systems and insulin pumps part 2

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Objectives: The aim was to describe the prevalence, incidence and predictors of the skin problems observed in Danish clinics using glucose monitoring systems and insulin pumps in children, after a 4 to 6-month follow-up study to investigate fluctuation, seasonality and skin problems' impact on quality of life.
Methods: 138 patients within the age of 4-20 using CSII (n: 136) and/or CGM (n: 94) filled in a second questionnaire, 4-6 months after they responded to the first, about skin problems relating to CSII and CGM. The questions have been focusing on current skin problems and changes in treatment in the time between the two responses. Descriptive statistics, chi-squared test and advanced statistics (HrQoL RASCH modeling and GLLRM) were used to analyze the collected data.
Results: The study showed no significant difference in total current skin problems regarding the use of the CSII or CGM (p > 0.05 for both), though a paired t-test showed a significant reduction in red/-blue dots (p = 0.01) regarding the CSII. Although there was not a significant difference, the study reaffirmed that many patients currently have skin problems with 60% having skin problems to CSII and 40% having skin reactions to CGM. Patients still rate the skin complications to the CSII to be an average "moderate problem", compared with the skin complications to the CGM to be a "big problem" and therefore significantly worse (p < 0.0001).
Conclusions: Our research show that there is no significant difference regarding current skin problems 4-6 months after our pediatric patients responded to the first survey. Although skin complications are still very common among many of the children. This could indicate that more research is needed within this field to aid the prophylaxis and treatment of skin complications when using CSII and/or CGM.

P024

Sagittal vein thrombosis in a girl with diabetic ketoacidosis and iron deficiency anemia - a case report

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Cerebral venous thrombosis is a rare complication in general population and it is important for it to be diagnosed accurately as the management is specific and relatively simple. We report a girl with type 1 diabetes of 10 years duration who presented with mild diabetic ketoacidosis (DKA) and refractory seizures. On evaluation was found to have iron deficiency anemia (IDA) and mild hypocalcemia, due to vitamin D insufficiency. In spite of treatment and normalization of serum calcium, she still had refractory seizures, for which neuroimaging was performed which revealed superior sagittal sinus thrombosis. She was evaluated and found negative for precipitating prothrombotic conditions including all genetic and functional assays and autoimmune markers. Since she had no other etiological prothrombotic cause (except DKA and IDA), she was treated with 3 months of anticoagulation and antiepileptics without any morbidity. Repeat neuroimaging showed that there was complete recanalization of the vein. She remains well 2 years after the initial event. This case highlights the importance of doing early comprehensive investigation in face of atypical neurological features in patients of DKA especially as most CNS disturbances will be usually presumed to be cerebral edema.

P025

Anasarca and difficult to treat colitis in an adolescent with newly diagnosed type 1 diabetes mellitus following the resolution of diabetic ketoacidosis

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Introduction: Untreated Type 1 Diabetes Mellitus is a condition known to be associated with severe catabolism due to an absolute lack of insulin. In most cases we see an improvement in the condition of the patient once insulin therapy is initiated.
Objective: We report a newly diagnosed case with T1DM who came to us after resolution of DKA in anasarca and difficult to treat colitis.

Case Report: A 15 years old boy recently diagnosed to have T1DM was referred to us following the resolution of DKA for abdominal pain, diarrhea and anasarca.
The child was sick looking though vitals were stable. His BMI was 12kg/m2.
The child has severe abdominal tenderness and b/l pleural effusion.
USG Abdomen showed findings suggestive of colitis. The child was managed with i.v. fluids and antibiotics. He was gradually allowed orally and achieved euglycemia on subcutaneous insulin. However the child did not show any improvement in diarrhea and anasarca and even required a therapeutic pleural tap.
Work up for tuberculosis, HIV, dengue, and typhoid was done but it was negative. CT scan of the chest and abdomen was done which showed Gross ascites with moderate bilateral pleural effusion. Edematous colonic loops with thickening of jejunal folds.
Results: There was no proteinuria and a good oral intake of proteins should have resulted in an increase in serum protein.
When there was no improvement in the diarrhea despite one week of antibiotics we concluded that a severe catabolic state had been precipitated by untreated diabetes. The ensuing hypoalbuminemia lead to gut wall edema which did not allow the diarrhea to improve. Hence we gave him i.v. albumin, following which the diarrhea resolved.
Conclusion: Severe catabolic state precipitated by untreated T1DM can be difficult to treat even after resolution of DKA and initiation of appropriate insulin therapy. Though albumin should be used sparingly, persistent diarrhea with edematous bowel loops and hypoalbuminemia can respond very well to i.v. albumin.

P026
Management of DKA in a patient with coexisting type 1 diabetes mellitus and sickle cell disease

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Background: Type 1 Diabetes Mellitus (T1DM) and Sickle Cell Disease (SCD) are independently common diseases, although the coexistence appears rare. The role SCD has on diabetes control and frequency of Diabetic Ketoacidosis (DKA) is unclear, although as acidosis and dehydration can trigger a VOC (vaso-occlusive crisis), DKA can likely trigger a VOC. SCD patients with a VOC tend to independently have risk of dehydration due to insensible losses or hyposthenuria, potentially triggering ketosis.
Case: We present an 11-year-old female with Hemoglobin - SS Disease with subsequent diagnosis of T1DM at 4 years of age. Diabetes control was poor, with frequent DKA episodes, at times accompanied by VOC. Medical course was complicated by growth failure, hepatopathy, pancreatitis, multiple periventricular watershed infarcts and intraparenchymal hemorrhagic infarcts.
Objectives: Understanding specifics of fluid management and pain control in patients with DKA with VOC.
Methods: Literature review was done in PubMed in February, 2018 with terms 'T1DM' and 'SCD'. Guidelines for T1DM and SCD were individually reviewed.
Discussion: Fluid resuscitation in DKA is done cautiously due to risk of cerebral edema, and often with isotonic fluids initially to prevent rapid fluid shifts. Excessive isotonic fluids in a VOC could lead to increased sickling, for which continued hydration with hypotonic fluids is often recommended. Pain control is complex as opiate therapy used frequently in VOC may limit mental status exam and prevent adequate monitoring for cerebral edema.
Conclusion: Poor control of one condition could exacerbate the other, therefore management of a DKA episode with concurrent VOC requires consideration of multiple factors, including specifics of fluid resuscitation and appropriate pain management. Treatment should balance the goals of one condition without increasing risk of complications of the other.

P027
Admissions rate due to ketosis episodes and DKA in children and adolescents with type 1 diabetes. Report of 178 episodes during the period 2010-2017 in a tertiary hospital

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Introduction: DKA is the main cause of death in children and adolescents with T1DM. Identification of predisposing factors is therefore an opportunity to identify risk groups and prevent it.
Objectives: To describe the rate and characteristics of ketosis and DKA admissions in patients with T1DM in a tertiary urban hospital.
Methods: Retrospective study analyzing demographic, clinical and laboratory parameters regarding admissions due to acute episodes of ketosis or DKA in a tertiary hospital during the period 01/01/2010 - 31/12/2017.
Results: 178 episodes of hospitalizations (belonging to 117 subjects) due to ketosis or DKA were identified: 27 hyperglycemia with ketosis; 46 mild DKA; 59 moderate DKA and 46 severe DKA. The incidence of DKA was 2.85/100 patients-year, showing an oscillating trend during this period. For the total number of episodes average age at presentation was 13.04+/-4.04 years; gender (38%♂ /62%♀); diabetes duration 5.04+/-3.40 years; previous HbA1c 9.10+/-1.97%; 21.2% immigrant background; 82% MDI vs 18% CSII; time of hospitalization 1.68+/-1.19 days; 15.7% required ICU care. In 34.3% episodes insulin omission was reported; in 20.8% a concomitant illness was identified; 10.8% subjects reported problems with the pump infusion set and in 34.1% no predisposing factors were identified. In subjects with severe DKA, a longer period between the last follow up visit and the admission was identified (severe 4.33+/-5.54months; moderate 3.41+/-4.94 months; mild 2.44+/-3.02 months).
Conclusions: The rate of hospitalizations due episodes of ketosis or DKA in a tertiary hospital remains stable through the last years and slightly lower than the rates reported by the DPV registry. Subjects in our cohort tended to present an average age close to adolescence, female sex predominance and elevated HbA1c (>9%). The identification of subjects in risk to develop DKA may address the development of specific approaches aimed to avoid admissions in this selected population.

Poster on Display – Associated Diseases

P028
Metabolic syndrome and prediabetes among obese Arabic children in Kuwait

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Introduction: The Kuwait Nutrition Surveillance System (Ministry of Health 2015; https://www.moh.gov.kw/en/Ministry-Statistics) reported that 26.2 % of schoolchildren (>5-19 years) were obese. Information on metabolic complications related to obesity are critical components of risk assessment related to long term health outcomes. The metabolic syndrome (MetS) refers to a cluster of factors that increase the risk of cardiovascular disease and diabetes.
Objective: To estimate prevalence of MetS and prediabetes in obese Arabic children (12-17 years old)
Methods: Obese (BMI for age z-scores >+2 according to WHO; http://www.who.int/growthref/who2007_bmi_for_age/en) "apparently healthy" boys and girls 12-17 years old will be recruited. Informed written consent will be obtained from one parent. Children will provide oral informed assent. Anthropometry (body weight/height and waist circumference) and blood pressure will be measured. Venous blood will be drawn after an overnight fast. MetS will be based on the International Diabetes Federation (IDF) consensus definition of the metabolic syndrome in children and adolescents (https://www.idf.org/e-library/consensus-statements.html). Prediabetes will be based on HbA1C in the range 5.7- 6.4 % or fasting blood glucose 5.6-6.9 mmol/l. All children will be counseled about the importance of lifestyle modifications to reduce body weight. If needed, children will be referred for additional assessment.
Results: Preliminary results based on 95 obese children indicate that 18.9 % (19.3 % boys and 18.4 % girls) had MetS. 17.5 % had fasting blood glucose in the range 5.6-6.9 mmol/l and 28 % had HbA1C in the range 5.7-6.4 %. One child had HbA1C at 6.5 %.
Conclusions: These results indicate that metabolic complications are relatively common in obese Arabic children. More attention is needed to address MetS and prediabetes in populations with high prevalence of childhood obesity.

P029
Prevalence of thyroid auto-immunity in children and adolescents with type 1 diabetes mellitus and their siblings

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Introduction: Autoimmune pathology in type 1 diabetes mellitus (T1DM) predisposes the children to other autoimmune disorders like Autoimmune Thyroiditis (AIT). Anti TPO antibody titer estimation can detect AIT before the onset of thyroid dysfunction in these children.
Objectives: To assess the prevalence of thyroid auto-immunity in Indian children and adolescents aged 2-18 years withT1DM.
Methodology: This was hospital based cross-sectional study conducted at Kalawati Saran Children's Hospital, New Delhi from November 2014 to March 2016. The study population consisted of 3 Groups; Group A- 120 children withT1DM, Group B - 120 siblings of the index cases and Group C- 120 healthy age and sex matched control children. Children in all the 3 groups were screened for thyroid peroxidase antibodies (anti TPO) and thyroid function (free T4 /T3 and TSH levels) using solid phase, enzyme labeled electrochemiluminescent sequential immunometric assay (ECLIA).
Statistical Analysis: The proportion of children with positive anti TPO titers and thyroid dysfunction were assessed and compared among the 3 groups. Chi-square test was used to find association between the categorical variables and expressed as Odds ratio with 95% confidence intervals (CI). A p-value < 0.05 was taken as significant.
Results: The prevalence of anti-TPO positivity (25%) was much higher among the children with T1DM than their siblings (8.3%) and unrelated healthy control children (6.7%) though the prevalence of autoimmune thyroid disease (AITD) was not different among the 3 groups. Children with T1DM were 4.7 (CI- 2.0 -10.7, p < 0.001) times more likely than healthy unrelated controls and 3.7 (CI- 1.7 - 7.9, p - 0.001) times more likely than their siblings to have a positive anti-TPO titer.
Conclusions: There is a definite need to screen all children with T1DM for thyroid autoimmunity and regularly follow up those in whom these antibodies are positive.

P030
Prevalence of thyroid disorders in a cohort of children and adolescent diagnosed with T1DM before 18 yrs of age

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Introduction: Autoimmune thyroid disease and T1DM are two autoimmune diseases frequently associated, especially in pediatric population. Autoimmune thyroiditis occurs in approximately 8 to 17 % [1,2]. Up to 20 percent of patients with T1DM have positive antithyroid antibodies [3]. Population studies of school girls in India have suggested evidence of juvenile autoimmune thyroiditis at 7.5 % [4]. Coexisting thyroid disorders significantly affect the insulin requirement, glycaemic control, hypoglycaemia and optimal growth in them. It is essential to identify and treat them at the earliest to avoid untoward problems.
Objectives: To determine the prevalence of thyroid disorders in cohort of children and adolescents with T1DM diagnosed before 18 yrs of age at our center.
Methods: A cross sectional data analysis of all children and adolescent registered at our institute and diagnosed with T1DM before 18 yrs of age from Jan 2013 to April 2018. Thyroid function test were done as a part of annual screening, suspicion of goiter, symptoms of hypothyroidism, unexplained hypoglycaemia or reduction in insulin dose.
Results: T1DM diagnosed before 18 yrs of age = 408
TFTs data available in 322 (79%) Female (54%)
Hypothyroid = 46 (14.3 %) [Female 29 (63 %)]
Euthyroid with positive Anti TPO antibodies = 8 (2.48 %)
Hyperthyroid = 3 (0.93 %)
Euthyroid = 265 (82.3%)
Conclusions: Thyroid disorders are frequently present among T1DM patients (14.3 % hypothyroid and 0.93 % hyperthyroid) and can imbalance the glycaemic control. It reinforces and supports a call for improvement in the quality of health care services, including provision of universal screening for thyroid function in children with T1DM.

P031

Assessment of metabolic syndrome risk in children & adolescents as per the recommendation based on the age and sex-specific reference curves for Waist Circumference (WC) for Indian children by Khadilkar et al

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Objective: To assess the risk of metabolic syndrome (MS) in children and adolescents as per the suggested cutoff values of 70th percentile according to the Khadilkar et al age and sex specific reference curves for Waist Circumference (WC) for Indian children.
Study Design: A total of 250 children (134 girls, 116 boys) aged 6 to 18years referred to our center from January 2016 to April 2018 with WC >70th percentile were screened for metabolic syndrome risk factors. BMI, blood pressure, and levels of fasting triglycerides, high- density lipoprotein (HDL) cholesterol, and plasma glucose were recorded for all children.
Results: Prevalence rates of MS in the pediatric age group vary depending on the criteria used. **The International Diabetes Federation**'s (IDF) definition of the MS in children, divided into 3 age groups (6-10yr, 10-16yr, and 16+ yr), includes abdominal obesity as a criterion for the diagnosis of MS in children.
As per this definition, 49 out of 250 (19.83%) children aged 6-18yr met the criteria for pediatric metabolic syndrome.

AGE	6 to <10 yr (n = 86)	10 to <16 yr (n-148)	16-18 yr (n = 16)
% meeting the IDF criteria	12.7%	20.3%	50%

[*Age-wise distribution as per IDF*]

Children were also evaluated for MS as per the modified definition proposed by **NCEP/ATPIII**. As per this definition, 44/112 (39.28%) children in the age group of 12-18 yr and 50/138 (36.23%) children in the 6 to < 12yr age group met the criteria for pediatric metabolic syndrome.
Conclusion: Overall, 37.6% and 19.83% children met the NCEP/ATPIII & IDF criteria respectively. The low incidence of MS with IDF definition may be due to the cut-off value used for blood pressure as systolic BP ≥130 or diastolic BP≥85mmHg for all age groups.
The 70th WC percentiles cutoff as per Khadilkar et al. to screen for MS in Indian children seems appropriate since the prevalence in our study is significantly high.

P032

Depression disorders in children with type 1 diabetes mellitus

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Introduction: Depression is under-diagnosed in children with type 1 diabetes.
Objectives: To determine the prevalence of depression disorders in children with type 1 diabetes attending Alexandria University outpatient clinics and identify the possible risk factors of depression in children with diabetes.
Methods: This case control study conducted on 100 children with type 1 diabetes with at least 6 months of illness, aged 7 to 18 years and 100 non diabetic children matched for age and sex as control group. Children with Chronic illness other than diabetes mellitus were excluded .All children included in this study were subjected to full history of diabetes including: age at onset, duration of diabetes, previous hospital admission due to hyperglycemia or hypoglycemia, type of insulin administered and method of administration, number of injections and dose. They completed the Children's Depression Inventory (CDI) Arabic form. Glycemic control was determined by calculating the mean of the last two or more readings of HBA1c.
Results: The diabetic children had significantly higher depressive score compared to the control; mild , moderate and severe were 26%, 40% and 29% in diabetic children compared to 55%, 28% and 6 %, respectively.
Conclusion: Children with diabetes had high depressive score

P033

Prevalence of Celiac disease and autoimmune thyroid dysfunction in children with type 1 diabetes

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Objective: To estimate the prevalence of Celiac disease (CD) and autoimmune thyroid dysfunction (AITD) in children with type 1 diabetes.
Study Design: The analysis included 177 (83 girls, 94 boys) children and adolescents with a diagnosis of Type 1 Diabetes who were followed up for a duration of more than 2years at Sir Ganga Ram Hospital, a tertiary care hospital in Northern India.
Results: Biopsy-confirmed CD was present in 18 (10.16%) children. Duration of diabetes at the time of CD diagnosis was <2 years in 13 (72.22%), >2-5 years in 4 (21.05%), and >5 years in 2 (10.52%) children. Celiac disease was found in 11/94 (11.7%) boys and 8/83 (9.63%) girls.
We found 28 (15.81%) cases of autoimmune thyroid dysfunction, 27 (15.25%) cases of hypothyroidism and 1 of hyperthyroidism. Duration of diabetes at the time of diagnosis of AITD was < 2 year in 17 (60.71%), >2-5years in 4 (14.28%), >5 years in 3 (10.71%) children. AITD was present in 3 (10.71%) children prior to the diagnosis of Type 1 Diabetes. AITD was present in 18/83 (21.68%) girls and 10/94 (10.63%) boys.
Conclusion: CD and AITD are common comorbidities in children with type 1 diabetes. The findings support routine screening for CD & AITD in patients with type 1 diabetes, particularly within the first 2 years after the diagnosis of diabetes. The prevalence estimate for CD is slightly higher in our study compared with a review conducted over three continents where an overall prevalence of 3.5% (1.9-7.7%) was reported. The difference in the prevalence could be because of the smaller number of children included in the study.

P034

Time course and predictors of development of celiac disease in type 1 diabetes

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Introduction: Celiac disease (CD) is common in subjects with type 1 DM. Lack of characteristic clinical features mandates the need for screening for the condition. The duration and frequency of the screening is unclear. An understanding of time course and predictors of celiac disease in type 1 DM would held devise screening strategy for the same.
Objective: To study the time course and predictors of development of celiac disease in type 1 DM.
Methods: Retrospective Observational Study. Tissue transglutaminase antibody levels were estimated at diagnosis and annually thereafter. Celiac disease was diagnosed on the basis of positive TTG levels and characteristic features on duodenal biopsy.
Results: One fifty children and adolescents with Type 1 DM (89 boys) diagnosed at the age of 7.9 ± 4.1 years were followed for 4.4 ±

4 years (range 1-19.2 years). Celiac disease was identified in 23 subjects (15.3%). Two subjects had CD before type 1 diabetes. Seven subjects were identified with CD at diagnosis of T1DM. New onset CD was identified in 14 children 3.3 ± 3.2 years (range 1 -12.6 years) after diabetes onset. Survival analysis revealed that 83.3% of subjects with new onset CD were identified within 5 years of onset of diabetes. Subjects with new onset celiac disease (n = 14) had compromised growth (weight standard deviation score, SDS -1.2 ± 1.1 versus -0.8 ± 1.5 and height SDS -0.8 ± 1.2 vs -0.1 ± 2.4) and higher insulin requirement (1.6 ± 0.5 vs 1.1 ± 0.5) at presentation than those who remained celiac disease free on follow-up.

Conclusion: Findings of our study demonstrate high prevalence of new onset celiac disease in subjects with Type 1 diabetes on follow-up. There is a need for periodic estimation of TTG in subjects with type 1 diabetes till at least 5 years of diagnosis. Growth failure and high insulin requirement predict development of celiac disease in these subjects.

Poster Tour 02 - Monogenic & Other Form of Diabetes

P035

Neonatal diabetes with extra hepatic biliary atresia due to PDX1 mutation without exocrine pancreatic insufficiency - a rare case

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Introduction: Permanent Neonatal diabetes is a rare disease. Most of permanent neonatal diabetes are caused by singles gene mutation in potassium channel genes (KCNJ11, ABCC8) or in the insulin (INS) gene. PDX-1 mutation is a rare cause for PNDM and usually associated with Annular Pancreas, Duodenal Atresia, Hypoplastic Gall Bladder and Exocrine Pancreatic Insufficiency. We wish to report a case of permanent Neonatal diabetes due to homozygous novel mutation in the PDX1 gene with unreported association of extrahepatic billiary atresia without exocrine pancreatic insufficiency.

Case Report: A preterm (36weeks) boy 1.36 kg, 3rd born to third degree consanguineous parents had hyperglycemia on day 2 of life. There was anhydramnios and IUGR by antenatal scans. Initial Genetic analysis for ABCC8, KCNJ11, INS, EIF2AK3 mutations were negative with pending results for rare mutations. Child was discharged by day 32 of life with subcutaneous lispro insulin needed as per CBG monitoring. On day 45 child presented with lethargy, poor feeding and vomiting. There was history of clay colored stools for past 10 days. Workup revealed conjugated hyperbilirubinemia, anemia, thrombocytopenia, deranged coagulation profile. HIDA scan and liver biopsy suggestive of extra hepatic biliary atresia. Child was managed with vitamin supplements, antibiotics for sepsis and required multiple transfusion for refractory anemia. He also developed severe exfoliative dermatitis. Despite our efforts, child expired due to sepsis. Genetic mutations for rare genes of NDM showed homozygous frameshift variant for PDX1 gene. Parents were heterozygous carriers for the mutation. There was no evidence of exocrine pancreatic deficiency in the child.

Conclusion: Our case highlights the possible association of Neonatal diabetes caused by PDX1 gene mutation, with extra hepatic billiary atresia and refractory anemia, without exocrine pancreatic deficiency which has not been reported so far.

P036

Comparison of differences in clinical characters and courses between a girl with GCK-MODY and the normal sibling

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Objectives: Heterozygous inactivating mutations in the glucokinase (GCK) gene cause maturity-onset diabetes of the young (GCK-MODY), which is a mild familial diabetes mellitus. Because of reports of fetal growth retardation, we compared the prenatal and postnatal course of a GCK-MODY case and her normal sibling.

Target and Methods: Case 1 (proband): She was born as a SGA baby with a gestational age of 37 weeks and 1 day, height 39.5 cm, weight 1,542 g. Hyperglycemia and failure to thrive was recognized; at 9 months, the blood glucose level was around 140 mg/dl in CGM. The p.Gly72Arg mutation was confirmed heterozygously in exon 3 of the GCK gene, and the patient was diagnosed as GCK-MODY.

Case 2 (mother of the proband): At the age of 34 years, insulin was administered after diagnosis of gestational diabetes in case 1. Since case 1 was GCK-MODY, genetic testing was conducted and similar genetic abnormalities were found.

Case 3 (Presenter´s sister): Born SGA with a gestational age of 37 weeks 5 days, height 44 cm, weight 2,305 g. No hyperglycemia was observed after birth, and no genetic variation of the GCK gene was observed. Case 1 and case 3 were compared at the fetal stage: estimated body weight, postnatal height, weight course.

Results: The estimated body weight of Case 3 in the fetal stage was about -0.9 SD; in case 1, severe hypoplasia of about -3.5 SD was observed , and after birth, prominent growth disorder was seen.

Conclusions: In Case 1, we suggest that the failure of growth in fetal life was due to low insulin secretion and that SGA had a large influence on the postnatal growth disorder. In cases of maternal hyperglycemia, childhood fetal hypoplasia, and postnatal hyperglycemia, the possibility of GCK-MODY should be considered. Decisions on treatment policy and glycemic control must be effective during next child pregnancy.

P037

Demographical and clinical characteristics of 12 patients with thiamine-responsive megaloblastic anemia syndrome: data from the German/Austrian DPV Registry

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Objectives: Thiamine-responsive megaloblastic anemia syndrome (TRMA) is an extremely rare disorder characterized by a triad of megaloblastic anemia, non-type I diabetes mellitus, and sensorineural deafness. The aim was to characterize the clinical phenotype of this very rare type of diabetes by means of multicenter data documentation.

Methods: The standardized diabetes patient follow-up registry DPV currently comprises data on 499,325 patients with diabetes from 464 centers in Germany, Austria, Switzerland, and Luxembourg. The database was searched for the additional lifetime diagnosis of TRMA/Rogers syndrome. We analyzed demographic data (age, sex, duration of diabetes), glycemic control (HbA1c), insulin dose as well as treatment regimen. For the present study, data from the last documented visit were considered. All statistics were carried out with SAS 9.4.

Results: The DPV registry comprises information on 12 patients with TRMA. The patient characteristics are shown in table 1.

	Patients with TRMA (n = 12)
Age at analysis [years]	13.02 (7.30-17.02)
Age at diabetes onset [years]	1.46 (1.22-5.91)
Current age < 18 years	75%
Male patients	42%
Duration of diabetes [years]	7.22 (3.80-14.00)
Insulin treatment	92%
Insulin dose [units/kg]	0.81 (0.37-1.06)
HbA1c [mmol/mol]	50.38 (46.01-60.55)
Pump use	18%

[*Table 1: Characteristics of patients with TRMA as median with quartiles or proportion*]

According to the literature, many patients with TRMA do not require insulin at the beginning of diabetes. In the further course, however, most patients with TRMA do become insulin-dependent as observed in our study. Our data confirm the observation of other authors that diabetes in patients with TRMA mostly develops in the first 5 years of life.

Conclusion: Data on long-term observation of the further course of diabetes in patients with TRMA are scarce and confined to a few case-reports. Aggregation of data on patients with TRMA in a registry could provide the basis for long-term follow-up of a larger cohort of patients with this very rare disease.

P038
An adolescent with Rabson-Mendenhall syndrome: long-term follow-up

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Backgound: Rabson-Mendenhall syndrome is extremely rare disease with significant insulin resistance, growth retardation, dysmorphisms, lack of subcutaneous fat, acanthosis nigricans.

Aim: To analyze a long- term follow-up of case of Rabson-Mendenhall syndrome in boy.

Materials and Methods: The parents of child are cousins. The boy is from VII pregnancy at 35 week, birth height is 41 sm, weight is 2150 g, 7/8 on Apgar scale. He had marked significant intellectual and psycho-speech delay after one year of life. At the age of 4 Rabson-Mendenhall syndrome was established by geneticist on basis of phenotypic features. At the age of 9 glycemia was 29.3 mmol/l, insulin 400 ME/ml. Insulin therapy was started, however, mother stopped it. During 4 years the mother of boy did not appeal to health care professionals. At the age of 13 boy was hospitalized: HbA1c 14.1%, diabetic non proliferative retinopathy, neuropathy was revealed. The patient received a high insulin doses, a metformin was added, however glycemia was 9.6-15.5 mmol/l. At the age of 17 the boy was once again hospitalized, the therapy was corrected: total insulin doses 128 U/day, metformin 1700 mg/day. Objective status: height -104 sm. (SDS -10.63), weight -20 kg, BMI -18.5 kg^2/m^2 (SDS -1.2). A significant acanthosis nigricans in the neck, axillary cavities, elbows folds. The laboratory: cholesterol 7.27 mmol/l, glomerular filtration rate 35 mg/min, HbA1c - 11.4%. Diabetic proliferative retinopathy OU, terminal stage, diabetic cataract OU, retinal detachment of OU was diagnosed. The parallel sequencing (IOM Torrent platform) revealed homozygous replacement c.3539+4_8delICGTCT ins TGACAGTAAACCTTCAA in *INSR* gene (MIM#: 147670, reference sequence NM_000208.2). The patient was discharged with improvement of glycemic profile, however glucose fluctuations was 7.0-15.1 mmol/l.

Conclusion: Only few cases of Rabson- Mendenhall syndrome in child are described in literature, so this case presents a great interest.

P039
Monogenic diabetes (MODY) study in Kuwait: initial report

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Background: MODY describes a heterogeneous group of monogenic inherited disorder of diabetes. MODY 3, the most common subtype, is caused by mutations in *HNF-1 alpha* (hepatocyte nuclear factor -1 alpha). MODY 5 is caused by mutations in *HNF-1 beta* (hepatocyte nuclear factor-1 beta) and is characterized by developmental renal disease and pancreatic atrophy.

Objectives: To study the prevalence of MODY in patients with autoimmune negative type 1 or type 2 diabetes diagnosed before the age of 25 years and have a family history of diabetes.

Methods: Targeted next-generation sequencing tested mutations of known /putative monogenic diabetes gene by targeted next-generation sequencing at Exeter Laboratory.

Results: Out of 50 subjects enrolled in the study 12 had tested positive. In the following report, we describe the clinical features and the molecular genetics results of two positive mutation subjects. The first is a female diagnosed at the age of 16 years with type 1 diabetes, who had C- peptide of 1.2 ng/ml and strong family history of type 2 diabetes in both her mother and sister. She required small doses of insulin (0.5 unit/kg) to maintain good glycemic control. The second subject is a 13-year-old male who was diagnosed soon after birth with chronic renal failure due to bilateral cystic kidney disease. He had renal transplantation at the age of 3 years and developed diabetes at the age of 10 years.

Results: Sanger Sequencing of *HNF1A* gene revealed a heterozygous mutation, insertion of cytosine at nucleotide 872 (c.872dupC) in the first subject, confirming the diagnosis of MODY 3.Gliclizide was started and HbA1c dropped to 6.8%. Sequencing of *HNF1B* gene revealed a mutation p.E138K consistent with a diagnosis of renal cyst and diabetes syndrome (RCAD) in the second subject.

Conclusion: Diagnosis of MODY can have significant implications for the guidance of appropriate treatment, prognosis and genetic counseling.

P040
Case series on thiamine responsive megaloblastic anemia syndrome (Rogers syndrome): a rare form of monogenic diabetes mellitus in children

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Objective: To study the clinical presentation and outcome of children presenting with Type 1 diabetes mellitus and thiamine-responsive megaloblastic anemia (TRMA) syndrome.

Methods: Five children who were investigated for anemia were also found to be thriving poorly with onset of polyuria hence a diagnosis of non-autoimmune type 1 diabetes mellitus was considered since these features were also associated with sensorineural hearing loss. Appropriate diagnostic workup and management was carried out and the children were regularly followed up as outpatients.

Results: The mean age of presentation was 23.2 months. Mean hemoglobin at presentation was 3.44 gm/dl while mean hemoglobin after treatment with thiamine was 10.96 g/dl (range: 9.1-12.3 g/dl). There was dramatic improvement in hematological picture also with thiamine. All children were treated with oral thiamine 150 mg daily.

Two out of five children required insulin only during presentation and were soon weaned off. Requirement of insulin fell from 1unit/kg/day to 0.5 unit/kg/day in other three subjects. Hearing loss persisted in all and did not show any improvement with thiamine.

Conclusion: TRMA syndrome (Rogers syndrome) is a triad of megaloblastic anemia, sensorineural hearing loss and diabetes mellitus. Disturbances of thiamine transport into the cells results from mutations in the *SLC19A2* gene. In anemic children with type 1 diabetes mellitus and severe pallor at presentation, a high index of suspicion of megaloblastic anemia should be considered as a possibility. Oral treatment with thiamine results in amelioration of anemia and hyperglycaemia. It is gratifying to see that some children may not even require treatment with insulin for control of hyperglycaemia but they need regular monitoring. Any diabetic child with anemia and/or deafness should therefore be evaluated for Rogers Syndrome using *SLC19A2* gene analysis. Lifelong treatment with pharmacologic dose of thiamine (25-75 mg/day) is advised.

P041

Diabetes and Down's syndrome; psychosocial health, family dynamics and challenges in diabetes self-care

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Introduction: The risk of having type 1 diabetes (T1D) have been estimated to be almost fourfold among individuals with Down's syndrome (DS).

Objectives: The aim of the study was to examine psychosocial health and challenges in keeping a good glycaemic control in children, adolescents and young adults with Down's syndrome and diabetes.

Methods: 11 parents (6 mothers, 5 fathers) of all 6 available children in the catchment area (12-22y) with Down's syndrome and diabetes participated in the study. A semi-structured interview guide was constructed for the interviews. These were audiotaped, transcribed and analyzed by using qualitative content analysis; a method for systematic analysis of interview texts in various steps. The qualitative content analysis used was influenced by Graneheim and Lundman.

Results: From data analysis emerged one main theme, 3 categories and 12 subcategories. The main theme was “Psychosocial impact and challenges in diabetes self-care”. Psychosocial impact from the diabetes diagnosis involves the young individual as well as his/ her family. For the young individual the reason for social restrictions were mainly their need of continuous help with the diabetes self-care. Feelings of guilt toward siblings were brought up in many of the interviews. The diabetes care sometimes was a cause of conflict between the parents but also made them strong as a team.

Conclusions: The social consequences of diabetes diagnosis in children, adolescents and young adults with DS are the most prominent in our results. The diabetes diagnosis causes continuous need for help and support in a lifelong perspective and thus affects these individuals in terms of social restrictions and less prospects of independency. Siblings are often neglected and feelings of guilt were common among the parents. An important challenge in diabetes self-care is handling persistent fear of diabetes related procedure in these children.

P042

Two patients with diabetes and mutations in genes that regulate beta cell function in mice

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Objective: Two patients are described with new onset diabetes and mutations in genes that are known to regulate beta cell function in animal models.

Methods: Patients who presented to the University of Virginia Children's Hospital for clinical care

Results: Patient C presented at 11 yo with hyperglycemia, 25 mM. She had no acidosis. C-peptide was 1.1 ng/ml. She is overweight, has shortened 5th digits, micrognathia and hypertelorism. She had a seizure disorder starting at 14 month old and MRI and EKG were normal. At 8 yo she had a seizure followed by ventricular fibrillation. She was successfully defibrillated. Genetic testing revealed a mutation in RYR2 gene, c.7025 G>A and p.Gly2342Glu, associated with Catecholaminergic Polymorphic Ventricular Tachycardia (CPVT). The gene encodes an endoplasmic reticulum calcium ion channel that is present in cardiomyocytes and beta cells. The murine knock-in model has decreased glucose-stimulated insulin release with ER stress response, mitochondrial dysfunction, and beta cell apoptosis. Complicating this picture, however, is the fact that GAD65 Ab = 0.14 (normal < 0.02), IA-2 Ab = 0.32 (normal < 0.02), ZnT8 Ab = 61.6 (normal < 15), IAA = 0.00 (normal < 0.02) at Mayo Clinical Labs.

The second patient presented at 12 yo with hyperglycemia, 30 mM. She had no acidosis. C-peptide was 0.54 ng/ml. She was normal weight and had bilateral ptosis, aniridia and nystagmus. She has a known PAX6 mutation, W257X. PAX6 is a transcription factor that is required for normal development of the eye and also for normal islet cell number, morphology, and hormone gene expression. Complicating this picture is the fact that GAD65 Ab = 0.10, IA-2 Ab = 0.05, ZnT8 Ab < 15, and IAA = 0.00.

Conclusions: Both of these patients with diabetes carry mutations in genes that cause disruption of normal beta cell function. They both also have positive islet cell Ab's. These mutations may contribute to development of diabetes.

P043

Severe diabetic ketoacidosis with cerebral edema in a patient having relapse of TNDM due to R50Q mutation in the *KCNJ11* gene

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TNDM presents within the first 6 months of life with remission in childhood. The most common cause of TNDM is an abnormality of chromosome 6q24. Other causes include an activating mutations in *KCNJ11* or *ABCC8*. Some patients with TNDM may relapse later in life. Clinically, relapse is considered to resemble type 2 diabetes.

We present the case of TNDM with severe diabetic ketoacidosis threatening brain edema and developed complications: diabetic polyneuropathy, OU cataract.

Result: The girl was diagnosed with NDM in 3 months old and at 1 year her hyperglycemia remitted. After that her mother did not apply for medical care, therefore, glycemia was not controlled.

From the age of 13 periodic episodes of lethargy and headache were noted. At the age of 14 she was admitted to the hospital with dispnoea and signs of severe dehydration. Diagnostic work-up revealed hyperglycemia (414 mg/dL) with severe ketoacidosis: pH 6,8; BE -31.8 mmol/l, lactate 2.9 mmol/l, blood ketones 7.5 mmol/l. HbA1c was 17.2%. C-peptide level was undetectable.

CT scan of brain demonstrated the signs of developing brain edema. The girl recovered from ketoacidosis within 72 hours and was started on subcutaneous insulin 1,2 U/kg/day.

Further examination showed diabetic polyneuropathy and OU-cataract that are an evidence of prolonged hyperglycemia.

Molecular genetic analysis revealed a heterozygous c.149G>A p. R50Q mutation in *KCNJ11* gene.

Two months later the girl was successfully transferred to glibenclamide (0.45 mg/kg/day). A scheduled re-evaluations at 6 months showed improvement in glycemic control (HbA1c 6,2%).

Conclusion: The obtained data underscore the need for child regular observation during TNDM remission in order to permit timely detection of relapse and prevention of diabetic ketoacidodsis and microangiopathy. Molecular genetic analysis allows to personalize hypoglycemic therapy improving glycemic control and life quality in patients with NDM.

Poster on Display - Monogenic & Other Form of Diabetes

P044

A rare case of Kearns Sayre syndrome with three co-existing endocrine complications in a child

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Background: Kearns Sayre Syndrome is a heterogeneous mitochondrial disorder with multisystem involvement in the form of myopathy, external opthalmoplegia, pigmentary retinopathy, heart block, cerebellar ataxia and endocrinopathies.
Case: We report a 12 year old boy with a background of bilateral sensorineural hearing loss who presented to the endocrine clinic with faltering growth. Endocrine testing confirmed the presence of growth hormone deficiency and central adrenal insufficiency. As he had bilateral partial ptosis with opthalmoplegia, it raised the suspicion for a mitochondrial disease. Muscle biopsy was performed which showed the characteristic 'red-ragged appearance' of muscle fiber, confirming Kearns Sayre Syndrome. He went on to develop other systemic involvement including diabetes mellitus, which required subcutaneous insulin.
Discussion: This is one of the few reports of endocrinopathies being the first presenting complaints in Kearns Sayre syndrome. We discussed the usual presentations of Kearns Sayre Syndrome in literature and the management of his mitochondrial diabetes.

P045

An unusual presentation of monogenic diabetes mellitus in a girl with Turner syndrome

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Background: Turner syndrome is a genetic condition characterized by the partial or complete absence of an X chromosome in a girl. Girls with Turner syndrome are at increased risk of type 1 and type 2 diabetes. In contrast, there have been no previous reports of monogenic diabetes mellitus associated with Turner syndrome.
Case: We report a 12 year old girl who presented with recurrent candidiasis over 9 months associated with an elevated random blood sugar level with a HbA1c of 10.9%. She had no symptoms of polyuria, polydipsia or loss of weight and she was not in ketoacidosis. Her C peptide levels were not elevated at 721 pmol/L (364-721). Anti-islet cell antibody and anti-GAD antibody were negative. She was not overweight with a BMI of 19.0 kg/m2 with no features of insulin resistance on examination.
In addition, she was found to have short stature (height measured was at 3rd percentile, weight was at 10th-25th percentile) and she was prepubertal. Investigations showed hypergonadotrophic hypogonadism and chromosomal karyotyping confirmed the diagnosis of Mosaic Turner syndrome.
She was started on insulin therapy and achieved good control with a low total daily dose of insulin at 0.3 units per kg per day. Genetic testing identified a novel variant in exon 8 of HNF4A gene, confirming the diagnosis of MODY 1. She was weaned off insulin after 3 months and has maintained euglycemia on diet control.
Conclusion: Girls with Turner syndrome are at increased risk of adiposity, insulin resistance and the subsequent development of type 2 diabetes mellitus and also an increased risk of type 1 diabetes mellitus due to autoimmunity. In girls with Turner Syndrome and diabetes without the features of obesity, insulin resistance and negative insulin antibodies, it is important to screen for monogenic diabetes as this has a significant impact on treatment and long term outcomes.

P046

Tacrolimus induced diabetes mellitus in children: a case series

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Introduction: Tacrolimus is an important immunomodulator used in children which can lead to blood sugar abnormalities.
Objectives :To describe the clinical profile, biochemical profile and management of three children with Tacrolimus induced diabetes mellitus managed in a multidisciplinary diabetic clinic.
Methods: Retrospective review of case records of three children who received Tacrolimus 0.1-0.4 mg/kg/day and developed diabetes mellitus from 2013 - 3018.
Results: Three subjects (median age -15 years, two females) developed Tacrolimus induced diabetes mellitus. Indication for Tacrolimus were NODAT (new onset diabetes after transplantation) and Nephrotic syndrome. All three were on Tacrolimus and steroid therapy. Two children were symptomatic and one picked up on routine screening. None had diabetic ketoacidosis. Median C peptide level was 2.2 ng/ml, anti GAD (glutamic acid decarboxylase) were negative . Median HbA1C was 9.7% and one child underwent continuous glucose monitoring. One adolescent each received Glargine with Aspart (1.2 U/kg), Glargine (0.25 U/kg) and Detemir (0.2 U/kg) for 8 months, 3 months and 2 months respectively. Insulin dosages were weaned as the Tacrolimus dosages were reduced. None developed hypoglycaemia or diabetic ketoacidosis on follow up.
Conclusion: Tacrolimus induced diabetes mellitus is an important cause of reversible cause of diabetes mellitus. Judicious insulin therapy is a key stone in the management of these children.

Case	Indication	HbA1C (%)	C peptide (ng/ml)	Anti GAD	Ketone	Acidosis	Type of insulin	Maximum dose of insulin (U/kg)	Duration
Case 1	New onset diabetes after transplantation	9.7	2.2	Negative	Negative	Negative	Glargine and Aspart	1.2	8 months
Case 2	Nephrotic syndrome	9.2	1.4	Not done	Negative	Negative	Glargine	0.25	3 months
Case 3	Nephrotic syndrome	9.7	3.2	Negative	Negative	Negative	Detemir	0.2	2 months

[*Profile of children with Tacrolimus induced diabetes mellitus*]

P047
Unusual and rare association of type I diabetes mellitus with epiphyseal dysplasia

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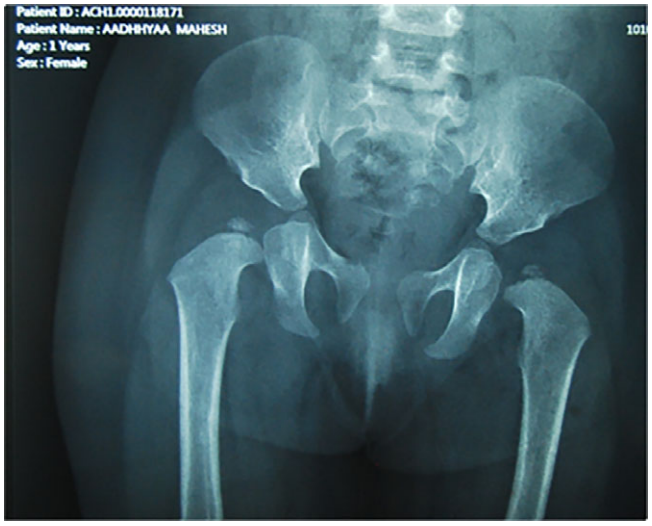
Introduction: Wolcott-Rallison syndrome (WRS) is a rare disease, inherited as autosomal recessive, and is characterized by neonatal or early-onset type I Diabetes Mellitus associated with epiphyseal dysplasia and growth retardation and other variable multisystemic clinical manifestations. Clinical manifestations vary between patients in their nature and severity and include frequent episodes of acute liver failure, renal dysfunction, exocrine pancreas insufficiency, intellectual deficit, hypothyroidism, neutropenia and recurrent infections. WRS is caused by mutations in the gene encoding eukaryotic translation initiation factor 2α kinase 3 (EIF2AK3), also known as PKR-like endoplasmic reticulum kinase (PERK).Eight cases have been reported from South India.
Here we report a case of 2 year old girl who presented to us with gait abnormality , she was treated for severe DKA at the age of 58 day and is presently on insulin. Child had normal birth history, no dysmorphic features and normal development. She has short stature and gait abnormality. Her sugars were difficult to control initial few months. Her development is normal and her skeletal survey revealed epiphyseal dyplasia in long bones, carpals and phalanges. X-ray pelvis shows dysplastic femoral head with shallow acetabular roof. Antibody screening was negative and other genetic tests for monogenic diabetes were negative. Molecular genetic analysis detected homozygous mutation in the exon 17 of EIF2AK3 gene (OMIM 604032).
Children with WRS have a risk of developing acute multi-organ failure during inter current illness. Parents should be informed about early recognition so that timely treatment is instituted. This case report depicts the importance to screen for associated abnormality with neonatal diabetes for timely intervention to avoid life threatening problems.



[X ray pelvis of the child with dysplastic femoral head and shallow acetabulum]

P048
Clinical and molecular characterization of children with neonatal diabetes mellitus at BIRDEM, a tertiary care center in Bangladesh

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Objective: To determine clinical profile and genetic mutations in patients with neonatal diabetes mellitus (NDM) diagnosed during 2001-2016 in department of Pediatrics, BIRDEM, Dhaka.
Methods: Twenty one patients with NDM were evaluated. Genetic testing was performed by sequence analysis of the *KCNJ11*, *ABCC8*, *EIF2AK3*, *INS* and other relevant gene or by methylation analysis of the 6q24 locus associated with transient neonatal diabetes mellitus (TNDM).
Results: Fourteen patients (10 female, 4 male) had permanent neonatal diabetes mellitus (PNDM) and 6 (3 female, 3 male) had TNDM, in one patient classification was not possible (presented with DKA and died, no mutation identified). The median age at initial presentation was 76 days (3-210), median birth weight 2000 gm (1000-3700), mean gestational age 37.15 ± 1.95 weeks (32-40), initial mean blood glucose 27.78 ± 9.39 mmol/L (14.9-50). Six patients presented with diabetic keto acidosis (DKA). The current mean age is 7.06±3.87 year (2.2-17). In PNDM patients current mean HbA1c is 6.57 ± 1.5% (5-8.5). Among 14 patients with PNDM 1 had novel mutation in *INS* gene, 3 had mutation in *KCNJ11* gene, 4 had mutation in *ABCC8* gene and 4 had *E1F2AK3* mutation (Wolcott-Rallison syndrome), in 2 patients no mutation was identified. In 6 patients with TNDM 1 had mutation in *INS* gene promoter, 3 had paternal uniparental isodisomy of chromosome 6, one had mutation in *KCNJ11* and *ABCC8* gene each. Outcome was good in majority of patients except those with Wolcott-Rallison syndrome; 3 out of 4 died due to DKA with renal or hepatic failure, 1 was lost from follow up. In PNDM patients with mutation in *KCNJ11* and *ABCC8* gene all were successfully transferred to oral sulphonylurea except one.
Conclusions: NDM is a heterogeneous disorder. With dedicated team effort, optimal glycaemic control, growth and development are achievable. Molecular genetic analysis is useful for prediction of outcome, mode of treatment and genetic counseling.

P049
Neonatal diabetes mellitus (NDM) - a case report

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Definition: Neonatal diabetes mellitus(NDM) is one form of **monogenic diabetes** that occurs in first 6-12 months of life.
Introduction: NDM diagnosed before 6 months of age is a rare disease, occurring 1:400,000 live births. There are two types of NDM: permanent NDM and transient NDM. Recently, various genetic defects like chromosome 6 uniparental disomy,ABCC8,KCNJ11 & INS gene mutations have been associated with NDM. We report one such rare case in our country.
Case presentation: The 3 months old male baby, the first child of unrelated parents, was admitted to the district hospital as his mother noticed increasing frequency of micturition for six weeks and her son's sweetened urine. **On the day of hospitalization, his *RBS* was 583mg%**. There was no other complications during pregnancy. No known history of diabetes mellitus in their family. His body weight was 6.1kg & height was 60cm.He was dehydrated, thirsty and irritable. **Urine sugar was ++++** and **random RBS was 480%**. HbA1C was 7.4%.The child was put on insulin infusion 0.1U/kg/hr and titrated dose for four days. We changed to levemir on day4,2U/2U with frequent feeding. We couldn't do other investigations because of limited resources. As the family lost follow up, the child didn't have insulin treatment for three months. Then at one year of age, his Hb A1C was 14%.The genetic testing was sent and sequence analysis gene showed a **rare heterozygous INS missense mutation,p.Cys95Arg**, in patient's exon 3 of INS gene. The mutation analysis confirmed **permanent neonatal diabetes**. INS missense mutation was not detected in his parents. It´s therefore likely that the p.Cys95Arg mutation has arisen de

novo. Now the child is three years old and on Levemir twice daily. His HbA1C was 7.5% last seven months ago and satisfactory growth.
Conclusion: Permanent neonatal diabetes mellitus which appears in first six months of life persists and needs insulin throughout the life span. INS gene mutations (gene mutation of our case) are the second most common cause of PND.

P050
Monogenic diabetes, case series from four Arab countries

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Introduction: Monogenic diabetes results from the inheritance of a mutation in a single gene. It may be dominantly or recessively inherited or may be de novo. Saudi Arabia is a country with lots of expatriates from other Arab countries, all these countries are still characterized by high rates of consanguinity.
Methods: 5 cases are described in a single center in Jeddah, all are products of 1st cousin marriage. 3 infants including 2 siblings from Egypt and one from Saudi Arabia were found to have diabetes after hospital admission for gastroenteritis with age range (2-3 months) at diagnosis. The 4th case (Yemeni) was admitted with anemia and failure to thrive, picked up during routine clinic visit at the age of four months, hyperglycemia was detected during routine hospital workup. The 5th case is a four years old Jordanian child who was found to have hyperglycemia during routine workup after hospital admission for pneumonia, with history of maternal diabetes during pregnancy that was misdiagnosed as gestational diabetes and an affected grandparent. All patients but the 5th were started on insulin after collecting samples from patients and parents for Molecular genetic testing.
Results: 3 patients were diagnosed with Wolcott Rallison, having missense mutation of EIF2AK3 and all expired by almost 6-7 months of age. Thiamine responsive megaloblastic anemia was confirmed with homozygous SLC19A2 mutation in the Yemeni patient and was successfully managed with high dose thiamine. Last child showed typical profile of fasting hyperglycemia and with the typical family history, was diagnosed on clinical basis as Glucokinase MODY with autosomal dominant pattern.
Conclusion: Awareness with different forms of Monogenic diabetes is essential for early diagnosis, especially in countries with high rates of consanguineous marriage. Genetic diagnosis is also mandatory in management, especially in the first 6 months of life and when insulin is not always the solution.

P051
Wolcott-Rallison syndrome with novel *EIF2AK3* mutation presenting with diabetes ketoacidosis after DPT vaccination

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Neonatal Diabetes Mellitus (NDM) is a rare form of Monogenic diabetes diagnosed before the age of 6 months. These infants usually present with a classical history of polyuria and polydipsia but there is often delay in recognition of symptoms leading on to development of Diabetes Ketoacidosis.
We present a six weeks old male baby who attended emergency department with one day history of fever and tachypnea. The child had DPT (Diphtheria Pertusis Tetanus) whole cell vaccine the day before following which he developed fever, pain and swelling in the leg. He was a first born child to consanguineous parents of Indian origin.
On examination the baby was severely dehydrated and was in circulatory failure. The venous blood glucose was 550 mg/dl and arterial blood gas showed severe acidosis with a pH of 6.9. The urine ketones was positive and the diagnosis of Diabetes Ketoacidosis was made. The baby was treated with intra-venous normal saline boluses followed by maintenance fluids with dehydration correction. The patient was also started on intra-venous insulin and subsequently changed to subcutaneous insulin. The infection markers were negative including blood culture. The liver function tests were deranged which was managed conservatively.
The GAD and Islet-cell antibodies were negative. Genetics for neonatal diabetes showed novel homozygous mutation in the *EIF2AK3* gene (in-frame deletion mutation p.Leu884del) consistent with the diagnosis of Wolcott-Rallison Syndrome (WRS). Both his parents were found to be heterozygous for the same mutation.
WRS is a rare autosomal recessive disorder caused by mutation in the *EIF2AK3* gene which encodes an endoplasmic reticulum transmembrane protein that plays a very important role during stress. We present this case for the identification of a novel mutation and to emphasize that even vaccination stress can precipitate diabetic ketosis and liver dysfunction in infants with WRS.

Poster Tour 03 - Psychosocial Issues in Diabetes

P052

The role of autonomy supportive health care climate in adolescents with type 1 diabetes

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Objective: In research about barriers to treatment adherence in adolescents with type 1 diabetes the role of health care providers and their possible impact on treatment adherence and glycemic control remains understudied. Moreover, less than 10% of the clinical interventions are provider-based (Datye, Moore, Russel, & Jaser, 2015). Against the background of Self-Determination Theory (Ryan & Deci, 2017), the present study examined the role of autonomy support by the diabetes team in addition to diabetes-related autonomy support by parents in adolescents' treatment adherence and glycemic control.
Methods: Linear regression analyzes was used in a sample of 136 adolescents (*M* age = 14.47; 54.1% girls), 171 mothers, and 121 fathers who completed questionnaires on treatment adherence, adolescent or self-reported maternal and paternal diabetes-specific autonomy-support, as well as perceived autonomy-support by the diabetes team. Physicians were contacted to collect HbA_{1c}-values from patients' medical records.
Results: Across all respondents, and in adolescents most prominently, perceived autonomy-support by the diabetes team related positively to treatment adherence in adolescents with type 1 diabetes (β = 2.738 p = .01). This was the case even when controlling for diabetes-related autonomy-support by parents. Moreover, in adolescent reports, there was a significant interaction between autonomy-support by parents and by the diabetes team (β = 1.966 p = .03; β = 1.860 p = .04), indicating that the combination of autonomy-support by the diabetes team and by parents, led to optimal treatment adherence.
Conclusions: Integrating attention for the quality of autonomy-support by the diabetes team in research as well as in clinical interventions, may be an innovative target for adherence-promoting interventions. Self-Determination Theory may lay the groundwork for future research and interventions (e.g., communication training for diabetes teams).

P053

Psychometric properties of the parent-preschoolers diabetes adjustment scale (PP-DAS)

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Objectives: It is well known that type 1 diabetes (T1D) in very young children places significant stress on families and that family adjustment is related to psychosocial and health-related outcomes, but there is no measure of family adjustment specific to parents of very young children with T1D (YC-T1D). Thus, in collaboration with parent stakeholders, we adapted measures of family adjustment to chronic illness to create the PP-DAS. This study aims to describe the initial psychometric properties of the PP-DAS.
Methods: Participants were the first 106 parents of YC-T1D to enroll in a larger randomized control trial. Parents completed the PP-DAS, Brief Symptoms Inventory-18 (BSI-18), and Parental Self-Efficacy Scale for Diabetes Management (PSESDM). Diabetes-related outcomes were obtained from the medical record. Principal component analysis (PCA) was used to identify underlying subscales (eigenvalue [E]>2 as cutoff). Reliability was established via Cronbach's alpha. Convergent validity was established by bivariate correlations with the BSI-18 and PSESDM and medical variables.
Results: The PCA supported a five-factor solution (Mastery, Child's Care, Personal Life, Emotional Adjustment, Family Adjustment; E = 2.13, variance accounted for = 42.69%). Of the 40 original items, 8 were removed due to low factor loadings or item-to-total correlations. The PP-DAS demonstrated good internal consistency for subscales (α's = .72-.84) and the total adjustment scale (α = .82). The PP-DAS total score demonstrated convergent validity with the BSI-18 (r = -.40) and PSESDM (r = .41). Only the Mastery subscale was associated with A1c. The PP-DAS total score and Mastery and Emotional subscales were positively associated with duration of diagnosis.
Conclusions: The PP-DAS demonstrates good initial reliability and validity. Future directions include establishing test-retest reliability and predictive validity via longitudinal associations between the PP-DAS and psychosocial and health outcomes.

P054

Determinants of psychological distress in families with type 1 diabetes mellitus and impact of a camp on psychological distress

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Introduction: Data on psychological distress in families with type 1 Diabetes Mellitus (DM) and its improvement by diabetic camps is scarce in Indian literature.
Objectives: To study determinants of psychological distress in families with children with Type 1 DM and to assess the short term impact of a camp based motivational intervention on psychological distress of the subjects.
Methods: Forty one families attending a type-1 diabetic clinic in India were selected and administered the Quality of Life (QoL) questionnaire in controlled settings. Glycemic control parameters and other demographic parameters (chronological age, diabetic age, glycosylated hemoglobin, total daily requirement, self-monitoring of blood glucose, sex, insulin regimen, presence of severe hypoglycemia and presence of complications) retrieved from logbook and case records. Fifteen families randomly underwent an educational camp. Motivating talk was given by parents regarding coping up with the disease. Medals were given to motivate children with low HbA1C, maintaining good log book, less number of hypoglycemia. QoL assessed immediately after the camp and after 3 months.
Results: Forty one families participated in the study (chronological age 10.7 $\pm$ 4.1years, diabetic age 2.7 $\pm$ 2.1years and 14 males). The mean score was 24.9 $\pm$ 8.7 (1-64). On univariate analysis: poor glycemic control, female sex and severe hypoglycemia were determinants of high psychological distress. On multivariate analysis, occurrence of severe hypoglycemia was the single modifiable independent determinant of significant psychological distress. There was a significant improvement in psychological distress scores after the camp: 28.7 $\pm$ 4.5 versus 16.6 $\pm$ 3.9 ($p < 0.05$).
Conclusion: Severe hypoglycemia is an independent modifiable risk factor for psychological stress.

Educational diabetic camps serve as a useful measure to improve psychological distress in families with type 1 diabetes.

Determinants	Standard error	Beta	t	Significance
HbA1C	0.217	0.140	0.775	0.44
Sex	0.195	-0.009	-0.046	0.04
Regimen	0.217	0.047	0.220	0.82
Breakthrough DKA	0.267	0.151	0.796	0.43
Severe hypoglycemia	0.214	-0.073	-0.372	0.05
Presence of complications	0.275	-0.031	-0.170	0.86
Chronological age	0.187	-0.035	-0.187	0.85
Diabetic age	0.216	-0.092	-0.426	0.67

[*Determinants of poor psychological score*]

P055
Provision of psychology in pediatric diabetes services

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Children & Young people (CYP) with Diabetes Mellitus (DM) have increased rates of depression, anxiety, psychological distress and eating disorders than their healthy peers. Psychological factors and the patient's health beliefs are important determinants of self-care behavior. Randomized control trials have confirmed that Psychological interventions can significantly lead to improvement in measures of psychological well-being. Routine psychological support is advocated as a normal part of a pediatric diabetes service.

Objective: To assess the current level of provision of psychology services for CYP with diabetes mellitus and how integrated the Psychologists are with the rest of pediatric diabetes multidisciplinary team (MDT) in United Kingdom.

Method: Clinicians working in 152 NHS trusts and health boards in the United Kingdom were invited via email to complete an online survey (from April 2018).

Results: Responses were received from 59.8% (91/152) NHS trusts and Health boards looking after approximately 18935 CYP with DM. 83.5% have a psychologist as part of the MDT. The median number of whole time equivalent psychologist (WTE) was 0.5. The ratio of WTE Psychologist to number of CYP cared for in the service varied from 1:75 to 1:3,600 (Median 1:404). 51% of Psychologists routinely attend all DM clinics & see CYP separately during clinic or with the MDT. 54% see all newly diagnosed patients at presentation. 87.7% see CYP outside of DM clinics in separate psychology sessions. 94.6% of services undertake annual assessment of psychological wellbeing using various tools with 'Well being in Diabetes Questionnaire' being the most commonly used (39%).

Conclusion: Compared to the 2008 National survey, there has been a significant increase in the provision of Psychological services for CYP (21% VS 83.5%) P < 0.05. This appears to be related to increased funding for diabetes services following introduction of best practice tariff.

P056
Emotional distress and psychosocial risk in children with type 1 diabetes in Ireland

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Objectives: To evaluate the risk for poor glycaemic control and for emotional distress (ED) and to examine the association of scores on two screening tools measuring psychosocial risk and ED in an Irish cohort of children with T1D.

Methods: The Risk Index for Poor Glycaemic Control (RI-PCG) is the screening tool to assess psychosocial risk where each score increases the risk of poor control and DKA on 10% (low risk score 0-1, moderate = 2, high risk ≥3). The Pediatric Index of Emotional Distress (PI-ED) was used for ED assessment (symptoms of anxiety and depression).

Results: As a part of 2-year longitudinal study 212 children with T1D (109 males) aged 4-18 years (mean 12 ± 3.4) were analyzed. 60.5% of patients had a low score (0-1) on the RI-PGC, 16.5% had a moderate score (=2), 23% had high scores (≥3). Parents reported socio-demographic issues in 49.8% of cases, psychological issues - 38.9%. There was a correlation between the Risk score and HbA1c in adolescents (p = 0.002). RIPGC score were associated with ED in total group (p = 0.03).

6.9% of patients were at high risk for ED (PI-ED>20). Anxiety symptoms were reported by 12.3% of children, depression - 16.2%. Most children at high risk for ED were female: anxiety 86,3% vs 13.7% boys (p < 0.001), depression 72.4% vs 27.6% boys (p = 0.01). Children with unemployed parents were at high risk for ED: 27.3% in high PI-ED score group vs 8.2% in low score group (p = 0.03).

Conclusions: High psychosocial risk is associated with higher HbA1c and ED, especially in female adolescents. ED is associated with parent's unemployment. Present analyzes suggest that screening tools for psychosocial risk and emotional distress (RI-PGC and PI-ED) are useful in clinical practice. The ability to predict higher risk of diabetes related complications and psychological distress would allow for early intervention by trained clinical Psychologist.

P057
The mental health of parents of children with type 1 diabetes in a north Indian metropolis needs attention and support

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Introduction: Type 1 diabetes (T1D) being expensive and stigmatizing, can have a devastating impact on parents' mental health. This needs quantification if it is to be tackled meaningfully.

Methods: During home visit interviews (Aug 2016-Nov 2017), 76 parents of children with T1D in Delhi were administered a standardized tool: "Depression Anxiety Stress Scale-21 (DASS-21)" to assess impact of child's chronic illness. Findings were correlated with DM duration using Pearson Correlation in SPSS and cross tabulation for age of child and socio-economic status (SES)

Results: Of 76 children (ages 3-17y (mean 9.4y), 62% were < 10y old; DM duration 1-14y (mean 4.8y); 30% duration was >5 y) with T1D, one parent was interviewed. In these 152 parents, ages 25-50y (mean 36y); education was: graduate & above: 49.3%, school pass-out 41.4%, uneducated 18.4%; occupation was: self-employed 23.7%, in jobs 42.1%, homemakers 32.9%, 2 dads unemployed.

Severe	% fathers n = 28	% mothers n = 48	% total Parents N = 76	% severely affected parents with kids <10yo	% from low SES	% from middle SES n = 18	% from high SES n = 26
Depression	28.6	47.9	40.8	51.6	50	22.2	42.3
Anxiety	28.6	52.1	43.4	75.8	62.5	22.3	43.5
Stress	17.9	43.8	34.2	65.4	41.6	22.2	34.6

[*Table: data pertaining to interviewed parents*]

Depression was not affected by diabetes duration; anxiety and stress correlated negatively, ie reduced with time. Of parents interviewed, a third (7 dads, 18 moms) had already been advised psychologist/psychiatrist consultation: of them, all dads, 14/18 moms had seen a psychologist. 10 had/were taking medication for stress/ sleep problems.
Conclusion: In urban north India, parents of T1D often have severe mental health problems, more so if (a) moms, (b) child under 10y, (c) in low and in high SES. These sub-groups need support and seem willing to seek it. Middle class families appear to cope better.

P058
Adjustment and adherence to treatment among adolescence with type 1 diabetes through photo-elicitation group-therapy

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Introduction: Despite technological advancements, poor glycemic control continues to be a major problem among adolescents with type 1 diabetes mellitus (T1DM). Preventive initiations which address the present state of affairs are therefore required. Photo-elicitation methods used in chronic diseases, encourage participants to focus on issues of greatest significance to them, and to photograph the "realities" of their everyday encounters and experiences. We aimed to assess the impact of photo-elicitation group therapy among children and adolescents with T1DM.
Method: An intervention merging established methods of photo elicitation, and photovoice was designed. Interventions were held during 2016-2017, at the Diabetes Clinic in Sheba Academic Medical Center in Israel. The interventions were designed for two different age groups, 10-12 and 13-15 years and included 14 sessions lasting 90 minutes each, and a final exhibition event. Applying grounded theory approach, interviews of the adolescents, parents and the clinic's attending endocrinologist, nurses and dietitians were conducted before, immediately after the intervention, and 12 months later.
Results: Fourteen children participated the program, their mean disease duration was 4.7 years, and mean HbA1c of 7.8%. Findings highlight the following themes: sense of normality, self-esteem, child-parent positive communication, belongingness, empowerment and peer-support. All were improved from baseline and associated with improve adherence to T1DM treatment.
Conclusions: Photo-elicitation empowers participants, by allowing them a more active position and by promoting verbalization of thoughts and emotions. An ecological adjustment model for adolescents with TD1M combining these variables is offered to improve adherence glycemic control, and improve quality of life.

P059
The tree of life project: an evaluation of a group approach to engaging young people with type 1 diabetes

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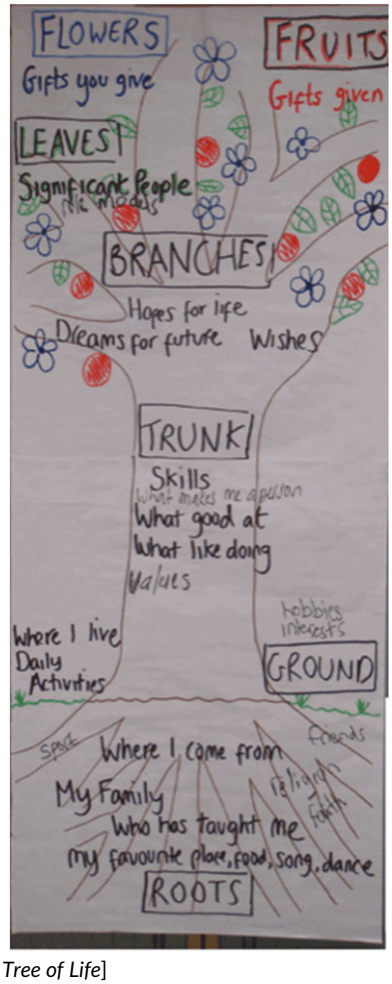
Introduction: Type 1 diabetes can dominate young people's lives, taking over their identity, leaving them feeling disconnected from family and friends and often unwilling to attend traditional therapy. The 'Tree of Life' is a group which has been adapted for young people with diabetes. It enables young people to a) Share knowledge and experiences of living with diabetes b) Develop positive views of themselves increasing self-esteem c) Change their relationship with diabetes so it has less influence on their lives. After attending young people are invited to qualify as 'peer trainers' to co-facilitate further days.
Objectives: To evaluate the Tree of Life project in a UK pediatric diabetes service.
Methods: Between July 2010 and May 2018, 22 Tree of Life groups were attended by 117 young people (aged 8 to 19 years). Participants share stories of their daily lives, abilities, hopes and dreams and identify important people, guided by a metaphor of a tree (figure 1). The group discusses challenges young people with diabetes might face and responses to them. Feedback was collected after each group.
Results: Qualitative data highlights how the group has helped young people develop positive views of themselves and feel less isolated by connecting, learning from and sharing knowledge with others with similar experiences. Attendees on average rated enjoyment of the day 9.56, likelihood to recommend a friend 9.16, and the usefulness of sharing of experiences 9.19 out of 10. 28 young people became peer trainers. Over 100 professionals attended 8 training days in delivering the group.
Conclusions: The Tree of Life is an innovative approach to delivering support to young people who are unable or unwilling to engage in traditional psychological approaches. The group allows young people to share and develop positive views of themselves and to learn from others living with diabetes. It is a transferable and sustainable approach.



[*Figure 1. The Tree of Life*]

P060

Parent reports of dietary actions to prevent type 1 diabetes are reflected in dietary intakes: TEDDY study

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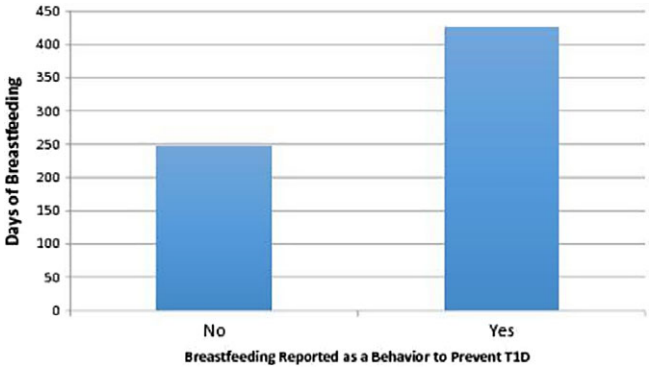
Objective: Many parents report engaging in dietary behaviors intended to prevent type 1 diabetes (T1D) in The Environmental Determinants of Diabetes in the Young (TEDDY) Study. We sought to validate whether children whose parents report dietary changes evidence actual dietary differences compared to those whose parents do not report these behaviors.

Methods: The TEDDY Study follows children with high-risk genotypes from birth to age 15. Mothers of 6,301 reported behaviors to prevent T1D at 6, 15, and 27-month study visits with an open-ended, retrospective question. Responses were coded. Dietary intake was collected via 3-day food records at 6, 9, 12, 18 and 24-month visits. Length of breastfeeding (days) and energy intake from carbohydrates (%) was examined. Dietary intake data from the visit(s) at/prior to the report of behaviors to prevent T1D was used (e.g., 12-month diet intake data was used for the 15-month visit).

Results: Children of mothers reporting reducing carbohydrates to prevent T1D (28% of sample) had a slightly lower % energy intake from carbohydrates than children of mothers who did not report this behavior at both 15 and 27 months (49.9%, 95% CI (49.5-50.3) vs. 50.8 %, 95% CI (50.6-51.0), p≤0.005 and 49.3%, 95% CI (48.9-49.7) vs. 50.2% 95% CI (50.0-50.4), p≤0.005, respectively), but not at 6 months. Children of mothers reporting breastfeeding to prevent T1D (9% of sample) at any visit had longer duration of breastfeeding compared to mothers who did not report this (p≤0.0001, Figure 1).

Conclusion: Children whose mothers report engaging in dietary behaviors intended to prevent T1D do evidence dietary differences, including increased length of breastfeeding and slightly reduced carbohydrate intake compared to children whose parents do not report these behaviors. Although TEDDY is a natural history study, these findings suggest that participants may change their behavior during study participation.



[*Breastfeeding duration by mothers who did not/did report breastfeeding as a behavior to prevent T1D*]

Poster Tour 11 - Psychosocial issues in Diabetes

P061
Type 1 diabetes, IS IT A SOCIAL STIGMA? "A journey from childhood to parenthood"

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Introduction: Majority of patients after T1 DM diagnosis face many social problems from the very early stages of life, starting from school till adulthood. Present study is to "assess the magnitude of social and matrimonial problems faced by T1 diabetics in India, in a 10 year follow up period". Study also includes assessment of the prevailing social perceptions which make their life downhearted.
Objectives: To study T1 diabetic subjects for assessing the magnitude of matrimonial problems faced by them ,as T1 diabetes is considered as a 'SOCIAL STIGMA'.
Methods: 40 T1 diabetic subjects in the age group of 19-31years, 27 females(67.5%) & 13 males(32.5%) ,were studied. Formal interviews were conducted with the patient's family members using specifically designed Questionnaire.
Result: 4 out of 9 T1 diabetic females (who got married) were sent back to their parents house within 6 months after the marriage and are now living separately. 2 women totally lost interest in self-care and monitoring after being denied funds for treatment by in-laws, and consequently succumbed to diabetes complications.
Marriage of 1 of the female subject, working as an executive, was canceled at the last moment when 1 of the close relative from boy's family raised objections. 2 female subjects are happily married to non - diabetic males. 4 male subjects did not disclose their disease before marriage.
Conclusion: Large number of patients face matrimonial problem as diabetes is considered as a social stigma. Problem is more severe with T1 DM females. Majority of male T1 DM do not disclose their disease before marriage. Post marriage majority of T1 DM are subjected to social stigma which invariably leads to confrontation, separation & divorce ,severe psychiatric problems with suicidal risks. Social implications of T1 DM for South Asia need special attention because of prevalent culture. Increasing awareness on socio-economic aspect of diabetes can play important role in improving diabetes control.

P062
Adjustment to type 1 diabetes among very young children and their parents as a function of time since diagnosis: cross-sectional analyzes

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Objectives: It is unknown how adjustment to type 1 diabetes (T1D) in very young children (YC) and their parents/caregivers varies with time since diagnosis and if/when they should be referred for behavioral health services. We report cross-sectional analyzes of baseline data from participants in a randomized, controlled trial (RCT) of an online coping resource designed by and for parents of YC-T1D. We explored how measures of child and parent adjustment to T1D vary with T1D duration.
Methods: The first 106 parents/caregivers of YC-T1D under 6 yrs old who enrolled in the RCT comprised four T1D duration groups: <1yr (n = 33); 1-< 2 yrs (n = 30); 2-< 3 yrs (n = 23); or >3 yrs (n = 20). We employed General Linear Models to compare parents' baseline scores on questionnaires across these groups, with child age as a covariate.
Results: Controlling for child age, significant group differences emerged for scores on the Preschool Diabetes Behavior Checklist (F = 2.60; p = .050) and the Diabetes Self-Management Profile (F = 3.84; p = .012), indicating significantly worse T1D-specific behavioral problems and adherence for children with longer T1D duration. There were no significant main effects for T1D duration group on the Eyberg Child Behavior Inventory or Pediatric Diabetes Routines Questionnaire, nor on any parent adjustment measures: Brief Symptom Inventory; Parent-Preschooler Diabetes Adjustment Scale; Parent Mutuality Scale; or Diabetes Benefit-Finding Scale.
Conclusions: Children's adherence and T1D-specific behavioral problems were worse among those further out from diagnosis, while other aspects of child and parent adjustment did not differ by T1D duration. Longitudinal research is needed to determine how T1D-specific behavioral and adherence problems emerge/worsen and why other indices of adjustment do not improve over time. Psychosocial screening and evidence-based interventions shortly after diagnosis may prevent the development or worsening of adjustment problems.

P063
Quality of life and problem areas associated with emotional distress in Indian children with type 1 diabetes

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Introduction: Children with type 1 diabetes (T1D) often have psychological problems.
Objectives: To assess quality of life and emotional distress in children with T1D.
Methods: We enrolled 8-17 y old children with T1D for at least 1y. Two questionnaires were administered: DAWN Quality of Life (QoL), and Problem Areas in Diabetes (PAID). QoL has 21 questions, scored from 0 (never) to 4 (all the time), grouped in 5 domains; and 1 on health perception. Score was considered 'concerning' if in upper two-thirds of the range (e.g., ≥28 out of 84 for total QoL). PAID has 20 items to assess negative emotions related to T1D with total score of 0-100. For each question, a response of 3 or 4 (somewhat serious or serious problem) was considered concerning.
Results: We enrolled 25 children (14 F, 11 M) aged 11.8 ± 2.8 y, with duration 5.0 ± 3.8 y and HbA1c 9.2 ± 1.6. Total QoL score was 22 ± 10, with concerning score in 8 (32%). The most affected domain was 'parent issues' with 88% children feeling that parents are too protective/ worried; 'impact of treatment' was concerning for 11 (44%). It was reassuring that only 1 child had concerning score for impact on activities; and health perception was excellent/ good in 17 (68%). Mean PAID score was 21 ± 15; in 3 children score was <10 suggesting denial; and in 2 it was > 40 indicating emotional burnout. Three areas -worry about hypoglycemia, anger at living with diabetes, and deprivation of food, were concerning for 5 children each (20%). In 4 areas- scared of living with diabetes, guilt and anxiety if going off-track, worry about future, and feeling alone, 4 children each (16%) had concerning responses. QoL score was linearly related to HbA1c, rho = 0.49, p = 0.012. Gender, age and duration of diabetes did not affect PAID and QoL scores.
Conclusions: QoL and PAID helped in identifying common issues (parents' overprotectiveness, worry about hypoglycemia, anger, etc.) that adversely affect psychological well-being in children with T1D.

P064

Definition of critical health-related quality of life subscale scores to support clinical decision-making based on the DISABKIDS© questionnaire

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Background: There is an increasing focus on health-related quality of life (HrQoL) as an important outcome within type 1 diabetes (T1D) research. However, there is no clear definition of an optimal score for HrQoL or guidelines for how to use HrQoL in clinical decision-making. The aim of this study was to define critical values for clinical decision-making.

Methods: Altogether, 99 patients with T1D aged from 8-18 years and their parents were asked to complete the Danish version of the DISABKIDS® questionnaire. We defined suboptimal metabolic control as glycated hemoglobin (HbA1c) levels of >70 mmol/mol (>8.5%). The graphical log-linear Rasch model was used to estimate the HrQoL subscale scores according to sex, age, treatment and HbA1c levels. The optimal critical value for each HrQoL subscale was calculated using stepwise analysis of categories in contingency tables by counting the joint distribution of DISABKIDS® scores and HbA1c levels.

Results: We found a trend for lower HrQoL scores in girls compared with boys for most subscales. We also found a decrease in HrQoL with increasing age but no differences in HrQoL based on treatment. Parents rated their children's HrQoL lower than the children did. Increasing HbA1c levels were generally associated with decreasing HrQoL subscale scores. The critical values for each subscale varied from 55 to 91.6. The odds of having an HbA1c level of >70 mmol/mol varied from 2.2 [1.0-5.3] to 6.8 [1.5-30.2] with the highest odds observed for the Emotion and Impact subscales.

Conclusions: We confirmed the same trend toward a perception of lower HrQoL in children with T1D by parents, girls, older children, and children with higher HbA1c levels. Large variations in the critical values determined for each subscale confirm the need for subscale-specific cut-off points to guide clinical decision-making. Prospective studies are needed to confirm the utility of the cut-off points to prevent metabolic control from deteriorating.

P065

To compare and evaluate effects of psychological state of patient- irritable or depressed on HbA1c level of type 1 diabetes mellitus

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Objective: To compare and evaluate effects of psychological state of patient- irritable or depressed on type 1 diabetes mellitus. (an observational study)

Research Design and Methods: Observational based study using data obtained from type 1 diabetic participant. Studies meeting the inclusion criteria were examined, and study demographics (age, sex, and type of diabetes) as well as psychological status information (assessment method, prevalence, and mean scale scores) were recorded using a structured form based on the case report form. Diabetic control status was measured in HbA1c level. Each participant was interviewed using the Psychological status to Illness Scale, a specifically designed questionnaire, Two subject pool were categorized based on their psychological status (irritate and depressed).

Result: Appropriate data required for this study were collected from total 205 participants out of which 27 were classified in depressed psychological status pool while 89 were in irritate.43.41% participant were found in irritable psychological status in which 55.05% participant were male and remaining 44.95% were female participant, while out of total 205 participant 13.71% was undergoing with depressed psychological status in which 66.67% was male and remaining 33.33% was female participant.

Samples were categorized in two different pool according to their psychological status- irritable and depressed, mean HbA1c level for each pool from their HbA1c data set was calculated. Statistical analysis was made by hypothesis testing. Significance level was 5%.

Conclusion: Prevalence of irritable psychological status can worse diabetic control more than the prevalence of depressive psychological status.

Keywords: Type 1 diabetes mellitus, psychological status, depressed, irritable, cheerful, HbA1c, Dysphoria

P066

Validation of the Diabetes Benefit Finding Scale for Parents

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Objectives: Benefit finding (BF; perceived positive effects of specific adversity) has been associated with psychological well-being in people with chronic illnesses and with better adherence for youth with type 1 diabetes (T1D). Our previous qualitative research with parents of young children (YC) with T1D indicated that BF may be a common parental coping mechanism. But, no tools exist to measure BF in parents. We aimed to establish initial psychometric properties of the Diabetes Benefit Finding Scale for Parents (DBFS-P), a 16-item questionnaire adapted from the DBFS adolescent-version and guided by parent stakeholder input.

Methods: Participants were the first 106 parents of YC with T1D (<6 yrs old) to enroll in a larger RCT. We examined the DBFS-P factor structure through principal component analysis (PCA); internal consistency through Cronbach's alpha; convergent validity via bivariate correlations between the DBFS-P and measures of parental depression, anxiety, T1D self-efficacy, and hypoglycemia fear; and discriminant validity via bivariate correlations between the DBFS-P and measures of parental somatization, spousal support, and child behavior problems.

Results: PCA revealed one factor (54.32% variance) with excellent internal consistency (α = .94). The DBFS-P demonstrated convergent validity with parental depression (r = -.34, p < .001), anxiety (r = -.21, p = .03), T1D self-efficacy (r = .36, p < .001), and hypoglycemia fear (r=.34, p < .001) and discriminant validity with parental somatization (r=-.01, ns), spousal support (r = .16, ns), and child behavior problems (r = -.08, ns). The DBFS-P was not correlated with child age, T1D duration, or HbA1c, which is consistent with prior BF findings.

Discussion: The DBFS-P demonstrated good preliminary reliability and validity. Our ongoing RCT will examine BF trajectories over time and evaluate whether parental BF mediates or moderates changes in other outcomes of health and well-being among YC with T1D and their parents.

P067

Medical provider autonomy support, regimen adherence, and glycemic control in adolescents with type 1 diabetes

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Background: Cross-sectional studies demonstrate that the patient-provider relationship impacts regimen adherence in adolescents with type 1 diabetes (T1D). However, no studies have examined longitudinal associations between patient-provider relationship and adherence or glycemic control.

Objectives: To examine longitudinal associations between patient-provider relationship, adherence, and glycemic control in late adolescents with T1D.

Methods: These data were obtained from a longitudinal, multi-site study of factors affecting self-management in adolescents with T1D. Data from surveys and laboratory results were collected at baseline (N = 165), 12-month (N = 156) and 24-month (N = 144) follow-ups. Participants had a mean age of 16.4 years (SD = 1.3) at baseline and were 50.9% female, with 20.6% of ethnic minority status. Pearson correlations evaluated associations between patient-perceived medical provider autonomy support (Healthcare Climate Questionnaire; HCQ), self-reported adherence (Diabetes Self-Management Profile; DSMP), and glycemic control (Hemoglobin A1c). T-tests examined differences between boys and girls on HCQ score.

Results: Baseline and 12-month HCQ scores were associated with DSMP both in cross-sectional and prospective analyzes (range of r's = .20-.29, p's < .02), indicating better adherence with more autonomy support; however, 24-month HCQ and DSMP were not significantly related. There were no sex differences in mean HCQ. However, when examining these relationships separately for boys and girls, all correlations were significant for girls (r's = .24-.42, p's < .03), except for that between baseline HCQ and baseline DSMP, which was observed for boys only (r = .26, p < .03). Baseline HCQ was associated only with 12-month A1c (r = -.24, p < .004).

Conclusions: Prior to 18 years of age in adolescents with T1D, greater medical provider support of autonomy was associated with better self-management. However, this relationship seems to be stronger for girls than boys.

Poster on Display - Psychosocial Issues in Diabetes

P068

Going to school with type 1 diabetes in urban India: experiences of children, adolescents and their parents, and attitudes of schools toward them

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T1D children need non-stigmatizing support at school for self-care activities. We looked at their school experience in private (PS) and government schools (subsidized: GS) in urban India.

Methods: We administered a pre-prepared questionnaire to T1Ds aged < 20 y and parents in Aurangabad, Delhi-NCR & Kanpur, and Hyderabad (West, North, South India respectively) about diabetes care and attitudes of staff.

Results: 397 responded: 204 (51%) boys; 277 (70%) in PS; mean age 11.7 + 3.7y; diagnosis age 7.2 + 3.7y; diabetes duration 4.5 + 3.5y. Insulin doses/day: 2 in 4.5% children; 3 in 22.2%, 4/more in 65.2%; pump 7.8%. 44% parents found school supportive, 6.3% unsupportive, rest no comment.

Facilitating care: School staff knew about diagnosis of diabetes in 96%. Only 52% children took insulin in school: 70% self-injected (with help from staff in 7%); parent came to inject in 27%; teacher/nurse injected in 3%. BG was checked at school by 60%, with staff help in 10%. 50% checked BG/ took insulin in classroom, 30% in medical room; 15% in staffroom and 5% in washroom. 21.9% said school had glucometer (82/87 PS). 82.6% said staff knew hypo handling.

Rejection, exclusion, taboo: 52.9% parents visited school daily/often. School refused permission to check BG 15.9%, refused injection-taking 4.3%; asked for secrecy when checking/ injecting 12.6%; prohibited child from sports/ excursions 17.9%; did not allow time for pre-sports snacks 7.6%. Only 3% children had to change school because of denied admission/ hostility (11/12 PS). 26.2% knew of others with diabetes in their school, 55% avoided meeting them.

Discussion: Most of these involved, responsive parents found school supportive; staff knew of diabetes and handling hypos, and mostly allowed testing/injecting. Unsupportive behaviors were seen in just 4-18%. Many schools lacked infrastructure to facilitate care. Many parents were themselves diffident. The situation may improve with HCP encouraging parents to ask for greater support.

P069

Impact of "Innovative Social activity" on happiness score in children and adult with type 1 diabetes mellitus (T1DM)

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Objectives: We experimented a new event to touch people with T1DM. We utilized the Diabetes Distress Score (DDS), along with happiness score for the T1DM patients, engaged in a different social activity "Fashion Show". This activity is an innovative approach toward addressing the psychological aspect of T1DM.

Method: We included 46 children of T1DM of which 28 were >18 years and 18 were <18 years of age. We organized a fashion show exclusively for the T1DM patients on the eve of World Diabetes Day. The parameters analyzed were age, duration of diabetes and HbA1c. A 17 items linguistically adapted DDS and was given to the T1DM patients as pre -event initiative and then were assessed post event directly to the age group >18 years. Parent DDS was given to patients <18 years of age. Their DDS was assessed by Positive Psychological Assessment which is validated research tool for measuring wellbeing. Post event response was measured on its basis. Happiness was measured by "Dr. Aaron Jarden Happiness scale".

Results: The total numbers of T1DM were 46, with their mean age >18yrs were 20 years (19 - 26 years) and in the group with the age <18 years the mean age was 12.6 years (8 -.18 years). Mean HbA1c was 8.5% (4.6-14.6%).DDS was normal In all patients. Pre event response on grade of happiness (0-10) where 0 is extremely unhappy and 10 is extremely happy was coming 4, after event it was 8. Subjective response for each individual post show was high.

Conclusions: This Innovative approach brought "extreme happiness" all people with T1DM,along with subjective comments like "Mind blowing", "out of the world"etc. In future if similar "Innovative activities" are planned that will possibly give some positive outlook toward the life of people with T1DM and which Intern will improve HbA1c.

P070

The DISABKIDS generic and diabetes modules are valid, but despite cross-cultural development results are not directly comparable between Denmark, Sweden and Norway

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Objectives: International bench-marking in the medical field is increasing. Patient reported outcome measures (PROMs) are important both in clinics and as an important outcome in type 1 diabetes (T1D). The aim of this study was to test if the DISABKIDS modules could be used to compare Health Related Quality of Life (HrQoL) of young patients with T1D in the Nordic countries.

Methods: Three former national validation studies on the DISABKIDS questionnaires in Sweden, Denmark and Norway were used for comparison of HrQoL. The Rasch and the graphical log linear Rasch model (GLLRM) was used to determine validity. Since some items were locally dependent, Monte Carlo methods was used to estimate reliability. The categories of the Danish and Norwegian Likert scale were translated from the English version; whereas the Swedish version was developed during the cross-cultural development, along with the English version.

Results: Responses to DISABKIDS questionnaire were available from 99 Danish children aged 8-18 year of age, 103 Norwegian children (age 7-19) and 131 Swedish (age 8-18). The Likert scale differed between languages. Sweden had higher scores for most of the subscales. For each country, validity and reliability was acceptable if differential item function (DIF) and local dependency (LD) was taken into account. When comparing scores from all three countries more questions showing LD and DIF partly explained by differences in Likert scales.

Conclusion: The current Nordic Disabkids questionnaires measures valid and reliable HrQoL within each country but adjustments for age,

gender and country are needed to compare HrQoL across countries. Differences exists in the Likert scales and these differences partly explain differences in HrQoL, adjustment or revision of the Likert scale are needed before HrQoL can be compared between the Nordic countries.

P071

Prevalence of depression among people with type 1 diabetes mellitus in India and its impact on glycemic control

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Objectives: Due to various psycho-social issues, people with Type 1 Diabetes Mellitus (T1DM) are vulnerable to various psychiatric disorders and depression is one of such common ailment. Our study aims to evaluate the prevalence of depression and its effect on glycemic control among people with T1DM.
Methods: The study included 108 patients with Type 1 DM with age ranging between 12-60 years. Data on different parameters like duration of DM, exercise, HbA1c, total daily dose, injecting habits, unexplained hypoglycemia and glycemic variability were obtained on these patients. Their depression level was assessed using PHQ-9 scale. The comparison of parameters measured on real scale between depressed and non-depressed groups was performed using t-test for independent samples, while those on nominal scale were evaluated using Pearson's chi-square test. Significance was tested at 5% level.
Results: Out of 108 patients with T1DM, 48 (44%)were normal , while 60(56%) had depression ranging from mild to severe on PHQ 9 rating scale. Different demographic parameters like age, gender and duration of DM were insignificantly different between two groups. The glycemic control (HbA1c) was statistically significantly lower in patients without depression (9.43 $\pm$ 2.25) as compared to those with depression (10.37 $\pm$ 2.23) with a p-value of 0.0351. Other parameters like total daily dose, unexplained hypoglycaemia and glycemic control between both the groups were insignificantly different in two groups with p-value > 0.05.
Conclusion: Prevalence of depression among T1DM from India is high. People with depression have poorer glycemic control than those without depression .

P072

The unique experiences of families with a parent and a child diagnosed with type 1 diabetes

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Background: The diagnosis of a child with Type 1 diabetes (T1D) can be overwhelming, bringing physical and psychosocial challenges for the child and their family. Understanding these challenges and providing adequate support may reduce diabetes distress, and improve overall quality of life, well-being and glycaemic control.
Objectives: To document the lived experiences of families in which a parent and a child both have a diagnosis of T1D. In particular, to describe how these families adapted and managed T1D. This study also explored how previous knowledge and experiences with T1D influenced their child's management and what support services families felt they needed.
Methods: A purposeful sample of families were recruited through Princess Margaret Hospital. Inclusion criteria were a child aged <16 years and diagnosed with T1D between the years 2013 - 2016, where one parent also had T1D. Using a qualitative methodology, ten face to face interviews with parents were conducted. Data were transcribed and analyzed using inductive thematic analysis.
Results: The primary themes that emerged were: concerns managing two member of the family with T1D particularly relating to fear around hypoglycaemia; T1D parents benefited from renewed education about management but wanted their prior knowledge recognized; emotions related to their child's diagnosis of T1D, included feelings of guilt and blame and it was identified that psychological support, approximately six months after diagnosis, would be beneficial.
Conclusions: Findings demonstrate the unique challenges families face when both a parent and a child have a diagnosis of T1D. These findings can be used to target psychoeducational interventions for families with more than one member diagnosed with T1D.

P073

Emotional and behavioral problems in youths with type 1 diabetes. Self, parents and physician´s perspective

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Objectives: This study aimed to explore the agreement between youth and their parents' report of the patient's emotional and behavioral problems, and the consistency of these evaluations with the physician's estimations regarding these problems.
Methods: A sample of 62 youths (aged 8-18 y, M = 13.23; SD = 2.39) diagnosed with T1DM $\geq$1 y (M = 72 m; SD = 43.71), 62 parents and 6 physicians were recruited at our Clinic. Children filled out the Strengths and Difficulties Questionnaire (SDQ) Self Report and parents the SDQ Parent Report; physicians answered a questionnaire assessing their clinical estimation of the youths' emotional and behavioral problems. Demographic data and A1c values were collected.
Results: Parents and children's self-evaluation of the child's emotional and behavioral problems were highly consistent, with children and parents evaluation significantly correlated (SDQ Total r = .427;p < 0,01;Intern r = .265;p < 0,05;Ext r = .564;p < 0,01) and showing no significant differences SDQ Total $t(61)$ = 1.438; n.s; Intern $t(61)$ = 1.421;n.s; Ext $t(61)$ = .845; n.s. The child's evaluation of internalizing problems (r = .304; p < 0,05), behavior problems (r = .304; p < 0,05), peer problems (r = .289; p < 0,05) and prosocial behavior (r = .251; p < 0,05) was associated with A1c values, while parent's evaluation was not. Physicians estimated more youth's behavioral and emotional problems for patients with higher levels of A1c (X^2 = 3.645; p < 0,05), with important divergences between parent and child reports and the physician's estimations.
Conclusions: Parents and their children had similar perceptions, but youth were more sensitive to metabolic control variations. Physicians associated children's problems with higher A1c, probably because their primary therapeutic focus is Diabetes control, but they may underestimate emotional and behavioral problems in youths with good metabolic control. Comprehensive assessment of the youths' diabetes status should include validated measures.

P074

When insulin alone is not enough: diabetes and psychosomatic medicine

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Objective: Evaluation of 123 children and adolescents with type 1 diabetes mellitus (T1DM) on a psychosomatic ward regarding their metabolic control and psychiatric co-morbidities.
Method: Retrospektive study on patients with T1DM admitted to the psychosomatic unit for children and adolescents at the Gemeinschaftskrankenhaus Herdecke, Germany, between 2007 and 2017.

Results: There were 77 girls (63%) and 46 boys (37%) among the 123 patients. The median age on admission was 14 years (17 - 18 years). At this time the mean duration of the T1DM was around 6 years (10 days - 15 years). The mean duration of admission was 32 days (2 - 139 days). The most common psychiatric diagnosis was an adjustment disorder (F43.2, ICD10) with 51%, followed by ´psychological and behavioral factors associated with disorders or diseases classified elsewhere´ (F54, ICD10) with 47% and hyperkinetic disorders (F90.-, ICD10) with 14%. The mean HbA1c on admission was 10,2% or 88 mmol/mol (6,6 - 15,5%, 49 - 146 mmol/mol), 8,2 % or 66 mmol/mol (6,0 - 13,3%, 42 - 122 mmol/mol) at the first visit after discharge (100/123 patients) and 8,6% or 70 mmol/mol (6,3 - 14,0%, 45 - 130 mmol/mol) one year after discharge (39/123 patients).
Conclusion: An elevated HbA1c as an indicator for a poor glycaemic control is a common reason for the admission to a psychosomatic unit. The causes for this unsatisfactory metabolic state are complex. An admission on a psychosomatic unit offers the opportunity to diagnose co-existing psychiatric disorders, allows an individual multilayered therapy and helps to establish an sustainable support after discharge. This leads to an improved glycaemic control. Moreover it underlines the importance of a psychosomatic input in patients with psychiatric challenges and poorly controlled diabetes.

P075

Health related quality of life in children with type 1 diabetes mellitus in a developing country

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Introduction: Diabetic children require not only strong attention for complications, but also require chronic long - term care where there is consideration of the psychological, emotional, socioeconomic and physical disabilities influencing the children daily function
Objectives: To assess health related quality of life (HRQOL) of children with type 1 diabetes attending diabetic clinic and to identify factors affecting quality of life of children with type I diabetes
Methods: The study conducted on 100 children with type 1 diabetes aged 5 to 18 years and their caregivers with at least 1 year of illness . Children who have other chronic diseases not related to the diabetes or children who their caregivers refuse to participate in the study were excluded .All children included in this study were subjected to a structured questionnaire including the following data socio demographic characteristic, family history of diabetes and other chronic disease, child clinical data: Age, gender, birth order, school attendance, grade, age at the time of diagnosis, duration of the disease, mean HbA1c in the last year, type and dose of treatment, occurrence of acute complications and previous hospitalization during the last year as well as presence of any diabetes related chronic complication. Arabic version of Pediatric Quality of life inventory scale (The Peds QL 4.0) , Generic core scale GCS and arabic version of The Peds QL 3.2 diabetes module were taken
Results: The diabetic children had poor QoL; long duration of diabetes and poor glycemic control were associated with poor QoL.
Conclusions: Support should be provided for the care of children with diabetes in Egypt.

Poster Tour 04 - Diabetes Education

P076

Aim: To create awareness regarding metabolic disorders among the young adults at pre pubertal age by preventing obesity & following healthy lifestyle

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Method: The Lion Club of India along with Diacare-A Hormone Clinic took an initiative and targeted 11 Government schools in Ahmadabad. Children from grade 7 to 10 were educated simultaneously at same day & time through power point presentation by HCPs during/at the world Diabetes Campaign.
Conclusion: Advocacy & awareness are important tools for education. Targeting the pre pubertal, adolescents & young adults, gives us a chance toward primordial & primary prevention of NCDs related to lifestyle. Educating this strata also gives their relatives an eye opening chance for secondary prevention of their existing disorders.

P077

Does carbohydrate counting education in children with type 1 diabetes improve their glycaemic control?

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Introduction: NICE guideline 2015 recommends that children with t1dm are offered carbohydrate (carb) counting education at diagnosis.
Objective: To evaluate the impact of carb counting on glycaemic control in children with t1dm.
Methods: We conducted a retrospective cross-over study of 51 children (0-16 yr old) that were diagnosed with t1dm between Jan 2012 to Feb 2014. Their HbA1cs were noted for a year prior to carb counting as well as after. 7 patients were excluded as 5 did not initiate carb counting and 2 started carb counting from diagnosis. Mean HbA1c before and after carb counting was compared.
Mean BMI percentiles were recorded for the children for a year before carb counting and after.
Out of the selected 44 children, 24 were boys and 20 girls, 66% were upto 10 yrs old and 33% were 11-16 years old. Data was obtained using SystemOne and electronic medical record.
Results: Mean HbA1c improved by 6.6mmol/mol after carb counting, it was 76.7mmol/mol before and 70.1mmol/mol after carb counting.
66% (29/44) of the children showed significant improvement in their mean HbA1c after carb counting, 59% of these were boys and upto 10 yr old.
71% of children aged 11-16 yr old showed improvement in their mean HbA1c as compared to 50% upto 10 yr old.
32% (14/44) of the children showed worsening of their mean HbA1c after carb counting, all of these were upto 10 yrs old, no correlation with sex was found.
2% (1/44) of children had no change in their mean Hb1c after carb counting.
20% of children were overweight/obese prior to carb counting as compared to 27% after carb counting, majority being boys (66-75%).
Children who showed improvement in their HbA1c after carb counting, 24% of them were overweight/obese prior to carb counting as compared to 31% after.
Conclusion: Carbohydrate counting improved glycaemic control in children with t1dm especially boys. Carb counting children seem to be more prone to becoming overweight/obese especially boys.

P078

One step together can make difficult journey easy

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Aim: To evaluate effectiveness of diabetes education by a Type1 Diabetes Mellitus (T1DM) person as a counselor on illiterate and under privileged T1DM children and their families.
Material and Method: One of our core group member from Non-government organization (NGO) dedicated to diabetes awareness. Who himself is a Type1 diabetic since last 30 years and a qualified educator took this challenge to educate 20 T1 DM Children and their families.
Age of children participated in study 5-15 years mean age 9years, duration of diabetes 1-7 years mean 4 years, 8 female and 12 male children all were from low socioeconomic class and none of them going to school. Many of them had episodes of hypo as many as 3-5 times in a month and 7 children were admitted in hospital for ketoacidosis in last one year.
Our team has done structured counseling of all children with their family members in group every 2monthly and once individually in 6 months, total duration of program was 1 year.
During individual counseling parents were encouraged for schooling of children and also empowered to read and adjust insulin doses, use of glucometer and diet adjustment in resource constrained set up.
Result: Now after one year 18 out of 20 stared their schooling
Episode of hypos goes down to as low as 1-2 times in a month and in few of them no hypos since last 3 months.
Only 2 children admitted with ketoacidosis but in very early stage and managed at ward only (ICU not required)
Quality of life and confidence of older children enhanced and brought them back to normal life and created interest toward their studies and future.
Discussion: A person with T1DM can understand problems better and handling illiterate and resource constrained children requires lots of patience, possibly "T1DM educator" is better solution in such situations.

P079

Effect of Knowledge about Diabetes in the Management of Type I Diabetes and Impact a novel intervention on diabetic knowledge

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Background: Data on knowledge on diabetes mellitus (DM) in care of type 1 DM and its enhancement by diabetic camps is scarce in Indian literature.
Objectives: To study the knowledge of diabetes in families of type 1 diabetic children and adolescents and its impact on diabetic control and to assess the **short term impact** of a camp based educational intervention on knowledge levels and glycemic control of the subjects.
Methods: 33 families attending a type-1 diabetic clinic in India selected and administered the Diabetic Knowledge Questionnaire (DKQ) in controlled settings. Glycemic control parameters and other demographic parameters retrieved from logbook and case records. 15 families randomly underwent an educational camp. DKQ assessed immediately after the camp.

Results: 33 subjects recruited onto the study (chronological age 10.4 ± 3.9yars, 10 males). The mean score was 17.5 ± 3.0 (range 12-23). Both parents answered all questions in the test without difficulty in a mean duration of 4.5 minutes. Subjects were divided into two groups: Score ≤ 17 and > 17 (based on the 50th percentile). Subjects with higher DKQ had lowered glycosylated hemoglobin (8.9 ± 0.9 versus 9.7 ± 1.1, p < 0.05) and higher self-monitoring of blood glucose frequency (22.4 versus 26.7) and lowered hypoglycemia (12.4 versus 24.1 episodes per 100 patient years)(p< 0.05). There was a significant improvement in DKQ scores after the camp (18.5 ± 1.2 versus 21.6 ± 2.1).
Conclusion: Families with **good knowledge** about the disease have a better glycaemic control as a result of increased SMBG with an allowance of manageable hypoglycaemia. **Educational Diabetic camps** serve as a useful measure to increase knowledge about diabetes in families with type 1 diabetes.

P080
At what age is a child able to self-inject insulin independently?

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Objectives: T1D treatment requires frequent blood glucose monitoring, insulin injections and adjusting insulin doses to match food intake and activity patterns.
Children with T1D are a vulnerable population, due to their age and unique needs of diabetes treatment. During the day they are involved in different environments, sometimes leading to a situation where they have to do the insulin injection independently. However, the age when a child acquires the self-management skills to achieve this is unknown. The aim of this is to perform a systematic review on the age a child is able to self-inject insulin independently
Methods: The Cochrane Collaboration protocol was used to do a systematic review. Medline, CINAHL and Embase databases were searched using a population intervention comparison and outcome format. A narrative synthesis was used.
Results: Six studies meet the inclusion criteria. The literature demonstrates different expectations between parents and HCP about the appropriate age for children to perform diabetes tasks independently. Another factor observed was that the performance for insulin administration increases with age. However, the appropriate injection technique was frequently poorly performed and showed variability within each age range.
Conclusions: This review has highlighted a lack of studies on the subject of this systematic review. We are therefore currently without evidence based guidance on this subject.
These review has not been able to identify a specific age at which a child can be independent with self-injection of insulin. Demonstrates that age alone cannot be used as a predictor. Future research needs to develop a reliable tool that should measure, not only age, but also the psychomotor development, diabetes knowledge, insulin injection technique, confidence and stress on insulin injection, family and social environment, to re-assure the child and their parents are competent and confident to self-inject with safety.

P081
Short sprints during exercise to reduce hypoglycaemia in type 1 diabetes: a free-living randomized controlled trial

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Objective: Using a randomized controlled study design, we tested the hypothesis that incorporating short sprints into moderate intensity exercise can reduce the incidence of exercise mediated hypoglycaemia in individuals with T1D in free-living conditions.
Methods: Individuals with T1D, diagnosed for >1 year, aged 14-35 years, with an HbA1c of ≤9% were recruited into a prospective randomized controlled cross over study. Participants completed three 14-day periods in random order. In one period participants adhered to their usual exercise management (control period), in the other 2 periods, participants additionally incorporated 10 second sprints (every 20 mins) or 4 second sprints (every 2 mins) into moderate intensity exercise. Outcome measures included the incidence of hypoglycaemia (defined as sensor glucose < 3.1mmol/L for ≥ to 20 minutes) over the 14-day period; and % time spent < 3.1mmol/L and < 3.5mmol/L. CGM data were analyzed using a mixed model approach.
Results: 24 participants completed the study, performing a total of 420 exercise episodes. The 10s period was associated with fewer hypoglycaemia events (< 3.1mmol/L) than the control period (adjusted incidence rate ratio of 0.67, 95% CI 0.46-0.98: p = 0.04), with a hypoglycaemia incidence rate of 0.40 (95% CI 0.26-0.55), 0.33 (95% CI 0.21-0.45) and 0.28 (95% CI 0.17-0.38) events per day in the control, 4s and 10s periods respectively. The 10s period was associated with a reduction in time spent < 3.5 mmol/L (control vs. 10s period, 3.1% vs. 2.1%, p = 0.03) and time spent < 3.1mmol/L (control vs.10s period, 1.9% vs 1.2%, p = 0.03) compared to the control period. There was no difference in the incidence of nocturnal hypoglycaemia between the control and sprinting periods.
Conclusions: In free-living conditions, the inclusion of 10s sprints into moderate intensity exercise reduces the incidence of hypoglycaemia, without increasing the risk of nocturnal hypoglycaemia.

P082
Reproducibility of blood glucose responses to exercise performed under similar conditions in type 1 diabetes

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Objective: Regular physical activity is recommended for people with Type 1 Diabetes (T1D) due to its cardio-protective effects and benefits on insulin sensitivity, psychological well-being and quality of life. However, the difficulty in anticipating the blood glucose response to exercise reduces the confidence of T1D patients to engage in an active lifestyle. The aim of this pilot study is to examine the within-person reproducibility in plasma glucose response to exercise of the same intensity performed under similar conditions.
Methods: Eight participants (4m, 4f) with T1D on insulin pump therapy (age 15-30y, mean HbA1c ≤9%, duration of diabetes >2y, c-peptide negative) were recruited for the study. On 3 separate days, participants exercised under basal insulin for 40 minutes on a stationary cycle ergometer at 60% VO_2 peak after an overnight fast. Plasma glucose levels (PGL) were measured during and for one hour after exercise.
Results: Seven participants have completed the study to date. Mean ± SD PGL prior to exercise was 9.33 ± 2.26 mmol/L and mean fall during exercise was 1.37 ± 1.13 mmol/L. One participant commenced exercise with a similar PGL (within 2 mmol/L) at all three visits, and the remaining six achieved this at two visits. The mean difference in

change in PGL during exercise when starting PGL was similar (using the two closest values per individual) was 0.02 mmol/L, with a within-person standard deviation (SDw) of 0.51 mmol/L, 95% CI [0.30-0.85]. Using all three responses per individual, the mean difference in PGL change was 0.28 mmol/L with SDw of 1.05 mmol/L [0.73-1.53]. The mean difference in PGL change during recovery was 0.08 mmol/L with SDw of 0.52 mmol/L [0.35-0.77]. No hypoglycaemia was observed during exercise.

Conclusion: The within-person plasma glucose response to exercise is reproducible when starting levels are similar, but is less so when they vary. These findings may be useful for future T1D exercise guidelines and encouraging an active lifestyle.

P083

Dietary protein intake in the evening reduces the risk of overnight late onset post exercise hypoglycaemia

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Objectives: Moderate intensity exercise for individuals with type 1 diabetes (T1D) increases the risk of immediate and late-onset post-exercise hypoglycaemia (LOPEH). Current strategies to reduce overnight LOPEH following afternoon exercise include the use of pre-bed carbohydrate ingestion and/or reduction of basal insulin. Studies investigating the impact of high protein meals on blood glucose levels (BGL) have demonstrated a significant and prolonged hyperglycemic effect. The hypothesis of this study is that pre-bed protein can reduce the risk of LOPEH, and may be a useful management strategy.

Methods: Five young people (3M:2F) with T1D (aged 19.6 ± 2.9y; duration of T1D 10.2 ± 5.4y; HbA1c 7.2 ± 0.7% [mean ± SD]) participated in two in-clinic studies. On both occasions each participant completed 45 min of exercise at 4pm, at 95% of their lactate threshold. At 8 pm they drank 125mls of water with 50g whey protein (intervention) or 125mls of water (control) in randomized order. Euglycaemia (5.5-6.5mmol/L) was achieved and maintained from 2 hours pre-exercise and overnight by a modified clamp technique; where insulin was infused at a constant optimized basal rate and 20% glucose was titrated to achieve target BGL. The primary outcome of the study is the glucose infusion rate (GIR) required to maintain euglycaemia. Effectiveness of the intervention was determined using a two-way repeated-measures analysis of variance.

Results: The mean GIR (±SEM) to maintain euglycaemia overnight following exercise, was significantly lower (p = 0.001) in the intervention nights (0.605 ± 0.09mg/m^2/min) as compared to the control nights (1.58 ± 0.32mg/m^2/min).

Conclusions: Early results suggest that following afternoon exercise, taking 50g of whey protein in the evening, significantly reduces the glucose infusion rate required to maintain euglycaemia overnight. Thus, the intake of dietary protein following afternoon exercise may prove to be an additional clinical strategy to prevent LOPEH.

P084

Type 1 diabetes and extreme endurance sports: importance of nutritional advice and value of continuous glucose monitoring for an athlete with type 1 diabetes enduring 25 marathons in 1 month. Case report

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Background: Extreme endurance such as ultramarathon is considered dangerous to people with type 1 diabetes (T1D) due to the unpredictable physiological stress it represents and the increased risks of severe hypoglycaemia, during and after activity.

Case Report: A 26 year old athlete living with T1D (diabetes duration 18 years, last A1C: 7.5%, on Multiple Daily Injections), has begun a "DiAthlete Challenge" - extreme endurance of 25 marathons in 1 month. Each marathon route (in the UK & Ireland), consisted of distances totaling 42.2 km (1,055 km in total) and were run continuously in a different city with a day's rest break between every 4-5 days of running. Continuous Glucose Monitoring (Dexcom) use and a nutritional plan, including necessary supplementation and hydration protocols, were considered as safety measures and were prepared in advance (Table 1). The average total running time was 5.25 hours a day (including breaks i.e. to visit school/hospital/sports clubs etc. and 1 hour lunch break - up to 7.5 hours). Insulin requirements were adjusted daily. Heartrate, pace, running duration, and weight were monitored as well as his blood sugar levels.

Results: 60% of glucose levels were in target (4-10 mmol/L) during the duration of the challenge, giving an average BG at 9.2 mmol/L. There was no severe hypoglycaemia (only 4 mild hypos), and no diabetes ketoacidosis (DKA). Initial insulin management plan was modified accordingly: from -30% to -20% basal insulin (daytime), and from -14% to +7% (night-time). The athlete presented no injuries or muscle cramps, his energy and performance was consistent and stable.

Conclusions: There was no significant weight-loss (-1 kg), severe hypoglycaemia or DKA during and after the challenge. Nutritional and insulin-management plan, and a use of CGM, were important factors to maintain athlete's with T1D safety in this extreme endurance challenge.

	Carbohydrate intake	Insulin adjustment
Day-time	1) 8-10 g per kg + 30 g per hour --> (560-700 g + ~240 g)	1) -30% reduction of basal insulin 2) -50% prandial insulin for breakfast, 3) -75% for lunch 4) -25% for dinner
Night-time		1) -14% basal rate reduction

[*Nutritional and insulin management plan for the DiAthlete Challenge*]

Poster Tour 18 - Diabetes Education

P085

Pediatric Insulin Injection Technique: Recommendations based on the Worldwide Insulin Injection Technique Survey

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Introduction: The Worldwide ITQ survey has shown that injections in pediatric patients are frequently being performed suboptimally, with deleterious clinical consequences.
Objectives: To provide these patients and their providers with consensus, evidence and experience-based recommendations for insulin delivery.
Methods: Recommendations are based on the ITQ patient responses and nurse examinations of 898 pediatric subjects.
Results: 33% of preschoolers, 45.9% of school age children and 61.5% of adolescents use needles longer than 4 mm. The prevalence of lipohypertrophy (LH) was 41-47% across the 3 age groups.
Conclusions: Consensus, evidence based recommendations for insulin delivery (FITTER) clearly state that 4 mm pen needles are first choice in children and adolescents. If a 4 mm needle is not available, 5 mm needles may be used with a lifted skin fold, and 6 mm needles (the shortest length currently available in syringes) require the additional use of a 45° angle, effectively delivering insulin at a 4 mm depth. Injections in children aged ≤ 6 years should use the 4 mm needle inserted perpendicularly into a skin fold. Older children do not need to raise a skin fold. These measures are intended to prevent IM injections. Two modifiable, principal factors associated with developing LH are incorrect rotation of injection sites and the reuse of needles, with excessive reuse defined as using a single needle more than 5 times. Injection site rotation, both inter-site and intra-site, must be performed diligently. At each clinical visit, injection sites must be inspected and palpated for evidence of LH. Children with LH should be counseled not to inject into LH sites, to leave at least 1 cm between successive injections and not to reuse needles. Those who switch injections from LH to normal tissue must be taught to promptly reduce their insulin doses (as much as 20%), guided by SBGM or CGM, and to review their injection site health/ glucose control regularly.

P086

'Snapshots' - a photography workshop to document and express the daily experiences of female adolescents living with type 1 diabetes

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Objective: To evaluate the effect of a pilot photography workshop as a supplementary treatment tool on metabolic control and quality of life in female adolescents with Type 1 diabetes (T1D).
Participants: Fourteen female T1D patients median age 13.8 years (12-17 years), median diabetes duration 6 years (2-12 years) participated in the workshop. The majority of the participants came from double-income, married households (85.7%), median number of 3 children (IQR 2.5, 3.5).
Methods: Ten photography sessions guided by a photography instructor, during a 6-month period, took place in a local museum. The participants learned the basics of photography including focus, exposure, composition, creative thinking, hands-on-experience and critique. Cellphone cameras were used to document daily life in their home environment.
Outcome measures: HbA1c and Quality of life assessed at baseline and end-of-intervention.
Results: A 'snapshot' of the work will be presented. Median Hba1c tended to decrease [from 8.2% (IQR 7.5, 9.9%) to 7.5% (IQR 6.7, 9.1%), P = .119] and median total quality of life score tended to increase [from 78.8 (IQR 62.8, 93.2) to 84.2 (IQR 75.0, 93.5), P = .086]; the changes were not statistically significant.
Conclusions: As the project is part of a community endeavor to increase public awareness of health-related issues, 'Snapshots' will be exhibited at a local museum and school children as well as adults will be invited to tour the exhibition. Photography enabled patients to express various emotions and experiences of living with diabetes, which otherwise weren't verbalized. Future studies with more participants are needed to determine whether 'Snapshots' might serve as an add-on tool to improve metabolic control and psychological outcome.
Keywords: type 1 diabetes, adolescents, photography, metabolic control, quality of life

P087

The U.S. - Russia Peer-To-Peer Dialogue Program: partnership to strengthen community support for children living with type 1 diabetes

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In Russia there are about 30,000 children with Type 1 diabetes (T1D). One of the recognized strategies to improve T1D management is peer education with social and psychological support.
Objectives: The American JSI Research & Training Institute, Inc. (JSI) and the Russian "CAF" Foundation for Philanthropy Support and Development implemented the Project under the U.S.-Russia Peer-To-Peer Dialogue Program aimed at improving peer support skills of the community-based patient organizations using learning collaborative approaches.
Methods: After conducting a self-assessment of the organizational capacity of the Russian Diabetes Association and 9 Diabetes Patients' Organizations, JSI and CAF provided them with recommendations and guidance. The Project ran meetings with leading US organizations working in T1D such as Juvenile Diabetes Research Foundation (JDRF), American Diabetes Association and Boston Children´s Hospital. The Russian and American families had the chance to share their experience of living with T1D and emphasize importance of psychological support to a wide Russian professional and community audience. This sharing is important because often health professionals in Russia underestimate the value of psychological care for individuals and their families living with T1D. Based on the T1D Connections Program Handbook of JDRF, CAF developed the Peer-to-Peer Diabetes Families Support Guidelines and educated patient associations to implement effective and safe practices of peer coaches to improve T1D control in Russian regions.
Results: The main outcome of the Project is improved access to the most advanced knowledge on healthy behavior and T1D management through patients associations. Participating patient association's leaders developed skills in organization capacity building, and were sensitized to provide better service to the patient community. The Project helped to establish strong and lasting connections between US and Russian community-based associations.

P088

Experience of the edutainment technique in the training of children and adolescents with Type 1 diabetes and their parents

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Introduction: Good metabolic control in type 1 diabetes (T1D) depends on the level of patients' education. For increasing this level it is necessary to search for new forms of education with using of interactive methods.
Objective: To evaluate of effectiveness pedagogical technology of edutainment (education + entertainment) in the training of children and adolescents with T1D and parents.
Methods: The technique of edutainment is a deliberate connection of any social order with the entertainment mechanism. We staged a solution of real life problems associated with T1D. It was named DiaQuest which included: team competitions in solving practical tasks on T1D; staging of the decision; the mentor in each team, who only guided the process; emotional glow, friendly atmosphere; mutual evaluation of teams. 23 families with T1D child were divided into 4 teams by age. Children under 8 years old solved the task about the algorithm of actions with the insulin pump problems at school. Adolescents 10-15 years old showed the advantages and disadvantages of the insulin pump. Young adults 15-18 years old staged a virtual scheme of good metabolic control. The team of parents solved the problems of communication in the family and in society. The evaluation was carried out according to the following criteria: level of T1D knowledge, the unity of the team members, the artistry.
Results: All participants were fully involved in the decision of tasks on T1D; the process of staging decisions brought them pleasure. All DiaQuest's participants were motivated to apply knowledge in the real life. Children under 8 years old had a sufficient level of knowledge, but they needed clear algorithms in practice; collective and interactive solving problem motivated teenagers to control their diabetes; children were more interested in watching their parents, not their peers.
Conclusions: Edutainment like DiaQuest could be effective form of training for children and adolescents with T1D and parents.

P089

A prospective survey of the knowledge and use of medical identification in children and young people with diabetes at a large children's hospital

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Objectives: Children and young people (CYP) with Type 1 Diabetes Mellitus (T1DM) are at risk of acute clinical emergencies. Wearing medical identification (ID) is recommended by the National Institute for Clinical excellence (NICE). Information on adherence to this recommendation in CYP with T1DM is scarce. This study aimed to assess parent and CYP's knowledge of the recommendation, to explore adherence and barriers to carrying ID and understand preferred forms of ID.
Methods: This was a prospective, cross-sectional questionnaire survey of CYP aged 10-19 years with T1DM of more than 6 weeks, and carers, conducted at diabetes clinics in a large diabetes center between 6- 31/3/2018.
Results: Questionnaires were completed by 47/47 CYP (mean age 14.1 years), and 38/39 carers, accounting for 19% of registered 10-19 year olds. Medical ID was owned by 29/47 CYP(61.7%) and 81% (13/16) of 16-18 year olds with no significant gender differences. 25/33 (75%) of young persons recalled having advice on ID, in contrast to 17/38 (45%) of carers. Diabetes ID cards (44%), given free to CYP on diagnosis by the clinic, and ID wristbands (34.5%) were the most frequent forms of ID owned. Although 8/29 (27%) CYP reported carrying ID daily, only 7/29 (24%) wore it on the day they attended. 20/44 (45%) CYP and 13/30 (43%) carers identified forgetting ID was the greatest barrier to carrying ID. 20/30 (60%) carers thought appearance was a barrier in contrast to 8/44 (18%) of YP. For 10/32 (31%) YP, in contrast to 6/45 (13%) carers, “feeling safe” was a factor in wearing ID.
Conclusion: Up to 40% of CYP do not possess medical ID and up to 85% of CYP are potentially at risk if experiencing a diabetes emergency away from their main carers. Professionals have a role in awareness of ID among CYP and carers by checking this at every clinic. Making ID cards available at every clinic, in addition to providing at diagnosis, may prove beneficial.

P090

Type 1 diabetes: capacity building in a middle economy setting

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Introduction: The management of Type 1 Diabetes Mellitus (T1DM) has evolved significantly with the widespread use of novel technologies such as the insulin pump. This demands for regular update and strengthening the capacity of professionals dealing with T1DM on a daily basis.
Objectives: The aim of this study is to reflect on capacity building in T1DM in middle economy setting.
Methodology: Capacity building was organized by T1diams, a non-profitable organization for people living with T1DM, in collaboration with the University of Mauritius and Ministry of Health and Quality of Life in Mauritius, through a 2-days workshop. Experts comprising of a pediatric endocrinologist and a psychologist from the Centre Hospitalier Universitaire Site Sud, Saint Pierre in Reunion Island facilitated exchange of experiences and ideas. Principles of community based participatory research were applied to appraise future needs of professionals and patients with T1DM.
Results: 60 participants attended the workshop including diabetes specialists, pediatricians, medical officers, nutritionists, academics, diabetic specialist nurses and students. Interdisciplinary discussion on the limitations of the health system and how care can be optimized was achieved. Junior doctors were enlightened on the validated pathway to manage diabetic emergencies. One of the pertinent observations was the lack of cohesion between the different organizations caring for T1DM in Mauritius. There were strong suggestions to create clear and well-defined roles that complement each other so as to enhance the shared care of patients, making judicious use of resources.
Conclusion: The workshop succeeded in the dissemination of guidelines and evidence-based practice for the holistic management of T1DM patients. Expert input from developed countries was found to be exceptionally useful. Cohesion between different stakeholders in the care of T1DM patients can be improved through regular and similar activities.

P091

Insulin: time it right. Timing of insulin administration in relation to a meal is as important as its administration

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Aim: To evaluate current practice regarding the timing of insulin administration in relation to a meal. We also evaluated the factors which could influence practice.
Methods: This was a prospective audit. We performed an outpatient based survey of patients/parents with type 1 diabetes mellitus. We produced a questionnaire based on previous studies and experience. We surveyed 47 patients/parents.
Results: 55% of children were on pump therapy, while 43% were on MDI therapy. Insulin was administered by children themselves in 62%, compared to 19% each in the parents and "both" categories. Insulin was administered pre-meal in 70%, post meal in 19% and both pre and post in 11% of children. 86% of pre-meal insulin was administered just before a meal and the remainder (14%) within the 15 minutes before a meal. Post meal insulin was administered just after meal. Factors influencing the timing of insulin administration were advice from health care professionals (HCPs) (79%), habit (23%), convenience (11%), fear of hypoglycaemia (13%) and meal related (4%). 98% of children reported receiving education regarding the timing of insulin in relation to meal. 2 children (duration of diabetes 14 years and 4 years) were taking insulin post meal as advised by their HCPs at the time of diagnosis.. A small number of parents had concerns regarding whether children would finish their meal, and chose to give insulin post meal.
Conclusion: It is encouraging to note that 70% of children were receiving meal time insulin before meals. The most important factor influencing the timing of insulin administration is education received from HCPs, highlighting the importance of structured diabetes education at diagnosis with review and re-education during the care pathway. A small number of parents and patients reported fear of hypoglycaemia as a reason to inject insulin post meals; input from the diabetes MDT (e.g. dietician and psychologist) may help ameliorate the actual or perceived risk.

P092
Obesity and insulin resistance: differences between pubertal and prepubertal children

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Objectives: Insulin resistance in obese children is associated with severity of obesity as well as with puberty. Puberty is related to a substantial reduction of insulin sensitivity, due to hormonal changes during this age. The aim of this study is to compare obesity and insulin resistance indices between prepubertal children and adolescents.
Methods: Fifty-four prepubertal children (59.3% boys) and 41 adolescents (36.6 % boys) with mean age 9.8 ± 2.1 and 11.8 ± 1.8 years respectively were studied. Waist circumference, WHtR, BMI, HbA1c, HOMA-IR and Matsuda indices were calculated. For the comparison of proportions chi-square and Fisher's exact tests were used. Student´s t- tests were used for the comparison of means. Also, linear regression analysis was used to adjust the results for gender differences.
Results: The mean BMI was 31.3 (SD = 5.5) in the pubertal group and 28.4 (SD = 3.5) in the pre-pubertal group (p = 0.002). Fasting glucose levels were similar between the two groups, while insulin levels were greater in the pubertal group (p = 0.003) even after adjusting for sex (p = 0.007). HbA1c and WHtR were not significantly different between the two groups. Moreover, the Area Under the Curve (AUC) for insulin was higher in the pubertal group (p = 0.010). HOMA-IR was higher (p< 0.001) and Matsuda index was lower (p = 0.010) in the pubertal group as compared to the prepubertal group. The prevalence of Insulin resistance (HOMA-IR>3) was higher in pubertal subjects as compared to the prepubertal ones (70% vs. 32%, p < 0.001). Furthermore, higher percentage of subjects had Matsuda index less than 2.5 in the pubertal group (55% vs. 26.9%, p = 0.006). The aforementioned results were significant after adjustment for gender differences. Waist circumference was found to be significantly increased in the pubertal group (p = 0.003).
Conclusion: Insulin resistance is more evident in obese adolescents and it is therefore imperative to treat obesity in early childhood.

P093
Evaluation of relation between diabetic education levels of type 1 DM child/adolescent and parents and metabolic control

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Introduction and Aim: The education of the diabetic patient and parent is an important phase of diabetic treatment. In this study we aimed to evaluate the relation between diabetic education levels of type 1 DM child/adolescent and parents and metabolic control.
Material and Method: The study included the patients and their parents who referred to Pediatric Endocrinology clinic and followed at least for 1 year with diagnose of Type 1 DM. Children over 11 years old and their parents performed questionnaire form which aims to evaluate diabetes knowledge level and daily diabetic management. They had 20 questions, every right answer had 10 points, and diabetes knowledge point (DKP) was measured. HbA1c levels in last 1 year used to evaluate metabolic control. HbA1c level < %7.5 was good, % 7.5-9 was mild, >%9 was bad in metabolic control.
Results: Mean age of 42 patients (27 girl/15 boy) was 11.6 ± 4.1 (1.6-18.6) years. Mean diabetes duration was 4.8 ± 3.3 (1-15) years and mean HbA1c levels were 8.2 ± 1.4% (5.9-12.3%). Metabolic control was evaluated as good in 33.3% (n = 14), mild in 38.1% (n = 16), bad in 28.6% (n = 12). 69% of parents (n = 29) evaluated their own diabetes knowledge as good, 16.7 (n = 7) as very good and 14.3% (n = 6) as mild. When they were asked for usage of diabetes knowledge in management of disease 47.6% of parents (n=20) answered as always, 35.7% (n = 15) as often, 9.5% (n = 4) as sometimes and 7.1% (n = 3) as rarely. No relation was detected between HbA1c levels and patient and parents DKP (p = 0.279, p = 0.963, respectively). HbA1c levels observed to decrease when usage of diabetes knowledge in management of disease increases, but no statistically difference found (p = 0.418).
Conclusion: In this study no relation was found between patients and parents diabetes knowledge levels and metabolic control. It is considered that usage of knowledge in management of disease has impacts on metabolic control but there are more important factor affecting metabolic control.

Poster on Display - Diabetes Education

P094
Academic challenges faced by children with type 1 diabetes in Asia - the problem and solution

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Introduction: A comprehensive understanding of socio-psychological impact of diabetes is important for informed policy and practice. Type1 Diabetics feel stigmatized at school, workplace, relationships resulting in negative impact on their psycho-social wellbeing contributing to poor clinical outcomes.
Objectives: A study was undertaken at Delhi Diabetes Research Centre (DDRC) after parents of T1D children reported decline in academic performance. We proposed hypoglycemia during examination as the main contributing factor.
Methods: An observational study was conducted involving12 kids with T1D-7girls & 5 boys in 13-17yr age group. We studied self-reported outcomes of performance & hypoglycemia during exams. The concerned teachers were counseled about symptoms of hypoglycemia and instructed to allow kids to carry Glucose Tabs(GT) with them during exams. Following this, children´s questionnaire was conducted-Did you need to take GT? Did symptoms improve? Did you perform better in exams? Do you feel more confident in facing exams with above provision? Results-6 kids reported hypoglycemia, verified by fingerstick glucose test. 4 reported hypoglycemic symptoms only, no glucose testing was done. All 10 kids reported symptomatic improvement with GT. 2 didn´t report any sugar problem. All children reported improvement in confidence & self-reported exam performance after implementation of above program.
Conclusion: Frequent hypoglycemic episodes can affect academic performance and reduce confidence of children. Based on our observations the Central Board of Secondary Examination (CBSE) of India has now permitted children with T1D to carry GT /snacks/water with them at all times during examinations and Medical certificate issued from their physician to be submitted to school & CBSE. This decision will have positive impact on performance and reduce apprehensions of parents. We suggest that apex bodies like ISPAD issue guidelines based these observations for benefit of T1D children worldwide.

P095
My experience as a diabetes educator in a Non-Profit Organization, T1Diams, Mauritius

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Introduction: In Mauritius, the incidence for Type 1 Diabetes is on the rise. Local public and private health sectors still lack the specific training structure to implement a correct therapeutic approach in handling and managing Type 1 diabetes. T1Diams, a non-profit organization has been offering support to individuals with Type 1 diabetes for the past 12 years while lack of funds remain the principal cause of limitation in its endeavors.
Objective: It was well understood that the prime mission of a diabetes educator was to train patients in the self-management of Type 1 Diabetes. This is a state of art in itself and necessitates the establishment of specific, measurable, attainable, realistic and timely goals in collaboration with the patient.
Methods: The author was trained on the management of Type 1 Diabetes using the French protocol of 'Aide aux Jeunes Diabetiques' (AJD).
She was placed under supervision to acquire knowledge and competence in Type 1 Diabetes self-management, aim at being therapeutic as well as educational for the beneficiaries. The supervised training included:

- Diabetic games through creative educational tools
- Regular home visits for outreach of members
- Participating in talks / awareness programs in schools
- Educating beneficiaries on the self-management skills such as insulin administration, blood glucose: monitoring/timing of testing, measurement techniques, treatment of hypoglycemia and hyperglycemia
- Healthy Nutrition and carbohydrate counting
- Psychosocial Support

Results: As per the author's experience, the real essence of diabetes education lies in placing the patient at the center of a personalized care system in an environment which fosters decision-making, patient engagement and enhanced motivation for health improvement.
Conclusion: For diabetes education, counseling becomes therapeutic when trust, respect and empowerment are promoted.
Keywords: Mauritius, Type 1 diabetes, Diabetes educator, Medical team

P096
Determinants of parental stress in families of children with type 1 diabetes mellitus

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Background: Data on parental stress in families with type 1 Diabetes Mellitus (DM) is scarce in Indian literature.
Objectives: To study determinants of parental stress in families with children with Type 1 DM
Methods: 100 families attending a type-1 diabetic clinic of a multi-specialty hospital in a developing country were consecutively selected. In a controlled setting, the family was be administered the questionnaire -parental experience of childhood Illness scale(PECI). Parental education, presence of another child, occupation of the parents, Glycemic control parameters and other demographic parameters (chronological age, diabetic age, glycosylated hemoglobin, total daily requirement, self-monitoring of blood glucose, sex, insulin regimen, presence of severe hypoglycemia and presence of complications) retrieved from logbook and case records.
Results: 100 families participated in the study (chronological age 10.7 $\pm$ 4.1years, diabetic age 2.7 $\pm$ 2.1years and 14 males). The mean score was 86.0 $\pm$ 13.1(1-64). On univariate analysis: chronological age and regimen were determinants of stress. On multivariate analysis, chronological age (< 5 years) was the single independent determinant of significant parental stress. The scores were significantly higher in parents of children< 5years versus children >5 years (99.5 $\pm$ 14.5 versus 76.6 $\pm$ 13.9 ($p < 0.05$)).
Conclusion: Chronological age (< 5years) is an important determinant of parental stress in type 1 diabetes mellitus. Constant team motivation and support should focus on alleviation of parental stress in this age group.

P097
Abstract Withdrawn

P098

Pilot study on use of indigenous questionnaire in assessing efficacy of diabetes self-management education (DSME) module among caregivers and children with T1DM

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Objective: DSME is a standard of care in T1DM. This pilot study was planned to evaluate its efficacy using indigenously developed questionnaire.

Methods: This hospital based study was conducted, using questionnaire in Hindi (with 8 components) with Pre-Post Test design (before and after DSME), on 70 consecutive children with T1DM and their caregivers over 6 months. The questionnaire consisted of 25questions and each right response carried one mark (maximum of 25). DSME was provided in 4 structured sessions, each lasting 1.5-2 hours, using audio-visual aids in local language by same diabetes educator.

Results: Seventy sets of pre & post-test responses were analyzed. Mean age of children and median duration of T1DM were 7.76 ± 4.51 years and 0.45 months (range: 1 day to 129 months) respectively. There was significant difference in mean scores of Pre and Post-test questionnaire (8.41 ± 5.30Vs 20.34 ± 3.45, P value: 0.000) and mean difference in scores was 11.92 ± 4.86. Factors including educational status of mothers, duration of T1DM, previous educational counseling and previous DKA had significant positive effect on pre-test scores. Although these factors had positive effect on post test scores also, it was not significant.

Conclusion: There was significant difference in scores of all patient care givers (within groups) between Pre-test and Post-test. But in post-test (after DSME) there was no difference of scores between groups, hence it indicates the effectiveness of DSME.

The indigenous questionnaire seems to be reliable tool to assess the baseline diabetes self-management knowledge and impact of DSME objectively but needs further validation for its generalized use.

P099

Who should know the students with type 1 diabetes mellitus in school?: From a questionnaire survey of Japanese school staffs

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Background: Recently, the inventive insulin therapy is popular in children with type 1 diabetes (T1D), so that self-care behavior is required in school. There is no consensus or rule of who should know about students with T1D and explain about that in school. We have annually provided the seminar for school staffs since about 20 years ago for advocacy of T1D. A questionnaire survey on the status of children with T1D at school has being conducted at each seminar. We focused on the range of students knowing about diabetes students.

Objective: To see the present situation of the support and self-care of students with T1D in school.

Methods: We compiled the results of the questionnaires conducted at the past seminars (2013~2016, 2018). The range of student who knows was graded to five, so called "Open range"; no other students know, only some friends, in the class, in the grade or in the school. The student with T1D was classified into five age groups; preschool or nursery school, low grade (1st to 3rd grade) in primary school, high grade (4th to 6th grade) in primary school, junior high school (7th to 9th grade) and senior high school (10th to 12th grade).

Results: Total numbers of school staffs attended to seminar were 395. Median response rate was 85.8%. Sum of Open range of in the class, in the grade and in the school in each age group were 50%, 64.8%, 76.1%, 76.9% and 45.7%. No other students know of Open range were 16.8%, 14.3%, 1.4%, 6.3%, 8.6%. Most main person about revealing a disease to others is class room teacher or parents below elementary school age and class room teacher or patient's own above junior high school age.

Conclusion: From our survey of questionnaire, elementary school and junior high school students tend to reveal a disease to wider than the class. But in senior high school students, the answer revealing nothing to other students is increased. We consider to need survey based on patients with T1D whether match to their will and decision.

Poster Tour 05 - Diabetes Technology

P100
Insulin availability and affordability in Haryana and Madhya Pradesh states in India

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Introduction: Despite being used to treat people with diabetes for nearly one hundred years, it is thought that globally one in two of those in need of insulin have challenges accessing it. Poor availability in facilities and unaffordable prices are considered key barriers to access to insulin. Little is known about the situation in India.
Objective: Investigate the availability, price and affordability of insulin in Haryana and Madhya Pradesh states.
Method: In 2017, data was collected in 3 public hospitals, 15 private pharmacies and 3 private hospitals located in 3 areas (capital, provincial and district) of each state. Prices were collected on all insulins in stock, plus metformin and gliclazide tablets as comparators. Government procurement prices were also collected. Prices were standardized to 10ml 100IU/ml in US dollars.
Results: In the public hospitals in Haryana, human insulin (short-acting) was only found in the teaching hospital in the state capital. Availability was higher in the public sector of Madhya Pradesh. In the private sectors, mean availability of human and analog insulins was 0-100% and 0-67%, respectively, depending on insulin type, outlet type, and state. The comparators were more available than insulins. Government procurement prices for human insulin were US$2-3. Median private sector patient prices were US$5.60 (human) and US$18.27-US$28.49 (analog), respectively. People on low wages would have to work 1.3-1.9 days (human) and 6.3-7.3 days (analog) to purchase 30 days' supply of insulin. The comparators were more affordable at 0.5-1 days' wages.
Conclusion: While metformin and gliclazide were affordable, insulin was not. The government must ensure human insulin is available in public hospitals when needed, and at affordable prices in the private sector.

P101
Randomized case control study for the clinical evaluation of stem cell therapy in patients with type 1 diabetes - one year follow up

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Objective: We conducted a randomized case control study for the utility of stem cell transplantation in type 1 diabetics for 1 year to evaluate clinical effect of stem cell intervention and conventional insulin therapy.
Methods: Stem cell therapy involving mesenchymal cells by Reelabs was performed on 22 T1DM patients (case) and 17 patients in control arm, with standard care of therapy without any intervention with stem cells. Total 5 doses of stem cells were administered, at pre-defined fortnightly intervals over a period of 3 months. Evaluation of glycemic parameters for the % change in HbA1c, Fasting Blood Glucose (FBS), Post Prandial Blood Glucose (PPBS), C- peptide and decrease in insulin dose as compared to baseline for both groups were recorded at 0, 3, 6, 12 months and compared after 1 year and
Results: Mean age in case and control was 16 years and 15 years, respectively. Mean baseline HbA1c was 11 % in each group, mean FBS 260, 314 mg/dl, mean PPBS 387, 414 mg/dl, C peptide 0.61, 0.45 ng/ml and daily insulin dose at the initiation of the study was 58, 71 units, respectively. Significant difference in % change of FBS (-6.75 %), PPBS (-5.54%) and daily insulin dose requirement (-18.15) in the case as compared to control arm was noted. There was numerically superior % increase in the C peptide levels across groups, but difference did not achieve statistical significance. In case arm, after 12 months, there was 44.14% reduction in insulin dose (mean insulin dose at 12 months (32.4 $\pm$ 6.6 units), reduction in insulin dose was statistically significant ($p < 0.0001$). There was 25.2% reduction in HbA1c ($p < 0.0001$), 54.75% reduction in PPBG ($p < 0.0001$) and 47.2% reduction in FBS ($p < 0.0001$).
Conclusion: Superior reduction in daily dose of insulin in T1DM patients demonstrates and corroborates with benefits of the stem cell therapy across other glycemic parameters. Mesenchymal stem cell therapy is a realistic goal in T1DM patients.

P102
Comparison of overnight glucose control of young patients with T1D during the MiniMed™ 670G system pivotal trials

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Introduction: The MiniMed™ 670G system with SmartGuard™ Auto Mode automatically adjusts basal insulin delivery every 5min based on sensor glucose (SG) values. Its at-home safety and effectiveness were demonstrated in two separate multi-center pivotal trials consisting of T1D subjects aged 7-13yrs and 14-75yrs.
Objectives: To compare overnight (9PM-6AM) SG and insulin delivery data from pediatric (7-13yrs) and adolescent (14-21yrs) participants.
Methods: The MiniMed™ 670G system was used in Manual Mode (fixed pre-set basal rates) for 2 weeks, followed by Auto Mode (automated basal insulin delivery) for 3 months. Overnight median and IQR of SG values during the run-in and study phases, for both cohorts, were analyzed.
Results: Significantly lower SG was observed between 3AM and 6AM and was mainly due to the system transferring variability from SG to insulin infusion rate. The average nightly coefficient of variation of insulin delivery was 68% during study phase versus 19% during run-in. During the 9-hour overnight period in Study Phase, the system suspended insulin for an average 1.7hrs and 1.6hrs, and delivered insulin at the maximum allowable limit for an average 3.1hrs and 3.2hrs, for pediatric and adolescent cohorts, respectively.
Conclusions: These data suggest that increased variability in basal insulin delivery, achieved with MiniMed™ 670G system automation, results in improved overnight SG control that is comparable in pediatric and adolescent patients with T1D.

Table: Overnight sensor glucose with MiniMed™ 670G system use, at various time points during the Manual Mode run-in phase and the Auto Mode-enabled study phase, in pediatric and adolescent cohorts with T1D.

		Median, IQR of Sensor Glucose mg/dL (mmol/L)			
		9:00 PM	Midnight	3:00 AM	6:00 AM
Run-in Phase (Manual Mode)	Pediatric	165, 118-220 (9.2, 6.6-12.2)	167, 117-223 (9.3, 6.5-12.4)	165, 121-213 (9.2, 6.7-11.8)	145, 112-187 (8.1, 6.2-10.4)
	Adolescent	168, 119-215 (9.3, 6.6-11.9)	152, 113-202 (8.4, 6.3-11.2)	144, 102-188 (8.0, 5.7-10.4)	139, 104-179 (7.7, 5.8-9.9)
Study Phase (Auto Mode)	Pediatric	159, 116-211 (8.8, 6.4-11.7)	160, 123-206 (8.9, 6.8-11.4)	137, 117-175 (7.6, 6.5-9.7)	124, 110-144 (6.9, 6.1-8.0)
	Adolescent	155, 117-206 (8.6, 6.5-11.4)	153, 118-197 (8.5, 6.6-10.9)	136, 113-170 (7.6, 6.3-9.4)	127, 112-150 (7.1, 6.2-8.3)

Run-in phase duration was 2 weeks.
Study phase duration was 3 months.

[*Table: Overnight sensor glucose data with the MiniMed 670G system*]

P103

Impact of continuous and flash glucose monitoring on HbA1c, quality of life indicators and hypoglycaemia confidence in children and young people with type 1 diabetes

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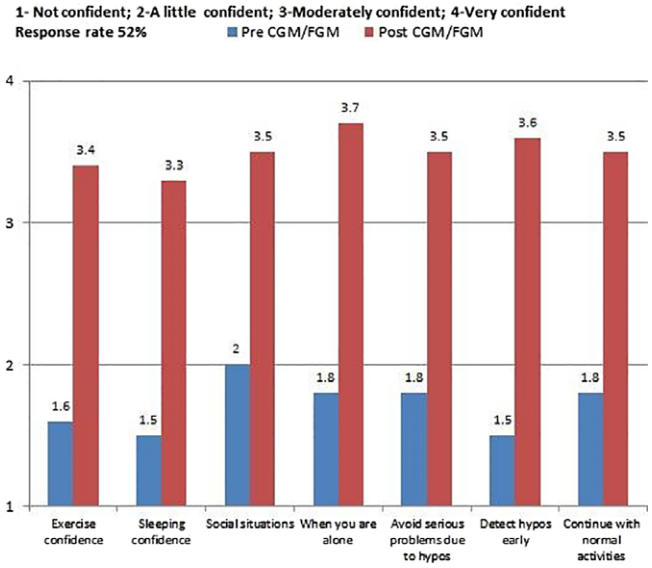
Objectives: To evaluate the impact of continuous glucose monitoring (CGM) and flash glucose monitoring (FGM) on children and young people with type 1 diabetes (CYPD).

Methods: In a district general hospital in south of England, with a total of 214 patients with type 1 diabetes (T1D), HbA1c was compared pre and post intervention with CGM (n = 36) and FGM (n = 22) within each group and in patients with 'high HbA1c' (>68 mmol/mol) pre-intervention (n = 11 CGM, n = 9 FGM) using paired Wilcoxon signed rank test. Comparison between CGM and FGM groups was made using unpaired Wilcoxon signed rank test.

Families completed Glucose Monitoring Satisfaction Survey (GMSS) (1) and Hypoglycaemia Confidence Scale (HCS) (2).

Results: In the CGM and FGM groups there was no statistically significant difference in HbA1c pre and post intervention (P = 0.755 in CGM and P = 0.305 in FGM) and when compared with each other, pre (P = 0.293) and post intervention (P = 0.072). However, within this cohort, patients with 'high HbA1c' before intervention, showed a statistically significant improvement in HbA1c, both with CGM (P = 0.032) and FGM (P = 0.039) post intervention with alpha levels of 0.05.

The GMSS showed improvement in 'openness', trust' with reduced 'emotional and behavioral burden'. HCS survey(Pic.1) showed families had increased confidence in managing hypoglycaemia.



[*Hypoglycaemia Confidence Scale (Average scores)*]

Conclusions: Statistically significant improvement in HbA1c after CGM and FGM was seen in CYPD with initial 'high HbA1c'. There was also significant impact on quality of life indicators and confidence in staying safe from hypoglycaemia related events.

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P104

Impact of continuous glucose monitoring on sleep quality in children and adolescents with type 1 diabetes and their parents: a pilot study

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Introduction: Many children with Type 1 Diabetes (T1D) and their parents/carers anecdotally report poor sleep quality. This is particularly problematic in patients experiencing frequent hypoglycaemia despite intensive blood glucose monitoring (BGM). Continuous glucose monitoring (CGM) overcomes some of the burden of BGM and can reduce overnight hypoglycaemia.

Objectives: This pilot study explored the impact of CGM on sleep quality in children/adolescents with T1D experiencing labile glycaemic control and frequent hypoglycaemia. Impact of CGM use on parental sleep quality was also investigated.

Methods: Actigraphy was used to measure sleep quality in children/adolescents aged 2-18 with T1D (n = 10) and their parent(s) (n = 18). Sleep quality was measured one week prior to the patient starting CGM and during week 5 of CGM use. Additionally, all participants recorded a sleep diary during each sleep monitoring week.

Results: Sleep efficiency improved by 7.03% in children/adolescents (95% CI 3.09 to 10.99; P = 0.003), and 4.14% in parents (2.21 to 6.06; P < 0.001). This was accompanied by a significant reduction in nocturnal wakening. In children/adolescents, mean reduction was 42.5 minutes (-66.5 to -18.4; P = 0.003), and in parents, 18.5 minutes (-28.6 to -8.4; P < 0.001).

Conclusions: This was the first study that objectively explored sleep quality in both children/adolescents with T1D, and their parents, before and during the use of CGM. The improvements in sleep efficiency and nocturnal wakening may be clinically significant for both patients and parents with regards to functioning, quality of life and neurocognition. Reasons for improved sleep quality may include reduced overnight disturbance from BGM, reduced hypoglycaemia and reduced anxiety related to hypoglycaemia. These factors may directly and indirectly impact upon an individual's T1D self-management and consequently, may affect a patient's glycaemic control. This area warrants further research.

P105

Evaluation of Flash Glucose Monitoring after long-term use: a pediatric survey

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Objectives: Self-surveillance is the key for glycemic control. The aim is to understand the opinions of type 1 diabetes children about their everyday use of Flash Glucose Monitoring (FGM).

Methods: An independent multicentric study was conducted between December 2016 and June 2017. Children with type 1 diabetes using the FreeStyle Libre® FGM system and/or their parents were

surveyed in several French medical centers, regardless of their treatment regimen and metabolic control. Data were obtained through a questionnaire given during medical consultation. Statistical analysis were made between age subgroups.
Results: Of the 347 patients recruited, 79.5% had been using the sensor for more than 3 months (average usage time: 285 days). The main reported motivations for initiating this type of monitoring were to avoid finger prick pain (for 85.9% of patients), to allow parents to check nocturnal glucose levels (60.8%), to make glucose level checks faster (50.7%), to improve school integration (36.0%), to understand glycemic variations (34.9%) and to anticipate hypoglycemia (32.0%). Two-thirds of respondents experienced difficulties, mainly the sensor falling off (47.6%), measurement discrepancies (25.1%), cutaneous reactions (22.2%), and 89.5% changed their habits: 70.6% took more scans, 37.2% corrected their hyperglycemia more promptly, and 37.5% used trends to adjust their insulin dosage. About one-third of the study group (35.1%) reached lower HbA1c levels, and two thirds (67.1%) were satisfied with the device.
Conclusions: Our results show that FGM is a widely accepted option for self-monitoring diabetes, but that specific training is required to improve its use for insulin dosage adjustment and metabolic results.

P106
Impact on of freely available continuous glucose monitoring on glycaemic control of Australian children and adolescents living with type 1 diabetes

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Objectives: To evaluate the effectiveness of freely available Continuous Glucose Monitoring (CGM) on a pediatric diabetes clinic.
Methods: The Australian Government supplied CGM free to eligible children with Type 1 Diabetes (T1D) under 21 years in April 2017. This study evaluated the uptake and effect of the free availability of CGM on our T1D clinic population under 21 years. Eligibility criteria included a T1D diagnosis over 1 year and being managed by our team for minimum 6 months prior to April 2017. Patients were grouped into those already using continuous CGM (CGMc), those who used CGM continuously since CGM became freely available (CGMcn), those who used CGM intermittently (CGMi) and those who did not use CGM (CGMno). Mean HbA1c for 12 months prior was compared to mean HbA1c for minimum 9 months after commencement of CGMcn using Students t-test.
Results: A total of 63 children were eligible for the study comprising 13 (21%) in CGMc (paying without subsidy prior to April 2017), 29 (46%) in CGMcn, 15 (24%) in CGMi and 6 (10%) in CGMno. The CGMc group mean HbA1c changed from 7.0% (SD 0.9) to 6.9% (SD 0.8) (NS). The CGMcn changed from 7.8% (SD 1.1) to 7.5% (SD 0.7) (p = 0.04). Overall 42 (67%) of eligible children utilized the initiative using continuous CGM (CGMc +CGMcn) (average age 12.8 yrs) with mean HbA1c now of 7.4% SD (0.9) (median 7.3%).
CGMi users (24%) were significantly older (mean age 14.8 yrs) and HbA1c changed from 8.5% (SD 1.6) to 9.1% (SD 1.7) which may reflect non-adherence to recommended therapy due to diabetes distress. Only 10% were considered not suitable or did not want CGM (mean age 15.0 yrs) with mean HbA1c changing from 8.4% (SD 2.1) to 8.6% (SD 0.9).
Conclusions: Introduction of freely available continuous CGM significantly improved glycaemic control for the new users and maintained glycaemic control in those already using continuous CGM. Those choosing not to use CGM or using intermittent CGM did not improve glycaemic control.

P107
Improvement in psychosocial outcomes in parents of children with type 1 diabetes following an Australia-wide roll-out of continuous glucose monitoring systems

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Objective: In a trial setting, continuous glucose monitoring (CGM) improves glycaemic control with potential benefits on psychosocial outcomes. However, the impact of CGM under free-living conditions is less well described. In April 2017, the Australian Government announced the availability of subsidized CGM to children and young people <21 years with type 1 diabetes (T1D). This provided a unique opportunity to study the effectiveness of CGM to improve psychological and glycaemic outcomes in a population-based sample in a real world setting.
Methods: Parents of children who commenced on CGM were approached to fill in an on-line survey with validated questionnaires (Fear of Hypoglycaemia (FOH), Diabetes Treatment Satisfaction (DTS)) and with questions on sleep before and two months after CGM start. Demographic and glycaemic outcomes were recorded from the Western Australian Children's Diabetes Database.
Results: A convenience sample of 60 parents completed the survey at baseline (BL) and follow-up (FU). The (mean ± SD) age of children was 13.1 ± 4.4 years, duration of diabetes 5.1 ± 4.4 years with 57% females. 70% of children were on DexCom G5 while 10%, 17% and 3% were on Medtronic Guardian Connect, G2 and MiniLink respectively. The (mean ± SD) FU time for repeat questionnaire was 81.3 ± 27.0 days. Parental FOH improved (BL vs FU; 50 vs 44.3; p = 0.004) with improvement in worry score (p = 0.004) and no change in behavior score (p = 0.081). DTS improved with a mean change of 13.8 ± 9.8. Overnight finger-prick testing reduced (BL vs FU 69.2% vs 41.7%; p< 0.001) and the overall sleep quality improved with CGM (mean score BL vs FU; 3.1 vs 2.5 p< 0.001). HbA1c reduced from 8.3% to 7.8% (p< 0.001).
Conclusions: The availability of subsidized CGM led to a reduction in the parental FOH with improved sleep and improved glycaemic control in children in the short-term. These findings provide further evidence to the need for on-going monitoring to review translational outcomes.

P108
Flow-chart to prevent hypoglycemia and hyperglycemia in adolescents with type 1 diabetes using standalone continuous glucose monitoring with predictive alarms: real life validation and 6 month follow-up data

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Introduction: Predictive alarms (PA) have been integrated in continuous glucose monitoring (CGM) system (Guardian Connect™, Medtronic, Italy), to advise patients that in a time-frame a hypo or hyper glucose value will be reached.
Objectives: Our aim was to determine the efficacy of a specific-designed flow-charts to limit hypo and hyper in 32 adolescents with type 1 diabetes using MDI plus Guardian Connect, under free-living conditions.
Methods: PA system safety and efficacy were evaluated by analyzing CareLink data either during a 4-day camp, after 4 days at home, and after 6-month follow-up. Mean meter BGs, mean sensor glucose,

sensor SD, %time in hypo (< 3.9 mmol/l), %time in hyper (>8.9 mmol/l), episodes of severe hypo, DKA episodes have been analyzed. The primary outcome was the %time for hypo and hyper.

Results: We analyzed 32 patients (mean age 15.7 ± 1.5 yrs, diabetes duration 8 ± 4 yrs, HbA1c 7.8 ± 1.2%). The average BGs was 10.3 ± 1.4 mmol/l, while average sensor glucose was 10.1 ± 1.3 mmol/l, with slightly lower values during camp than at home (p = **0.000**) Time spent in hypo was similar at camp and at home (0.53 ± 0.83% vs 0.40 ± 0.67, p = **0.033**), as well as time spent over 10 mmol/l (27.12 ± 14.91% vs 33.42 ± 16.34, p = 0.000). After 1 month since camp, 87% of adolescents were still using glucose sensor daily, with %time in target 68%, while after 6 months 49% of teens were using glucose sensor daily with %time in target 58%.

Conclusions: PA system in adolescents with type 1 diabetes was safe and effective, moreover the use of the flow-charts contributed to reduce both hypo events and time spent in hyper. Correcting a glucose value before it reaches a hypoglycemic threshold with one third of glucose amount usually used (5 gr instead of 15 gr) is effective to prevent hypo and limit hyperglycemic excursion after correction. We confirm that almost half of adolescents are still using the system 6 month after the camp, as we demonstrated previously for 640G.

Poster Tour 13 - Diabetes Technology

P109

Design and launch of a Health Registry for type 1 diabetes mellitus in a tertiary care children´s hospital

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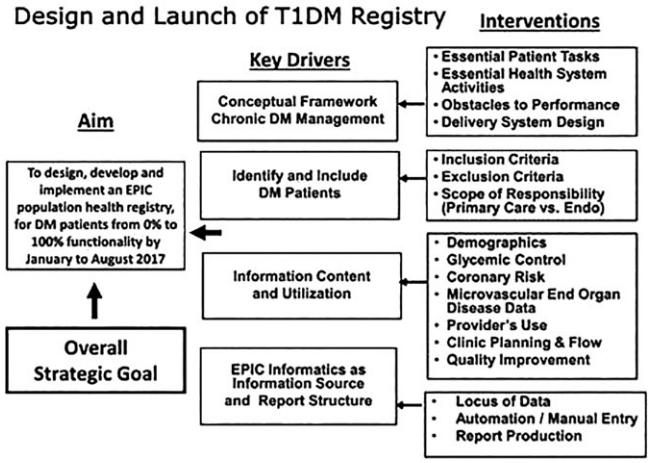
Objective: Design and launch a pediatric type 1 diabetes mellitus (T1DM) Health Registry (HR) to provide informative data, including: new onset T1DM inpatient risk assessment, pre-visit clinic planning, patient care and chronic illness management, and quality improvement (QI) program assessment for clinical support in the ambulatory and inpatient setting.
Methods: A multidisciplinary (clinical, medical informatics, and QI) team created the HR and Dashboard (HRD). Design work included registry conceptual framework, identification of the target patient population, information content and utilization (including cardiovascular risk, glycemic control and demographic data), and information source/report structure requirements. Clinicians developed a Key Driver Diagram as a project roadmap, with breakout detail for each driver's intervention.



[Design and Launch T1D Registry]

EMR informatics specialists surveyed the medical providers for key metric criteria and build requirements that were clinically relevant. A critical path timeline was planned for the registry development process including: requirements analysis, metric build, data migration, and iterative validation steps. "Go-live" planning and execution was undertaken for user communications, training, and implementation.
Results: Requisite HR clinical support information is now available via the HRD in EPIC. By consulting the HRD, clinicians and ancillary staff can access both program and patient level composite scores (status "snap shot"), pre-visit planning measures, and disease management reports to assist with patient care delivery.
Conclusions: Utilizing HR information leverages the ability of diabetes care teams to assess, plan, provide care, and educate T1D patients in chronic illness management using a population health approach. We hope that this strategy will improve patient care delivery and thus positively affect long-term health outcomes.

P110

Greater satisfaction with the use of a prefilled insulin cartridge compared with a self-filled insulin reservoir in insulin pump users with type 1 diabetes

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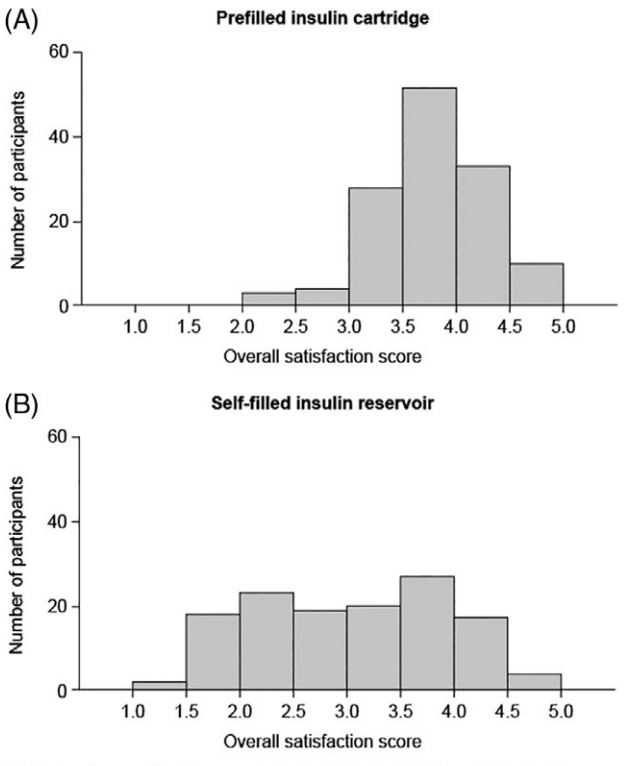
Objectives: To investigate satisfaction with the use of a prefilled insulin cartridge compared with a self-filled insulin reservoir in insulin pump users with type 1 diabetes (T1D).
Methods: Adult (n = 105) and adolescent (n = 25) participants with T1D were asked to perform six insulin pump preparations, three using a prefilled insulin cartridge (PumpCart®) and three using a self-filled insulin reservoir (mylife™ YpsoPump® Reservoir), in a comparative handling test. After the last preparation with each method, overall satisfaction scores and scores relating to burden on the user, user inconvenience, and device effectiveness (on a scale of 1 to 5) were obtained using the Insulin Delivery Satisfaction Survey (Polonsky WH *et al*., 2015).
Results: Overall satisfaction scores were significantly different and numerically higher for insulin pump preparations using the prefilled insulin cartridge compared with the self-filled insulin reservoir (mean [SD]: 4.0 [0.5] vs 3.3 [0.9]; $p < 0.001$) (Figure). Mean (SD) scores were statistically different in favor of the prefilled insulin cartridge versus the self-filled insulin reservoir for burden on the user (1.8 [0.6] vs 2.9 [1.0]), user inconvenience (2.0 [0.7] vs 2.8 [1.1]), and device effectiveness (3.9 [0.7] vs 3.6 [0.9]) (all $p < 0.001$).
Conclusions: Adult and adolescent insulin pump users with T1D were more satisfied with the use of a prefilled insulin cartridge compared with a self-filled insulin reservoir when preparing an insulin pump.

Frequency distribution of participants' overall satisfaction scores for insulin pump preparation using (A) a prefilled insulin cartridge and (B) a self-filled insulin reservoir



Satisfaction levels were collected as numerical ratings in the Insulin Delivery Satisfaction Survey. A score of 1 reflects the lowest reportable level, and a score of 5 reflects the highest reportable level.

P111

The economic additional expenditure related to skin problems in patients with insulin pump and/or glucose sensor in a Danish context

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Objectives: The use of insulin pump and glucose sensor is advantageous, but unfortunately about half of the pediatric patients experience skin problems. To reduce or overcome skin problems many patients use additional products, or change their infusion or sensor sets pre-termly. Therefore, the aim of this study was to investigate additional economic expenditures related to skin problems.
Methods: 145 patients from 2 different hospitals in Denmark participated in a cross-sectional survey about skin problems related to insulin pump and/or glucose sensor use. Additional expenses aside technology and diabetes treatment in general were calculated based on adhesives, patches, lotion etcetera and pre-term shifts of infusion or sensor sets due to skin problems. Descriptive statistics and unpaired t-test was used
Results: The average yearly additional cost due to lotion, patches, extra infusion sets and sensors per patient is shown in the figure in United States Dollars (USD). When comparing patients with and without visible skin problems due to insulin pump, mean difference per patient was 120.2 USD/year (95% CI: 35.4-204.9), $P < .01$. The corresponding comparison for skin problems due to glucose sensor use showed a mean difference of 223.7 USD/year (95% CI: 87.5-359.9), $P < .005$. In total extra infusion and sensor sets accounted for respectively 42% and 38% of the expenditure. Even patients with no current visible skin problems used averagely 42.4 USD/year on extra infusion sets due to pre-term changes caused by skin problems.
Conclusions: Our data show that skin problems due to use of insulin pump and/or glucose sensor have huge economic consequences on the Danish welfare system, the average additional expenditure per 100 patients a year corresponds to over fifth of a yearly nurse salary. This leaves an economic incentive for developing more skin-sensitive adhesive for the infusion set and sensors: Skin problems increases both personal and economic burden of disease.

P112

The uptake of insulin pump therapy in children and adolescents with type 1 diabetes in Ireland: a retrospective longitudinal study using national pharmacy claims database (2012-2016)

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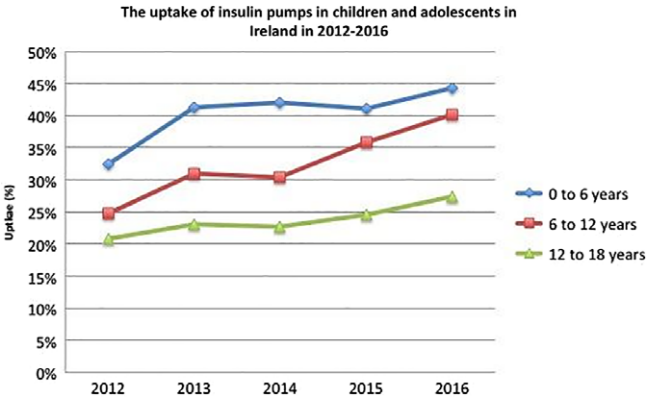
Introduction: The use of insulin pumps is increasing in pediatric populations and is considered acceptable and successful[1]. Thus, the 'Model of Care for the Provision of Continuous Subcutaneous Insulin Infusion (CSII) for treatment of Type 1 Diabetes (T1D) in the Under Five Age Group' was introduced in Ireland in 2012 to improve access to insulin pump therapy in the youngest children with T1D. The evidence on uptake of insulin pump therapy is, however, lacking.
Objectives: The aim of this study was to assess the uptake of insulin pumps in the pediatric population in Ireland from 2012-2016.
Methods: The Irish Health Service Executive Primary Care Reimbursement Services pharmacy claims database, which includes all community-dispensed medicines for diabetes, was used. The number of insulin pump users was calculated based on the prescriptions claimed for the infusion sets each year in 2012-2016. The uptake rate was calculated as the % of insulin pump users in the pediatric population (< 18 years) with T1D in Ireland and stratified by age and year.
Results: In 2016, 35% of pediatric patients with T1D (< 18 years) (n = 876) were using insulin pumps in Ireland. The uptake increased from 24% in 2012. The highest uptake was observed in the youngest age-group (< 6 years), but the largest increase in uptake was observed in those aged 6-12 years (from 26% in 2012 to 42% in 2016).

Figure 1:



[*The uptake of insulin pumps in children and adolescents in Ireland in 2012-2016.*]

Conclusions: A stable growth in the uptake of insulin pump therapy in children and adolescents with T1D was observed in Ireland over the last 5 years. The Model of Care for the Provision of CSII for treatment of T1D, introduced in 2012, may have been a contributory factor particularly in children under 6 years old (rapid increase in 2013), and those 6 years and older (in 2014-2016).

Reference

1. Danne, T. et al. 2014. ISPAD Clinical Consensus Guidelines 2014. Chapter 9: Insulin treatment

P113

Upload at home: a step toward autonomy for patients with diabetes

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Background: Analysis of patient data on glucometers and pumps is required to make clinical decisions. These devices require to be uploaded onto a computer so that data can be reviewed in a systematic way. We observed difficulties and identified barriers in uploading glucometers and pumps in outpatient settings.
Aim: To encourage uploading at home prior to attending the outpatient appointment, which will lead to:

1. Improved **waiting time** in OPD & Allow **more time** with the clinical team.
2. Improved parental/patient **understanding of diabetes management:** Promoting autonomy.
3. Improve quality of service by increasing efficiency and efficacy.

Methods

- Discussion in diabetes MDT.
- Process mapping of patient journey and ways to improve upload at home
- Collected baseline data of number of patients/families uploading their meters and pumps at home in all 3 hospitals across the trust.

Multi-facetted approach was implemented to achieve our aim.

- Home visits were made to understand the issue.

- Preparation of flyers and leaflets to help parents open Diasend account and link with the clinic.
- Contacted parent support groups and emailed flyers and leaflets to parents.
- Provided a Tablet for the clinic to open Diasend account and link with the clinic.
- Organized a family evening to run 2 Diasend workshops for the parents to open Diasend account and link with the clinic.

Result: All 3 units recorded an increase in number of patients/parents uploading at home. Over the period of 6 months we recorded an increase from 8% to 30%, 35% to 47% and 41% to 62% respectively in diabetes clinics at Princess of Wales hospital, Morriston hospital, and Neath Port Talbot hospital.

Conclusion: Uploading at home:

- Enables more efficient use of clinic time and reduced waiting time in OPD.
- Has the potential to help improve the patient/parents understanding of diabetes management leading to improved clinical outcomes.
- Motivated healthcare professionals to discuss this issue on every contact.

P114

Rates of adherence in young children using CGM with remote monitoring

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Objectives: CGM use can improve glycemic control and quality of life. CGM use is increasing, especially in young children. T1D Exchange data show significant increases from 4% (2010-12) to 52% (2016-18) of children < 6y who use a CGM. However, historically adherence to sensor wear in this age group has been low. Our objective was to assess current adherence to sensor wear in children (2-6y) participating in a multicenter trial.

Methods: Following informed consent and enrollment, parents received standardized Dexcom G5 training, including use of Share, the remote monitoring feature. Over the 6-month study, adherence was reviewed monthly. Adherence failure was defined as wearing the sensor fewer than 6 of 7 days in preceding month; a day of sensor wear was defined as having at least one data value.

Results: Sixty children (mean age 5.0 ± 1.4 y (2.0-6.9 y); T1D duration 2.1 ± 1.2 y (0.6 -4.8 y); baseline A1c = 8.3 ± 0.8% (6.5-10.9%)) were enrolled. Forty-six were already using a Dexcom CGM, four were using a Medtronic CGM and 10 were CGM naïve. There was a 3.3% failure rate. Of the 12 adherence failures, one subject contributed three failures; all others were unique occurrences.

Conclusions: Sensor use adherence in this study was much greater than in previous reports of CGM in this age group which showed up to a 55% failure rate after 6 months of CGM wear, using the same criteria for adherence (Tsalikian, Ped Diab, 2011). Remote monitoring and improved sensor accuracy and reliability likely contributed to this increase in adherence to CGM use.

P115

Improvement of patient reported outcomes in a multinational multicenter trial using the Accu-Chek Insight system in CSII treatment in children 2-17 yrs

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Objectives: To evaluate the clinical and psychosocial impact of the Accu-Chek® Insight insulin pump system in children with type 1 diabetes and their parents.

Methods: Single-arm, open, prospective 26-week trial, indication for CSII, HbA1c ≥7.0%; Full Analysis Set (completing 6 mo. of CSII) n = 30, age 2-17 yrs., using questionnaires at baseline and 26 wks.

Results: Modest changes from baseline to 26 wks. in the average therapeutic parameters (HbA1c: 8.2 to 8.1%; total daily insulin dose: 43.3 to 41.5 U; basal insulin: 18.6 to 15.1 U/day; bolus frequency: 5.1 to 6.2/day). Patient Reported Outcomes improved, specifically treatment satisfaction (DTSQ, parent and teen < 0.0001) and parent-reported generic quality of life (QoL), PedsQL (overall (77.1 - 81.8, p< 0.05); physical functioning subscale (83.6-90.4, p = 0.017); with n.s. differences on emotional functioning (63.4-68.8), social functioning (83,1-86.9), school functioning (73.3-75.3), parent-reported diabetes QoL (diabetes (64.3-67.0), treatment I (70.2-71.1), treatment II (72.9-77.7), worry (71.6-76.9), communication (75.6-77.0)), and children's generic QoL (84.7-85.3). Parent-reported sleep disturbances were reduced (21 vs.16 parents) as were maladaptive sleep patterns (20 vs.14). Strengths reported by parents and children included the bolus advisor feature, using prefilled cartridges and the discreet nature of self-management via handset. The slow touchscreen of the handset was criticized.

Conclusions: Changing from MDI or CSII to the Accu-Chek Insight insulin pump system in pediatric patients did not change clinical parameters. However, at 26 wks. improved treatment satisfaction, quality of life and psychosocial functioning was reported by children and parents alike. Using the pump system improved sleep for parents and allowed discreet diabetes management for children. Patient reported outcomes and human factor studies are recommended for evaluating new devices.

P116

Impact of type 1 diabetes (T1D) duration and tubeless insulin pump use on A1c in youth

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Objectives: International data on youth < 25 yr old with T1D indicate that 26% have A1c < 7.5% and 34% have A1c ≥9% (Diab Med 2015;323:1036); further, A1c increases over time during childhood and adolescence. We assessed A1c change in youth with T1D after initiation of a tubeless insulin pump (Omnipod® System, Insulet Corp).

Methods: Data were obtained by EHR review before and 1 yr after tubeless pump initiation in 232 youth, ages 3 to < 25 yr. Pre/post characteristics were compared according to baseline therapy and T1D duration.

Results: At baseline, youth (50% male) were 12.1 ± 4.4 yr old (M ± SD); median T1D duration was 2.3 yr (IQR 0.7, 5.9); A1c was 7.8 ± 1.0%. Nearly half (48%) began tubeless pump within 2 yr of T1D diagnosis; most transitioned from MDI (67 vs 33% from tethered pump). Baseline MDI vs tethered pump users were more likely to be male (56 vs 37%) and have shorter T1D duration (1 [0.5, 2.9] vs 5.6 [3.8, 9.1] yr) (both p< .01). Baseline A1c was lower in youth with T1D duration < 2 vs ≥2 yr (7.6 ± 1.1 vs 8.1 ± 0.9%, p< .001). After 1 yr, tubeless pump use was associated with a non-clinically meaningful A1c increase of 0.2%, similar for prior MDI or tethered pump use; 29% had A1c < 7.5% and 16% had A1c ≥9%, which varied by baseline T1D duration. For those with baseline T1D duration < 2 vs ≥2 yr, 34 vs

25% had A1c < 7.5% and 10 vs 22% had A1c ≥9%, respectively, (p .03). From baseline to 1 yr, proportion with A1c ≥9% was stable at 10% when baseline T1D < 2 yr and proportion with A1c < 7.5% was stable at 25% when T1D ≥2 yr.

Conclusions: Tubeless pump use maintained A1c after 1 yr in youth with T1D when deteriorating glycemic control would be expected. Tubeless pump use did not increase the proportion with poor control (A1c ≥ 9%) in youth with short T1D duration and tubeless pump use maintained the proportion with target A1c < 7.5% in youth with longer T1D duration. More aggressive insulin dose escalation following pump initiation is needed to improve A1c.

P117

Continuous glucose monitoring system reveals pervasive school time hyperglycemia and night time hypoglycemia in Indian children with type 1 diabetes

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Background: The lack of insulin use during school by most Indian school children could make them predisposed to hyperglycemia during school hours. Also, the type of Indian foods which may protect from night hypoglycemia has never been studied.

Objectives: We studied dietary pattern and glycemic profile in school going Indian children with T1DM to confirm anticipated hyperglycemia during school hours and explore the association of nocturnal hypoglycaemia with the composition of the night meal.

Methods: Continuous glucose monitoring (CGM) and food recording were done in 22 patients aged 4 -19 years. Cognitive behavioral therapy was conducted based on the CGM and diet analysis. After three months, CGM was repeated to assess the change.

Results: High sensor glucose (>180 mg/dl) was noted on 73% of 139 school days and involved 64% of school time. The contribution of elevated sensor glucose during school to total time spent with elevated sensor glucose in a day was 39 ± 18%. Low sensor glucose (< 70 mg/dl) was present during 40% of 154 nights and involved 59% of sleep time. Carbohydrates were disproportionate (63%), and protein was low (13%) in the diet. There was a trend toward protection from nocturnal hypoglycemia on nights where dinner included dal (lentil, the staple protein of a vegetarian diet)" vs when it did not [AUC_{sleep} (mg/dlxhr) 67.5 ± 49 vs 99.3 ± 59.4 p = 0.051). Cognitive-behavioral therapy failed to improve school time hyperglycemia and nocturnal hypoglycemia.

Conclusions: High carbohydrates and low protein in the diet of our children need recognition and management. Glycemic management during school hours needs special attention in India. Nocturnal hypoglycaemia is a major concern. However, CGMS based cognitive behavioral education failed to improve glycemia during school and sleep in this pilot study.

Poster Tour 20 - Diabetes Technology

P118

Use of FGM as a clinical tool in type 1 diabetes young adults

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Aim: To study the benefits of FGM as a clinical tool in type-1 young adults at a tertiary care center.
Method: We studied 74 type -1 patients between the age group of 16 to 21 years between January 2016 to December 2017.
Inclusion criteria:
• type 1 diabetes patients
• within the age group of 16 to 21 years
• consenting to apply FGM and for follow-up visit at clinic on 1-5-9-14 days.
• without any current illness infection , or any other co-morbidity.
• On insulin with basal bolus therapy and standard 1-4 injections, patients on insulin pump.
Exclusion criteria:
• Type 2 diabetes or any other type of diabetes
Patients who were poor in their adherence to SMBG were applied FGM. Our study included 74 patients, who were asked to come for follow-up after 1-5-9-14 days after application of FGM. These patients did their regular exercises, work, study and all other day to day activities except multiple SMBG. We also educated them regarding carb-counting, insulin correction dose and physical activities.
Result: Total 74 (M-33, F-26) ,Loss of follow up n-10, device failure n-5 so number of patient studied were n-59. FGM found out asymptomatic midnight hypoglycaemia, day time hypos, Rebound hyperglycemia which they were not able to detect when they were on SMBG. We also saw much variability in their sugar readings. Many patients were able to adjust their carbs in different meals according to sugar. There were also there 3 patients who went for one day trekking camp in this FGM test days. FGM was useful during trekking activities as well.
Conclusions: There was some change done in their dosage due to asymptomatic midnight hypoglycaemia and also we were able to minimize the variability in there graphs. This device was useful in their life style modification and good quality of life by reduce in number of SMBG, less pricks , by doing regular exercise and managing their insulin dose according to their carbs in meals.

P119

Evaluation of glycemic profile in patients with type 1 diabetes using flash glucose monitoring: cross sectional data from a tertiary care center

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Background: Flash glucose monitoring (FGM) is a newer technology available for continuous glucose monitoring.
Objective: To study the glycemic profile of patients with type 1 diabetes mellitus (T1DM) using FGM.
Methods: Prospective study on 51 consecutive patients with T1DM. FGM was done using Abbott freestyle libre pro sensor, at baseline. Parameters of glycemic variability were analyzed in a subset of 22 patients. Data of SMBG frequency, total daily dose (TDD) and glycosylated hemoglobin (HbA1c) were collected at baseline and at 3-6 months follow up.
Results: Median age was 15 years (8-36 years) and median diabetes duration was 5 years (0.5-20 years). Mean HbA1c at baseline was 8.2 ± 1.5. More than 10 days FGM data were available in 44/51(86%) patients. Estimated HbA1C from FGM correlated with laboratory HBA1c (r = 0.370, p = 0.010). Percentage time spent in the desired glycemic range (80-160 mg/dL), above and below the range was 31.8 ± 15.3%, 54.4 ± 21.5% and 14.2 ± 10.3% respectively. Children had significantly higher HbA1c and glycemic variability as compared with adults (table1). Follow up HbA1c and TDD of insulin was not significantly different from baseline. SMBG frequency (>2/day) increased from 26/51 (51%) at baseline to 21/33(64%) in follow up. Sensor dislodgement was noted in 8/51(16%).
Conclusion: Use of FGM provided valuable information on glycemic profile and variability in patients with T1DM. However, further studies are needed to confirm its impact on glycemic control.

	Age < 18 years	Age ≥ 18 years	P value
N	30	21	
Estimated HbA1c	8.3 ± 1.5	7.1 ± 1.5	0.006
Daily average BG (mg/dL)	191 ± 42	157 ± 44	0.004
%time in target range	27.2 ± 12.1	38.5 ± 17.0	0.017
% time below range	12.1 ± 8.9	17.1 ± 11.5	0.137
% time above range	60.8 ± 18.3	45.2 ± 22.9	0.009
SD*	4.6 ± 0.9	3.5 ± 0.7	0.043
MAGE*	10.5 ± 3.0	8.1 ± 1.7	0.030
CONGA*	7.6 ± 1.7	6.1 ± 1.3	0.01

[*Table1: Comparison of glycemic profile of children (<18 years) and adults*]
*n = 13 in group 1 and 9 in group 2

P120

Metabolic control in children with diabetes mellitus type 1 users of insulin infusion pump with predictive insulin suspension

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Objective: Evaluation of the metabolic control in children whith Diabetes type 1 who use insulin continuous infusion pump with predictive suspension of insulin at 6 months
Methods: Follow-up study in children with Diabetes Mellitus type 1 users of Medtronic minimized 640G smart guard technology, which includes the function of predictive suspension of insulin. The value of glycosylated hemoglobin (HbA1c), total insulin dose per kilogram of body weight (DDT) before the start of insulin infuser and at 6 months after use were compared; the difference between the first month and the sixth month of pump use in the average of exposure to hyperglycemia (AUC > 140 mg/dl) and the average exposure to hypoglycemia (AUC < 70 mg / dl) was analyzed.
Results: Sixteen children were followed up, 68% male, average age was 7,4 ± 2,3 years; time with diabetes was 3,5 ± 1,3 years, the indication for the use of pump was microdose in 66% of the cases, the rest was hypoglycemia. The HbA1c prior to the pump was 7,6 ± 0,51 and at 6 months 7,1 ± 0,76 (p = 0,02), the DDT per kilo of weight prior to pump use was 0.72 ± 0.04 and the 6 months 0,74 ± 0,16 (p = NS), AUC > 140 mg/dl at the first month was 44.13 ± 18.9 vs at 6 months 31.85 ± 12.4 (p = 0.02); AUC < 70 mg / dl first month was 0,20 ± 0,03 and at 6 months 0,52 ± 0,22 (p = 0,01).
Conclusions: In this follow-up, a continuous infusion pump with predictive insulin suspension was found to improve metabolic control of

patients at 6 months of follow-up, measured both in Hb A1c and a decrease time in hyperglycemia > 140 mg/dl. Being a safe treatment and with a low level of hypoglycemia.

P121

Abstract Withdrawn

P122

Beneficial effect of *Trigonella foenum-greacum* seed acetone fraction in a type 2 diabetes model of rats

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Objectives: In traditional medicine from India, the seed decoction of *Trigonella foenum-greacum.* is widely used for the treatment of diabetes mellitus (DM) either alone or in combination with other plants. The present study is designed to investigate the anti-diabetic effects of *Trigonella foenum-greacum* acetone fraction (TAF) from fruit ethanolic extract in a type 2 diabetes (T2D) model of rats.

Materials and Methods: T2D was induced in rats by feeding a 10% fructose solution ad libitum for 2 weeks followed by a single intraperitoneal injection of streptozotocin (40 mg/kg body weight) and the animals were orally treated with 150 or 300 mg/kg body weight (bw) of the TAF once daily for four weeks.

Results: After 4 weeks study period, diabetic untreated animals (DBC) exhibited significantly higher serum glucose, serum fructosamine, LDH, CK-MB, serum lipids, liver glycogen, insulin resistance (HOMA-IR), AI, CRI and lower serum insulin, β-cell function (HOMA-β) and glucose tolerance ability compared to the normal animals. Histopathological examination of their pancreas revealed corresponding pathological changes in the islets and β-cells. These alterations were reverted to near-normal after the treatment of TAAF at 150 (DXAL) and 300 (DXAH) mg/kg bw with the effects being more pronounced in the DXAH group compared to the DXAL group. Moreover, the effects in the animals of DXAH group were comparable to the diabetic metformin (DMF) treated animals. In addition, no significant alterations were observed in non-diabetic animals treated with 300 mg/kg bw of TAF (NXAH).

Conclusion: The results of our study suggest that TAF treatment showed excellent anti-diabetic effects in a T2D model of rats.

Poster on Display – Diabetes Technology

P123

Remote monitoring for the diabetes mellitus type 1 as an effective tool to improve disease compensation

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Actuality: The use of remote technologies is a very topical direction in monitoring patients with diabetes mellitus type 1. The aim is to evaluate the clinical and metabolic efficiency of remote monitoring of the children and adolescents with diabetes mellitus type 1.
Materials and Methods: The study included 80 patients with diabetes mellitus type 1, aged 8-18 years, who were divided into 2 groups: 1 - patients receiving pump insulin therapy with a remote monitoring and 2 - patients receiving therapy in the basal-bolus regimen (40/40).
The first group patients remotely transmitted data on self-monitoring, insulin therapy and diet to the doctor for recommendations, using the program CareLink iPro-2, Guardian. Patients from the second group were visiting a doctor at their place of residence. All patients done analysis of HbA1c. Using the EasyGV calculator [https://www.phc.ox.ac.uk/research/technology-outputs/easygv], the following indexes were determined: SD, CONGA, LBGI, HBGI, MAGE, M-value. The statistical processing of the results was carried out using the IBM SPSS Statistics 20.0.0 program. The significance of the differences was evaluated according to the Mann-Whitney U test. Significant differences were considered when $p < 0.05$.
Results: HbA1c had a significant decrease in the measurements in group 1 patients compared to group 2 (χ^2 = -0.450, p = 0.014). Since glycated hemoglobin does not always reliably reflect the level of compensation, an analysis of the variability parameters, which was lower in group 1 than in the 2: SD (χ^2 = 0,022, p = 0,022), CONGA (χ^2 = -0,853, p = 0,001), J-index (χ^2 = -0,504, p = 0,005), LBGI (χ^2 = -0,451, p = 0,014), HBGI (χ^2 = -0,053, p = 0,003), MAGE (χ^2 = -0,480, p = 0,008), M value (χ^2 = -0,593, p = 0,001).
Conclusions: Remote monitoring of patients with diabetes mellitus type 1 is an effective method of observation and leads to a decrease in the variability of glycemia and improvement of disease compensation.

P124

Continuous subcutaneous insulin infusion (CSII) or Insulin pump therapy (IPT) in a district general hospital. Is it feasible?

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Aim of the study: This is a qualitative study aims to give an insight into staff opinion on the feasibility of an insulin pump therapy(CSII) service to children and young people with Type 1 diabetes locally.
Methods: A semi structured interviews with existing members of Multidisciplinary team (MDT).
A total of 16 healthcare professionals were interviewed. The interview were recorded with Audi-tape & transcribed. A thematic analysis was performed using descriptive and inferential statistics.This study was approved by the ethical committee of Warwick University. Ethical approval was also obtained from the local Hospital ethical committee prior to conducting the study. A thematic analysis was performed with NVIVO software. Data was also analyzed manually in order to facilitate immersion in the subject matter.
Results: The provision of an IPT service in a local capacity, the majority of interviewees responded favorably to the provision of such a service as long as appropriate resources and staffing were made available. The main barriers identified by staff were staff resourcing and financial resourcing. This is not a surprising finding, as lack of resources tends to be an issue for all healthcare service areas at the current time. However, the enthusiasm of staff to provide the service was very apparent, rather than an absolute rejection of the idea on an assumption that the necessary resources would not be made available.
Conclusion: This research work shows staff ability to recognize the needs of the local population and be motivated to service them as best as possible. IPT service was felt to be feasible in a district hospital pending availability of adequate training and resources, most notably the presence of a Consultant Pediatric Endocrinologist.

P125

Evaluation of Freestyle Libra use in a UK district general hospital

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Introduction: The Freestyle Libra obtained a European CE Mark for the use in children in Feb 2016. The Libra was not available through the NHS. Despite this, we noted increasing numbers of patients within our medium sized, UK, district general pediatric diabetes clinic choosing to self-fund the Libra. Through Abbot, each patient had the option of 1 free sensor for a trial of the Libra. We requested patients taking up this offer attended a Libra initiation teaching session and followed up the progress of children who chose to attend.
Objectives: To monitor the effectiveness of Freestyle Libra use in terms of glycaemic control and the impact on our local diabetes service.
Methods: Patients wishing to trial the Libra attended a ½ day education session. They had a 2 week trial of the Libra and a proportion opted to continue its use. We compared HbA1c and input from the diabetes service after 6 months, between those who continued on the Libra and those who had the 2 week trial.
The HbA1c results were compared using a two tailed Mann-Whitney U Test.
Results: 47 patients attended the initial education session. 12 were lost to follow up. 8 continued to use the Libra for 6 months and 27 stopped after 2 week trial.
The average change in HbA1c for the 6 month Libra group was -7mg/dL, compared to +1.5mg/dL in the 2 week group (p 0.012).
There were no significant difference in input from the diabetes team between the 2 groups.
Conclusions: In our clinic population the use of self-funded freestyle Libra devices improved HbA1c, compared to not using the Libra. The use of the Libra did not require additional resources from the diabetes team. Due to the financial burden of continuing with the Libra, the continuing group may have very specific characteristics and the results may not be generalizable to a wider population. However, they do demonstrate what improvements are possible with Libra use in the correct population.

P126

Incidence of technical errors while using Flash glucose monitoring (FGM) system in a single practice in India

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Introduction: Continuous usage of FGM (Abbott Freestyle Libre sensors) has improved diabetes control and quality of life. Lower cost & longer sensor duration means access by more & younger patients. In India, Libre Pro has been available for over 5y; we advocate it for routine glucose monitoring by as many willing and affording Type 1 diabetes (T1D) patients possible, but some confusing/ alarming events, indicating technical errors in device operation, are seen. These included brief (few min) breaks in glucose tracing (with normal sensor function subsequently), and episodes of prolonged hypoglycemia ('long hypos'). We looked at the incidence of these 2 events.
Methods: T1Ds are advised to bring sensors for routine clinic visits; if they did, FGM records were downloaded. All records available of 35 unselected T1Ds (3.3-32y) were analyzed. Usage was recorded as patient-days. Flat glucose tracings < 40mg/dl for >2h (without recovery) were considered long hypos. Data of symptoms or glucometer checks for each such tracing was not available, but we assumed that such tracings for > 2h are possibly artifactual. Number of breaks in tracings and long hypos were counted, and also number of premature end of recording (< 14d).
Results: In 3395 usage-days in 217 records, there were 177 events of breaks in tracings, ie 1 per 19.2 usage-days. 3 patients contributed > half of total episodes, with no identifiable reason. There were 862 long hypos: 1/3.9 usage-days (range 1/0.9-47); these decreased the sensor A1C assessments, likely spuriously. 59 records (27.2%) ended prematurely (2-13 days). No effect of age, gender, and season was apparent.
Conclusions: Technical errors can occur in FGM. Patients can be reassured to ignore brief tracing breaks, advised to confirm all low glucose sensor readings with glucometer checks, and warned of premature end of function. The wide variability of incidence of these events suggests possible user related factors, which are presently not identified.

P127
Diabetes technology in Siberia

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Objectives: Continuous subcutaneous infusion of insulin with insulin pumps and continuous glucose monitoring (CGM) by sensors represent technologies designed to assist patients with T1D in safely reaching glycaemic goals.
Methods: In Krasnoyarsk region of Siberia 54.3% children with T1D receive continuous subcutaneous insulin infusion (CSII). 14.6% pediatric T1D patients use real-time continuous glucose monitoring (RT-CGM). Patients eligible for the study were with T1D, aged 5-18 years, who had received CSII and had HbA1c of 7.4-9.5%. The mean level HbA1c was 7.6%.
Results: The baseline mean HbA1c had decreased to 7.6% in the pump therapy group, compared with 8.9% in the multiple daily injection (MDI) group. An increased frequency of sensor use was associated with a greater reduction in HbA1c. The proportion of patients who reached the glycated hemoglobin target was greater in the pump therapy group than in the MDI group. The rate of severe hypoglycemia in the pump therapy group was significantly low that in the MDI group.
Conclusion: In children with T1D, sensor-augmented pump therapy resulted in significant improvement in HbA1c levels compared with MDI insulin therapy. A significantly greater proportion of children in the pump therapy group than in the MDI group reached the target glycated hemoglobin level, without increasing of severe hypoglycemic events.

P128
Use of intermittent continuous glucose monitoring system (CGMS) in South Indian children and adolescents

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Background: A recent consensus guideline by European Society of pediatric Endocrinology and International Society of Pediatric and Adolescent Diabetes has revolutionized the use of CGMS pediatric setting. There is lack of Indian data in this regard.
Aim of the Study: To describe our experience in the use of CGMS in the diabetic clinic.
Methodology: Retrospective review of case records of all children and adolescents who underwent intermittent CGMS from January 2013 to December 2017.
Results: During the study period, 10 (out of 190 children registered in the diabetic clinic) children underwent intermittent CGMS. Mean age was 8.4 ± 2.3 years; M:F = 2:6 The indication for CGMS testing was brittle type 1 diabetes mellitus, suspected hyperglycemia in obese adolescents, MODY 3 for initiation of oral hypoglyeia agents and secondary diabetes for initiation of insulin therapy.
Based on the CGMS report: one child the cause for nocturnal hypoglycemia was recognized as high basal dose and appropriate dose adjustment was done; one child the cause for hyperglycemia was recognized and the insulin carbohydrate ratio for bolus injections were modified.
None developed any local reaction at sensor sites. There was near perfect correlation with the glucose recordings by glucometer.
Conclusion: CGMS is a useful tool in the management of diabetes mellitus.

P129
Comparison of glycemic control and treatment satisfaction among CSII and MDI (basal-bolus therapy) in Indian pediatric population

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Objective: To evaluate whether continuous subcutaneous insulin infusion (CSII) may have any advantage over multiple daily injections (MDI) on glycemic control and treatment satisfaction in pediatric patients with Type 1 diabetes.
Material and Methods: It is an open-label, Retrospective study where data was collected from Pediatric and adolescent endocrine clinic at tertiary center from past 2 years. The study population consisted of 48 patients on CSII who were on CSII for more than 12 months; and age and glycemic control (HbA1C) matched 72 patients taken from MDI Group. Glycemic controls were evaluated in all patients at baseline and after 12 months. And both groups were given a treatment satisfaction questionnaire (PedsQL diabetes module 3.2) and results were compared and evaluated.
Results: After 12 months, a similar decrease in HbA1C was observed in both groups. Blood glucose standard deviation, and overall hypoglycemia were significantly reduced in CSII group. Overall score increased in CSII and decreased in MDI, while perceived hyperglycemia and hypoglycemia decreased in CSII compared with MDI. Treatment satisfaction scores were significantly better in CSII group.
Conclusion: Among Type 1 diabetic pediatric patients, CSII showed a similar efficacy in reducing HbA1c compared with MDI, with less hypoglycemia and glycemic excursions, and was better in improving overall treatment satisfaction and the rate of perceived hyperglycemia and hypoglycemia.

P130
Apdp pre-start program to continuous subcutaneous insulin infusion (CSII)

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Objectives: CSII has been shown to be the safest, most flexible and accurate method of insulin administration for pediatric ages, allowing

reduction of needle phobia and severe hypoglycemia, improving quality of life. A structured and personalized education of children, young people and their families contributes to an optimized CSII treatment and prevent diabetes complications. APDP is an outpatient clinic with CSII since 2008, the Pre-Start program is applied since 2015 to empower youth and their families and optimized treatment. The aim of this work is to evaluate the impact of a structured CSII training program on patient satisfaction and metabolic control.

Methods: Pre-start program, consist of 3 weeks of intensive glycemic control, 3 group sessions (total duration 12 h), addressed to patients and caregivers. These sessions are facilitated by a nurse and a nutritionist and include theoretical and practical concepts to apply in this treatment and guidance about nutrition therapy including advanced carbohydrate counting. Patients' evaluation and satisfaction was assessed by a questionnaire. A1C was evaluated at the beginning of the program, before starting insulin pump treatment, at 6 and 12 months of CSII treatment. 60 participants (18 children until 18 years of age and 42 caregivers) were included in 7 sessions.

Results: Participants evaluated this program as very important (98%) and were very satisfied (95%). During this 3 week pre-start program A1C decreased 0.2% and after 1 year the total decrease was 0.6%. 25% of the initial group had A1c < 7.5%, while 56% and 50% achieved this goal at 6 and 12 months

Conclusions: This program showed excellent results on patient satisfaction and they have highlighted the importance of diabetes skills acquirement. Empowering people for their CSII treatment with this training program can optimize a better development of diabetes skills and contribute to metabolic control improvement and maintenance.

P131

Are four times daily injections of insulin using a smart blood glucose meter as effective as insulin pumptherapy in pediatric patients with diabetes?

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Introduction: In the Netherlands the healthcare cost are increasing and cost efficiency decisions about effective use of advanced and generally more expensive devices is increasingly needed. Therefore, the question arises whether four times daily injections in combination smart glucose meter (meter with bolus advice function similar to the boluswizard) is as effective as insulin pump therapy in pediatric patients with diabetes in the clinical practice.

Objective: The objective of this study was to evaluate whether patients on a four times daily regime with a smart glucose meter have a comparable HbA1c compared with insulin pump users.

Methods: Single center retrospective observational cross-sectional database analysis.

Results: 175 patients in the clinic were evaluated of which 48% used an insulin pump, 42% used a smart meter and (9%) used a basic blood glucose meter. Initial results show that the average HbA1c of patients on an insulin pump was 65.8 mmol/mol (SD = 10.0). The HbA1c of patients on MDI and a smart meter the average HbA1c was also 65.8 mmol/mol (SD = 14.8). Considering a 5 mmol/mol difference in HbA1c as clinically relevant it is shown with a two one-sided test procedure that the groups are indeed equal ($p < 0.01$). Further analysis will be performed to control for potential confounders.

Conclusion: This database study has shown that with 4 daily injections of insulin with a smart meter can achieve equal results compared to pump therapies.

Poster Tour 06 - Diabetes Epidemiology

P132
Epidemiology of type 1 diabetes in children and adolescents in Ireland: a retrospective cross-sectional study using national pharmacy claims data

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Background: There were approximately 2700 children and adolescents with type 1 diabetes (T1D) attending Irish clinics in 2012, as per the National Audit from 2013[1]. The incidence of T1D in 0-14 year olds (as per Irish Childhood Diabetes National Register) was 27.2 (95% CI 23.9-30.7) per 100,000 children/year in 2008[1].
Objectives: The aim of this study is to determine the prevalence and incidence of T1D in the pediatric population in 2016 in Ireland using national pharmacy claims data.
Methods: The Irish Health Service Executive Primary Care Reimbursement Services (HSE-PCRS) pharmacy claims database, which includes all community-dispensed medicines for diabetes, was analyzed. Children and adolescents (younger than 18 years of age) were assumed to have T1D if they had received a co-prescription of insulin and glucose strips in the analyzed year. Patients who had been using oral hypoglycemic agents for at least 12 months before commencing insulin were excluded. The incidence was estimated based on the first claim for insulin in 2016. The data were stratified by age and geographical region and rates were calculated using the Irish census data for 2016[2].
Results: 2617 children and adolescents under 18 years met the criteria for prevalent case of T1D. 0.22% (95% CI 0.21-0.23) of the Irish population aged < 18 years had T1D in 2016. The incidence rate for children and adolescents aged 0-14 was 34.37 per 100,000 population per year (95% CI 30.75 - 38.00) in the same year.
Conclusions: The prevalence and incidence of T1D in pediatric population determined in this study are similar to estimates from previous years in Ireland. National pharmacy claims data may be a useful source for epidemiological estimates of T1D in a country where a national registry is lacking.

References

1) Health Service Executive. 2015. Model of Care for All Children and Young People with Type 1 Diabetes.
2) Central Statistics Office. 2016

P133
Worldwide differences in childhood diabetes: the SWEET centers

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Objective: To provide a global picture of pediatric diabetes among centers participating in the SWEET initiative. We analyzed the diabetes type, gender, age of diabetes onset, age during the most recent treatment year, and center size.
Method: The regions studied were Europe(EU), Asia/Middle East/Africa(A/ME/AF), Australia/New Zealand (Aus/NZ), North America(NA) and South America(SA). We included patients 0-21 years with data from 2015-2017, with analysis of most recent documented year of treatment. Descriptive analysis was conducted with continuous variables represented as median, lower (Q1) and upper quartile (Q3) and binary variables as percentages. Unadjusted comparisons were conducted using Kruskal-Wallis test for continuous outcomes and Chi-squared test for binary outcomes.
Result: The total patients were 35,470. 32,607(92%) had T1D, 753 (2.1%) T2D, 890(2.5%) pre-diabetic, 1220 (3.4%) had other types of diabetes. The proportion of non-T1D in EU were 9.0%, 3.2% in A/ME/AF, 7.6% in Aus/NZ, 6.9% in NA and 14.5% in SA (p< 0.001).
The median number of patients per center documented in 2017 was 309 (IQR 205-550) for EU, 127 (36-240) for A/ME/AF, 326 (120-793) in Aus/NZ, 816 (287-1075) in NA, 283 (27-324) in SA (p = 0.001).
The percentage of patients per center 18-21 years were 15.0 in EU, 19.2 in A/ME/Af, 7.8 in Aus/NZ, 18.9 in NA, and 5.8 in SA.
Differences between the regions were observed regarding the proportion of males affected with diabetes (51.1% in EU, 50.5% in A/ME/AF, 51.6% in AUS/NZ, 52.6% in NA, 45.7% in SA, (p = 0.002)).
Age at diabetes onset was 7.8 years (4.3-11.2) in EU, 8.8 years (5.0-12.3) in A/ME/AF, 7.7years (4.3-11.0) in Aus/NZ, 8.4 years (4.9-11.7) in NA, and 8.5years (5.3-10.9) in SA (p< 0.001).
Conclusion: We report relevant differences in the demographics of diabetes types, gender, age at onset, and current age for SWEET centers from different regions. These have to be taken into consideration for the future regional audit process.

P134
Comparison of the incidence of diabetes in U.S. and Indian youth: an international harmonization of youth diabetes registries

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Introduction: Comparisons of diabetes incidence across populations offers context for understanding the relative burden of disease and insight into the pathogenesis of diabetes.
Objectives: We sought to compare the incidence of type 1 (T1D) and 2 (T2D) diabetes in youth within diabetes registries in the U.S. and India.
Methods: We harmonized data elements from the population-based SEARCH for Diabetes in Youth registry (SEARCH) in the U.S. and the healthcare-based Registry of People with Diabetes with Youth Age at Onset in India to the Observational Medical Outcomes Partnership (OMOP) Common Data Model. Data were from youth with incident diabetes age < 20 at diagnosis between 2006 and 2012. Denominators were from census data corresponding to the case ascertainment areas. We compared diabetes incidence across registries by type and within age and sex categories using a 2-sided, skew-corrected inverted score test.
Results: The incidence of T1D and T2D was significantly higher in SEARCH as compared to YDR (Table). Age at peak incidence of T1D

was similar across registries, whereas T2D incidence was higher at an earlier age in SEARCH. Sex and age differences existed, with a higher rate of T2D among females in SEARCH (7.5/100,000, females vs 4.4/100,000 males) as compared to YDR (0.5/100,000, females vs 0.4/100,000, males) (Table).

Conclusions: Comparison of India and U.S.-based youth-onset diabetes registries indicated that the incidence of T1D and T2D was significantly different. Examination of the distribution of risk factors for T2D is needed to elucidate whether the differences observed represent under ascertainment of cases or differences in distribution of risk factors.

Table. Average annual incidence rates (per 100,000 per year) by type and, within type, by sex, age at diagnosis

	SEARCH		YDR**		
Type 1	Total Cases	Rate/100,000* (95% CI)	Total Cases	Rate/100,000* (95% CI)	p
Sex					
Female	3,486	20.2 (18.5,22.1)	988	4.1 (3.4, 4.8)	<0.0001
Male	3,959	22.0 (20.3,23.9)	1,104	4.0 (3.4, 4.6)	<0.0001
Age at diagnosis					
0-4	1,204	14.1 (12.1,16.3)	351	3.0 (2.3, 3.9)	<0.0001
5-9	2,417	28.1 (25.3,31.2)	642	5.0 (4.1, 6.2)	<0.0001
10-14	2,684	30.7 (27.8,33.9)	677	4.9 (4.1, 6.0)	<0.0001
15-19	1,136	12.3 (10.5,14.3)	422	3.0 (2.4, 3.9)	<0.0001
Crude Incidence	7,442	21.2 (19.9,22.5)	2,092	4.0 (3.6, 4.5)	<0.0001
Type 2	Cases	Rate/100,000 (95% CI)	Cases	Rate/100,000 (95% CI)	p
Sex					
Female	1,298	7.5 (6.5,8.7)	111	0.5 (0.3, 0.7)	<0.0001
Male	782	4.4 (3.6,5.2)	116	0.4 (0.3, 0.7)	<0.0001
Age at diagnosis					
0-4	4	0.0 (0.0,0.4)	3	0.0 (0.0, 0.3)	0.47
5-9	97	1.1 (0.7,1.9)	13	0.1 (0.0, 0.4)	<0.0001
10-14	940	10.7 (9.1,12.7)	63	0.5 (0.2, 0.9)	<0.0001
15-19	1,039	11.2 (9.5,13.2)	148	1.1 (0.7, 1.6)	<0.0001
Crude Incidence	2,080	5.9 (5.3,6.6)	227	0.4 (0.3, 0.6)	<0.0001

*Rate calculated as (total cases/7)/denominator*100,000
** New Delhi and Chennai regions

P135
Trajectories of metabolic control and their determinants among youth with type 1 diabetes

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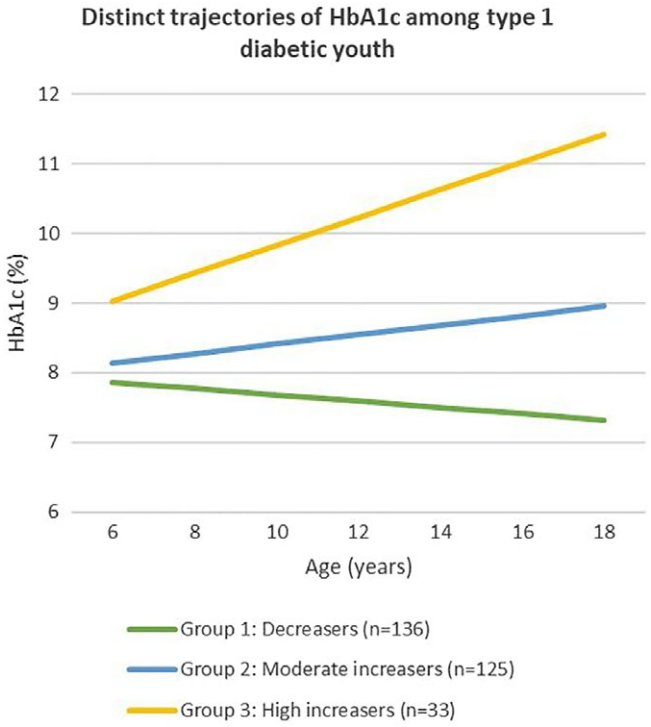
Objectives: To identify distinct longitudinal patterns of metabolic control based on HbA1c levels among youth with type 1 diabetes, and identify sociodemographic determinants of these patterns.

Methods: Medical records of 294 youth aged 14-18 years with a duration of diabetes >1 year and actively followed in a tertiary pediatric hospital diabetes clinic were reviewed. HbA1c levels, age, sex and ethnic background (Caucasian vs other) were retrieved. Weight and height at the first clinic follow-up were transformed to body mass index z-scores (zBMI) using WHO reference curves. Area-level average household income was determined with 2016 census data for dissemination areas. Groups of youth with similar patterns of HbA1c levels were identified with latent group based modeling, and described (Chi-2 and ANOVA).

Results: Youth had a mean (SD) of 22.8 (11.9) clinic visits, age at diagnosis was 9.3 (4.2) years, and duration of diabetes was 6.9 (4.1) years. Average HbA1c was 8.4% (1.2). Three groups with distinct patterns of HbA1c levels were identified. Group 1: decreasing HbA1c levels over time (46% of the sample), Group 2: moderately increasing HbA1c levels over time (42% of the sample), and Group 3: higher initial levels of HbA1c that further increased over time (11% of the sample). Compared to other groups, youth in the decreasing HbA1c group were more likely to have a shorter duration of type 1 diabetes (5.6 vs 7.9 years, p< 0.001) and to be older at diagnosis (10.4 vs 8.0 years, p< 0.001). Group membership did not differ by sex, ethnicity or baseline zBMI. While area-level income decreased progressively from Group 1 to Group 3, differences were not statistically significant.

Conclusions: Distinct trajectories in metabolic control are identifiable among youth with type 1 diabetes. Youth diagnosed at an earlier age or with longer duration of diabetes may be more at risk of experiencing poor metabolic control over time.



P136
Effects of child´s age at onset of T1D on body growth and final height. Longitudinal study

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One-third of children under 15 years old with T1D started before the age of 5, in the same time the incidence of T1D increased dramatically since the early 2000s. The purpose of this study was to see the effects of early T1D on stature growth.

Methods: Longitudinal retrospective study of children with T1D who have completed their growth. The measurements were systematically done at all the quarterly control visits and reported on the Sempé and Pédron curves. The heights are taken for the study on the anniversary dates with a precision of the order of half a centimeter. The final height of siblings aged 18 and over was measured.

Results: 264 boys and 220 girls were studied, of whom 38 and 33, respectively, had started their T1D before the age of five. There are no differences in the final height of patients with T1D in our recruitment, girls or boys, with family controls and the subjects of Sempé and Pédron. Thus, for boys, we note 173.91, 172.94 and 174.5 cm respectively for patients, family controls and subjects of Sempé and Pédron. There is almost no pubertal peak in girls, this peak is very blunt in boys, preceded by a rate of growth constantly higher than that of controls. The comparison of the final height of patients with T1D shows a deficit in subjects who started T1D before the age of 4, significant in boys.

Conclusions: This study shows comparable final heights to controls and the loss of the pubertal peak in our recruitment of children with T1D. The final height deficit in patients with very early-onset of T1D must encourage the achievement of the best glycemic control and body weight control over the long time to be covered before the end of growth. Therapeutic and nutritional education, insulin adjustments, or even the wider use of the pump, are appropriate.

P137
HbA1c trajectories in 15,897 youth with T1D - an international comparison from Australia, Germany/Austria and USA

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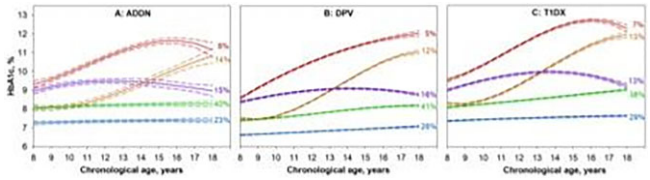
Objectives: Adolescence can present barriers to achieving glycemic targets; however, not all youth experience a deterioration in glycemic control during puberty. We aimed to group youth with T1D by their glycemic trajectories and assess international differences.
Methods: The analysis included 15,897 youth from the Australasian Diabetes Data Network (N_{ADDN} = 1132, 45% female), German/Austrian Diabetes Prospective Follow-up (N_{DPV} = 8929, 48% female), and US T1D Exchange registry (N_{T1DX} = 5836, 49% female) with duration ≥ 2yr and ≥ 5 aggregated HbA1c measures by year of age between 8-18 years. Latent class growth modeling identified subgroups following a similar trajectory for HbA1c.
Results: Five trajectories were present in all cohorts. Among the 3 registries a similar proportion were classified into each trajectory group. The majority of patients followed a stable trajectory from either a low, intermediate or high HbA1c, while approximately 17% showed a deterioration in glycemic control at early adolescence from either an intermediate or high HbA1c at baseline. Differences in minority status were found across trajectories in both the DPV and T1DX cohorts (p≤0.001) with the proportion of patients from an ethnic minority lowest in the low stable trajectory groups.
Conclusions: Across 3 registries, similar groupings by HbA1c trajectory were observed. The majority of patients have suboptimal glycaemic control which remains stable over time or further deteriorates from early adolescence.



[*Trajectories of HbA1c among youths with T1D in ADDN (A), DPV (B) and T1DX (C).*]

P138
Islet autoantibody change after T1D onset is associated with adiposity

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Objective: To determine the stability of individual islet antibodies (Ab) over 2 years from clinical T1D onset and the relationships with adiposity.
Methods: T1D patients diagnosed between 12/2004 and 6/2008 with assays of 4 Ab (GADA, IA-2A, ICA, ZNT8) at both onset and 2-year follow-up were included (n = 141): age 9.5 ± 4 (1.2-18.9) years, 96% white, 59% male. Measures of Ab, age, height, weight, waist circumference, leptin and adiponectin, were collected within a 3-month post onset window. BMI percentile, waist/height and leptin/adiponectin ratios were calculated.
Results: At least 80% (n = 112) of T1D subjects had no change in their individual Ab status at 2 years. The commonest transitions occurred in GADA with a 26:2 (loss: gain ratio) (p< 0.001) followed by ICA 13:2 (p = 0.007); IA2 10:0 (p = 0.002); ZNT8 6:2 (p > 0.2). Of the 5 subjects whom transitioned to positive, 2 gained GADA, 1 ICA, 1 ZNT8, and 1 both ICA and ZNT8. Subjects who lost GADA were 2.5 years younger than those with persistently positive GADA results (P< 0.0001). Compared to those with no change, patients who lost GADA had a higher BMI (p = 0.04). Those that lost ICA had a higher waist/height ratio (p = 0.05) and leptin (p = 0.005).
Conclusions: Ab status was remarkably stable over 2 years in the majority of subjects. Any change was characterized by Ab loss, most often GADA. Those who lost GADA showed a significantly higher BMI, compared to those with no change. Loss of ICA was associated with more central adiposity with a significantly higher waist/height ratio & leptin levels. Although, we had hypothesized that obese subjects would gain Ab after diagnosis, the opposite was suggested by the higher markers of obesity in those who lost Ab. This finding needs to be further investigated, for a better insight during monitoring of obese T1D patients. ZNT8 showed more stability than the other more established Abs making it a useful clinical marker when present.

P139
Intergenerational effects of hyperglycaemia in pregnancy: the PANDORA Wave 1 study

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Background: Type 2 diabetes (T2D) prevalence is up to 10 times higher in Aboriginal than non-Aboriginal Australian pregnant women, and 20 times higher in children. The PANDORA study is a longitudinal birth cohort (n = 1225) recruited from a hyperglycaemia in pregnancy (HIP) register.
Objectives: The study explores the impact of HIP on growth of offspring.
Methods: We assessed anthropometry of 18-60 month old children of mothers with HIP (46 T2D, 177 GDM) compared to those without HIP (n = 52), and by ethnicity (156 Aboriginal, 112 Europid).
Results: Aboriginal and Europid children were similar in age at follow up (33.1 vs 34.0 months, p = 0.37), gender (52.6% vs 52.1% male, p = 0.94) and birthweight Z score for gestational age (0.3 vs 0.2, p = 0.48). However, Aboriginal mothers delivered earlier (38.1 vs 39.1 weeks, p < 0.01) and, of all mothers with HIP, were more likely to have T2D (33 % T2D, 67% GDM vs 1% T2D, 99% GDM, p < 0.01), BMI similar (29.4 vs 28.2 kg/m^2, p = 0.20).
Child weight, height and BMI Z scores, and subscapular and suprailiac skinfolds were significantly lower in Aboriginal vs Europid children, all p < 0.01. Among Aboriginal mothers, T2D was associated with lower child height Z score (T2D -1.3 vs GDM -0.8 vs no HIP -0.8), and greater waist (51.0 vs 49.8 vs 47.7 cm) and mid-upper arm (16.2 vs 16.0 vs 15.6cm) circumferences (all p < 0.01), but not with skinfold thickness.
Using multivariable regression, child birthweight Z score was associated with greater height z-score (0.22, p < 0.01), and arm (0.36, p < 0.01) and waist circumferences (0.99, p < 0.01). Aboriginality was

associated with lower height (-0.78, p < 0.01) and arm circumference (-0.96, p < 0.01). Maternal glycaemic status was not significant.
Conclusions: Postnatal growth of Aboriginal children may reflect ongoing health challenges and influence future adverse outcomes. Further work will assess adiposity, growth trajectories and other potential contributions to early onset cardiometabolic risk.

P140
Improved characterization of patients with autoimmune polyglandular syndrome type 1 (APS-1) or immunodysregulation polyendocrinopathy enteropathy X-linked (IPEX) syndrome by standardized multicenter patient registries: Data from the German/Austrian DPV Registry

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Objectives: The immunodysregulation polyendocrinopathy enteropathy X-linked syndrome (IPEX) and the autoimmune polyglandular syndrome type 1 (APS-1) are rare diseases associated with diabetes mellitus. The aim of this study was to better characterize the clinical phenotypes of these rare types of diabetes by means of multicenter data documentation in a series of patients.
Methods: The standardized diabetes patient follow-up registry DPV currently comprises data on 499,325 patients with diabetes from 464 centers in Germany, Austria, Switzerland, and Luxembourg. The database was searched for the additional lifetime diagnosis of APS-1 or IPEX. Demographic data, glycemic control, insulin dose and treatment regimen were analyzed. For the present study, data from the last documented visit were considered. Statistics were carried out with SAS 9.4.
Results: Among 118,952 patients with type-1 diabetes, we found 5 patients with APS-1. Among 12,996 patients with type-3 diabetes, 6 patients with IPEX and 2 patients with IPEX-like-syndrome were found. The patient characteristics are shown in table 1.

	Patients with APS-1 (n = 5)	Patients with IPEX and IPEX-like-syndrome (n = 8)
Age at analysis [years]	25.60 (17.20-25.85)	10.90 (5.10-15.80)
Age at diabetes onset [years]	3.30 (2.40-12.50)	0.40 (0.10-1.50)
Currently< 18 years	40%	100%
Male patients	80%	75%
Duration of diabetes [years]	11.20 (8.40-23.20)	9.50 (3.23-15.60)
Insulin dose [units/kg]	0.95 (0.53-1.06)	0.90 (0.64-1.15)
HbA1c [%]	8.20 (6.91-9.16)	7.70 (6.57-9.12)
HbA1c [mmol/mol]	66.12 (52.02-76.61)	60.66 (48.31-76.18)
Pump use	25%	100%

[*Table 1: Characteristics of patients with APS 1 or IPEX as median with quartiles or proportion*]

IPEX primarily affects boys. Interestingly, we found 2 affected girls with IPEX in DPV. All patients with IPEX developed insulin-dependent diabetes in early infancy. Probably due to this fact, all patients with IPEX were treated with insulin pumps. In the literature, the male-female ratio in APS-1 is 3:4, i.e. females are more often affected. In our analysis, we found a male-female ratio of 4:1, perhaps explained by the fact that APS-1 is often undetected in children. Onset of diabetes in APS-1 is described as very variable. All our patients developed insulin-dependent diabetes in childhood.
Conclusion: A standardized multicenter patient registry can provide a unique basis to better characterize clinical phenotypes of rare disorders in individual centers which could help to improve understanding of the diseases and their treatment.

Poster on Display - Diabetes Epidemiology

P141

Prevalence and the factors associated with diabetes mellitus in young adults in rural Telangana

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Introduction: The high magnitude of non-communicable diseases (NCD) demands urgent attention. According to World Health Organization (WHO), NCDs will be responsible for a significantly increased total number of deaths in the next decade. NCDs deaths are projected to increase by 15% globally between 2010 and 2020.
Hence present study to know the prevalence and associated risk factors of diabetes mellitus in young adults by using Indian Diabetes Risk Score (IDRS) in Rural Telangana.
Methods: A cross-sectional study in 1200 Young Adults (18 to 40 years) were recruited in the study. In Rural Telangana,10 villages and 3 hamlets, under shamirpet mandal, Ranga Reddy district were randomly selected. For good representation of the study, It was decided to consider all 10 villages and 3 hamlets for collecting Sample.
Results: Screening them byIDRS has brought out that, 92 (7.7%) at High Risk for Diabetes, 608 (50.6%) at Moderate Risk for Diabetes and 500 (41.7%) at Low Risk for Diabetes. Thereby giving the prevalence of High risk subjects for development of Diabetes based on IDRS i.e. 92/1200 is 7.67 %.
These 92 high risk subjects identified by application of IDRS were subjected to Fasting Blood Sugar (FBS) estimation, 63 of 92 high risk subjects were found diabetes. Thus prevalence of Diabetes in identified high risk subjects was identified as 63/92 i.e. 68.47 %.The prevalence of Diabetes using two step procedure(IDRS+FBS) i.e. 63/1200 is 5.25%.
Conclusions: The present study identifies that the prevalence of Diabetes was 5.25 %.With prevalence of Diabetes in identified high risk subjects was identified as 68.47 %. Diabetes is associated with many risk factors however ,Positive family h/o of DM, consumption of less than five servings of Fruit and vegetable intake, higher Body Mass Index (overweight and obese) were found to be independent risk factors for development of diabetes mellitus on multivariate logistic regression analysis.

P142

Epidemiological and anthropometric evolution in type 1 diabetes in children and adolescents from general recruitment and comprehensive registration since 1973

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Diabetes in children has undergone a profound and rapid mutation for twenty years. Our study aims to present the evolutionary aspects for 45 years.
The general recruitment, about 250 new patients/year, comes from a region of 13 million inhabitants; it reports 3911 T1DM at the end of 2017. The register, validated at 100%, is that of the reference department, which has 1.8 M inhabitants, 28.2% of whom are under 15 years of age; it has 2361 T1DM at the end of 2017, based on incidence data. Anthropometric and corpulence data are referred to the pediatric curves.
The incidence (/10^5 children) was 31.12 for all 0-14 year olds and shows an average annual increase of 10.2% since the year 2000; these figures are 22.62 and 15.0% under 5 years, 36.92 and 16.2% for 5-9 years and 37.93 and 8.0% for 10-14 years old. The prevalence was 1/600 children under 15 in December 2017. The sex ratio is globally 1 but is subject to significant cyclical variations. Seasonality, permanently significant from 1973 to 2014 in favor of the winter months (58.32% of 1449, $p < 0.01$), is no longer in 2015-2017 (52.87% of 505, $p = 0.57$). Mean BMI at the beginning of T1D was 16.79 $\pm$ 2.04 before the year 2000 and 18.29 $\pm$ 2.80 after ($p < 10^{-9}$), with no gender differences; it is maximal after the age of 5 years. The final size is not different from that of the controls, despite the erasure of the peak of growth; however the very young age of appearance induces a significant final size deficit in the boys.
Environmental factors have become more important in children´s over the past twenty years. The rejuvenation of the age of onset of T1D is largely related to excess of body weight. Toxins and other disrupters, themselves conveyed by the diet, can also explain the increase in the general incidence. The recent reversal of the relationship with the previously dominant infectious environment is another warning sign. Nutritional education and dietary control could slow the progression of the child´s diabetes.

P143

Demographic and clinical characteristics of a population-based pediatric cohort of type 1 and type 2 diabetes in Western Australia (1999-2017)

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Introduction: Western Australia (WA) has a single tertiary referral center that provides diabetes care to all children and adolescents diagnosed with diabetes throughout the State, enabling the accurate study of a contemporary, population-based pediatric diabetes cohort.
Objectives: To determine the demographic and clinical characteristics of all children and adolescents diagnosed with type 1 (T1D) and type 2 (T2D) diabetes aged < 17 years, in WA from 1st January 1999 to 31st December 2017.
Methods: Children and adolescents newly diagnosed with T1D and T2D aged < 17 years in WA from 1999 to 2017, were identified from the Western Australian Children´s Diabetes Database (WACDD). The WACDD is a population-based, prospective, longitudinal diabetes registry established in 1987 with near complete estimated ascertainment rates for children diagnosed with T1D (>99% complete) and T2D (92% complete) across the whole State. Data on eligible cases were extracted for diabetes type, sex, Indigenous status and date, age, HbA1c, BMI, blood pressure and postcode at diagnosis.
Results: Of 2,149 eligible cases identified, 1,951 (91%) had T1D and 198 (9%) T2D. The mean age at diagnosis was 8.7($\pm$4.1) years in cases with T1D and 12.9($\pm$2.1) years in those with T2D. For cases with T1D, 47% were girls, 2% of Indigenous descent, 72% resided in metropolitan areas and 6% in remote areas. Of those with T2D, 61% were girls, 58% of Indigenous descent, 52% resided in metropolitan areas and 32% in remote areas. Eight percent of cases with T1D, and 28% of those with T2D lived in postcode areas classified in the quintile of highest socioeconomic relative disadvantage. At the time of diagnosis, the median HbA1c% [IQR] was 11.6[10.1, 13.4] and 8.9[6.6, 11.9], and mean BMIz 0.36($\pm$0.96) and 2.01($\pm$0.65), for cases with T1D and T2D respectively.
Conclusion: Pediatric patients diagnosed with T1D and T2D in WA continue to have distinct demographic and clinical characteristics at the time of diagnosis.

P144

Spectrum of congenital heart disease in infants of diabetic mothers: an experience in a tertiary care hospital

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Introduction: Congenital anomalies occur more commonly in infants born to diabetic mothers of which cardiac defects predominates. Congenital heart disease (CHD) remains one of the major causes of mortality and morbidity in the pediatric population of both developed and developing countries.
Objective: To find out the pattern of CHD in infants of diabetic mothers (IDM).
Methods: This observational study was done in Special Care Baby Unit (SCABU) in BIRDEM Hospital, Dhaka, Bangladesh between May 2017 to April 2018. A total of 503 IDMs were admitted in SCABU during this study period. Echocardiography was done in thirty of these neonates who were clinically suspected of having CHD.
Results: Echocardiography result showed all 30 IDMs suffering from CHD. Atrial septal defect (ASD) was found in 4 patients and 4 patients suffered from ventricular septal defect (VSD). Four IDMs had both ASD and VSD. One patient suffered from VSD with pulmonary hypertension. Patent ductus arteriosus (PDA) was present in 3 neonates and 2 babies suffered from PDA and ASD both. PDA with persistent foramen ovale was present in 2 neonates. Among the cyanotic heart diseases 2 neonates had transposition of great arteries (TGA) of whom one also had ASD. Two IDMs had Truncus arteriosus (TA) and one had TA with single ventricle. One neonate had only hypertrophic cardiomyopathy (HCM) while HCM with large PDA with both tricuspid and mitral regurgitation was found in another IDM. TGA with VSD, ASD and PDA was found in one patient. Another neonate suffered from hypoplastic left heart syndrome with large PDA. VSD with PDA with tricuspid regurgitation was found in 1 neonate. This study also showed that of the 30 mothers 18 had pre gestational diabetes and the rest developed diabetes during pregnancy.
Conclusion: Among the 503 IDMs admitted in SCABU during the study period 30 (5.9%) had CHD making the percentage quite high. Therefore all IDMs should be screened for CHD by echocardiography.

P145

A study of gender, age and clinical presentation at time of detection of type 1diabetes [T1D] in 519 children in rural Marathwada region of central India

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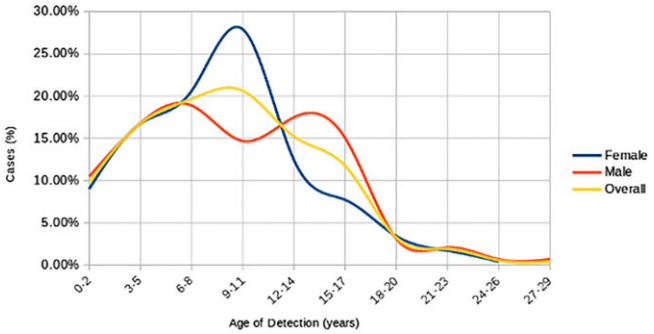
Objective: To study the distribution of gender, age of detection and clinical presentation of 519 children with T1D in rural, resource constrained Marathwada region in India at the time of detection.
Method: The data of 519 children with T1D was obtained from the records of children taking treatment and registered at our hospital. This data was scrutinized for gender distribution, age distribution and clinical presentation [with ketoacidosis or without] at the time of detection. We also looked at gender wise age distribution.
Results: The data of 519 T1D children showed:
1. Gender distribution: Of 519 children with T1D,233[~45%] were female and 286[~55%] were male.
2. Age distribution: Of 519 children with T1D,234 [~40.5%] were detected in the age group of 6-11 years of age.
3. Presentation at time of detection: Out of 519 children with T1D,498 [~96%] were detected with ketoacidosis. 4. Gender wise age distribution: A difference in distribution between genders was observed.
Boys showed a steady distribution of age of detection between ages of 6-17 years
Girls showed increase in age of detection between ages of 6-11 years with sharp drop before and after.



[*Gender-wise age distribution at the time of detection of T1D in 519 children.*]

Conclusion:
1. The gender distribution of data of 520 children with T1D showed almost equal numbers of boys and girls. [55% boys versus 45%girls]
2. The age distribution showed a strong predominance in the age group of 6-11 years of age. However, genders wise age distribution clearly suggested a difference in trends between girls and boys, where in girls were detected as a spike mainly in 6-11 years of age while boys were detected evenly spread between 6-17 years of age. 3. The clinical presentation at detection of T1D was with ketoacidosis in 96% children. Only 4% of children were detected earlier due to symptoms. This high percentage could be attributable to lack of awareness about T1D among public as well as health care providers in rural areas.

P146

Understanding the type 1 diabetes mellitus patients in Single center study

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Objectives: This study was done to understand the number of insulin injection, type of insulin and daily insulin dosage in Type 1 diabetes patients.
Methods: A review of records of 135 type 1diabetes cases from January 2017 to January 2018 in Ramchandani Diabetes Center was done.
Results: The mean age 135 patients was 17.93±6.63 years with duration of diabetes 7.37±4.78 years and 47 % are male and 53% are female among diabetes patients. Among 135 patients only 1 patient is using insulin pump. Daily insulin dosage is 39.73±17.47, daily basal insulin is 3.47+8.08, daily prandial insulin is 9.10+12.62, daily premix insulin 27.17+22.34.
Daily injection per day is 2-4 times a day (2.63±0.77). 63 patients are using prandial insulin with 48% is used analog and 52% is using regular insulin. 31 patients are using basal insulin with 93% using analog and 7% is using NPH.
There is no incidence of nephropathy and retinopathy in duration. In study duration 8 patients had incidence of severe hypoglycemia, 15 had DKA with hospitalization with 4 death due to DKA.
Conclusion: The majority of patients use basal insulin with high insulin units per day and DKA is the main cause of death in type 1 diabetes patients.

P147

Clinical profile of type 1 diabetic children from South India

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Objectives: There is scant literature available on the clinical profile of children with Type 1 Diabetes mellitus from India This study aims to describe the clinical features of Type 1 Diabetic children from a single tertiary referral university teaching hospital in South India.
Methods: Retrospective chart analysis of 279 children with Type 1 Diabetes who were diagnosed before 20 years of age was done.
Results: There were 157 females and 122 males. Mean age at presentation was 9.8+/- 5 years. Majority (38.4 %) presented between 5 and 10 years and 31 % presented between 10 and 15 years. 45.5 % had DKA at presentation and 12.6% had DKA on follow up. Documented severe hypoglycemias were noted only in 7% on follow up. Majority of the patients were on basal bolus regimen(58.8%) and used conventional insulin (49.8%). Mean HbA1c declined from diagnosis in the first year from 11.7% to 9.17%. Following that the mean HbA1c was 9%. 238 patients underwent screening for GAD 65 and IA 2 auto antibodies and 60 % had both antibodies positive 43/215 had thyroid disease out of which 69.8% had hypothyroidism 7% had subclinical hypothyroidism, 2.3% had hyperthyroidism and 20.9% had positive thyroid antibodies alone. 2 patients had celiac disease. Out of 121 patients who underwent screening for complications retinopathy and nephropathy were seen in 2 patients each.
Conclusions: This study on the clinical profile of Type 1 diabetic children in India shows a lower age of onset of Type 1 diabetes and suboptimal glycemic control in majority. Measures to improve glycemic control in Type 1 Diabetes is the need of the hour.

Poster Tour 07 - Chronic Complications

P148

To study relationship of Insulin like growth factor-1 (IGF-1) with growth, glycemic control and diseased duration in children with Insulin dependent diabetes mellitus (IDDM)

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Objectives: In IDDM, IGF-I concentrations have been found to be low. Our objective was to study the relationship of IGF-I with growth, glycemic control and disease duration.
Methods: A prospective observational study, at Pune India was conducted.168 children with IDDM (80 boys) without other co-morbidities, attending a tertiary care pediatric endocrine unit were included. Anthropometric parameters were measured with standard protocols and converted to Z-scores (Khadilkar et al. 2015).Date of diagnosis was recorded at time of first contact. HbA1c and IGF-1 concentrations were measured; IGF-1 Z scores were computed(Martin et al. 2013).Statistical analysis was performed using SPSS.
Results: Mean IGF-1 Z-scores were -0.96(1.3) and mean Ht Z score was 0.4(1.5).Mean IGF-1 Z-scores in children with intensive insulin therapy were 0.91(1.4) and with conventional therapy were -1.04 (1.2),($p< 0.05$). IGF-1 Z scores were negatively correlated with HbA1C and positively with height ($p < 0.05$). Further, Ht Z scores and HbA1C concentrations were negatively correlated ($p < 0.05$); mean HbA1C for short, normal and tall children was 10.2(2.4),10.0(2.1) and 9.8(2.2) respectively. There was negative correlation between disease duration and IGF-1 Z scores. Statistically significant differences($p < 0.05$) were found in mean IGF-1 and height Z-scores depending upon disease duration(< 2years, 2-5 years and >5 years).
Conclusions: Better glycemic control tends to normalize growth in children with diabetes. Disease duration is an important consideration. Optimum glycemic control is critical for adequate IGF-1 concentrations and growth in children with diabetes.

Disease duration (yrs)	No. of children	HT Z Score mean	IGF Z Score mean	HBA1C mean
<2	43	0.1 +_1.3	-0.73 +_1.3	9.68 +_2.4
2-5	73	-0.5 +_1.4	-0.79 +_1.3	10.26 +_1.9
>5	52	0.7 +_1.7	-1.40 +_1.7	10.02 +_2.1

[*HT Z Score, IGF Z score and HBA1C, mean in relation to disease duration*]

P149

Effect of type 1 diabetes mellitus on fertility of young men

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Introduction: The rising incidence of DM worldwide has resulted in an increased prevalence in men of reproductive age. The vast majority (>90%) of patients with type-1 diabetes are diagnosed before the age of 30. DM may affect male reproductive function at multiple levels as a result of its effects on the endocrine control of spermatogenesis, spermatogenesis itself or by impairing penile erection and ejaculation. Despite this, studies examining the effects of DM on sperm fertility potential have been limited.
Objective: To study the difference, if any, in semen, quantitative and qualitative, in men with and without diabetes, using the light microscopy.
Methods: Conventional semen analysis, core method to evaluate male fertility in the clinical setting was performed (semen volume, sperm count, motility and morphology) using light microscopic method. In all 30 subjects, 14 diabetic (mean age 30 + 4 years) and 16 non- diabetic subjects (control group, healthy men with no fertility concern, already fathered a child, mean age 30 + 4 years) were included.
Results: Significant reduction in semen volume in diabetic men (1.8 versus 3.7 ml; $P < 0.005$) was found. Total sperm count was reduced (41*106 versus 74*106; $P < 0.0001$) and the number of motile sperms was also reduced (37% versus 84%; $P < 0.0001$). Besides, the morphology of the motile sperms was altered as well (11% normal versus 87%; $P < 0.0001$).
Conclusions: Diabetes is associated with decreased semen volume, decreased sperm count and motility, and altered sperm morphology that may impair the reproductive capability of these men.

P150

Top tertile urinary albumin creatinine ratio (ACR) doubles the risk of 3-step progression of diabetic retinopathy: the adolescent type 1 diabetes cardio-renal intervention trial (AdDIT)

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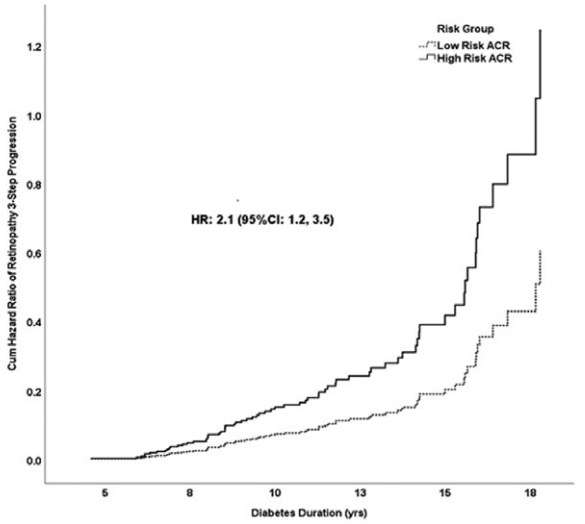
Objective: To determine if a high risk ACR phenotype predicts 3-step progression of diabetic retinopathy in the observational (non-intervention) cohort of the AdDIT study. We hypothesized that albumin-creatinine ratio (ACR) in the top tertile of the observed normal range predicts subsequent retinopathy 3-step progression in adolescents with type 1 diabetes.
Methods: A prospective observational study of the non-intervention cohort from the AdDIT study involving 631 participants (Low Risk ACR = 256 lowest & 261 middle tertile ACR and High Risk ACR = 114 Top ACR tertile, adjusted for age, sex and diabetes duration). Both groups were assessed prospectively with repeated standardized retinal photography graded centrally for retinopathy according to the

modified Airlie House classification. Risk of retinopathy 3-step progression according to ACR risk group allocation was determined using Cox regression models.

Results: After a median 9.7 [IQR 7.4, 12.7] years diabetes duration and study follow-up of 3.0 [1.9, 3.8] years, the cumulative incidence of retinopathy 3-step progression was 9.2% in the High Risk ACR vs 5.6% in the Low Risk ACR group (log -rank p = 0.004). In multivariable Cox regression models High Risk ACR was associated with a doubling of risk retinopathy 3-step progression (HR 2.11 (95%CI: 1.25, 3.55) independent of HbA1c (HR 1.3 (1.1, 1.5)).

Conclusion: Top tertile ACR in early adolescence (11-16yrs) within the normoalbuminuria range is associated with higher risk of future retinopathy 3-step progression independent of glycaemic control.



Duration (yrs)		0	3	6	9	12	15	18
Risk Group	Low Risk ACR	444	443	401	276	158	58	7
	High Risk ACR	110	110	100	62	24	9	

[*Retinopathy progression AdDIT*]

P151
Evaluation of Lipoprotein-associated phospholipase A2 (Lp-PLA2) as a marker for microvasculopathies in adolescents with type 1 diabetes

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Objectives: Lp-PLA2 is a strong predictor for cardiovascular diseases and positively correlated with oxidative stress. In type 1 diabetes (T1D), oxidative stress and the quality of glucose control are causal factors for the accelerated occurrence of cardiovascular diseases, often preceded by microvasculopathies. However, little is known about the relevance of Lp-PLA2 as prognostic marker for microvascular diseases.

Methods: We analyzed Lp-PLA2 activity in 167 adolescents with a history of T1D of more than 10 years (mean age 17.0 ± 2.3 years). Clinical data were obtained from the DPV registry at blood collection and on average 2.4 ± 1.3 years later at follow-up (n = 100). Relationships between Lp-PLA2 activity and age, BMI, HbA1c, insulin dosage and presence of microalbuminuria as surrogate marker for microvasculopathies were evaluated.

Results: Lp-PLA2 activity was higher in male (170.9 ± 38.2 nmol/min/ml, n = 100) than in female T1D patients (155.0 ± 34.0 nmol/min/ml, n = 67, p = 0.006). Microalbuminuria was present in 36.4% of T1D patients, additional 7.7% (5/65) of patients developed microalbuminuria until follow-up. Neither presence nor future development of microalbuminuria were associated with Lp-PLA2 activity. In contrast, cross-sectional multiple linear regression analysis revealed a significant negative correlation of Lp-PLA2 activity with HbA1c (ß-coefficient: -8.85, 95%CI [-14.32;-3.37], p = 0.002). Besides, Lp-PLA2 was positively associated with male sex (23.56 [8.51; 38.62], p = 0.002) and cholesterol (0.45 [0.20;0.69], p< 0.001) and negatively associated with HDL-cholesterol (-1.03 [-1.55;-0.51], p< 0.001).

Conclusions: Lp-PLA2 activity was not associated with prevalence or future incidence of microalbuminuria. In contrast, higher HbA1c levels had an inverse association with Lp-PLA2 activity. This association of decreased Lp-PLA2 activity with poor glucose control might limit its function as a predictor of micro- and macrovascular diseases in young patients with T1D.

P152
Circulating inflammatory markers, diabetes type and complications in youth

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Objectives: To investigate biomarkers associated with inflammation in 3 common types of diabetes in youth, Type 1 diabetes (T1D), Type 2 diabetes (T2D) and cystic fibrosis-related diabetes (CFRD), by assessing influence of diabetes type, complication status and other determinants.

Methods: The study group (mean age 15 ± 3 years; 49% female) consisted of 134 T1D, 32 T2D, 32 CFRD, 37 controls without diabetes and 11 with CF but normal glucose tolerance. Vascular inflammation was assessed by sE-selectin (ELISA) and systemic inflammation by hsCRP (turbidimetry), as well as WCC and ESR in those undergoing diabetes complications assessment. Nephropathy was defined as elevated albuminuria (≥20 µg/min). Cardiac autonomic neuropathy was assessed by measures of heart rate variability (HRV) on a 10-min continuous electrocardiogram, peripheral nerve function by vibration and thermal threshold testing and retinopathy by 7-field stereoscopic fundal photography. Descriptive statistics, ANOVA and regression analyzes were performed, with significance at p < 0.05.

Results: T1D had HbA1c than T2D and CFRD (8.5 vs 6.6 vs 5.9%, p < 0.001) and longer diabetes duration (8.1 vs 1.8 vs 2.3 years, p < 0.001). Inflammatory markers were lower in T1D than in the other diabetes groups (p< 0.05) but higher than in controls. T1D had less albuminuria than T2D (1 vs 19%), less HRV abnormalities than T2D or CFRD (28 vs 54 vs 50%) and less peripheral nerve abnormalities than T2D (5 vs 19%). In multivariable analysis, hsCRP and ESR were associated with complications (p< 0.05) on top to effects of HbA1c, BMI and diastolic blood pressure (p < 0.05). In addition, BMI was an independent explanatory variable for some biomarkers (p < 0.05).

Conclusion: Inflammatory markers are elevated in adolescents with diabetes, being higher and comparable in T2D and CFRD than in T1D. Inflammation is independently associated with diabetes complications, consistent with inflammation being a driver of vascular pathology in diabetes.

P153

Favorable lipid profile in children on pump treatment compared to children on injection therapy: results from the SWEET Diabetes Registry

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Objectives: Dyslipidemia is one of the major factors contributing to the increased cardiovascular risk of subjects with type 1 diabetes (T1D) and may be present from childhood. Although pump treatment has been found to have a beneficial effect on metabolic parameters and to be associated with lower cardiovascular mortality, the effect of type of treatment on the lipid profile of children with T1D has not been investigated in detail. In this study, we did a cross sectional analysis of the lipid profile of children ≤18 years with T1D from SWEET, an international diabetes registry, with a focus on the effect of the type of treatment (pump vs injections).
Methods: Dyslipidemia was defined as LDL≥100 mg/dl or non-HDL≥120 mg/dl. LDL and non-HDL values among 14290 children (52% ♂ , 51% pump) from 60 SWEET centers were analyzed both as continuous and binary variables and compared between pump and injection groups by linear and logistic regression analysis adjusted for sex, age, diabetes duration, Hb1Ac and BMI-sds groups, region, and for common interactions between age, sex, HbA1c and BMI.
Results: Our study confirmed established associations of increased lipids with female sex, age, diabetes duration, HbA1c and BMI. LDL and non-HDL were lower in the pump group compared to the injection group after adjustment for demographics, HbA1c and BMI-sds groups and for interactions [LDL: injections: 94.4 (CI: 93.7; 95.2); pump: 92.3 (91.6; 93.0) mg/dl, p< 0.001, non-HDL: injections: 111.3 (110.5; 112.1); pump: 108.3 (107.6; 109.1) mg/dl, both p< 0.0001]. Similarly, the odds ratio for LDL≥100 mg/dl [0.89 (0.82; 0.97)] and non-HDL≥120 mg/dl [0.85 (0.78; 0.93)] was significantly lower in the pump group even after all adjustments.
Conclusions: Our results indicate that pump treatment is associated with a better lipid profile. Further research needs to elucidate the pathophysiological basis of that observation and address the impact of pump therapy itself on lipids.

P154

A study of muscle and bone parameters in children with type 1 diabetes mellitus (T1DM)

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Introduction: Children and adolescents with T1DM are at risk for decreased bone and muscle mass.
Objectives: Our objective was to study muscle and bone parameters in children with T1DM in comparison with healthy control.
Methods: Study was conducted from 2015-18. Children with T1DM (N = 251) and healthy controls (N = 250) were included in study. Anthropometric parameters were measured and converted to Z-scores. Muscle area and bone density were assessed using peripheral quantitative computer tomography (Pqct) at the radius and HBA1C was measured. Children with diabetes were divided as per disease duration (< 2yrs, between 2-5yrs and >5 yrs).
Results: Mean age of T1DM children was 10.8 ± 4.3yrs (controls was 10.3 ± 3.6). Mean HBA1C was 8.8 ± 2.6. Mean height Z-score was significantly higher in controls and reduced with increasing duration of diabetes (0.0 ± 1.3 in controls and -0.3 ± 1.5, -0.7 ± 2.5 and -1 ± 1.8 respectively, p< 0.05). Similarly, Z-score for trabecular density, bone area and stress strain index (Z-SSIpol) were significantly lower in patients with T1DM and decreased with increasing disease duration (table). Cortical density showed a negative trend, but was not significant.
Trabecular density and HBA1C concentrations were negatively correlated (p < 0.05, R = -0.18) as was muscle area and HBA1C concentrations (p < 0.05, R = -0.17).
Conclusion: Trabecular density, bone area and stress strain index were affected in T1DM children. With increasing disease duration, attention is required for optimization of musculoskeletal health.

	Normal	Duration of T1DM			P value
N	250	< 2 yr 101	2-5 Yr 96	>5 yr 52	
Z-Trabecular Density for Age	-0.1506 ± 1.17	-0.6286 ± 0.95	-0.7317 ± 0.97	-0.8211 ± 1.08	0.002
Z-Total Density for Age	-0.3133 ± 1.13	-1.07 ± 1.02	-0.70 ± 0.89	-0.513 ± 1.11	0.061
Z-Cortical Den for Age	-0.4151 ± 1.30	-0.428 ± 1.27	0.166 ± 0.90	-0.163 ± 1.36	0.058
Z-SSIPol for Age	-1.2637 ± 0.68	-1.45 ± 0.56	-1.02 ± 0.69	-1.807 ± 0.63	0.003
Z-Muscle Area for Height	-2.264 ± 0.90	-2.43 ± 0.80	-2.1387 ± 1.28	-2.5 ± 1.02	0.631
Z-Bone Area for Height	-1.69 ± 0.95	-1.683 ± 0.86	-1.14 ± 1.0	-1.78 ± 1.27	0.043

[*Peripheral quantitative computer tomography (Pqct) indices*]

P155

Screening by 2 fields for retinopathy reduces the yield for background and moderate retinopathy

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Objective: To determine the proportion of background retinopathy and severity of retinopathy in the peripheral retina detected by 7 field compared with 2 field assessment in adolescents. Recently there have been calls for longer periods between screening determined by the presence and severity of retinopathy at last screen. This is determined from 7-field photography. However, the main concern voiced by adolescents attending the diabetes complications assessment clinic (DCAS) is loss of vision.
Methods: The presence of retinopathy was reviewed for all patients, 11 to 20 years (n = 1839), attending DCAS from September 2004 (when digital screening began) to March 2018. Retinopathy grading is reported by an ophthalmologist per the modified Airlie House System: grade 21 very mild, 31 mild, 41 and 45 moderately severe, 55 severe non-proliferative retinopathy. Retinopathy was compared according to central (2 fields) and peripheral fields (further 5 fields).

Results: 672 (9%) individual eyes had retinopathy. For 372 eyes (55%) the retinopathy was in either the central fields or in all 7 fields. However 26 eyes (7%) from this group would be given a lower grading with only central assessment. For 300 eyes (45%), no retinopathy would have been detected using 2 field photography, as it occurred only in the peripheral fields. While the grading difference occurred mostly for grade 21, more severe retinopathy would have been missed in 14 eyes (2%) (Table).

Conclusion: If the timing for follow up assessment of retinopathy is determined according to a presence or level of retinal grading by 2 field photography, then the wrong decision will be made in 49% of cases. Detection of early retinopathy allows opportunity to better educate adolescents on the importance of preclinical screening, the benefits of achieving target glycaemic control and general health advice that might otherwise be missed.

	7 Field				
2 Field	21	31	41	45	55
10	286	12	1	1	
21		23		1	
31 and 41					2

[*Comparison of 7 field and 2 field grades*]

P156
Outcome of simultaneous kidney pancreas transplantation single center experience

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Introduction and Objectives: T1DM is most common chronic disease in children. It is associated with increased mortality & morbidity due to vascular complications and chronic kidney disease. Simultaneous pancreas and kidney transplantation is an important treatment option T1DM with CKD providing improved glycemic control and freedom from dialysis. This treatment modality is only in a nascent stage in the country and this study describes the outcomes at one center.

Method: Simultaneous pancreas and kidney transplantation (SPK) was done in (N = 11) T1 DM with CKD patients. The study was conducted at Post Graduate Institute of Medical Education & Research (PGIMER, Chandigarh, from Jan 2105 to April 2018. T1DM was diagnosed as per ADA criteria. The indication for transplantation was recurrent hypoglycemic unawareness and requirement of dialysis. All pancreas grafts were enterically drained. All patients underwent induction with anti-thymocyte globulin and were on immunosuppression with tacrolimus, mycophenolate and steroids.

Results: The mean ± SD follow up of these patient was 13 ± 9 months. The mean age at transplantation was 23 ± 3.54 years. Ten patients survived till hospital discharge with severe allograft pancreatitis causing death in the one patient. Two patients succumbed to infections post discharge. Three pancreas grafts were explanted but the simultaneously transplanted kidneys had normal function. The seven patients with pancreas kidney grafts are off insulin and free from dialysis with mean HbA1c and serum creatinine is 6.1 % and 1.48 mg%.

Conclusion: The relatively young age at time of transplantation is likely to be a pointer to the suboptimal care of T1DM in the country. Given the poor outcomes in patients with T1DM with CKD on maintenance hemodialysis with hypoglycemic unawareness simultaneous pancreas kidney transplants remain an important treatment option in these patients.

Poster Tour 15 - Chronic Complications

P157

Soluble urokinase plasminogen activator receptor in type 1 diabetic patients, relation to microvascular complications

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Objectives: To evaluate Soluble Urokinase Plasminogen Activator Receptor as a marker of inflammation and endothelial dysfunction in patients with Type 1 Diabetes Mellitus and to assess its relation to diabetic microvascular complications.
Methods: This cross sectional study was conducted on 70 children with type 1 diabetes mellitus who were subjected to measurement of blood pressure (mmHg), fundus examination, screening for peripheral neuropathy using the simple rapid bedside neuropathy disability score. Mean random blood glucose levels, fasting lipid profile, fraction C of glycosylated hemoglobin (HbA1c%), Urinary albumin excretion, estimated glomerular filtration rate and serum levels of Human Soluble Urokinase Plasminogen Activator Receptor (suPAR) by enzyme linked immunosorbent assay (ELISA) using suPAR ELISA kits (Glory Science CO., Del Rio, USA).
Results: The studied patients were 24 males 34.3% and 46 females 65.7%. Their mean age was 11.86 ± 3.72 with age Range 4 - 18. Their disease duration ranged from 1-15 years with mean of 5.47 ± 3.22 years. They were compared to 40 age and sex matched healthy controls. We observed that 16 patients had diabetic neuropathy 22.9%, 12 patients had nephropathy 17% and none of them had retinopathy. Soluble urokinase plasminogen activator receptor (suPAR) level was significantly elevated in patients with type 1 diabetes compared to those without p< 0.005. High suPAR level was found in patients with nephropathy p< 0.005 and neuropathy p< 0.005 compared to those without these complications. Significant positive correlations were found between suPAR and each of disease duration P< 0.005, systolic blood pressure P = 0.001, total cholesterol P < 0.005, triglycerides P < 0.005, LDL P = 0.013 and UAE P < 0.005.
Conclusion: Increased suPAR level in early diabetes might be a useful indicator to identify type 1diabetic children at risk of developing vascular complications later in life who might benefit from a timely and appropriate intervention.

P158

Circulating osteopontin level in patients with type 1 diabetes mellitus and its association with diabetic vascular complications

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Objective: OPN plays a significant role in the development of several autoimmune diseases. Interestingly; it was also shown to participate in the acute pancreatic islets response to experimentally-induced diabetes in NOD mice.
Aims of this Study: Evaluate circulating Osteopontin (OPN) level in patients with T1DM and to explore clinical and biochemical correlates of OPN with carotid intima media thickness (CIMT) as a marker of subclinical atherosclerosis.
Patients and Methods: Sixty children and adolescents with type 1 DM and 30 healthy age and sex matched controls were enrolled. Data collected regarding; medical history, clinical evaluation, and screening for diabetic microvascular complications. Serum OPN levels were measured by ELISA. Carotid intima media thickness (CIMT) was done by echo Doppler.
Results: T1DM patients had significantly increased OPN levels (P = 0.000). OPN level were positively correlated with disease duration (P< 0.01), diastolic blood pressure, albumin excretion rate and Carotid intima media thickness (CIMT) (P< 0.05). The cutoff value of OPN >5 µg/l could differentiate patients with and without micro-vascular complications with a sensitivity of 70.59 % and specificity of 88.77 %, area under the curve (AUC) is 0.80.Significantly higher OPN levels in patients with nephropathy or peripheral neuropathy (P = 0.000 and P = 0.003, respectively). 21.7% of patients with T1DM patients had significantly increased carotid intima media thickness (CIMT). 67.6% of patients with micro-vascular complications had increased CIMT (P = 0.022).Multivariate linear regression analysis showed that disease duration, weight, height, BMI and OPN levels were independently related to increased CIMT.
Conclusion: Patients with T1DM had increased serum OPN levels and CIMT. Higher OPN concentrations are associated with an unfavorable metabolic profile and positive micro-vascular complications in these patients.

P159

Hand posture and joint mobility in young patients with type 1 diabetes mellitus

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Introduction: It is known that limited joints mobility can affect the quality of movement and could also adversely affect the body development of young subjects with Type 1 diabetes mellitus (T1DM).
Objectives: The aim of this study was to investigate using a new method how diabetes affects hand and foot posture in young T1DM patients.
Methods: We enrolled 20 young T1DM patients: (M/F:11/9), mean age 13,8 ± 3,8 yrs, BMI: 19,5 ± 4,7 kg/m^2, diabetes duration 4,6 ± 3,6 yrs, mean HbA1c 8,2 ± 1,2 % and 46 young subjects practicing soccer and dance: (M/F:30/16), mean age 12,6 ± 2,1 yrs, BMI: 18,9 ± 2,6 kg/m^2. Hand posture (analysis of frontal plane image of Prayer sign test), muscle strength (hand grip), ankle joint mobility and posture (inclinometer and sagittal plane image of the lower limb) trunk flexibility (sit & reach test), and lifestyle (questionnaire:IPAQ-C, IPAQ-A) were evaluated. The individual sporting history was investigated.
Results: The analysis of hand images showed the presence in diabetic patients of a higher extension of the fifth metacarpophalangeal joint (patients group: 34,7 ± 11,0°; control group: 18,6 ± 8,5°) and higher flexion of the proximal interphalangeal joint (patients group: 11,0 ± 5,1°; control group: 0,4 ± 9,8°).
In comparison to controls, the patient group showed a higher inclination of the fifth metacarpal joint (42,4 ± 11,2° vs 34,4 ± 8,4°; p< 0,005) and a lower inclination of the proximal phalanx (4,9 ± 6,0° vs 15,7 ± 6,1°; p< 0,001). Moreover, the tests performed showed a significantly higher ankle joint mobility in young dancers (155,8 ± 10,3°) compared to patients and soccer group (126,8±15,5°; p< 0,001) and patients group (127,3±33,7°; p< 0,001).
Conclusions: The results of this pilot study indicate that the metacarpophalangeal joint and the proximal interphalangeal joint take a different posture in patients with T1DM. All this indicates that diabetes could affect hand posture and joint mobility from the first years of disease onset.

P160
Evaluation of bone mineral density in children with type 1 diabetes mellitus

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Introduction: Type 1 diabetes mellitus (T1DM) is associated with reduced bone mineral density (BMD). Potential pathogenic mechanisms of T1DM related bone damage may include the deficiency of insulin and insulin-like growth factors. Early identification of reduced BMD is useful in reducing the bone loss and fracture risk. We can get a quick, non-invasive, and accurate quantitation of bone mass by using dual energy X-ray absorptiometry (DEXA scan).
Objectives: The aim of the study was to assess BMD in children and adolescents with T1DM of 5 years duration or more and to evaluate its relation with the glycemic control.
Methods: This study included 30 children and adolescents with T1DM attending the diabetic clinic in Alexandria University Children's Hospital, Egypt. They were compared with 30 apparently healthy children of matched age and sex. Thorough history taking and clinical examination were done with emphasis on age and duration of diabetes, type and dose of insulin, and history of fractures. Laboratory investigations were done including renal functions, serum Calcium (Ca), Phosphorus (P), Alkaline Phosphatase (ALP), and Glycosylated hemoglobin (HbA1C). BMD was assessed by DEXA scan at the spine (L2-L4) and at the femur.
Results: In the present study, the mean age of the diabetic cases was 12.2 years with mean of 7.6 years as duration of diabetes. No significant difference between the two groups as regards the serum levels of Ca and P but ALP was significantly higher in diabetic cases than in controls ($p = 0.001$). It was found that 9 diabetic cases (30%) had low bone density (Z score < -2 Standard deviation (SD) by DEXA scan). The mean HbA1C level in diabetic cases with low BMD was 10.8%. The diabetic cases had lower mean BMD results than in control group ($p = 0.01$).
Conclusions: Reduced BMD is common in children with T1DM. We recommend assessing children with T1DM by DEXA scan for early identification of reduced BMD to reduce the fracture risk.

P161
Effect of lipoprotein-associated phospholipase A_2 on atherosclerosis in children and adolescents with type 1 diabetes mellitus

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Aims: Children with type 1 diabetes (T1D) have high risk for early adult-onset cardiovascular disease. Lipoprotein-associated phospholipase A_2 (Lp-PLA_2) is one of the predictor for atherogenesis. The aim of this study was to investigate the changes in Lp-PLA_2 levels according to the duration of diabetes and its effect on atherogenesis in children and adolescents with type 1 diabetes mellitus (DM).
Participants and Methods: Eighty eight diabetic children and aged 7-25 years were included in this cross-sectional study. In all patients of serum sample, Lp-PLA_2 levels, HbA1c, and lipid profile were assessed. Carotid Intima Media Thickness (IMT) was measured as an indicator of subclinical atherosclerosis. None of the patients have office hypertension. The patients were divided into three groups according to the duration of diabetes as 1 to 5 years (group1), >5 to 10 years (group 2), and >10 years (group 3).
Results: Lp-PLA_2 levels were found to be significantly higher in group 2 than group 1 and 3. Low density lipoprotein cholesterol (LDL-C) and triglyceride (TG) levels were significantly lower in group 1 compared with groups 2 and 3 ($p < 0.05$). Significant differences were found regarding carotid IMT between group1 and 3, and group 2 and 3 ($p < 0.05$). There was no significant correlation between Lp-PLA2 levels and atherosclerotic parameters ($p > 0.05$).
Conclusion: Lp-PLA2 levels showed changes as the duration of diabetes increased. Although Lp-PLA_2 levels increased after the fifth year of diabetes, interestingly, it decreased after the tenth year of the disease. The lack of association of LP-PLA_2 levels with no atherosclerotic markers in children and adolescents with type 1 DM suggests that the effect of Lp-PLA_2 on atherogenesis is debatable. Further studies are needed to clarify the potential association of Lp-PLA_2 with atherosclerosis.

P162
The Atherosclerosis and Childhood Diabetes Study (ACD): early low-grade inflammation in young patients with type 1 diabetes compared to healthy controls

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Introduction: Patients with type 1 diabetes (T1D) have increased mortality from Cardiovascular Disease and inflammation is important in the development of atherosclerosis. In the ACD study we prospectively evaluate early stages of atherosclerosis and its predisposing factors in childhood onset T1D compared to healthy controls.
Objectives: To evaluate the extent and change in inflammation over a five year period in T1D patients and healthy controls.
Methods: The ACD study is a prospective population-based cohort study with follow-up every fifth year of childhood onset T1D patients and healthy control subjects from the South-East Health Region of Norway. At baseline 307 diabetes patients (50.5% girls) and 116 healthy controls (50.4% girls) were included. At the 5-year follow-up 245 diabetes patients (53.5% girls) and 130 healthy controls (56.2% girls) were included. Circulating levels of VCAM-1, P-selectin, E-selectin, CRP, IL-6, IL-18, MCP-1, MMP9 and TIMP1 were measured by ELISAs at both baseline and 5-year follow-up. Statistical analyzes include descriptive and linear mixed models.
Results: The mean age at baseline was 13.7 $\pm$ 2.8 years. The disease duration in the diabetic group was 5.6 $\pm$ 3.4 years at baseline and 10.3 $\pm$ 3.6 years at the 5-year follow-up. Most pro-inflammatory markers changed significantly over five year period within both groups. Significant mean change between-groups over the five year period was observed for the following markers: IL-18 28 pg/mL (95% CI 7.7 to 49.2; $\rho = 0.007$), P-selectin 2.0 ng/mL (95% CI 0.2 to 3.8; $\rho = 0.028$), TNFα 0.5 pg/mL (95% CI 0.03 to 0.9; $\rho = 0.038$) and TIMP-1 9.8 ng/mL (95% CI 3.4 to 16.1; $\rho = 0.003$).
Conclusion: An early low-grade inflammation is present in young individuals with T1D already five years after diagnosis. This is sustained at ten years disease duration, however only limited changed compared to healthy controls.

P163

Early onset childhood diabetes and rapid progression to severe retinopathy in adolescence before age 18 years: is retinopathy on the rise?

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Objective: To determine temporal trends in the prevalence of severe diabetic retinopathy (DR) in adolescents with type 1 diabetes (T1D). The incidence of T1D has increased in young children therefore more adolescents have longer diabetes duration.
Methods: Incident cases of early onset T1D (< 4years) were ascertained from the NSW T1D register over two 3 year time periods: 1999-2001 (n-114) and 2002-2004 (n = 145). We have been screening for DR using 7-field stereo digital images since 2004. Vision-threatening referable DR (VTDR) was defined as pre- proliferative DR or worse and/or diabetic macular oedema (DME). The detection of VTDR in 2015-2017 was compared with the previous 3 years (2012-2014) in adolescents < 18 years.
Results: The incidence of T1D increased by 27% for the < 4yr age group, across the two diagnostic periods and the incidence of VTDR increased fourfold in the respective adolescent screening periods. In 2012-2014, there was one case of VTDR (pre-proliferative) in a 16 year old boy. In 2015-2017, 4 cases of VTDR were detected. All had chronic suboptimal glycaemic control with HbA1c at screening: 8.1% to 11.3%. Two cases were post menarchal girls (aged 15 and 17yrs) with proliferative DR requiring laser photocoagulation and the other two were boys (both aged 15yrs) with pre-proliferative DR. Progression was rapid in the two girls from no DR and background DR at screen 2.2 years previously. One prepubertal boy, lost to follow up for 10 years, presented with growth failure and his HbA1c had decreased from 14% to 8.1% over 6 weeks; the second boy was lost to follow-up for 3 years (previously no DR).
Conclusion: There was a marked increase in VTDR incidence in adolescents (< 18 yrs) during the period 2015-2017 compared with 2012-2014. We speculate that with an increasing number of children diagnosed with T1D before the age of 4 years, there will be more cases of VTDR in adolescents detected in the future, emphasizing the importance of regular screening.

P164

Influence of puberty on periodontal disease in type 1 diabetes mellitus

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Objective: To establish a correlation between periodontal health status with pubertal stage & metabolic control in subjects with type 1 diabetes.
Research Design and Methods: Oral hygiene index (OHI), gingival index (GI), probing pocket depth (PPD) and clinical attachment loss (CAL) were recorded in subjects with type 1 diabetes (110) and healthy siblings (22). Duration of diabetes, age of diagnosis of T1D, glycosylated hemoglobin (HbA1c) and presence of microvascular complications was documented.
Result: Mean age of the case and control was 13.32 ± 3.96 years and 13.18 ± 5.58 years. GI (p = 0.044) and PPD (p = 0.013) was worse in the cases vs. the controls. No difference was found in the number of teeth and OHI.
Greater PPD (p = 0.026) in cases vs. the controls in stage II-IV puberty was seen and both worsening GI (p = 0.038) and greater PPD (p = 0.027) in the cases vs. controls in stage V despite better OHI p = 0.040. Pubertal staging revealed no difference in any of the studied dental parameters in stage 1.
HbA1c but not duration of diabetes was seen as a significant predictor of periodontal disease (PD). (OR = 1.03, 95%CI-1.01-1.06). Positive correlation between HbA1c values with PPD (p = 0.009) and GI (p = 0.001) was seen. PD was significantly associated with markers of nephropathy and neuropathy.
Conclusion: Type 1 diabetes was more likely to develop PD compared to healthy siblings. Onset & progression of puberty & poorer glycaemic control, rather than duration of diabetes was associated with greater risk of PD. PD was more likely to be associated with markers of microvascular disease.

P165

Retinopathy in Bangladeshi youth cohort with diabetes- a multicenter study

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Objectives: The aim of this study was to investigate the prevalence and risk factors associated with, retinopathy in Youth with diabetes
Methods: A total of 1227 adolescents and youth (minimum diabetes duration 2 years) with median age of 19.0 years (interquartile range, 16.0-22.0) and diabetes duration of 5.6 years (4.0-8.0) were included in the study from eleven centers of Bangladesh. Retinopathy was detected using wide-field fundal photography and grading was done by National Screening Committee of UK by experienced Ophthalmologist.
Results: Diabetic retinopathy was observed in 69 (5.6%) participants, 66 of them were early diabetic retinopathy stage 1. Among them 5.2% were T1 diabetes, 14.8% were Fibrocalculous pancreatic diabetes (FCPD) and 4% were Type 2 diabetes (p.016). Compared with the group without retinopathy, participants with retinopathy had higher HbA1c 9.2[8.0 -11.2] vs 8.5 [7.3 -9.7] (p .032), longer duration of diabetes 7.0[4.8-9.7] vs 5.5 [3.9-7.8] years; (P < 0.001), and were older 21.0[18.0-23.0] vs. 19 [16.0-22.0] years; (P = 0.0001). On logistic regression univariate analysis independent predictors of retinopathy were older age at diagnosis, longer duration of diabetes and median HbA1c which remained significant in multivariate analysis as predictors of retinopathy.
Conclusions: Greater HbA1c in addition to established risk factors, support the concept that the pathogenesis of diabetic retinopathy is likely due to the combined influence of various risk factors. Early detection of Diabetic retinopathy is imperative, which could be reversible after strict glycaemic control and arrest the risk of progression toward severe stages of Diabetic retinopathy.

Poster Tour 21 - Chronic complications

P166
Apolipoproteins as biomarkers of diabetic retinopathy in T1DM patients

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Introduction: Diabetic Retinopathy (DR) represents a common and severe complication of diabetes; thus there is a need to be able to prevent DR and to identify specific and early predictors. Many epidemiologic studies were dedicated to the relationship between the DR and traditional lipids, i.e. triglycerides, cholesterol, highdensity-lipids (HDL), low-density lipids (LDL), which are considered effective biomarkers in this disease. But recent studies suggest that lipoprotein α (Lp α), apolipoprotein AI (apoAI) and apolipoprotein B (apoB) could be stronger predictors of DR progression than traditional lipids (TL).
Objectives: Our study aims to determine if Lp α, apoAI, apoB and apoB-to-apoAI ratio can be effective biomarkers for DR and to determine any correlation between serum levels and severity of DR in type 1 diabetic (T1DM) patients.
Methods: This was a cross-sectional study of 37 patients with T1DM aged 16-42 years. Fasting blood samples (< 12 hours) included cholesterol, HDL, LDL, triglycerides, Lp α, ApoAI, ApoB, ApoB-to-ApoAI ratio. DR was graded according to the International Council of Ophthalmology classification from retinal photography taken at 45° field of view.
Results: After adjustment for age, sex, diabetes duration, A1C, systolic blood pressure, diabetes medications and according to the DR screening results patients were divided into 3 groups: mild-moderate non-proliferative DR (I group), severe non-proliferative DR (II group) and proliferative DR (III group). In the I group TL were above normal in 7%, while apolipoproteins - in 36% of cases. In the II group TL were above normal in 9%, but apolipoproteins in 19%. In the 3 group TL were high in 8% and apolipoproteins in 15%.
Conclusions: Lp α, ApoAI and apoB and the apoB-to-apoAI ratio were significantly associated with DR severity. Serum apolipoprotein levels may therefore be stronger biomarkers of diabetic retinopathy than traditional lipids.

P167
Metabolic safety and efficacy of growth hormone in short stature type 1 diabetes (T1DM) children with or without growth hormone deficiency (GHD)

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Introduction: The incidence of T1DM is increasing, especially in the younger age groups (age < 5 years). Early diabetes onset and a mean HbA1c value >7% are negatively correlated with adult height. Short Stature is therefore commonly prevalent in T1DM children. This can be due to co-existence of T1DM and GHD, but more often it is idiopathic.
Objectives: To find out
1. Are the children with T1DM and short stature, potential candidates for combined GH and insulin therapy?
2. In these children, with adequate adaptation of insulin dosage, does metabolic control worsen during GH therapy ?
3. What is the final height outcome in both the cohorts?
4. Does the combined therapy improve the quality of life of the children with diabetes.
Methods: This project was carried out as a multi-center project, with leading pediatricians, diabetologists and endocrinologists. All 22 children with T1DM and short stature were screened for nutritional anemia, renal impairment, liver impairment, primary hypothyroidism and other causes of short stature. After correction of all these causes, children were screened for GHD. After the diagnosis of GHD, cerebral MRI to rule out hypothalamic or hypophyseal masses, was carried out. All children received a GH dose of **25-35mcg/kg/day** along with adequate insulin dosage adjustment. All children were followed up for three years period through the study. Complete longitudinal data on height SDS, HbA1c, daily insulin requirement, mode of insulin therapy and BMI SDS was maintained.
Results:
1. GH efficacy is not reduced in T1DM.
2. GH therapy does not worsen the glycemia beyond control.
3. Good metabolic control and attainment of target height significantly improve the quality of life of the children with diabetes.
Conclusions:
1. Early initiation of treatment of idiopathic short stature in children with diabetes is recommended.
2. Optimal dosing of GH is recommended without fearing the metabolic worsening.

P168
Prevalence risk factors outcome and follow up of cataract surgery in type 1 diabetes mellitus (T1DM)

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Objective: Cataract in Type1DM is present in 1-27% in different populations. It is considered a rare complication of T1DM.
Purpose of this study was to look at the Prevalence and for the factors contributing to cataract formation in India.
Method: We have been collecting date and following up all patients with Type 1 diabetes who were operated for cataract surgery in last 10 years. Prevalence and predictors in children were also seen. 150 children were evaluated for fundus screening.
Total no. of patients 10, male/female 5/5. Mean Age of surgery 13.7 years (6-18 years), Mean age of cataract detection after diagnosis of T1DM 3.7 years (1-8 years) Mean Current age16.9 years (7-22 years) and duration of diabetes 8.3 years(4-15),HbA1c 7.9 (6.7-10),Mean Age of surgery 13.7 years (6-18 years), episodes of Ketoacidosis 6/10, Nephropathy 2/10, Retinopathy none, operated both eyes in 9/10, Type of cataract - cortical 6/10, posterior polar 3/10 and hyper mature cataract 1/10. 7/10 children belonged to low socio economic status.
Result
1. Prevalence 7.1%
2. 50% had Hb1AC < 7.5
3. Cataract in Type 1 DM may be seen as early as 3.7 Years of onset of T1DM.
4. Majority had cataract after 10 years of age.
5. Not linked to microvascular complications.
6. No. Gender preponderance.
7. Usually bilateral.
8. Vision Improved in 1-2 weeks.
   Best corrected visual Acuity (BCVA) in 1-2 weeks time was 6/6

or 6/6(Partial) in all patients except one, as this patient was amblyopic pre operatively.
9. Strongly associated with ketoacidosis.
10. Usually cataract was soft or cortical.
    a. 2 Patients had posterior polar cataract in both eyes.
    b. 1 Patient had hyper mature cataract.
11. 3 Patients over the years developed retinopathy.
12. Vision of all 10 patients is good after 10 years of average follow up.

Conclusion: - cataract in Type 1 diabetes is seen as early as 1 year after the onset of Type1DM.
Risk factors are diabetic ketoacidosis and low socio economy status (? nutritional deficiency).

P169
Cohort analysis for glycemic control and microvascular complications of resource constrained type 1 diabetic under regular follow up: a 7 years analysis

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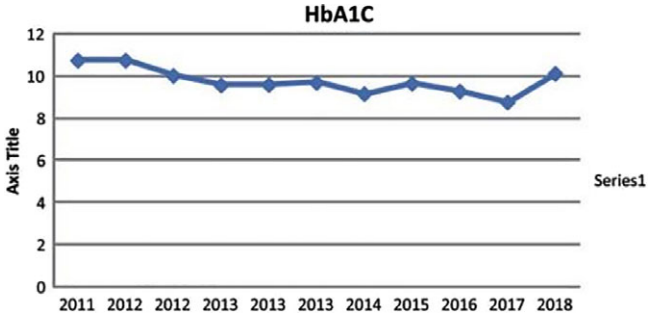
Objectives: To examine the glycemic trends of type 1 diabetics treated under a resource constrained setting with conventional insulin and correlate with microvascular complications of diabetic retinopathy and nephropathy .we also looked for the reasons of unsatisfactory outcome.
Material and Method: All children, diagnosed in a geographically defined area around Kanpur, identified using Kanpur Diabetes Registry Project.
Patterns of HbA1c values were observed over a 7 year time point with regular monitoring of HbA1c with periodicity of 6 months, as part of continuing 7 year population based study which evaluates impact of glycemic control early in disease on the occurrence of incipient diabetic nephropathy and background retinopathy. All patients also received structured education once in 4 months.
We did the interim analysis of the follow up trends for the glycemic control for 7years for T1DM who came to us between 2011 till 2018.
These patients are under active 7 years follow up. Data was analyzed retrospectively for glycemic control pattern of 125 patients (75M, 50F), mean age 12.73(3-17).
Mean duration of diabetes: 7.65 years (2.5 - 11Years in 2011).
Results
1. None of the patient in first visit had retinopathy, over 7 years 12 patients developed Diabetic retinopathy.
2. Nephropathy deteriorated over the years (1st Visit - 29%, 2nd visit - 23%,3rd visit - 38%, 4th visit - 40% of patients).
3. HbA1c initially reduced then it increased.
4. Reason for deterioration - lack of parental motivation even with adults it emerged as reason for poor control.



[HbA1c correlation over 7 years.]

Conclusions: T1DM management under resource constrained set up is a challenging.
Lack of Individual self-motivation and parent's motivation emerged as main reason for poor control, along with *financial* Constrains.

P170
Improvement in cardio-metabolic risk with vitamin D supplementation in children with type1 diabetes

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Objectives: Children with T1D are likely to have increased cardio-metabolic risk (CM). Studies suggest supplementation with vitamin D reduces cholesterol concentrations. Our objective was to supplement children with T1D with vitamin D & study changes in lipid profile & body composition (BC).
Methods: Study was conducted from 2015-17. Children with> 1yr of diabetes [136 children (boys-65)] with T1D between 3-18 yrs with no other comorbidity & not on any supplements were included. Anthropometry, biochemical parameters (HBA1c, Vitamin D & lipid parameters) were assessed. BC was measured using bioelectrical impedance. 1000 IU of vitamin D3/day was given to children for 1 year.
Results: At baseline, mean age was 12.5 ± 3 years; mean height, weight, BMI and waist circumference (WC) Z scores were -0.5 ± 1.5, -0.5 ± 1.1, -0.3 ± 0.9 & -0.9 ± 2.1 respectively; mean HbA1c was 10.3 ± 2.1%, vitamin D was 14 ± 7.7 ng/dL. At end line, mean height, weight, BMI and WC Z scores were -0.4 ± 1.9, -0.3 ± 1, -0.15 ± 1.1 and -1.2 ± 1 respectively; mean HbA1c was 9.4 ± 1.7%, vitamin D was 21.3 ± 9.1ng/dL ($p < 0.05$).BC Z scores at baseline showed Fat Mass Index (FMI) was -0.4 ± 0.7, Fat Free Mass Index (FFMI) was -0.7 ± 0.9 & Muscle Mass Index (MMI) was -0.65 ± 0.9. Body composition at end line showed Z scores of FMI was -0.2 ± 0.9, FFMI was -0.6 ± 0.9 & MMI Z was-0.5 ± 0.9.
Waist circumference, Lipid concentrations, HbA1c, Vitamin D & bone profile (p< 0.05) improved significantly at end line. Body composition also improved ($p < 0.05$) in boys and was unchanged in girls ($p > 0.05$).
Conclusion: Vitamin D supplementation helped in reducing cardio-metabolic risk in T1D children.

	Baseline	Endline
Cholesterol (mg/dL)*	159.9 ± 43.2	127.8 ± 32.2
HDL (mg/dL)*	51.3 ± 12.5	39.4 ± 13.7
LDL (mg/dL)*	89.7 ± 40.4	70.9 ± 30.1
Triglyceride (mg/dL)*	71 ± 36.7	87.8 ± 33.3
VLDL (mg/dL)* VLDL (mg/dL)*	18.8 ± 22.9	17.5 ± 6.7
FMI*	-0.4 ± 0.7	-0.2 ± 0.9
FFMI**	-0.7 ± 0.9	-0.6 ± 0.9
MMI**	-0.65 ± 0.9	-0.5 ± 0.9.

*[Lipid profile and body composition in study population (*p value <0.05, **->0.05)]*

P171
Lipid profile in relation to glycaemic control in type 1 diabetes children and adolescents in Bangladesh

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Objectives: Dyslipidaemia and hyperglycaemia are metabolic abnormalities commonly found in young patients with Type 1 diabetes and both increase the risk of cardiovascular disease.
Methods: This cross sectional study was aimed to evaluate the pattern of dyslipidaemia and its relationship with other risk factors in children and adolescents with type 1 diabetes. A total of 397 Type 1 diabetes (T1DM) patients aged 10-18 years who attended CDiC, a Pediatric diabetes clinic in BIRDEM over one year period were included in this study.
Results: The overall frequency of dyslipidaemia was 63.5% and median duration of diabetes was 3.0[2.0- 5.0 years]. The High TG, High Cholesterol, High LDL and low HDL were found in 47%, 66.8%, 81% and 37% respectively. Patients with dyslipidemia had significantly lower median BMI (kg/m^2) (18.2 [IQR; 16.2-21.2] vs 19.2 [17.2-21.6] (p = .015)). FBS was significantly higher (12.8 [10.0 -15.5] vs 10.8 [7.7-12.6] (p< 0.0001)) and higher median HbA1c (9.9 [8.5-11.9] vs 9.0 [7.9- 10.5] (p< 0.0001))in dyslipidemic patients.
Conclusion: There is high prevalence of dyslipidemia in our children and adolescents with T1DM, which was associated with poor glycaemic control. Longitudinal studies will provide early diagnosis, and intervention of dyslipidemia which is imperative to assist in preventive strategies.

P172
Bone status among youth and young adults with type 1 diabetes - a control study after 10 years

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Objectives: A study from 2007 (Silesia region, Poland) showed to differences in bone quality of pre-pubertal children with type 1 diabetes (T1D) in comparison to healthy pre-pubertal children and significantly worse bone quality in DM1 adolescents compared to healthy peers. The present study aimed to assess the bone status of these patients with DM1 10 years later.
Methods: 32 patients (12 women) from the former study, aged 14-27 (20.5 ± 3.93) years, with DM1 duration 13.9 ± 1.97 years were willing to participate. Bone status was assessed by phalangeal Quantitative Ultrasound (QUS; Ad-SoS - amplitude dependent speed of sound [m/s]) as in the past. Additionally analysis included: gender, age, T1D duration, anthropometric parameters presented as standard deviation scores (SDS), daily insulin requirement (DIR), mean glycated hemoglobin (HbA1c) from the year preceding the research, medication other than insulin, bone fractures and comorbidities.
Results: There were no significant differences between the current and past (10 years earlier) QUS results, also in subgroups according to history of fractures, comorbidities or additional medication. Past QUS measurements correlated positively with current results (r = 0.64, p < 0.001). There were significant differences between current and previous mean Ad-SoS SDS between females and males (0.71 ± 1.11 vs -0.30 ± 1.12; p = 0.018) and between patients with positive and negative history of fractures (0.37 ± 1.11 vs -0.55 ± 1.21; p = 0.042). Mean HbA1c from the last year, DIR and anthropometric measurements were not related to bone status.
Conclusions: During 10 years bone status of the studied adolescents and young adults did not change. The only parameter that was found to impact bone quality was history of fractures. This may suggests that bone status in young patients with DM1 depends rather on factor not directly related to diabetes.
Source of funding: Partially financed by BK/204/RAU1/2017

P173
Assessment of platelet morphology in children with type 1 diabetes mellitus (T1DM)

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Background: Type1diabetes mellitus (T1DM) is still rapidly increasing. As the onset of the disease occurs in early life, the afflicted are at great risk of developing cardiovascular disease as a complication of diabetes. The majority of ischemic events occur due to intravascular thrombosis. This is a state which favor platelet aggregation and adhesion.
Aim of the Study: Was to investigate whether platelets' morphology is altered in children with T1D,and its relations to disease duration and metabolic control of the disease.
Subjects and Methods: This was a case-control study included 75 children with T1D.They were divided into three groups, group I;25 children recently diagnosed with T1D,group II;25 children with T1D for duration(1-5) years and group III;25 children with duration ≥ 5 years. Another, 25 apparently healthy children age and sex matched with the diabetic children served as a control group. The studied groups were subjected to:Thoroug history taking ,clinical examination and laboratory investigations included: Random blood sugar, Complete blood count ,Platelets study(platelet count ,mean platelet volume, platelet distribution width, platelet large cell ratio) ,HbA1c % and Fructosamine.
Results: The diabetic group had significantly higher levels of (MPV, PDW P-LCR),than the control group. BMI had significant fair correlations with PDW and P-LCR. Duration of diabetes had significant positive correlation with mean platelet volume (MPV),platelet distribution width (PDW) and platelet large cell ratio (P-LCR), Fructoseamine had a moderate significant positive correlation with MPV and significant fair positive correlations with PDW and P-LCRP.
Conclusion: Platelets in T1D show morphological evidence of hyperactivity (higher MPV, PDW and P-LCR) in comparison to the control which may predispose the patients to future cardiovascular events.

P174
A retrospective study of prevalence of diabetes mellitus in children with Thalassemia major in India

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Objective: To study the incidence and prevalence of Impaired Glucose Tolerance (IGT)/Diabetes Mellitus (DM) in Thalassemia major children, receiving regular blood transfusions. Also to study the correlation between-Age of starting transfusion/ Average Sr. Ferritin levels/ Age of starting chelation AND incidence of IGT/DM in these children.
Method: A retrospective study of thalassemia major patients, comprising of both males and females, receiving regular blood transfusions and chelation therapy in Sir Ganga ram Hospital, Delhi, during 2000-2013.

Basic information for each child was determined - age of presentation, onset of transfusion and chelation/ Anthropometric data/Pubertal status (tanner staging).

Blood investigations -Sr. Ferritin and average ferritin levels, Hemoglobin level, OGTT (Oral Glucose Tolerance Test).

Results:

Endocrine complications (% in both sexes)	Country					
	Cyprus (435)	Greece (262)	Italy (1861)	Tehran (220)	N. Am (262)	Our study (225)
DM/IGT	9.4	5/27	4.9	8.7	5	8/4.9

[*Incidence of IGT/DM in Thalassemia major children*]

The incidence is comparable with studies conducted in different countries, but as large scale studies are not available from India, true incidence of IGT/DM in Thalassemia major cannot be determined precisely.

Conclusion: In our study incidence of IGT/ DM *increased with Age* - maximum seen in age group>15 years.

• No association was found between age of onset of transfusion and chelation/ Average Ferritin values with incidence of IGT/DM.

• Lacunae in study -

- Large scale studies required for determining true incidence of disease in India.
- Patients lost to follow up/ late presentation.
- Lack of infrastructure for investigations and treatment.

Poster on Display – Chronic Complications

P175
Prevalence and determinants of dyslipidemia in children and adolescents with type 1 diabetes mellitus

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Background: Dyslipidemia is an important macrovascular complication of type 2 diabetes in children and adolescents. No Indian data in this regard.
Aim: To study the prevalence and determinants of dyslipidemia in a multidisciplinary diabetic clinic of a tertiary care referral hospital.
Methods: A cross sectional study was conducted on all children and adolescents with type 1 DM. Subjects underwent assessment of Lipid profile as per International Society of Paediatric and Adolescent Diabetes (ISPAD) after 12 hours of fasting. Dyslipidemia defined by the American Diabetes Association (ADA) as having: low density lipoprotein-cholesterol (LDL-C)≥100 mg/dL, high density lipoprotein-cholesterol (HDL-C) < 40 mg/dL , total cholesterol (TC)≥200 mg/dL, triglycerides(TG) ≥ 100 mg/dL. Dyslipidemia was considered present if one or more of these lipid parameters were abnormal.
Results: 48 subjects were included in the study. The Mean Total cholesterol was 161.6 ± 8.9 mg/dL, Triglyceride 114.3 ± 9 mg/dL, HDL-47.0 ± 7.0 mg/dL, LDL -99.7 ± 12.7 mg/dL. The prevalence of abnormal total cholesterol, high triglyceride, low HDL and high LDL were 36.8%, 39.5%, 21.1% and 34.2% respectively. The determinants of presence of dyslipidemia on univariate analysis were total daily insulin requirement, BMI SD scores and frequency of hypoglycemia (p< 0.05). BMI SD scores were the most determining factor on multivariate regression analysis (p< 0.05). All subjects with dyslipidemia were given lifestyle advice, none initiated on hypolipidemic therapy.
Conclusion: The prevalence of abnormal triglycerides and abnormal Low Density Lipoprotein in our study were 39.5% and 34.2% respectively. Abnormal BMI SD score is a modifiable risk factor for development of dyslipidemia.

	Unstandardized coefficients - beta	Unstandardized coefficients - std error	Standardized coefficients	t	Significance
Regimen	0.496	0.204	0.414	2.42	0.022
Chronological age	0.306	0.347	0.306	0.882	0.386
Diabetic age	0.209	0.270	0.156	0.774	0.445
HBA1C	-0.293	0.269	-0.264	-1.091	0.285
BMI SD score	0.343	0.209	0.309	1.643	0.012
Microalbuminuria	0.312	0.345	0.172	0.906	0.373
hypertension	0.143	0.384	0.079	0.372	0.713
sex	0.213	0.197	0.215	1.081	0.289
pubertal	-0.221	0.335	-0.226	-0.660	0.515

[*Table 1*:]

P176
Association of micro albuminuria in children and adolescents with diabetes in Bangladesh

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Objectives: Diabetic nephropathy is leading cause of morbidity and mortality of type 1 diabetes mellitus (DM). Microalbuminuria is the first clinical sign of nephropathy.
Methods: This was a cross-section study with longitudinal evaluation of urinary albumin excretion in 333 children with type 1 diabetes attending CDiC Clinic in BIRDEM over a period of two years. The aim of the study was to assess the frequency of microalbuminuria and to determine other associated risk factors. We collected blood and early morning spot urinary sample and analyzed for HbA1c by Clover A1c and urinary microalbumin by a DCA analyzer. Children had urinary microalbumin 30-300 mg/L on at least two occasions were categorized as having persistent microalbuminuria. Demographic and clinical data were recorded including age at onset of diabetes, age during registration, gender and duration of diabetes which were compared between patients without microalbuminuria and with microalbuminuria.
Result: Microalbuminuria developed in forty nine children and adolescents (15%). Median HbA1c was higher 10.1[9.3-12.2] vs 8.4 [7.2-9.6] (p .0001) in adolescents with microalbuminuria. On logistic regression univariate analysis independent predictors of microalbuminuria were older age, systolic blood pressure, BMI SDS and mean HbA1c which remained significant in multivariate analysis as predictors of microalbuminuria.
Conclusion: We found high prevalence of microalbuminuria which was associated with higher age, systolic blood pressure, BMI SDS and HbA1c.

P177
Hypertension in adolescents and young Indian adults with type 1 diabetes: prevalence and risk factors

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Introduction: Hypertension (HTN) is a major cardiovascular risk factor in type 1 diabetes mellitus (T1DM). The prevalence and risk factors for HTN in Indian patients with T1DM is not studied.
Objectives: To determine the prevalence of HTN among T1DM patients ≥ 15 years of age and its associated risk factors.
Methods: In a cross-sectional study, we measured the prevalence of HTN in 279 consecutive patients with T1DM of age ≥ 15 years and associated risk factors.
Results: Median age of the study group was 24 years [interquartile range (IQR) 19 , 31 years] and duration of diabetes was 8 years (IQR 4 ,13 years). Prevalence of HTN was 10.7% (95% CI, 7.4% to 14.9%). Among males prevalence was 13% (compared to population prevalence 7%) while among females it was 9% (population prevalence 4%). Seventy percent of those with HTN were males and age-related increase in prevalence was noted. Fifty percent of patients had evidence of chronic kidney disease and only 27% of patients had their blood pressure controlled on medications. On multivariate analysis, T1DM with a family history of HTN [odds ratio (OR) 4 (1.6 - 9.7)], duration of diabetes [OR 1.1 (1.0 - 1.1)] had high odds and baseline higher eGFR [OR 0.98 (0.96 - 0.99)] had low odds of being hypertensive.
Conclusions: Prevalence of HTN was higher in T1DM when compared to population prevalence in Uttar Pradesh. A family history of HTN and increasing duration of diabetes increased odds of HTN. Control of HTN was not adequate with medications. Hence, vigilant screening and prompt management must be emphasized to physicians involved in caring T1DM patients.

Poster Tour 08 - Diabetes Care

P178

An ambitious intervention at onset of diabetes is a good investment for keeping a good metabolic control during the first 2 years

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Objectives: Many children and adolescents with diabetes have sub-optimal control. We took part in an 18 month national Quality Improvement Collaboration (QIC) with benchmarking through our national pediatric diabetes registry SWEDIABKIDS.
Methods: All 14 participating teams met 4 times for brainstorming and to make an inventory of needs and possibilities. We used systematic improvement methods including the value compass, microsystem analysis, flow charts, fishbone diagrams, and a plan-do-study-act wheel to test different improvement ideas. Our clinic chose as our main topic to keep HbA1c below 52 mmol/mol (6.9%) for the first 24 months after diabetes onset. Carbohydrate counting was started from diagnosis. Patients were instructed to keep records of mean glucose over 7, 14 and 30 days, and contact the clinic if it was > 8 mmol/l (145 mg/dl) for 2 weeks in a row. i-Port was used for all <10 years and pumps for <7 years. A historical control group with onset up until 1 year before the project was used.
Results: During the 18 months' project time, 17 patients had new onset diabetes. After 2 years, only 2 (12%) had an HbA1c above the ISPAD target of 7.5% compared to 6 (35%) in the control group. More patients in the project group had HbA1c < 52 mmol/mol (<6.9%) at 12 months (82.4 vs. 41.2%, p = 0.032). This was not statistically significant at 24 months (70.6 vs. 35.3%, p = 0.084), however the difference is clinically significant. Mean HbA1c after 24 months was 48. ±10.0 in the project group and 53.9 ± 10.2 in the control group (ns). When comparing all HbA1c values at 3, 6, 12, 18 and 24 months, the difference was highly significant (Univariate Anova, p = 0.006).
Conclusions: Participation in a QIC project helped decrease HbA1c, and we found a significant increase in the number of patients that managed to keep HbA1c < 6.9%. We conclude that an ambitious intervention at onset of diabetes is a good investment for keeping a good metabolic control during the first 2 years.

P179

High prevalence of islet-antibody negative type 1 diabetes (type 1B) among children and adolescents in North India

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Introduction: Type 1 B (islet antibody negative) diabetes is rare in patients of European origin. Previous studies in Indian patients with T1DM have demonstrated lower prevalence of GADA and IA2A as compared to Caucasians.
Objective: To study the prevalence of type 1B diabetes among recently diagnosed (<12 weeks) T1DM children and adolescents in north India.
Methods: The study included 110 T1DM patients (67 males). Antibodies against GAD, IA2 and ZnT8 were measured by a validated radio-binding assay using islet antigen labeled with 35S-methionine. IAA was measured (in patients with diabetes of <2 weeks) using a radio binding assay. Clinical and biochemical parameters were compared between antibody positive and negative patients.
Results: Age of onset of diabetes was 10.5 ± 4.8 years, duration was 3.4 ± 3.8 weeks and DKA was present in 47%. In patients with all four islet antibodies studied (n = 61), GADA, IA2A, IAA and ZnT8A were present in 53%, 34%, 31% and 29 % respectively. All 4 antibodies were negative (type 1B diabetes) in 17 patients (28%). ZnT8A was the only detected antibody in 4 patients reducing the frequency of type 1B diabetes from 34% to 28%. Clinical and biochemical parameters including DKA, other auto antibodies (TTG, TPO, PCA) and fasting C-peptide were not different between two groups, however antibody positive patients revealed risk association for DRB1*0301 [OR = 5.10 (CI = 1.61-16.16) p = 0.003]. Among patients in whom 3 antibodies (ZnT8A, GADA and IA2A) were tested (n = 110), 28 patients (25%) were negative for all antibodies. Nine patients (8%) were positive only for ZnT8A.
Conclusion: There is a high proportion of type 1B diabetes among Indian children and adolescents, though clinical features and β-cell reserve did not differ from islet antibody positive patients. HLA-DR3 allele was more frequent in antibody positive patients. The measurement of ZnT8A was useful in decreasing the proportion of type 1B diabetes.

P180

Engaging with young people to develop relatable and reliable web based information about real life with type 1 diabetes

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Objective: Young people with Type 1 diabetes face a period of transition which offers exploration and possibilities, but also anxiety and uncertainty. There is a lack of trusted information on real life issues that affect young people. Resources are needed to reduce isolation and support young people through this transition.
Method: In-depth interviews were undertaken with 14 young people aged 16-25, 7 male and 7 female.
Findings were that young people wanted reliable yet relatable information about how to manage real life situations that affect young people, eg going to university, alcohol, sex and relationships. The format should be simple, concise and specific. Apps, websites and social media were the first sources used to search for information and connect with others.
Diabetes UK worked with a creative agency to produce specific information about going to university with Type 1 diabetes. 50 young people responded to a social media call to share their story. All stories were reviewed for clinical accuracy to ensure they were reliable, and six filmed to produce a series of videos about managing Type 1 diabetes at university. These were launched alongside new web content featuring 12 more young people sharing their tips and experiences at www.diabetes.org.uk/guide-to-diabetes/teens/me-and-my-diabetes/school-and-college/Type-1-and-uni-life. The information was promoted through all social media channels.
We also used the same process to produce and promote related content on alcohol, sex and relationships.
Results: The videos were viewed 56021 times through Facebook, Twitter and Instagram, and 3085 viewers engaged with them. However, click through to on-line information was disappointing at just 311.
Conclusion: On line videos featuring real life stories are an effective way to provide information to young people. The poor click through to web based information could indicate that video content is sufficient for this age group, but this requires further investigation.

P181
Pediatric diabetes clinics: involving parents by letting them book appointments themselves according to their needs

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Objectives: Usually appointments are scheduled with regular intervals for diabetes patients. However, it could be an advantage with a more flexible system, in which the patients can book whenever they have a challenge. We examined the utilization of the pediatric diabetes outpatient clinic when parents were in charge of bookings compared to the traditional way of organizing the appointments.
Methods: Before the intervention period patients were seen every 6 weeks (HbA1c ≥ 64 mmol/mol) or 3 months (HbA1c < 64 mmol/mol). The diabetes specialist nurses (DSNs) could be telephoned 8.30-9.00. After 9.00 a message could be left on the answering machine asking the DSNs to call back. From May 2016 till May 2017 only one annual appointment was scheduled. The parents should book all other consultations themselves. At every visit the HbA1c was measured.
All patients with diabetes for at least one year were included unless having complications, received psychiatric treatment, or the patient's family had so severe challenges in life that it made it impossible for them to administer a flexible system.
Results: Out of 237 patients, 175 were included in the study. Of these 36 were excluded as they moved or were transferred to an adult clinic before end of the study period.
HbA1c before vs. after: 59.99 (SD 9.98) vs. 63.08 (SD 13.87) mmol/mol (p = 0.0003) (paired t-test).
Conclusions: Families in Denmark have a busy life and it is a huge challenge to have a child suffering from diabetes. Some parents therefore tend to forget to book appointments, however the greater availability of DSNs by telephone seemed to be appreciated. Still an overall increase in HbA1c was seen during the intervention period.
To ensure that the children are seen at the clinic it could be considered a help for the families that the clinic book the recommended appointments - preferably in collaboration with the parents and children.

		2015-2016	2016-2017
Number of consultations	Mean	5.9	4.3
	Median (range)	5 (2 - 13)	4 (0 - 13)
	2 or less consultations	4	22
Number of telephone calls	Mean	0.9	2.0
	Median (range)	1 (0 - 10)	3 (0 - 20)
	2 or less calls	100	48

[*The use of services by the parents*]

P182
The association between quality of care and healthcare utilization and costs in commercially insured children and young adults with diabetes: a retrospective analysis using health plan administrative data

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Objectives: This study examines the relationship between quality of care and healthcare utilization and costs in individuals less than 25 years old with diabetes using insulin.
Methods: We used a large repository of commercial insurance enrollment and claims data to conduct a population-based study examining the relationship between quality of care (i.e., ≥2 A1C tests/year, ≥4 SMBG tests/day, and ≥2 endocrinologist/PCP visits/year, based on National Committee for Quality Assurance and American Diabetes Association guidelines) and healthcare utilization and costs (excluding durable medical equipment), during a 1-year period from the first insulin pharmacy claim. After propensity score matching, patients who met all 3 quality of care measures (the "quality met" group) were compared to those who met some of the measures (Comparison 1; N = 2,397 per group), and those who met none of the measures (Comparison 2; N = 775 per group). Statistical analyzes included linear and Poisson regressions.
Results: Individuals in the "quality met" group had significantly more physician visits per year and significantly fewer hospitalizations per year, in both Comparison 1 and Comparison 2. The "quality met" group had significantly lower average total medical costs of -$1003 in Comparison 1 and -$2515 in Comparison 2, and significantly lower average inpatient costs of -$723 in Comparison 1 and -$1833 in Comparison 2. There were no significant differences in outpatient or emergency room costs in either Comparison 1 or Comparison 2. However, the "quality met" group experienced significantly fewer emergency room visits, in Comparison 2.
Conclusions: Commercially insured pediatric and young adult patients with diabetes who have better quality of care experience fewer hospitalizations and decreased medical costs, despite having more office visits. This may be of particular interest to payers focused on optimizing economic outcomes, while improving quality of life for this population.

P183
Revamping sick day education for type 1 diabetes: a quality improvement initiative

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Objective and Methods: Diabetic ketoacidosis (DKA) is a serious, preventable complication of type 1 diabetes. Our certified diabetes educators (CDEs) provide sick day/ketone education at the visit 1 month after diagnosis. Our handout lacked information about how to calculate insulin doses and how to manage ketones in various circumstances. A quality improvement project with 4 Plan, Do, Study, Act cycles was initiated to assess and improve parental knowledge about sick day/ketone management and create a more useful handout.
Results: Cycle 1: Following CDE teaching (n = 20), we used Likert scales to assess parent confidence (8.9/10) and CDE perception of parent ability to manage diabetes during illness (9.5/10). The results did not correlate to staff perception of how families actually perform during illness. Many parents requested more specific guidance.
Cycle 2: A 6 question quiz of plausible scenarios was given to parents (n = 31) after being taught with the original materials (flowsheet). They then received a revised version (matrix). On a 10 point Likert scale, parents rated the matrix 1.8 points higher.
Cycle 3: A third set of parents (n = 27) completed the same quiz after being taught with the matrix. Mean score for fluid management and repeated monitoring during ketosis increased (2.5 vs 1.9 out of 3), though the overall score remained the same (3.7/6). 30% of parents did not recognize DKA warning signs.
Cycle 4: We edited the matrix to include DKA warning signs. CDEs emphasized the need for additional insulin to treat ketosis. A separate version of the handout was created for insulin pump users. Providers who cover sick day calls report that parents educated with the matrix refer to it during the call and have more advanced questions.
Conclusions: Patients with diabetes should receive clear instructions for sick day management. We will be improving sick day training by reviewing the plan more frequently with patients to increase understanding and retention.

P184
Is fasting c-peptide level useful to predict insulin requirement and diabetes control in children with type 1 diabetes?

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Objectives: C-peptide is a widely used measure of pancreatic beta cell function. Increasing evidence suggests that c-peptide may also be useful in predicting future levels of glycemic control and risk of future diabetes complications. The aim of the study was to assess the correlation between c-peptide level at diabetes onset and glycemic control and insulin requirement during first three years after T1D onset.
Methods: There were 199 children (89 girls) with newly diagnosed T1D included. Mean age at diagnosis was 8.1 ± 4.2years, mean initial HbA1c was 11.3 ± 2.7%; mean BMI 16.8 ± 3.5 kg/m^2 and fasting c-peptide level (FCL) 0.67 ± 0.46 ng/ml. Following parameters were analyzed: HbA1c, BMI, daily insulin dose: total (TDD) and basal (TBD), TBD/TDD proportion (basal%) at onset and every 3 months during a 3-year-follow-up.
Results: A significant negative correlation between age (r = 0.47, p< 0.0001) and a positive correlation between BMI (r = 0.29, p< 0.0001) and FCL was found. We did not demonstrate the correlation between levels of FCL and autoimmunity antibodies, basal% or sex. Patients with higher FCL required lower TBD at onset, 3, 6, 9 and 15 month. We also found a positive correlation between FCL level and TDD during first 9 months of follow-up. Out of 199, total remission was observed in up to 3% of patients. There was no correlation between FCL and HbA1c at 6, 9, 12 and after 18 months post-diagnosis. Mean HbA1c levels during follow-up were good or acceptable (6.4, 6.6, 6.7, 6.8, 6.8, 6.9, 7.0, 7.2, 7.2%). No correlation between BMI at diagnosis and HbA1c was noticed, except first 3 months (r = -0.17, p = 0.023).
Conclusions: Lower insulin requirement in first year post-diagnosis is expected in children with higher FCL. In the first three years of T1D duration, glycemic control is remains good, despite the initial c-peptide level.

P185
A retrospective regional analysis of outcomes during transition of young people with type 1 diabetes

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Objectives: Transition from pediatric (PC) to adult care (AC) is a vulnerable period for young people (YP) with Type 1 Diabetes. The West Midlands (WM) Regional Pediatric Diabetes Network conducted a region wide study of Diabetes transition outcomes to identify 1. Areas of good practice, 2. Risk factors for poorer outcomes, 3. Regional objectives for services and 4. Provide baseline data against which future performance can be measured.
Methods: Retrospective Regional Network Audit of follow (FU) and HbA1c 12 months pre and 24 months post transfer in YP transitioning between January 2012 and December 2013.
Results: Data was submitted by 9 of 13 (69%) Trusts, accounting for 298 YP moving from PC to transition clinic (TC), and 195 from TC to AC. 41/298 (13.8%) YP were lost to FU in TC (range 0-29%). 41/195 (21%) were lost to FU within 2 years of AC (range 0-40%). Median age at move to AC was 17.8 years, range 16 -19.84 years. 22%, were seen in AC within 3 months of their last TC visit. For 45% and 13% their first AC visit took place 6-12 and >12 months respectively, following their last TC visit.
Pre and post HbA1c data was available on 144 YP (73%) transferring from TC to AC. Median HbA1c was 75 (Trust range 64-83) mmol/mol in the year prior to move to AC and 78mmol/mol (Trust Range 63.5 to 89.5) mmol/mol) in first 2 years of AC. Lag time between the TC and first AC visit did not correlate with HbA1c.
YP in TC with HbA1c < 53 (7.5%) deteriorate (p = 0.028), and HbA1c >9.0% improve (p< 0.00009) on move to AC. Age at move to AC positively correlates with fall in HbA1c (R = -0.201, p = 0.048).
Conclusion: WM Trusts need to focus on
1. Reducing high lost to FU rates of 1 in 5 YP (up to 1 in 2.5 in some Trusts)
2. Reducing lag time from TC to first AC.
3. Careful consideration could be given to transferring some YP in TC with HbA1c > 9.0% to AC at an earlier point.
4. Further studies should look at impact of age and deprivation on rates of attrition following move to AC.

P186
Utilizing Holter and ambulatory blood pressure monitoring simultaneously to identify arrhythmias and evaluate blood pressure in young hypertensive with type 2 diabetes mellitus

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Objectives: We evaluated 407 hypertensive with T2DM age below 40 years, hospitalized for 24 hours to analyze the association of hypertension and arrhythmia simultaneously for three years as part of the PREDICT evaluation program, a mixed methods approach, developed as a standard care of management simultaneously, at three tertiary care hospitals in varied resource settings.
Methods: We used Trillium Holter recorder and DynaPulse Ambulatory Blood Pressure monitoring (ABPM) for the recording the data. We did the sub group analysis of the young hypertensive with T2DM of the PREDICT group (n = 3230) which included hypertensive with T2DM.
Results: The mean age was 37.8 years. The commonest risk factors were sedentary lifestyle (64%), obesity (56%), dyslipidemia (37%), smoking (23%), sleep apnea (21%). Arterial pressure variability and bradyarrhythmia were significantly associated with sleep apnea (p< 0.0001). Patients with ST-T wave depression > 1 mm (26%) and tachycardia (31%) as a sub-group were significantly associated with both the reverse dippers and non-dippers. (p< 0.0001). Heart rate variability especially tachycardia associated with ST segment depression has a bad prognosis and when this dual association is present in patients with non-dipping pattern of blood pressure, the outcomes are even worse. The masked hypertension is revealed and helps identify the population at risk with ventricular premature beats.
Conclusions: Chronotherapy in concurrence with the circadian rhythm to reduce the side effects, optimize the dosage, reduce the pill burden would be a suitable option to achieve a better BP control in young T2DM. Nocturnal anti-hypertensive dosing to target the nocturnal hypertension would be an appropriate management approach. The novel approach of using holter and ABPM is a cost-effective tool for screening the young hypertensive with T2DM to timely predict the outcomes and implement a customized clinical approach to prevent events.

Poster Tour 16 - Diabetes care

P187

A survey of clinical practice patterns in management of diabetes during Ramadan fasting in the Arab Society for Pediatric Endocrinology and Diabetes (ASPED) countries

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Aim: To ascertain the pattern and practices to the management of diabetes during Ramadan fasting among physicians who look after children and adolescents living with diabetes in Arab countries.
Methods: An electronic survey provided in English and French was distributed using an online questionnaire to practicing physicians in ASPED countries (no = 464).
Results: Of the 166 eligible responders, 142 (85.5%) were pediatricians, and the remaining 20 (12.1%) were adult physicians; all but 10 were specialists or consultants. Most respondents (79.6%) would allow their patients to fast, Ramadan, if they asked for it and 75.2% of them favored structured educational sessions 2-4 weeks before Ramadan, but 23.5% would do it earlier up to 2-3 months. 34.8%, 37.5 %, and 24.1% of respondents allow their patients to fast by the age of 14 and 12 and ten years respectively; while 3.6% allow fasting as young as eight years. 31.0% and 39.3% of the participants stated thought their patients can complete 50% and 80% of the fasting days. 46.9% stated that hypoglycemia unawareness was the most serious complication for a patient to be at "very high-risk" from fasting. 62% of the respondents reported that fasting must be broken if symptomatic hypoglycemia occurred regardless of the BG level fast. 63.4% of respondents decreased the dose of basal insulin by 25% from original dose while 56.4% used rapid-acting analog with meals. 52.8% thought that use of insulin pumps decreases the frequency hypoglycemia during fasting compared to multiple daily injections; however, 39.6% were not pump users.
Conclusions: There is a wide variation in the management of children and adolescents with diabetes during Ramadan among ASPED members. This observation calls for targeted educational efforts in the region, highlights the need for ASPED- sponsored guidelines to help clinicians meet the challenges in this area of diabetes care.

P188

Glucose levels during and after sexual activity in young adults with type 1 diabetes

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Objectives: The energy expended during sexual intercourse among young subjects may qualify as a significant exercise. This may be particularly true for men; some of whom were found to expend more energy during sexual activity than during 30 minutes of moderate intensity exercise on a treadmill. Data are limited regarding glucose levels during and after intercourse among young adults with type 1 diabetes (T1DM).
Methods: This was a 1-week, prospective study conducted among patients with T1DM who attend a diabetes clinic. Subjects were asked to wear the PCGM device (iPro(®)2; Medtronic MiniMed, Inc., Northridge, CA, USA), they were unaware of glucose levels until the stored data were transferred and analyzed. Participants were asked to fill out a food diary and activity diary (sport and intercourse).
Results: The study cohort comprised 13 young adults (7 females) with T1DM. Their mean age was 27.3 ± 4.7 years, disease duration 12.7 ± 4.5 years, 8 were treated by CSII, their mean HbA1c levels was 8.3 ± 1.6 % (range 6.2-12.3), 10 were singles. There were 30 events of sexual activity, none of the participants experienced severe hypoglycemic episode during sex. There was no statistical difference in glucose levels before and immediately after sex, the vast majority stayed at the same range. However, within 2 hours after intercourse there were 5 episodes of hypoglycemia (glucose < 70 mg/dl), two of them < 54 mg/dl. There were 13 episodes of hyperglycemia (>250 mg/dl). Prior to sexual intercourse, 18/30 (60%) of participants practiced specific strategies aimed at maintaining high blood glucose levels. There was no difference in AUC above or below target in days when sport or sex were practiced.
Conclusions: Glucose levels stayed relatively stable during intercourse in young adults with T1DM, however within two hours after sex there were significant excursion in glucose levels, 17% had hypoglycemia and 60% had hyperglycemia.

P189

The incorporation of available technologies for diabetes care among different worldwide centers: The ESPE/ISPAD working group on diabetes technology survey

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Objective: International Societies for diabetes care are aiming to facilitate and improve the uptake of diabetes technologies. This survey investigated healthcare professional (HCP) evaluation of the role of technology in diabetes care within their centers.
Methods: Between April to November 2017, 215 HCPs from six continents (132 Europe, 36 Asia, 23 North and 7 South America, 9 Africa and 8 Australasia) replied to an online survey and provided data for analysis.
Results: Of those participants responding to the survey, the mean number of patients with diabetes within each service was 702, ranging from 10 to 10,000. Eighty percent of respondents reported provision of 24/7 support for patients and 35.3% had an organized national diabetes registry. Insulin pumps were used by 35.3% of patients and glucose sensors by 23.0%. The proportion of technology users varied greatly between continents; highest usage of technology was reported in Australia (51.5% insulin pumps and 58.1% glucose sensors), followed by North America (45.8% and 28.3%) and Europe (42.0% and 24.5%). The availability of diabetes technology was relatively low in Asia (13.3% and 13.8%), Africa (4.4% and 4.2%), and South America (4.0% and 1.3%). Reimbursement for insulin analogs was provided by 89.3%, for insulin pumps by 75.3%, and for glucose sensors by 59.5% of responding centers.
Each centers' multidisciplinary diabetes team consisted of on average, per 100 patients, 1.1 consultant physicians, 0.9 nurses, 0.9 dieticians and 0.5 psychologists/social workers with a mean of 3.2 HCPs/100 patients.

Conclusions: Despite increased availability, the incorporation of technology within diabetes care remains a challenge, especially in lower income regions. Ensuring that individuals with diabetes have access to both technology and sufficient trained personnel to educate and support appropriate usage is paramount to broaden uptake to allow safe achievement of optimal glycemic control.

P190

Comparison of two Insulin regimens on growth and glycemic control in children with Insulin dependent diabetes mellitus (IDDM)

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Objectives: Due to economical reasons, basal bolus as well as splitmix regimens are used in India. We compared prospectively, growth and glycemic control in children with IDDM based on insulin regimens used.
Methods: Study design was prospective, observational study conducted on children attending a tertiary care center at Pune, India. Height, weight, BMI, all converted to Z-scores [Khadilkar et al. 2015]), Tanner staging, HbA1C, and type of insulin regimen (splitmix- group1, basal bolus group2) were collected. Statistical analysis was performed using SPSS version 12.
Results: 239 children (boys-106) were studied with n = 102(boys-53) in group1, n = 137 (boys-53) in group 2. Mean age was significantly lower in group 2 (10.7 ± 4.7 vs 12.1 ± 4.8 yrs, $p < 0.05$). Mean HAZ (-0.6 ± 1.4 VS -0.6 ± 1.6), WAZ (-0.7 ± 1.0 VS -0.7 ± 1.1) and BMIZ (-0.5 ± 0.8 VS -0.4 ± 0.9) scores were comparable in both groups. Less proportion of children in group 2 were stunted (11.8% vs 9.5% in gr 1 and 2 resp), while more children were light (2.9 vs 5.8% in gr 1 and 2 resp).Proportion of children with optimal glycemic control was higher (HBA1c< 7.5%; 18% vs 10.8%) in group 2; mean number of hypoglycemic episodes per month were more in split-mix regime (2.3 ±3.49 vs 2.21 ± 1.89, $p< 0.05$).
Conclusion: Children receiving split mix regimen were more likely to be stunted, were heavier and had more no of hypoglycemic episodes with poorer glycemic control. Basal bolus regimen may help in optimizing glycemic control and growth.

Parameter	Group-1 (split mix)	Group-2 (basal bolus)
No of children	102 (42.7%)	137 (57.3%)
Age (yrs)	12.1 ± 4.8	10.7 ± 4.7
WAZ	-0.7 ± 1.0	-0.7 ±1.1
HAZ	-0.6 ± 1.4	-0.6 ± 1.6
BMIZ	-0.5 ± 0.8	-0.4 ± 0.9
Short	12 (11.8%)	13 (9.5%)
Over weight + Obese	9 (8.9%)	15 (11%)
HbA1C mean	9.8 ± 2.1	9.5 ± 2.1
No of hypoglycemic episodes	2.30 ± 3.49	2.21 ± 1.89

[*Comparison of anthropometric parameters and glycemic control in split-mix and basal bolus regimen*]

P191

Improvement of type 1 diabetes care in the state of Gujarat by developing multiple type 1 diabetes care centers

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Aim: To improve the standard of Type 1 Diabetes (T1D) care in the state of Gujarat by developing multiple T1D care centers.

Background: T1D is one of the most common pediatric endocrine illnesses. India is home to an estimated 97700 children with T1D.The disease, if left poorly managed, poses various challenges which leads to development of complications. The challenges of T1D include lack of disease awareness among the parents and HCPs, management of the disease, economics of the health care, school issue, accessibility of medicines etc. These can be met by increasing public awareness programs, conducting workshops for diabetes educators, newsletters, CMEs, online courses and by structured teaching modules.
Studies in India estimate that for low income families with T1D child upto 35% of income is spent on T1DM care. The increase in cost with time is due to the increase in complications.
Methodology: Diabetes Care India (DCI) with the help of fund by World Diabetes Foundation with the aim to improve the standard of diabetes care in Gujarat has established 20 Type 1 Diabetes Care Clinics. These clinics are established with the aim to increase awareness of type 1 diabetes among HCPs as well as T1DM patients and their family members, Educate school teachers, create T1D data registry.
Results: DCI has trained HCPs at 20 Clinics and 63 schools have been covered to educate teachers about T1D. It has organized 104 education programs in different geographical areas of Gujarat to educate T1D patients, their parents and relatives for better management of T1D. Since January 2017 1628 patients have been entered in registry software. More than 3500 HbA1C tests were done free of cost & all patients were screened for Neuropathy, Retinopathy & Nephropathy. All these patients were provided with the education materials in regional language and direct contact number of HCPs in their respective area where they can get free consultation as many times as required.

P192

Abstract Withdrawn

P193

Effect of rotation of injection sites and frequency of needle use on glycemic control in T1DM

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Aim: To evaluate the effect of rotation of injection site and frequency of needle use on glycemic control in type 1 diabetes mellitus patients.
Objective: To evaluate glycemic control in T1DM patient who rotate the injection site.
To evaluate glycemic control who change frequency of needle use from 6 time/day to 1time/day in T1DM patients.
Background: Lipodystrophy is an abnormal accumulation of fat underneath the surface of the skin. It's most commonly seen in people who receive multiple daily injections, such a people with type 1 diabetes. As a result fat either breaks down or builds up under the skin which can cause lumps or indentations that interfere with insulin absorption. Finally it effects glycemic control. Avoiding the injection site is one of the most people.
Method: To evaluate the prevention of lipodystrophy 310 patients of T1D were included in the study. Patients were classified in subgroup of duration of T1D as 2 years, 4 years, 6 years and 8 years. Included patients are diagnosed as type 1 diabetes and they were using basal-bolus insulin therapy. Patients also classified as per the frequency of Insulin injections. Counseling was done by the diabetes educator at every 15 days interval. For appropriate result needles were provided to the patients by us.
Result: Out of 310 T1DM patients 201 showed good glycemic control by using injection site rotation in association with single time needle use. It is also observed that as increase the duration of type 1 diabetes lipodystrophy increases. Same injection administration for long time influence injection site damage. Using same needle long time results in slightly distorted this can increase the chance of experience pain while putting the in or taking out.

Conclusion: Using same injection site and same needle over time can cause lipodystrophy. Periodically changing injection site in association with changing needles every time helps to prevent lipodystrophy which ultimately helps in good glycemic control.

P194
Peer feedback and reflection around transition services Kettering (within East Midlands)

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Introduction: NHS England created the Diabetes Transition Service Specification to ensure a service model to help planned transition to adult service. 16900 patients transitioned in 2016 with worsening DKA and poor control post transition.
Objective: The Transition survey was done in the Midlands to understand our transition gaps to better service transformation. 6 themes: Staged and timely Pediatric preparation; Independence and autonomy; Person centered and responsive; Structures and systems; Access and engagement and Continuing care and assessment were assessed.
Methodology: The survey was prospective conducted between Dec 2016-Oct 2017 on 12-20-year olds. Questionnaire was designed by the diabetes Network groups.
Results: 138 surveys from all 8 East Midlands (EM) units with 29 from Kettering. Age range was 12-20 years (M: F 1:0.7). 62% (49%) felt that transition process was discussed with them by their PDSN or pediatrician. 96% felt the team explained things well. 24% (30%) preferred to see an adult diabetologist, 14% (20.3%) DSN and 10%(10%)psychologist. 59% (50%) felt they saw 3 members of the MDT in clinic.
59% (43%) prefer an afternoon clinic and 12% (58%) preferred an out of hours clinic. 55% (27%) preferred to book their next appointment with 83%(86%) preference for hospital appointment. Factors reducing clinic attendances related to time at 69% (44%), location 55% (22%) other responders factors table 2.
66% (78.3%) of the young people were confident to get advice. 31% (40%) felt overnight advice was critical. 34% (44%) preferred to continue care with the home care team. 34% (41%) were aware of the local transition services nearer to their universities.
Conclusion: Our survey gave a deep insight into the needs of our patients resulting in introduction of Transition booklet to provide support around sensitive lifestyle factors and Integrated transition services through shared QI projects.

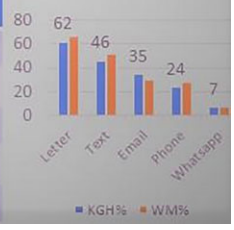
Table 1

Themes of issues	Positive Responders % (WEM)
Discussion of transition process	69(73)
Information on alcohol & smoking	76(79)
Pregnancy ,leaving home, tattoos & piercings	50(70)
Parties, safe sex, ID, non- prescription drugs & Holidays.	68(70)
Rights of young people in clinic	100(95)
Understanding Confidentiality	48(53)

Table 2

Ideas to improve attendance	%(WEM)
Letter to School	10 (17)
Annual list of clinics	10(11)
Text on the day	41(36)
Text a week before	21(32)
Transport	4(6)

Fig 1



[*Response overview of lifestyle and clinic attendance*]

P195
A randomized controlled multicenter study evaluating digital health in type 1 diabetes children

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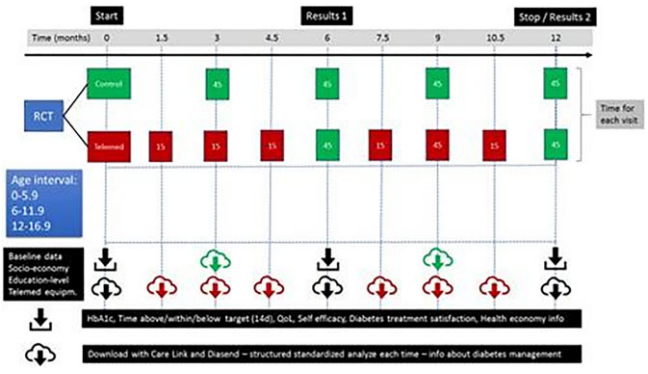
Objectives: To evaluate digital health provided as person centered video visits along with analyze of downloaded data and its impact on health economy, glucose control, health, quality of life, diabetes treatment satisfaction, self-efficacy and health related locus of control.
Methods: 80 children below 16.9 years of age is randomized to
A) Control group: standard visits every 3 month or to
B) Intervention group: every other standard visit replaced by three person-centered video visits including analysis of downloaded data.
The total time spent to be the same in both groups. Baseline data is collected before start including information about travel time, time spent on re-visits, salary etc. Actual time spent on each visit/contact is recorded. Validated questionnaires are used in patients and guardians at start, 6 months and 12 months regarding health, quality of life, Diabetes Treatment Satisfaction Questionnaire, Diabetes Treatment Satisfaction Questionnaire Change, Self-efficacy and health related locus of control. Glucose control is evaluated by HbA1c at start, 6 months and 12 months along with downloaded continuous glucose monitoring devices providing analyzes regarding time in range, time in hypoglycaemia, mean glucose value and standard deviation. Comparisons is conducted between control and intervention with health economy as primary outcome, diabetes treatment satisfaction as secondary outcome and glucose control, health, quality of life, self-efficacy and health related locus of control as third outcome.
Results: The 6 months results are collected and analyzed in June 2018.
Conclusion: In absence of any results to analyze at present, the forthcoming results are expected to be of great importance to future diabetes management. Not least when it comes to reaching the unreached as digital health could be provided wherever there is internet access.



[*Figure: Overview of study*]

Poster Tour 22 - Diabetes Care

P196

Comparison of freestyle libre and freestyle libre pro on glycemic control and glycemic variability in youth with type 1 diabetes mellitus

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Objectives: FreeStyle Libre and FreeStyle Libre Pro are flash glucose monitoring (FGM) systems available in Japan from November 2016. We evaluated the effect of FreeStyle Libre on glycemic control and glycemic variability by viewing real-time on-demand glucose data.
Methods: A prospective study was conducted at Yokohama City University Medical Center, Japan. Eligible patients were prepubertal children 6 years of age and older who had absolutely insulin-deficient type 1A diabetes of at least 3 years' duration. Patients using a sensor-augmented pump were excluded. Study participants inserted and wore the sensor in random order with the FreeStyle Libre Pro for up to 14 days and FreeStyle Libre for up to 28 to 56 days, with an interval of 4 weeks.
Results: Nine patients (4 females, 5 males) were included. Mean age was 11.7 ± 0.9(SD) y. Mean duration of diabetes was 5.6 ± 1.7 y. Mean HbA1c was 8.7% before use of FreeStyle Libre and 8.6% before use of FreeStyle Libre Pro. The mean sensor glucose value throughout the wearing time was 209 ± 102mg/dl with Freestyle Libre and 189 ± 103mg/dl with FreeStyle Libre Pro. The mean percentage (range) of sensor glucose values< 70 mg/dl was 8.6 (4-19) % with Freestyle Libre and 12.6 (1-28) % with FreeStyle Libre Pro. Changes in HbA1c values were similar.
Conclusion: Data from the FGM system showed glucose variability and frequency of hypoglycemia in 9 adolescents with type 1 diabetes mellitus who were absolutely insulin-deficient. The changes in glucose variability were similar between the periods of using FreeStyle Libre and FreeStyle Libre Pro. There were no differences in HbA1c level and time of hypoglycemia between the two usage periods. The usage times of the FGM system were short. Further studies are needed to determine whether improved outcomes can be achieved with prolonged use of the FGM system.

P197

Illness or disease? What happens when adolescents with type 1 diabetes and poor metabolic control meet the experts?

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Objectives: Diabetes self-management can be very challenging requiring both motivation and courage to accept to be and to appear different from others. Support for self-management is expected to improve wellbeing of patients as well as quality of life.
Many adolescents with type 1 diabetes have difficulties reaching the goals of good metabolic control and apparently find it unhelpful to attend diabetes clinics.
The purpose of this study was to explore the encounter between nurses and adolescents with type 1 diabetes, poor metabolic control and many missed appointments.
Methods: A case-study of 3 young patients was carried out using field observations, semi structured interviews and focus-group-discussion to explore the encounter and how the adolescents coped in everyday life.
Goffman's theory of symbolic interactionism using drama as a metaphor was used to describe the different roles of the nurses and of the patients. Kleinman's theory on disease and illness was used to describe issues addressed in the clinic and challenges in life with a chronic condition.
Results: From observations, we found that the nurses set the agenda and that focus in the encounter was mainly on disease and biomedical treatment. The young patients saw themselves and were seen as patients in the clinic and focus was mainly on disease-problems. In everyday life the patients wanted to be seen as a person and thus tried to hide the role of a patient which made it difficult to prioritize diabetes.
Conclusion: The health care system, in its eagerness to obtain good metabolic control to avoid complications, seems to primarily offer care focusing on bio-medical issues. Barriers for optimizing diabetes control seemed to be the lack of help from the health care system to deal with illness-problems. Focus on illness may need a more prominent role in diabetes treatment and there seems to be a need of a different approach toward adolescents with type 1 diabetes.

P198

Parents experience of being involved in health service planning. What do they want?

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Objectives: Patient involvement in health service planning is considered important and may result in a more responsive service and better care increasing compliance and quality of life. We examined parents' experience of being in charge of bookings compared to fixed appointments as well as preferences for future organization.
Methods: Normally appointments are scheduled every 6 weeks (HbA1c ≥ 64 mmol/mol) or 3 months (HbA1c < 64 mmol/mol). The diabetes specialist nurses (DSN) can be called from 8.30-9.00.
From May 2016 till May 2017 only one annual appointment screening for complications was scheduled. The parents were asked to book all other consultations based on their needs. Telephones were open 8-15.
Patients with diabetes for at least one year were included. Those with complications, in psychiatric treatment, or families with challenges in life that would make it difficult to administer a flexible system were excluded.
After the intervention, parents answered a questionnaire examining their experience and wishes for future organization.
Results: 139 were included (72 boys and 67 girls), mean age 12.5 years (CI: 12-13.1), mean diabetes-duration 5.9 years (CI: 5.4-6.4). 46 % answered the questionnaire.

	The DNS	Doctor
Got an appointment when needed	68%	47%
Did not need an appointment	22%	42%
Important to meet same health professional	97%	81%
Importance of calling the regular DNS	97%	Not relevant

[*The parents` answers to the following questions in relation to their DNS and doctor, respectively*:]

In average, patients called 2.0 times as compared to 0.9 before the intervention.
Future organization: 8 % wanted to continue the new system, 27 % wanted appointments as agreed with their DSN/doctor, and 65 % wanted fixed appointments.

Conclusion: Very few were comfortable being responsible for booking appointments. Most preferred a fixed system, still 27% wanted to plan the appointments together with their nurse/doctor. Individual needs and wishes should be taken into consideration. Availability and regular caretakers seem important and should be prioritized.

P199
Treatment regimens and corresponding A1c levels for type 1 and type 2 diabetes: Data from SEARCH (US) and YDR (INDIAN) Registries

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Objective: To compare similarities and differences in treatment regimens and corresponding A1c levels in youth with type 1 (T1D) and type 2 diabetes (T2D) in two registries, SEARCH for Diabetes in Youth (SEARCH) registry in the US and the Registry of People with Diabetes with Youth Age at Onset (YDR) in India.
Methods: Data from the SEARCH and YDR registries were harmonized to the structure and terminology of the Observational Medical Outcomes Partnership (OMOP) Common Data Model (v5). Data used in the analyzes were from youth with T1D and T2D, < 20 years of age at diagnosis, and newly diagnosed between 2006 and 2012 for YDR and for the years 2006, 2008, and 2012 for SEARCH. We compared diabetes treatment regimens and corresponding A1c levels across registries.
Results: There were 3,315 T1D (SEARCH = 1,899, YDR = 1,416) and 547 T2D (SEARCH = 384, YDR = 163) youth for this analysis. The mean A1c for T1D (11.0 ± 2.9 vs.7.8 ± 1.7%) and T2D (10.0 ± 2.8 vs.7.2 ± 2.1%, p < 0.001) were higher in YDR when compared to SEARCH. Among T1D in SEARCH, 67.6% were on multiple daily regimens; whereas, in YDR 60.6% of them were on once or twice daily regimens. Insulin pumps were used in 16.6% in SEARCH but only in 0.5% in YDR. Among T2D, there were less differences in treatment regimens between SEARCH and YDR. However, A1c was uniformly higher in YDR irrespective of regimen used.
Conclusion: Efforts should be made to achieve better glycemic control in both countries in youth onset T1D and T2D in order to prevent long term complications.

P200
Predictors of glycemic control in children with type 1 diabetes: a study from a public sector tertiary care center from North India

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Objective: Improved glycemic control in children with type 1 diabetes (T1D) has unequivocally been demonstrated to delay the onset and slow the progression of microvascular.
Complications: Some personal and social factors could affect glycemic control in children with T1DM. The identification of modifiable factors will help in improving the delivery of diabetes care by focusing on the identified factors. We aimed to find out the factors affecting the glycemic control in a cohort of children with T1D at our center.
Methods: This retrospective study included children with T1D attending a tertiary care hospital in Northwest India between 2015 to 2017. The data on age, sex, disease duration, insulin regimen, comorbidities, maternal education, and occupation, was extracted from the clinic records.
Results: Of the 500 patients registered during the study period, complete information was available for 280 patients. The mean age at the time of evaluation was 10.6 ± 4 yr (2-21) and mean duration of disease was 47.86 ± 28.1 months (16-141) months. The mean HbA1c was 7.95 ± 1.46 %. The mean HbA1c was similar in different age groups (0-6 years {47} 7.75 ± 1.20, 6-12 years{139} 7.84 ± 1.43, >12 years{94} 8.21 ± 1.59), sex(Male{163} 7.91 ± 1.38, Female {117} 8.01 ± 1.57), insulin regimen(Basal bolus{231}7.92 ± 1.45, Split Mix{40}8.20 ± 1.56, Insulin Pump {6}7.86 ± 1.07). The mean HbA1c did not differ according to thyroid status, celiac disease status, Pubertal status The HbA1c values were significantly higher in children with longer duration of disease (8.39 versus 7.57) and lower maternal education status (8.22 versus 7.56 P value < 0.05).
Conclusions: We identified maternal education status and duration of the illness as significant factors to affect the glycemic control. Better diabetes self-management education (DSME) to mother and older children with a frequent update of DSME may help to improve the glycemic control.

P201
Transition rate of patients with T1DM and their reasons from SAP to FGM therapy in our clinic

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Introduction: Sensor Augmented Pump (SAP) therapy was covered by public insurance in Japan in 2014 and afterwards its users with type 1 diabetes (T1DM) are progressively increasing. SAP can alert their hyperglycemia and hypoglycemia, so it enables patients to prevent severe hypoglycemia with insulin titration. Otherwise SAP therapy still

T1D Treatment Regimens	SEARCH (n = 1,899) n (%)	A1c *	YDR (n = 1,416) n (%)	A1c *	T2D Treatment Regimens	SEARCH (n = 384) n (%)	A1c *	YDR (n = 163) n (%)	A1c *
Multiple daily insulin regimens	1284 (67.6)	7.9 ± 2.1	405 (28.6)	10.7 ± 2.7	**Metformin only**	165 (43.0)	6.5 ± 1.4	59 (36.2)	9.5 ± 2.5
Once or twice insulin regimens	38 (2.0)	8.3 ± 2.3	858 (60.6)	11.0 ± 2.9	**Insulin + Metformin**	90 (23.4)	7.5 ± 2.1	10 (6.1)	10.3 ± 2.6
Insulin pump	307 (16.2)	7.7 ± 1.3	7 (0.5)	11.9 ± 5.5	**Insulin + other orals**	11 (2.9)	9.3 ± 2.3	15 (9.2)	11.5 ± 2.6
Unknown regimens/ No information	270 (14.2)	8.1 ± 1.9	146 (10.3)	12.3 ± 3.5	**Insulin only**	49 (12.8)	8.6 ± 2.6	28 (17.2)	10.7 ± 3.1
					Other orals	20 (5.2)	7.7 ± 2.3	11 (6.7)	7.8 ± 1.3
					No medications/ Missing	49 (12.8)	6.7 ± 2.0	40 (24.5)	10.5 ± 3.2

[*Table. Treatment regimens and corresponding A1c of T1D and T2D in SEARCH and YDR Registry.*A1c (%) data presented as mean (SD)*]

has some problems such as cost, skin troubles and necessity to replace a sensor frequently. Last autumn Flash Glucose Monitoring (FGM) was available in Japan. Some patients using SAP preferred to FGM in place of SAP, because of no calibration with self-blood glucose monitoring and easy to use. In this study, we analyzed the transition rate and reasons why they changed their therapy from SAP to FGM with pump.
Objectives: The primary objective was to reveal the proportion of SAP and FGM users in type 1 diabetes. The secondary objective was to ask patients the reasons why or why not they use SAP and/or FGM through analyzing the questionnaires.
Method: The retrospective study included T1DM patients who were receiving CSII therapy with using one or both glucose monitoring system (SAP and/or FGM) in the clinic of Pediatrics of Osaka City University Hospital. We checked their chart data to detect whether they use SAP and/or FGM by medical record. To know the reason why they use the device, we carried out the questionnaire survey to those who use SAP and/or FGM with CSII.
Result: A total of 344 T1DM patients were included in the outpatient clinic. 208 patients (60% of all T1DM patients) received CSII therapy and 82 patients used SAP system with 620G insulin pumps. At least 103 patients had been experienced or were using FGM system.
Conclusion: Almost the same number of SAP and FGM were there. Approximately half of the patients preferred FGM with priority over convenience rather than SAP having the function of glucose alerts. We report the reasons and clarify both merits and demerits through the questionnaire.

P202
Knowledge and perception on type 1 diabetes among university students in Mauritius Island

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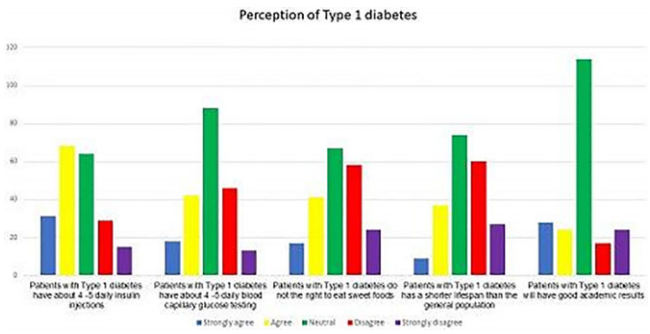
Objectives: The aim of this study was to explore knowledge and perception of Type 1 Diabetes (T1D) among University Students in Mauritius.
Methods: In 2018, students had to fill an online questionnaire via Google Docs®; data and responses were collected and exported to Microsoft office Excel 2016® for data analysis.
Results: 207 students (62 Males and 145 females) took part with 70.5% being in the age group of 21-25 years. 93% of students responded that T1D is not contagious. The cause of T1D was as follows: lack of exercise (5.3%), eating too much sugar or sweets foods (40.1%) or the cause is unknown (54.6%).
The treatment of T1D: no treatment (4.8%), oral anti diabetic drugs only (6.3%) , multiple daily insulin injections only(40.6%), multiple daily insulin injections and oral anti diabetic drugs (38.2%), treated with diet only (6.8%) and treatment by doing daily physical exercise only (4.8%). 82.6% of responders said that the treatment was life long and 104 students (50.2%) said that T1D can be prevented. 31.9% knew the existence of a non-profit organization (T1Diams) for T1D.
Conclusion: To the best of our knowledge this study is the first of its kind in Mauritius. The study demonstrates that more awareness program must be carried out, in terms of knowledge and perception of T1D, among university students in Mauritius.
Keywords: Students, Mauritius, Perception, Type 1 diabetes, Knowledge, Awareness



[*Figure 1 Perceptions of Type 1 diabetes*]

P203
Hospital-based home care for children newly diagnosed with type 1 diabetes: assessing expectations and obstacles in families and general practitioners

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Objectives: To evaluate whether hospital-based home care was desired by the parents of children diagnosed with type 1 diabetes under the age of five and their general practitioners, and to identify the main expectations and obstacles to its implementation.
Methods: This descriptive multicentric study was performed in France between November 2016 and November 2017. Data were collected by interviewing 57 families of children diagnosed with diabetes before the age of five years and the corresponding 30 general practitioners. The primary endpoint was families' or general practitioners' acceptance of home based care after diagnosis. Univariate and multivariate analyzes were performed to identify factors associated with refusal of this care pathway.
Results: A high proportion of families and physicians (respectively 86% and 93%) wished hospital-based home care to be established and considered it essential (79% and 87%, respectively). Low income families were less likely to accept hospital based home care ($p < 0.001$). The expectations of families from this pathway were help with social care, management of emergencies, and return to school. The physicians' main request was improved interprofessional collaboration, with the most popular suggested measure being shared computer files.
Conclusion: Most of the families of children with diabetes and their general practitioners wanted changes in the care pathway with a transition toward hospital based home care after diagnosis. Multidisciplinary support, personalized social care and access to welfare benefits could improve acceptance rates, especially among low-income families.

P204
Mauriac syndrome: still exists and haunts us from time to time. A case series

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Objectives: This case series aims to demonstrate that Mauriac Syndrome- a combination of hepatomegaly, stunted growth and delayed puberty caused by under-insulinization- still has a surprising prevalence today among a sub-population of children with Type 1 Diabetes.
Methods: This is a retrospective study of 5 cases of Mauriac Syndrome in one hospital over a ten year period.
Results: We found 5 cases spanning between 2006 and 2016. The age range at presentation was 13-15 years of age. The finding of hepatomegaly prompted the diagnosis in each case. Each child displayed some degree of derangement in liver function and/or lipid profile. All had a history of insulin non-compliance as well as issues with poor parental supervision and family dysfunction. Social services were involved in 4 of the cases following the diagnosis. With intensive multidisciplinary team input and a supervised insulin regime, compliance improved. All cases demonstrated resolution of the syndrome. Unfortunately diabetes control ultimately remained suboptimal with numerous subsequent admissions with Diabetic Ketoacidosis seen in all but

one child who was lost to follow-up, having left the area following safeguarding proceedings.

Conclusion: Mauriac Syndrome still exists today and diabetes teams caring for young people should be aware of the condition. At particular risk are adolescents not complying with their insulin regime, those with high HbA1c, static growth and/or delayed puberty and those with disrupted social circumstances. Trajectory of height and weight, Pubertal status, HbA1c, liver function and hepatomegaly should be assessed routinely.

Identifying the syndrome is of particular importance because of its implications for adult height and the potential to reverse these, as well as the opportunity to use it as a trigger for behavioral change and limit other more short-term adverse events such as DKA.

Poster on Display – Diabetes Care

P205
Validation of a risk screening tool for pediatric type 1 diabetes patients: predictor of increased acute health care utilization

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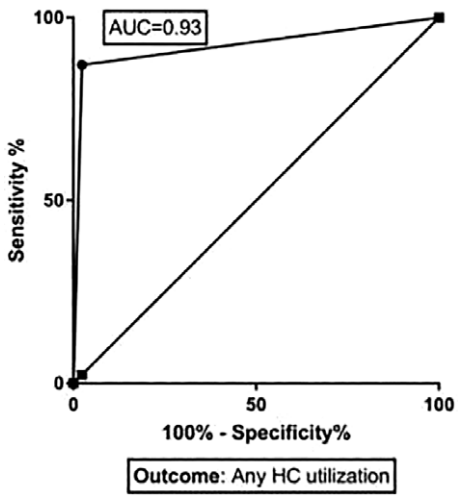
Objective: To determine the utility of a risk screening tool in predicting health outcomes among patients with new onset type 1 diabetes mellitus (NOT1DM).
Methods: 158 patients with NOT1DM were adjudicated as high risk or low/moderate risk based on results of the risk assessment screening tool (previously presented). Data on HbA1c and number of acute healthcare visits (AHC) were collected at 6, 12, and 18 months post diagnosis and differences by risk status were assessed using a chi-square test. ANOVA with a Dunnett correction was used to evaluate differences in HbA1c values at the 3 time points. Validity of high risk status for predicting favorable vs. poor outcome was assessed using area under the receiver operator characteristic curve (AUC- ROC), sensitivity and specificity data.
Results: Of 158 patients (age 9.6 ± 4.3 years; 50% males), 31 patients (20%) scored in high risk category (no age or sex differences), 21% had poor glycemic control (GC) at 18 mo., 30% had poor GC at any of the three visits, and 34% had either poor GC at 18 mo. or any AHC utilization. High risk score was significantly associated with greater odds of any health care utilization: 27 of 30 patients with AHC (90%) had a high risk score, while only 4 patients out of 128 with no AHC utilization (3%) had high risk scores (OR = 217.4, 95% CI = 50.0, 946.2; p-value < .0001).



[AUC - Outcome - Any HC Utilization]

Conclusions: Our screening tool appears to have greatest utility at differentiating patients with vs. without any HC utilization (alone, without grouping together with poor GC), with excellent discriminatory ability (AUC = 0.93), sensitivity (90%), and specificity (97%). Longitudinal data collection post 18 months may further demonstrate utility to also predict poor GC. Overall, risk stratification can help target appropriate clinical interventions for prevention of AHC utilization and ultimately reduce health care costs.

P206
Needle-related procedures in diabetes treatment children´s and adolescents´ own stories about negative experiences

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Introduction: The treatment of type 1 diabetes (T1D) includes frequent needle-related procedures. Studies show that many children and adolescents experience needle-related discomfort to such an extent that it affects their ability to manage the disease in an optimal way.
Objectives: To illustrate what children and adolescents with T1D experience as negative in connection with needle-related procedures in the treatment of diabetes.
Methods: The study was designed as a qualitative study with a narrative approach. Data was collected through questionnaires from 83 children and adolescents and were analyzed through qualitative content analysis. The study is a sub-study of a major cross-sectional study conducted with mixed design at three pediatric diabetes clinics in Sweden, among children and adolescents with T1D aged 7-18 years.
Results: Three major categories emerged regarding children's and adolescents' negative experiences associated with needle-related procedures: the discomfort takes different expressions, the discomfort changes over time and needle-related procedures affect everyday life. Several children and adolescents experience needle-related procedures as painful and frustrating and venous sampling as strenuous. However, many felt that the negative experiences got improved with time.
Conclusion: The negative experiences of needle-related procedures in children and adolescents with T1D are individual. The pediatric nurse should carefully assess each child´s or adolescent´s experience in order to best understand their specific situation. Only then adequate care can be provided.

P207
Study of insulin-related skin complications in children and adolescents with type 1 diabetes mellitus

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Introduction: Skin complications related to insulin therapy have important effects on metabolic control in children with type 1 Diabetes Mellitus (T1DM). Lipodystrophy is one of the most common complications of subcutaneous insulin injection. Lipohypertrophy is usually caused by multiple overlapping injections and/or needle reuse.
Objectives: The aim of this work was to study Insulin-related skin complications in children and adolescents with T1DM and their associated risk factors.
Methods: The study was conducted on 115 cases with T1DM attending Diabetes Clinic in Alexandria University Children's Hospital in Egypt. Thorough assessment was done including duration of DM,

Glycosylated hemoglobin (HbA1c), frequency of changing the needles for injection, rotating sites and preferred site of injection. Examination of the sites of insulin injection was done for presence of lipodystrophy and associated skin complications as allergy, bruising, bleeding, infection or discoloration. Pain during injection was analyzed using Wong-Baker Faces Pain Rating scale.

Results: The mean age of the diabetic cases was 10.1 years with mean of 4.4 years as duration of diabetes. About 84% were using pens for insulin injection and 52.2% of them rotated the site of injection daily. 27% had no hurt during injection (Score 0) while 6% had the worst hurt (Score 10) on Pain Rating scale. 61.7% of the cases had pain when using a reused needle. Lipodystrophy was found in 57 cases (49.5%), bruising in 53.9%,and mild bleeding from injection in 51.3%. The hypertrophied site was related to the preferred site of injection. Cases with lipodystrophy had significant higher mean of age, longer duration of DM and were rotating sites of injection less frequently than those without lipodystrophy ($p < 0.05$).

Conclusions: Insulin-related skin complications are common in children with T1DM. Lipodystrophy is related to age, duration of DM, rotating the site of injection and frequency of changing the needle.

P208
Type I diabetes mellitus in toddlers

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Introduction: Children< 5 years of age comprise a small minority of children with type 1 diabetes (T1D). Diabetes in toddlers is a great psychosocial burden to their families and despite of advanced diabetes management options, their diabetic control remains suboptimal. Hence this study was undertaken to evaluate toddlers with T1D.

Objective: To study the diabetic control and physical growth of toddlers with T1D.

Methods: Assessment data of insulin regimen, compliance, serial anthropometry, home blood glucose monitoring and HbA1c was obtained retrospectively from 2 monthly clinic visits. Episodes of severe hypoglycaemia or ketoacidosis, if any, were also studied.

Results: Thirteen toddlers (8 girls, 5 boys) - mean age at diagnosis is 27 months (13-56m) - with regular follow up (mean- 20.5 months) were analyzed.

Seven children had split mix insulin twice daily while six received thrice daily (mean insulin dose- 0.78 ± 0.03 U/kg/day). (table)

Overall, fluctuations were noted in various factors studied.

Food intake and exercise patterns were very erratic.

Conclusion: The diagnosis of T1D in toddlers poses a severe challenge in setting up an optimal regime. Tight metabolic control is unrealistic as the risk of recurrent hypoglycaemia is high with erratic eating and exercise patterns. Insulin administration or use of insulin pump needs to be individualized aiming for the target range of blood sugar 110-220 mg/dl and HbA1C 8 to 8.5%.

Success depends on a well functioning, fully informed and highly motivated family, and also a dedicated and experienced diabetes health care team.

	HbA1c (mean)	Height SDS	Weight gain (mean)
At diagnosis	13.01 ± 2.5 %	-1.58	
3 months*	8.26 ± 2.14 %	-1.46	
6 months*	9.1 ± 1.2%	-1.4	1.39kg
9 months*	10.86 ± 1.9%	-1.5	
12 months*	10.31 ± 2%	-1.47	2.5kg

[**after initiating treatment*]

P209
An annual review questionnaire in children and young people with type 1 diabetes

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Objectives: To evaluate the usefulness of an Annual Review Questionnaire (ARQ), which was introduced as a clinical tool, to assess Knowledge and Compliance of Children and Young People (CYP) with Type 1 diabetes, with aspects of good clinical care as defined by National Institute of Clinical Excellence (NICE) guideline.

Methods: All CYP with Type 1 diabetes, were expected to complete the ARQ as part of annual review. The questionnaire asked about compliance and knowledge of aspects of good clinical care. CYP with diabetes duration < 3 months prior to audit period and those with Type 2 diabetes were excluded.

Results: Data on 80 patients, who completed the questionnaire between Feb-Mar 2018, was analyzed. 48.8% were males, 50% >12, 43.8% 5-12 and 6.3% < 5 years. 60.8% were White, 26.6% Asian, 11.4% African and Caribbean, 1.3% mixed and 47.5% on insulin pump. They were divided into 3 groups according to HbA1c level.

Group A : HBA1c < 7.5% (29/80),

Group B: HBA1c = 7.5-9% (36/80) and

Group C: HBA1c>9% (15/80).

Compared to the whole group, significantly more children in group A were aware of their glucose targets (89.7% vs 70% p< 0.01), reported never missing insulin bolus (85.7% vs 79.5% p< 0.00) and reported testing blood glucose >4 times a day (93.1% vs 75.9% p< 0.00). Only 76.3% of all patients were using level 3 carbohydrate counting to determine pre meal bolus insulin dose and only 57.5% were bolusing insulin with snacks.

Conclusions: The Annual review Questionnaire identified areas of both good and poor compliance and knowledge among CYP with Type 1 diabetes. This helped the diabetes team to try to target education to individual CYP in problem areas identified. CYP in group A showed statistically significant better compliance in some areas.

P210
Dental health status and hygiene in children and adolescents with type 1 diabetes mellitus in Erzurum/Turkey

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Background: There is disagreement on the effect of diabetes on oral hygiene. The purpose of this study was to assess the oral health and hygiene status of type 1 diabetic patient in Erzurum/Turkey.

Methods: In this case control study, periodontal health and hygiene of 20 children and adolescents (7-15 yr of age) with type 1 diabetes mellitus referred to Pediatric Endocrine Clinic and 20 non diabetic control subjects were clinically assessed. The required data such as sex, age, duration of the diabetes, type and number of insulin injections per day were obtained from self-administered questionnaire and the patient´s medical records. Participants in both groups were examined for Decay-missing- filled teeth (DMFT); dmft (for primary teeth), oral hygiene using Silnes-Loe plaque index (PI) and gingivitis index (GI). $P < 0.05$ was considered significant.

Results: The mean age of the study and the control group was 11.6 ± 3.05 and 11.08 ± 3.25 yr, respectively. There were no significant difference between two groups in terms of DMFT, dmft and PI indices (P< 0.05). The GI index difference was statistically significant in type 1 diabetic group ($P > 0.01$).

Conclusions: Apart from higher scores of GI index, frequency of oral and periodontal disease was not different in type 1 diabetic patients compared with healthy subjects. Findings of present study are insufficient to support a significant effect of diabetes on increasing the risk

of oral and periodontal diseases. However, children and adolescents with type 1 diabetic should receive oral hygiene instruction.

P211
Profile of young adults with diabetes type 1 who are transitioning from pediatric to adult care services

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The transition from adolescence to young adulthood must be well prepared until successful integration into adult medicine. It may be accompanied by a deteriorating glycemic control.
The Objective was to describe the profile adolescents with diabetes who are transitioning and to identify the factors predicting the glycemic control.
Patients and Method: This is a retrospective descriptive study of adolescents with T1D. The transition is envisaged from the age of 17 years after an adequate preparation.
Results: The study included 182 adolescents, with 102 boys. 111 were educated, 27 in professional, and 44 without any activities. There are 15 cases of addiction, 69 degenerative complications and pathological associations including 33 overweight , 20 nephropathies, 6 thyroiditis and 01 celiac disease. The estimated median age of transition of care was 19.7 ± 1.6 years; the duration of diabetes was 10.1 ± 3.9 years. The basal-bolus shema was performed in 77.4%. Median HbA1c was 8.74 ± 2.2% with 29% on the pediatric target of 7.5. The factors predictive of the glycemic control at the passage are comparable for geographical origin, health insurance, T1D in siblings, age of onset and age of diabetes; a non-significant benefit was noted for boys, older age, unattached parents, prolonged pediatric follow-up, associated diseases and pathological associations, and conventional insulin therapy. The advantage is significant in case of education or professional activity compared to inactive: average HbA1c, 8.54 vs 9.34% ($p < 0.04$) and pediatric target, 34.1% vs 13, 6% ($p < 0.02$). As a result, 52 adolescents are followed in adult services, 32 with no follow up and 98 are in transition.
Conclusion: The transition coincides with period of instability of adolescent personality and illness. The factors that classically influence the glycemic control have no effect on them, except for education and professional activity.

P212
13 years in the management of type 1 diabetes. What can we learn from the working staff of T1Diams, a non-profit organization in Mauritius?

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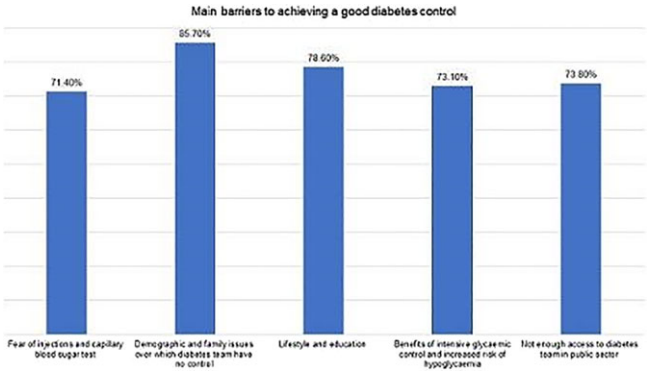
Objectives: Since 2005, T1Diams, a non-profit organization in Mauritius supports and eempowers more than 280 patients with Type 1 Diabetes **(T1D)** through therapeutic education and psychosocial support. The aim of the study is to investigate personal views of employees of the organization on the management of T1D.
Methods: In February 2018, data was collected via an online self-completion questionnaire sent to past, present staff and the management committee of T1Diams.
Questions covers demographic data, impact of T1D on the quality of life and barriers/solutions to an optimal Bio-psychosocial management. Data was compiled and analyzed on Microsoft office 365 Excel Sheets®.
Results: Response rate was 100% completion. Data from 42 participants (24 females and 18 males) were collected and the mean age was 31.7 ± 11.0 y. T1D was reported to have a negative impact on the quality of life namely emotional well-being (66.7%), physical activity (54.7%), work/studies (40.5%),leisure activities (50.0%), and relationships (28.8%).
Reponses from participants if they had to change one thing in their diabetes care team or practices to improve metabolic outcomes would be as follows: redesign initial therapeutic education (28.6%),more psychosocial support (16.7%), more frequent clinical care (14.9%), psychological input (11.9%), more insulin pumps (11.9%),more nutritional support (11.9%)intensify insulin therapy (4.8%).
Conclusions: This is the first retrospective study carried out to acquire the point of views of the working staff on the management of Type 1 diabetes during the last 13 years. Data from the study will influence action plan to improve practices in years to come.
Keywords: T1Diams, Non-profit organization, Type 1 diabetes, Clinical practice, Psychosocial support, self-assessment.



[Fig 1 main barriers to achieving a good diabetes control]

P213
A questionnaire investigation of pediatric type 1 diabetes self-management in a local region of Japan

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Introduction: It is necessary to improve diabetes self-management to improve the quality of life of patients with diabetes. For that purpose, grasping the current situation of self-management is important. However, there are insufficient data about the present situation of pediatric type 1 diabetes (T1D) self-management in Japan.
Objective: To investigate self-management of pediatric T1D and identify related problems.
Method: We held a seminar for patients and their families in the Shiga prefecture, and investigated the situation of self-management using a questionnaire.
Result: Twenty-nine patients answered the questionnaire. Their mean HbA1c level was 7.53% (standard deviation [SD], 0.78). The frequency of hypoglycemia was 6.6 (6.3) times per week. Participants performed self-monitoring blood glucose (SMBG) and administered IIs in the classroom (72% each), followed by the infirmary. Most infants who developed T1D became able to perform SMBG and administer IIs independently before 6 years of age (the age at elementary school entrance). Most patients who developed T1D after 6 years of age were able to perform SMBG and administer IIs independently immediately after onset. Patients became able to change the dose of insulin independently at the age of 12.25 years (2.28). Ninety-seven percent of patients performed carbohydrate counting (CC). Patients became able to perform CC independently at the age of11.50 years (2.93).
Conclusion: Acquirement of self-management ability depended on age. Seventy-two percent of patients performed their self-management in the classroom. This proportion seems high in Japan according to expert opinion; the cause may involve participation bias. Nevertheless, 28% of patients could only perform self-management in places where the school staff instructed. Furthermore, a nationwide

survey is necessary for grasping the actual situation of pediatric type 1 diabetes self-management without bias.

P214

Abstract Withdrawn

P215

Clinical profile and spectrum of complications of diabetes in the young onset diabetics

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Objective: The incidence with younger patients is continuously growing in the regular clinical care setting. Unhealthy lifestyle, sedentary habits are responsible for the changing dynamics of diabetes in young. We evaluated the incidence, clinical profile and spectrum of complications of different types of diabetes mellitus among young patients (age between 15 to 25 years).
Methods: We conducted a cross-sectional study of every consecutive diabetic patient of age of onset between 15 to 25 years attending Department of Medicine and department of Endocrinology.
Results: Out of the 60 patients seen during the period of study, Type 1 DM accounted for the majority (61%) of the cases. In Type 1 DM males (85%) were more affected and in Type 2 DM males and females were equally affected. Osmotic symptoms were present predominantly in Type 1 DM (67%). Positive family history was highest in Type 2 DM (81.2%) cases. Retinopathy was present in 28% of the total cases of young diabetes, predominantly in Type 2 DM (43.7%). Nephropathy is present in 16.6% of the cases of diabetes, in general predominating in Type 1 DM (22%). Both autonomic and peripheral neuropathy were found to be highest in Type 2 DM.
Conclusion: This group as diabetes in younger age group represents an extreme phenotype with high prevalence of risk factors. Hence, these patients require active intervention to modulate the risk factors and improve the outcomes.

P216

Accounting for metabolic control in adolescents with type 1 diabetes: modeling treatment adherence, adherence barriers, and psychosocial factors

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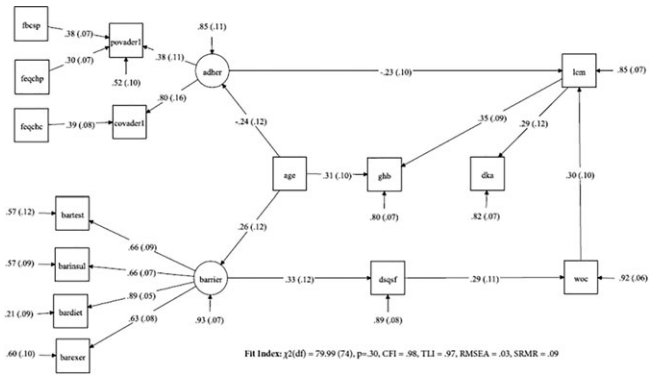
Objective: Adherence to treatment can improve glycemic control and reduce the risk of health complications, yet several studies failed to show a direct link between treatment adherence and glycemic control. This may be due to not accounting for the interplay of adherence barriers and treatment adherence, along with psychosocial factors related to adherence. This study addressed underlying mechanisms explaining the association between treatment adherence and glycemic control and complications.
Methods: Data were collected from 103 youth (63% girls) with type 1 diabetes and their parents (45% single parents); age of youth ranged from 13 to 18 years (M = 13.67 years, SD = 2.35).
Results: Structural equation modeling tested a latent variable model addressing the role of treatment adherence, adherence barriers, and psychosocial factors in current glycemic control and DKA in the previous year. Latent variable adherence included youth and parent self-report, controlling for family cohesion and diabetes-specific support. Latent variable adherence barriers consisted of testing, injecting, dietary, and exercise barriers. The path model controlled for age, shows that parent-reported negative life conditions (NLC) explains the interplay of treatment adherence and adherence barriers in their effect on glycemic control and DKA. Adherence barriers increased stress, leading to negative coping, and was associated with increased NLC, whereas better adherence led to decreased NLC; greater parent-reported NLC was directly linked with worse metabolic control. The model explained 20% of the variance in glycemic control and 18% variance in ketoacidosis.
Conclusions: The direct link of adherence and barriers with poor metabolic control is not apparent; however, their underlying mechanism shows their independent roles in predicting metabolic control, highlighting the important role of maternal stress in management of T1D in adolescents.



[*Adherence and Barriers for Metabolic Control*]

P217

Hormonal profiles following artificial nonnutritive sweeteners

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Objectives: To measure C peptide and Insulin responses to nonnutritive sweeteners.
Methods: Serum C peptide responses at -15, 0, 15, 30, 60, 90, 120 and 150 minutes following 100 gm glucose/equivalent equisweet amounts of Sucralose/Aspartame ingestion in the fasting state were measured in 50 subjects (25 nondiabetic and 25 Diabetic as adjudged by standard glucose tolerance tests ,WHO criteria) were measured by immunoassay. Glucose levels at these time intervals were also measured, and the hormonal levels normalized to the simultaneous glucose level.
These levels were measured both in the fasting state in the morning as well as in the afternoon, post lunch, on different days.
Results: Statistically significant increments in C peptide levels were observed as compared to fasting levels.
Conclusions: Nonnutritive sweeteners do present a stimulus to the C peptide stimulation system, though lesser than that to glucose. Metabolic implications in relation to Diabetes management are discussed. These relate to diabetes prevention as well as to treatment in dysglycemic subjects from Diabetic and Nondiabetic families.

Poster Tour 10 - Monogenic & Other Form of Diabetes

P218
A case of Wolcott-Rallison syndrome diagnosed with diabetes at 6 weeks of age

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Objective: Wolcott-Rallison syndrome (WRS) is an autosomal recessive disorder characterized by early-onset diabetes, skeletal abnormalities and potential development of acute liver failure. Neonatal or early infancy diabetes is a rare, potentially life-threatening condition, which highlights the importance of an early diagnosis. We therefore want to present a case of WRS diagnosed in Denmark.
Methods: A 6-week old boy presented with fever, dehydration and oral candida infection. The parents were consanguine.
Result: On admission, blood glucose was 22 mmol/l, C-peptide low (243 pmol/l) and anti-glutamic acid decarboxylase, anti-tyrosine phosphatase and anti-islet cell were all negative, revealing antibody negative early-onset diabetes. Insulin-pump treatment was initiated. Initially, liver and kidney function-tests were normal. Genetic testing using next generation sequencing and sanger sequencing identified a novel homozygous splice site mutation (c.1886+1delG) in the EIF2AK3 gene. The mutation is inherited in an autosomal recessive pattern and known to cause WRS. At 7 months of age, x-ray of the long bones revealed no clear evidence of epiphyseal dysplasia. Following a viral infection at age 10 months, the patient was admitted to hospital with fever, vomiting, severely elevated ALAT of 4169 U/L and neutropenia. He was diagnosed with acute liver failure. The liver enzymes normalized, but the neutrofilocyte-count remains low.
Conclusion: WRS causes neonatal or early-infancy onset of insulin dependent diabetes. WRS is most common in consanguine families, especially originating from the Middle East. There is a high risk of life threatening acute liver or renal failure induced by stress, such as hypoglycaemia, infections or anesthetics. This condition should be considered in young children presenting with diabetes, especially in consanguine families. Genetic testing is recommended for verification of the diagnosis.

Neonatal or early-infancy onset diabetes
Recurrent acute liver failure
Epiphyseal dysplasia
Renal dysfunction
Growth retardation
Hypothyroidism
Neutropenia
Developmental delay

[*Conditions associated with Wolcott-Rallison Syndrome*]

P219
Prevalence of metabolic syndrome and silent type-2 diabetes mellitus in obese children and adolescents

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Objective: Obese children are more prone to have metabolic syndrome (MS) and abnormal glucose metabolism. The aim of the study was to assess the prevelence of the MS, impaired glucose tolerance and untreated (silent) diabetes mellitus in obese Turkish children and adolescents.
Methods: We have studied 1399 obese (body mass index, BMI = >95. percentile) and overweight children and adolescents (BMI : % 85-95), 546 (%39.01) prepubertal and 853 pubertal (%60.09), aged between 7 and 18 years old. Medical history, physical examination, anthropometric measurements, results of biochemical and hormonal assays were obtained from the hospital records. MS was defined based on the modified WHO and Cook and IDF criteria adopted for children. The patients were defined as having impaired glucose tolerance (IGT) or diabetes, if the blood glucose level was between 140-200 mg/dl or >200 mg/dl respectively, in the 2. hour of OGTT.
Results: The prevelence of MS in obese children and adolescents were found to be %36.9, %43.4, %63.8 according to the modified WHO, Cook and IDF criteria, respectively. Pubertal cases had significantly higher MS prevelence than those of prepubertal cases according to all MS criteria .In overweight adolescents, the prevelence of MS was detected to be %4.5, %4.8 and %5.5 according to WHO, Cook and IDF criteria, respectively. IGT was detected in % 9.7 of the obese adolescents, but silent or undiagnosed T2DM prevelence was %5.9.
Conclusion: In our population, MS were frequently found among obese children and adolescents according to different MS criteria. The rate of IGT and silent or undiagnosed T2DM may be accepted as substantial. If these ratios are taken into account, all obese children should be evaluated for abnormal glucose metabolism even if there are no diabetes history in their family.

P220
Preliminary report of the clinical use of insulin degludec in youth with poorly controlled type 2 diabetes (T2D)

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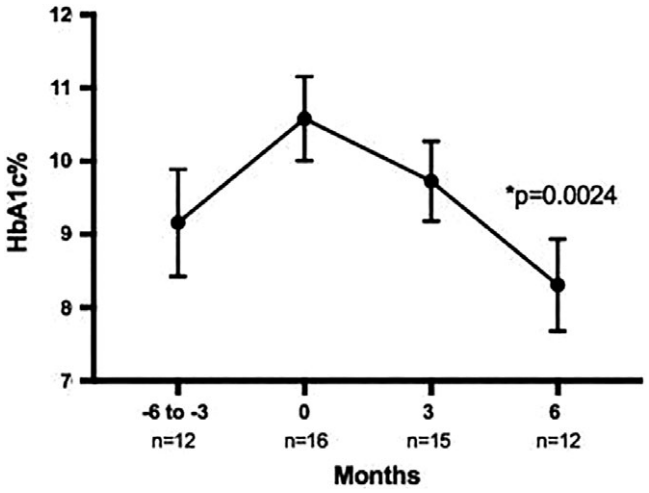
Objectives: In this study, we examined changes in A1c in adolescents with T2D before and after treatment with insulin degludec (Deg) in an uncontrolled, clinic setting.
Methods: An electronic medical record review was conducted of all pediatric T2D patients treated for at least 3 months with Deg. Mean A1c (+ SD) was calculated during the visit at which Deg was prescribed (0 mon), as well as 3 and 6 months before and 3 and 6 months after starting Deg.
Results: 16 adolescents with T2D were included in the study (13 female, age 17 ± 3 yrs, weight 107 ± 23 kg). Prior to initiation of Deg, 2 patients were on metformin alone and 14 patients were taking basal (glargine or detemir) insulin (2 insulin alone and 12 in combination with metformin). Regimens after starting Deg were Deg alone (n = 2) and Deg + metformin (n = 14.) Mean A1c increased from 9.2 ± 2.5 to 10.6 ± 2.2 % in the 3-6 mons prior to starting Deg (Figure). In contrast A1c fell to 9.7 ± 2.1% after 3 mon of Deg treatment and to 8.3 ± 2.1% after 6 mons (p = 0.0024 vs 0 mon). No episodes of DKA or severe hypoglycemia were reported during treatment with Deg.
Conclusions: These preliminary observations suggest that treating adolescents with poorly controlled T2D with Deg provides a safe means of significantly improving glycemic control. The impact of missed doses of Deg may be mitigated by the ultra-long duration of action of Deg.



[*Figure. HbA1c in T2DM pre/post treatment with Deg*]

P221
Longitudinal changes in glucose homeostasis across childhood and adolescence among youth with parental obesity

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Objectives: To describe the natural history of impaired glucose homeostasis from childhood to late adolescence among youth with a parental history of obesity.
Methods: We used baseline (8-10 yo), 1st follow-up (FU1, 10-12 yo) and 2nd follow-up (FU2, 15-17 yo) data from the Quebec Adipose and Lifestyle Investigation in Youth (QUALITY) cohort of Caucasian children with an obese biological parent at recruitment (complete cases = 338). At each assessment, a 2-h oral glucose tolerance test (OGTT) was performed after a 12h fast. Measures of plasma glucose were obtained 0, 30, 60, 90 and 120 min after ingesting 1.75g glucose/kg (max 75g). Impaired fasting glucose (IFG) is defined as fasting glucose ≥ 5.6 but < 7 mmol/L; impaired glucose tolerance (IGT) as 120 min glucose ≥ 7.8 but < 11.1 mmol/L; type 2 diabetes (T2D) as fasting glucose ≥ 7 mmol/L or 120 min glucose ≥ 11.1 mmol/L. Participants' trajectories across glucose tolerance categories were identified over time and displayed in tree diagrams.
Results: At baseline, 307 (91%) and 31 (9%) children had normal glucose tolerance (NGT) and IFG/IGT or T2D, respectively. Among NGT children at baseline, 227 (74%) remained NGT throughout follow-up, 62 (20%) developed IFG/IGT at FU1 and remained IFG/IGT at FU2 and 18 (6%) developed IFG/IGT at FU1 but reverted back to NGT at FU2. Among children with IFG/IGT at baseline, 26 (84%) reverted to NGT at FU1, of which 8 returned to IFG/IGT at FU2. The 5 children IFG/IGT at both baseline and FU1 all reverted back to NGT at FU2. Two NGT children at baseline were identified with T2D during follow-up. No participants reported receiving hypoglycemic agents between baseline and FU2.
Conclusions: We observed a substantial proportion of youth with transient IFG/IGT during puberty. Greater understanding of fluctuations in glucose tolerance status across adolescence are needed to inform optimal treatment strategies in youth with pre-diabetes.

P222
Rapid progression of type 2 diabetes in Indian children and adolescents - a case to ponder

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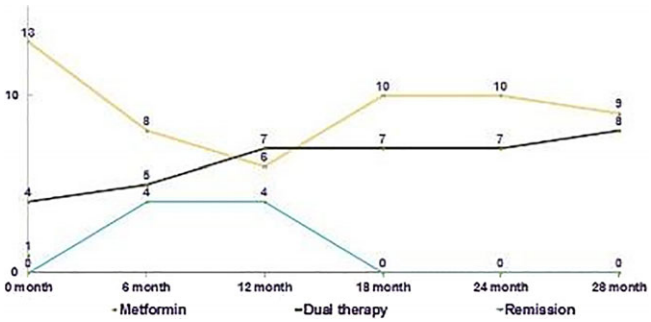
Introduction: Dramatic increase in childhood obesity has lead to a surge of type 2 diabetes in children and adolescents. There is limited information regarding course of type 2 diabetes in Indian children and adolescents.
Objective: To study the course of type 2 diabetes in Indian children and adolescents and its determinants.
Methods: Ongoing observational study.
Result: Seventeen subjects (10 girls, age 14.5 ± 2.4 years, range 10.1-17.9 years) with type 2 diabetes were followed for 1.9 ± 1.6 years. Comorbidities at diagnosis included hypertension in 76.5%, dyslipidemia in 64.7% and transaminitis in 88.2%. Initial treatment included life style modifications and metformin alone in 13 and metformin with insulin in 4. On follow-up 4 subjects achieved remission after 3.7 ± 2.0 months (1.7-6 months). Subjects achieving remission had greater reduction in BMI SDS at 6 months compared to those without remission (-0.2 ± 0.3 versus +0.1 ± 0.3). No difference was noted in the birth weight, baseline BMI SDS or DEXA derived adiposity status of the two groups. All subjects achieving remission had recurrence 11.9 ± 2.1 months later. Six out of 13 subjects started on metformin showed glycemic deterioration and required additional therapy at 13.8 ± 10.7 months. Of the 4 subjects started on insulin and metformin, only 1 was able to discontinue insulin. At last follow up, 9 subjects were on metformin monotherapy while 8 were on dual therapy (insulin in 4, SGLT2 inhibitor in 1, GLP1 analog in 1 and gliptin in 3).
Conclusions: Findings of our study suggests aggressive course of type 2 diabetes in Indian children and adolescents with glycemic deterioration in half within two years of diagnosis. Reduction in BMI SDS is the only factor that predicted remission in these subjects. This along with the observation that no remission was observed after six months of diagnosis highlights the need for early aggressive life style intervention.



[*Course of type 2 diabetes subjects showing number of subjects at 6 month interval in each category (Metformin, dual therapy, remission)*]

P223
Profile and follow-up of South Indian adolescents with type 2 diabetes mellitus

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Introduction: Type 2 DM is on the rise in developing countries. There are no data on type 2 DM in adolescents from our country.
Objective: To present the clinical, biochemical data and short term follow-up of children with type 2 DM seen in the diabetic clinic of a tertiary care referral hospital in a 2 year period.
Methods: All children and adolescents who satisfy the WHO criteria for diagnosis of DM, have normal C-peptide (> 0.9 ng/mL) and have negative anti-glutamic acid decarboxylase antibody are included. They were managed as per the ISPAD 2014 guidelines for management of DM in children. They were given diet advice and followed up every 3 months.
Results: Twenty one adolescents (9.4%) among children registered in the diabetic clinic of the unit) as type 2 DM in the study period. Mean age was 15.2 ± 2.1 years (M: F 11:10). The presentation was asymptomatic screening, classical symptoms of DM, ketoacidosis in 13 (61.9%), 7 (33.9%) and 1 (4.7%) adolescents respectively. The BMI SD score was 3.4 ± 1.0; all had waist circumference > 90th percentile. Family history of DM in 1st degree relative present in 17 (80.9%). All adolescents were pubertal. 5 (23.8%) and 7(33%) child had fatty liver and polycystic ovaries respectively. The mean HbA1C was 9.9 ± 1.4; C-peptide was 3.4 ± 1.1 ng/mL; Anti GAD negative in all tested; monogenic DM screen negative in 5 screened. The initial modality of therapy was: metformin, metformin with insulin and only insulin therapy in 18(85.7%), 2 (9.5%), 1(4.7%) adolescents respectively. Two children had a positive microalbuminuria screen, one needed enalapril, one had retinopathy. 4(19%) had systemic hypertension. Of the 18 on metformin, 3 required insulin therapy on follow up period. None had adverse reactions to metformin during the study period.
Conclusion: All overweight adolescents with high waist circumference and family history of type 2 DM MUST be screened for DM. Metformin is a safe drug that can be used to treat these adolescents.

P224
Bariatric surgery in young people. Is it safe and does it work? A retrospective review of data from a major UK center

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Type 2 diabetes linked to obesity has increased in the young. Bariatric surgery is now offered in the UK to those BMI > 40 kg/m^2 as a therapeutic option.
Objectives: To assess the safety and efficacy of bariatric surgery in our unit.
Methods: Retrospective case review
n = 27, 19f mean age 17(13-19), had laproscopic adjustable gastric band (LAGB) n = 3 vertical sleeve gastrectomy (VSG) n = 24.
Assessment included:
1. Oral glucose tolerance test, HOMA-IR, and HbA1c
2. Psychological evaluation, psychometric measurement of quality of life.
3. Nutritional evaluation, dietetic review of daily calorie intake and nutrient density.
4. Hemoglobin, and Vitamin D levels
Results: Mean BMI 50(31-66) kg /m^2 (31-66) at surgery dropping to 40 kg/m^2 at 6 months. In the VSG it persisted at 2 years, BMI 35kg/m^2.
Type 2 diabetes was present in 2.
1. 19m, 60 kg/m^2, HbA1c of 64 on insulin and metformin. He lost 18 kg/m^2 with VSG, 15 months post-op A1c is 39 on metformin alone.
2. 19m, 47 kg/m^2 , HbA1c 53, was started on sitigliptim, VSG recently performed.
In the remainder, HOMA-IR was elevated. LAGB mean 2.6(1.2-4) dropped to 1.25. VSG mean 4.1(1.8-6) dropping to 2.1(1-3.4). Mean HbA1c unchanged at 38 (34-43) mmol/mol 38 (30-38) at 6 months.
Safety data: No immediate surgical complications.
Iron, calcium and Vitamin D supplements at 3 weeks.
LAGB mean Hb 149g/L 136 at 3 months, 149 at 12 months. Mean Vitamin D 10 nmol/l, 17.5 at 3 and 12 months.
VSG mean Hb 134g/L 139 at 6 months, 129 at 12 months. Mean Vitamin D 55 nmol/L 49 at 3 months 20 at 12 months.
Long term: postural hypotension n = 2, one who lost 30 kg/m^2. Hair loss in 2f. Loose skin in 3, none have had plastic surgery. Vomiting in 2, helped by smaller meals.
One 18f developed an eating disorder and was referred to adult mental health.
Conclusions: Bariatric surgery namely VSG is a safe and effective treatment for obesity and Type 2 diabetes. Assessment by a multidisciplinary with links to an adult service is important for long term follow up.

P225
Effect of different treatment regimens on glycaemic control in children and adolescents type 2 diabetes

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Objectives: Type 2 diabetes mellitus is emerging as a new clinical problem within pediatric practice. To assess the glycaemic control among different treatment modalities in newly diagnosed type 2 diabetes mellitus (T2DM) in children and adolescents and to compare the change in HbA1c after I year.
Methods: A prospective study was conducted in the Changing Diabetes in Children (CDiC), Pediatric diabetes outpatient clinic in BIRDEM 2 from January 2014 to January 2016. Children and adolescents who were newly diagnosed were randomly included in the study. They were followed up regularly and evaluated after 1 year. The patents were categorized according to treatment modalities - oral insulin sensitizing agent (metformin) alone, insulin only and metformin in combination with insulin. Life style modification was advised in all of the patients. Glycaemic status was evaluated at registration and after 1 year by assessing HbA1c.
Results: Out of 123 patients (ages 8 -18years), 61% were female, 39% were male, mean age at diagnosis was 12.8 ± 2.3 years. Family history was positive in 94% patients and 16% mother had H/O GDM. Among them, 36(29%) were on oral drug only, 37(30%) insulin only and 50(41%) on combination therapy. Patients on metformin alone had a lower HbA1c at diagnosis [IQR: 7.6(6.1-11.7)] than those on insulin alone [11.3(9.8-13.0)] or combination therapy [10.1(7.4-12.4)] (p< .008). At follow up, median HbA1c was reduced more in oral only 7.0(6.1-8.5) and combination therapy 7.6(6.7-8.8) than insulin only 8.9 (6.2-10.3) though it did not reach statistical significance (p = .240).
Conclusion: Metformin only or along with insulin could be a good option in most of the children and adolescents with newly diagnosed type 2 diabetes.

P226

Care of adolescents with type 2 diabetes across the North West London Pediatric Diabetes Network

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Introduction: SWEET study revealed that although Type 1 Diabetes is more prevalent in children, those with Type 2DM suffer higher rate of complications.

Objectives: Our aim was to assess individual services in 5 hospitals across our network, using ISPAD and AAP guidelines as benchmark and use our findings to instigate changes in our clinical practice to ensure better management for this patient cohort.

Methods: Data was collected using electronic and paper records, anonymized and compared to ISPAD and AAP guidelines.

Results: Our cohort comprises of 48 patients(32 females, median age 14,range 9.0-17.7years)who have been under follow-up for a median of 1.5years.96% were diagnosed appropriately using an HbA1c or fasting glucose but 42% did not have autoantibody testing to preclude Type 1 diabetes. Strikingly, none of the patients had a comprehensive assessment of all diabetes-related comorbidities at presentation, with the most significant shortfalls seen with obstructive sleep apnoea, PCOS, depression and renal disease.88% were treated appropriately with either metformin or insulin monotherapy or both, along with lifestyle advice and dietician input. None had complete assessment of comorbidities at annual review, with particularly low rates of checking albumin-creatinine ratio and triglycerides. Median frequency of HbA1c monitoring was 3monthly,only 33% reaching less than 48mmol/mol at latest follow-up. The main reason for not achieving HbA1c targets is poor compliance with treatment and lack of community-based lifestyle intervention programs.

Conclusions: This audit reveals weaknesses at assessing comorbidities at presentation across most hospitals in the Network, vast majority of patients subsequently not achieving optimal HbA1c.Clinic proformas serve as aide memoir to improve management. Vital support can be provided by Community lifestyle intervention programs to engage this difficult age group of children. Wider choice of medications and innovative diets are needed.

Poster Tour 23 - Type II Diabetes

P227

The clinical characteristics of children diagnosed with type 2 diabetes before 10 years of age in Western Australia

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Objectives: The incidence of Type 2 diabetes (T2D) diagnosed during childhood is increasing in Western Australia (WA). Recent reports describe children as young as 4 years being diagnosed with T2D. Our study aimed to describe the clinical features of children diagnosed before age 10 with T2D in WA.
Methods: Data on children with a diagnosis of T2D before age 10 years was extracted from the Western Australian Children's Diabetes Database and hospital clinical files. The data was used to determine common features seen in these early onset T2D children.
Results: 195 children under the age of 16 years were diagnosed with T2D between June 2000 and June 2017. 12 (6.2%) children were less than 10 years of age. 9 (75%) female, 11 Indigenous Australian, 1 Maori, 6 children had chronic medical conditions. The youngest child was 6 years 11 months old. 3 children presented polyuria and polydipsia, 6 unwell with other illnesses and 3 asymptomatic. All children had one or both parents with T2D. 11 (93%) were obese at diagnosis with BMI z-score 2.379 $\pm$ 0.64, HbA1c 9.0 $\pm$ 2.38(mean $\pm$ SD). Type 1 diabetes antibodies were negative in 7 of 8 children tested. 7 of 10 screened for diabetes complications at diagnosis had 1 or more complications present.
Conclusion: 6% of children with T2D in WA are less than 10 years old at time of diagnosis. Common features seen in these children are female sex, indigenous heritage, obesity, parental T2D. Diabetes complications are commonly present at time of diagnosis in these young children.

P228

Acanthosis Nigricans: a predictor of developing type 2 diabetes?

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Objective: In a high risk cohort, does the presence of Acanthosis Nigricans predict the development of Type 2 Diabetes Mellitus in the future?
Methods: Established longitudinal birth cohorts, Indigenous (n 686) and non-Indigenous (n 195) with follow-ups at age of 18.4 years (adolescence) and 25.2 years (adulthood). Face-to-face physical examination including acanthosis nigricans (AN), height, weight used to calculate body mass index, and biomarkers including HbA1c. Diabetes (DM) was defined as HbA1c ≥ 6.5% and prediabetes as HbA1c between 5.8-6.4%.
Results: Complete data was available for 394 people (Indigenous 302, non-Indigenous 92). At adolescence, AN rates were higher in Indigenous (219/221), with low levels of DM (4; 2 with AN). Of those with AN, 188 had a normal HbA1c and 31 prediabetes. By adulthood, rates of AN had decreased (171 Indigenous), with AN no longer present in 74/221. DM rates had increased to 14. Of those with DM in adulthood, AN was present in 10/14 in adolescence and 11/14 in adulthood.
At adolescence, no relationship between AN and BMI was seen, with 54% (37/68) of underweight, 36% (65/182) normal BMI, 52% (50/96) of overweight and 52% (25/48) of obese people with AN. However, in adulthood, current BMI was associated with DM, odds ratio increasing from 5.9 (CI: 1.2-30) with overweight to 12.8 (CI: 2.5-66) with obesity compared to normal BMI.
Conclusions: AN was common in this high risk population at a young age. The proportion of people with AN was higher at adolescence than young adulthood. Of those who developed Type 2 DM by adulthood, 79% (11/14) had AN. However, 85% of those with AN at adolescence had a normal HbA1c up to 7 years after AN was identified, with only 2/221 having DM at that time and <1% having developed DM by adulthood. In this high risk population, although rates of AN were high, it was not a reliable predictor of current or future diabetes risk.

Poster on Display – Type II Diabetes

P229
Effect of eating habits on obesity and type 2 DM

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Objective: Obese children are predisposed to type 2 DM (diabetes mellitus). One of the greatest dangers for today's children is the easy accessibility to snack foods. In this study, we aimed to determine the relationship between nutritional habit, serving as a critical factor for childhood obesity.
Methods: Our study was prospectively conducted between July 2017-November 2017 by enrollment of children, aged 6-18 years, who admitted to the pediatric primary care clinic of Ankara University School of Medicine. Anthropometric values were recorded, snack habits were questioned. The data were evaluated by appropriate statistical methods. These children were observed for insulin resistance and type 2 DM. This study is a preliminary report of ongoing research of insulin resistance and type 2 DM.
Results: The mean age of 1949 children included in our study was 11.1 ± 3.8 years. We found that 12.5 % of our participants were overweight and 17.9 % were obese. When we questioned the habit of snacking, we found that only 13.8% of all cases did not consume snacks. The frequency of snack consumption was 1-2 days per week in 41.6%, 3-5 days per week in 19.4%, and every day in 25.2% of the participants. At least once a week of snack consumption was mentioned by 86.2% of the participants. While the obesity rate was 14.6% for those who never ate eat snacks, this rate increased to 24.6% for those who consumed snacks every day. We obtained statistically significant positive relationship between snacking habits and childhood obesity (p:0,15).
Conclusion: Our study showed that as the snacking habit increases, the tendency of obesity obese increases. Regulation of eating habits and avoidance of having snacks at home is a matter to be emphasized first. For this reason, snacks should not be available at home, should not be rewarded, and should not be sold in school canteens. Families should be informed about insulin resistance and diabetes and what obesity is.

P230
Rapid progression of type 2 diabetes and related complications in children and young people - a literature review

T. Barrett[1], M. Yazid Jalaludin[2], S. Turan[3], N. Shehedah[4], M. Hafez[5], Novo Nordisk Paediatric Type 2 Diabetes Global Expert Panel

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Objectives: Type 2 diabetes (T2D) is rare in children compared with adults and there are limited evidence-based therapies. Moreover, reports suggest that the natural history of the disease shows more rapid progression in children compared with adults, and diabetes-related complications occur earlier. To gain a greater understanding of pediatric T2D, we undertook a literature review of the evidence on disease progression in patients under 25 years of age.
Methods: We searched PubMed for the period January 2000-January 2018 and two congresses, Asia Pacific Pediatric Endocrine Society and Latin American Pediatric Endocrinology Society, reviewing their last two meetings. The search included terms for all known variants of "pediatric" or "adolescent" and "type 2 diabetes mellitus". The results were combined and then filtered using search terms related to "disease progression" or "clinical deterioration" or "diabetes complications". We then reviewed the articles and categorized them by likely relevance.
Results: We identified 564 'hits', of which 25 contained relevant data. The main findings were:
a) beta-cell failure is rapid in children, with reports ranging from 8-28% (median 25%) reduction in beta-cell function per year;
b) progression to exogenous insulin use ranged from 11-44% within 1 year from diagnosis, but was not consistent in all studies included;
c) many diabetes-related complications were evident within 2 years from diagnosis, particularly renal and cardiovascular complications.
Several of the studies compared pediatric T2D with pediatric type 1 diabetes or adult T2D and found significantly faster progression of pediatric T2D.
Conclusions: In this analysis of 25 studies, the aggressive nature of pediatric T2D was evident in the time to beta-cell failure, the need for exogenous insulin and the development of complications. To address these aspects of the disease, new treatments targeting the underlying pathology are needed urgently.

P231
Can early childhood characteristics distinguish children with normal glucose tolerance from those with deteriorating glucose homeostasis across adolescence?

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Objectives: We compared early characteristics between children who remain with normal glucose tolerance (NGT) and those who deteriorate to either impaired fasting glucose (IFG), impaired glucose tolerance (IGT) or type 2 diabetes (T2D) from childhood to late adolescence.
Methods: We used data from the baseline (8-10 yo), 1st follow-up (10-12 yo) and 2nd follow-up (15-17 yo) assessments from the QUALITY cohort of Caucasian children having a parental history of obesity. At each assessment, a 2-h oral glucose tolerance test (OGTT) was performed after a 12h fast. Among children with NGT at baseline, those who remained NGT across follow-up (n = 227) were compared to children who deteriorated to either IFG (fasting glucose ≥5.6 but < 7 mmol/L) , IGT (120 min glucose ≥7.8 but < 11.1 mmol/L) or T2D (fasting glucose ≥7 mmol/L or 120 min glucose ≥11.1 mmol/L) at one point during follow-up (n = 62). Baseline characteristics included age, sex, body mass index z-score (zBMI), pubertal stage, % body fat (DEXA), physical activity (7-day accelerometry), screen time (self-

report), as well as parental education, parental BMI, parental history of diabetes/gestational diabetes and household income. Comparisons between children who remained NGT and children who deteriorated were performed with Wilcoxon tests, t-tests and Chi-squared tests.

Results: Fasting glucose (4.9 vs 5.1 mmol/L, p< 0.001) and 120 min glucose (6.0 vs 6.4 mmol/L, p = 0.001) were lower in youth who remained NGT vs. those who deteriorated to IFG/IGT/T2D, although distributions overlapped considerably across both groups. No other baseline characteristics differed between the 2 groups.

Conclusions: Overall, we did not identify clinically meaningful differences in early childhood characteristics between youth remaining NGT vs. those deteriorating to IFG, IGT or T2D in these preliminary analyzes. Further research is needed to understand which factors predict a deterioration in glucose tolerance across adolescence.

Poster Tour 12 - Nutrition in Diabetes

P232

Cholecalciferol doses for optimizing serum 25-Hydroxyvitamin D levels in people with youth onset diabetes- a retrospective audit

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Introduction: Vitamin D deficiency (VDD) is quite prevalent in subjects with youth-onset diabetes (DOY). However, there is not much data on dose of VD supplementation in these patients.
Objectives: To study the factors affecting VD status in DOY patients, and the dose of VD supplementation in achieving 25-hydroxyvitamin D (25(OH)D) levels of ≥20 ng/ml.
Methods: In this retrospective audit, case records of all DOY subjects following the outpatient clinic of a tertiary care center in North-India were studied. DOY was defined as age of onset of diabetes of < 25y whereas VDD was defined as 25(OH)D of < 20 ng/ml.
Results: A total of 68 subjects (31 males, 37 females; 53 T1DM, 7 T2DM, 8 other types) were studied. Age of the subjects ranged from 3-39 years with a mean of 18.7 ± 7.8 (median,18). Duration of the diabetes ranged from 0.5 - 30 years with a mean of 5.6 ± 5.7 (median 4.2). 25(OH)D levels ranged from 7-209 ng/ml with a mean of 30.0 ± 29.5 (median,22). Of 68 subjects studied, VDD was observed in 31 (45.6%; 95%CI, 41.5-49.7). Mean 25(OH)D level was 23.1 ± 16.8 in subjects aged < 20 years and 39.9 ± 39.7 in subjects aged ≥20 y. VD status significantly correlated with younger age, presence of T1DM, past history of diabetic ketoacidosis (DKA), and number of vitamin D supplement doses received in last 6 months. 18 (72%) of subjects with 25(OH)D < 20 ng/ml and 11 (35%) of subjects with 25(OH)D ≥20 ng/ml had received cholecalciferol doses (60,000 IU each dose) of six or less (p< 0.007) (Table 1). There was no correlation of 25(OH)D with weight, BMI and recent HbA1c of the study subjects.
Conclusion: Among DOY subjects, T1DM patients particularly younger subjects (< 20y) and those with history of DKA are prone to have VDD. A cholecalciferol (vitamin D3) supplementation dose of 2000 IU daily or 60000 IU monthly is able to prevent VDD in at least two thirds of subjects with youth onset diabetes.

Variable	25(OH)D <20 ng/ml (n = 31)	25(OH)D ≥20 ng/ml (n = 37)	P value
Age (y)	16.3 ± 7.4*	20.7 ± 7.6	0.02
Gender (M:F)	15:16	16:21	>0.6
Type 1 diabetes, n (%)	28 (90)	25 (68)	0.024
History of DKA, n (%)	14 (45)	6 (16)	0.009
Weight (kg)	41.1 ± 17.1	49.6 ± 16.4	0.041
BMI (Kg/M2)	18.43 ± 4.04	20.01 ± 4.28	>0.1
HbA1c (%)	11.04 ± 3.8	9.75 ± 3.1	>0.1
Serum 25(OH)D (ng/ml)	14.12 ± 3.3	43.32 ± 34.8	<0.001
Received >6 doses of vitamin D (60k) in last 6 months, n (%)	13 (28)	26 (65)	0.007

[*Table 1: Factors correlating with vitamin D status (*Mean ± SD)*]

P233

Association between food insecurity and glycemic control among youth with type 1 diabetes in Haiti

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Objective: Food insecurity may challenge optimal pediatric diabetes management, especially in low-income countries where pre-mixed NPH/Regular insulin regimen prevail. We evaluated the relationship between food insecurity and hemoglobin A1c (A1c) in Haitian youth with type 1 diabetes (T1D) in Haiti.
Methods: Cross-sectional study from 07-12/2017 of youth aged 0-27 years with T1D at one pediatric chronic disease clinic in Haiti where medical care, insulin and supplies are provided free of charge. We used the World Food Program-Haiti questionnaire to calculate a Food Consumption Score (FCS). Recent A1c values were retrieved from the medical record. We used linear regression to examine the relationship between FCS and A1c.
Results: 68 patients (33% male; mean age 17.5 ± 4.8 y; mean diabetes duration 3.2 ± 3.1 y; mean BMI z-score -0.83 ± 1.1; 32% rural residence) were included. 15 (22%) patients had poor or borderline FCS. Carbohydrates were not consumed daily by 42%, although over 90% consumed fat daily, and 47% ate sugar on three days a week or more. Low consumption (< 3 days per week) of vegetables and meat was reported in one third, and of dairies and fruit in more than two thirds. Mean recent A1c was 11.1 ± 2.6% and only 13 (19%) had A1c values < 8% while 28 (40%) had values >12%. A1c was not predicted by FCS (p = 0.60). Instead, higher BMI z-score (p = 0.04) and older age (p = 0.003) predicted lower A1c. In a model adjusted for age (p = 0.001), sex (p = 0.11) and diabetes duration (p = 0.33), BMI z-score remained marginally significant (p = 0.08).
Conclusions: In this cohort of Haitian youth with diabetes, food insecurity and poor food composition are common. Glycemic control is very poor but is not predicted by FCS. Higher BMI as a possible marker of adequate nutrition and insulin adherence associates with improved glycemic control. Prospective studies should evaluate food insecurity in light of social determinants (poverty, stress, stigma, education) as predictors of glycemic control.

P234

In young people using insulin pump therapy an additional sixty percent of the mealtime insulin dose improves postprandial glycaemia following a high fat, high protein meal

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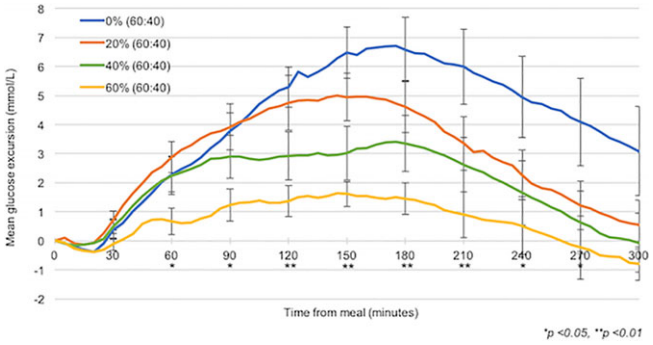
Research has demonstrated the need for additional insulin for fat and protein rich meals in individuals with Type 1 Diabetes (T1D). However, current insulin dosing algorithms for fat and protein have been associated with an increased rate of hypoglycaemia.
We aimed to determine the amount of additional insulin required for a high fat, high protein meal (HFHP) to optimize postprandial

glycaemia without increasing the incidence of hypoglycaemia in young people with T1D using insulin pump therapy.

This is a four-by-four randomized, crossover trial being conducted at two pediatric centers in Australia. Presented are the results of an initial 7 subjects; mean age 13.3 ± 3.8 years (4 male), diabetes duration 4.8 ± 4.1 years, and HbA1c 49 mmol/mol (6.7 ± 0.7%). Following an overnight fast, subjects were given the same high fat (40g), high protein (50g), moderate carbohydrate (30g) meal with insulin on 4 occasions. On each occasion, insulin was calculated for the carbohydrate content of the meal with an additional 0% (control), 20%, 40% or 60% of this dose added to give the total dose. The total dose was delivered as a combination bolus, 60% was delivered in a standard bolus 15 minutes prior to meal consumption with the remaining 40% delivered in an extended bolus over 3 hours. Postprandial glycaemia was assessed for 5 hours using continuous glucose monitoring.

Administration of an additional 60% of the mealtime insulin dose for a HFHP meal resulted in significantly lower mean postprandial glucose excursions from 60- 270 minutes ($p < 0.05$) when compared to the control condition, 0% (Figure 1). There were 2 hypoglycemic episodes (BGL ≤3.5 mmol/L), 1 episode occurred in the 40% and 60% condition respectively.

Preliminary study results have demonstrated that for a HFHP meal an additional 60% of the mealtime insulin dose improves postprandial glycaemia without increasing the incidence of hypoglycaemia.



[*Figure 1. Mean postprandial glucose excursions (±SEM) after a high fat, high protein meal.*]

P235

Food insecurity screening among families of children with diabetes: development of a screening initiative and care algorithm for practice

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Background: There is little research about food insecurity (FI) screening in households with children living with diabetes. This study evaluated the acceptability and feasibility of a FI screening initiative at the SickKids Hospital's pediatric diabetes clinic. The initiative comprised of three validated screening questions, a care algorithm, a community resource handout, and a poster. The initiative in turn helped registered dietitians tailor diabetes management plans among FI families and direct them to community resources.

Methods: In-person semi-structured interviews with 37 families and 3 dietitians were conducted to elicit feedback on the delivery, acceptability, and feasibility of the screening initiative. Prominent response themes were identified through content analysis. Data interpretation was facilitated by the insights provided by a reflective journal kept by an on-site research coordinator.

Results: Among those who were screened, fifteen families reported FI. 80% were immigrants, 40% were single parents, 13% were divorced/separated and 40% had an education of high school or less. Dietitians and most study participants felt comfortable with screening questions. Food insecure families appreciated the opportunity to express concerns and become aware of affordable food resources. However, about 20% of FI participants described fear of judgment and stigma from care providers, if screened positive for food insecurity. Dietitians reported lack of time to screen all patients and to provide follow-up resources for a positive screen. A self-reported intake-form was recommended to systematically screen everyone.

Conclusions: A standardized and respectful method of assessing FI could direct dietitians to better tailor treatment plans and support food insecure families of children with diabetes. Results encourage the implementation of similar food insecurity screening initiatives in other pediatric settings as part of routine clinical practice.

P236

Blood vitamin levels in type 1 diabetes children and adolescents: a pilot study

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Objective: Dietary restriction in children with T1DM may lead to micronutrient deficiencies. A study from India has reported lower intake of vitamin A, B1 and B2 than that recommended by ICMR. However, there is no data on the blood levels of vitamins in T1DM children.

Methods: Twenty T1DM (IgA tTG negative) and 20 age-matched apparently healthy children were included in the study. Subjects on any vitamin supplementation were excluded. Dietary recall for the previous 3 days of all participants was taken and blood samples collected in the fasting state for fat soluble and water soluble vitamin (except vitamin C) estimation. Dietary intake of vitamins was correlated with their blood levels and they were compared between cases and controls.

Results: The two groups were comparable with respect to age, sex, height SDS, weight SDS and BMI SDS. There was no significant differences in the levels of any of the vitamin level and their dietary intake between the T1DM patients and controls except for blood B5 level which was higher in T1DM patients (32.5 ± 10.8 vs 26.27 ± 6.25 ng/ml, $p = 0.018$). All subjects had vitamin D levels between 10-30 ng/ml whereas 11 controls and 9 cases had levels between 20-30 ng/ml (vitamin D insufficiency) whereas the remaining were vitamin D deficient. Two controls had slightly low thiamine blood levels (< 0.5 ng/ml), two controls and one T1DM child had slightly low vitamin K level (< 0.1 ng/ml) whereas all other vitamin levels were normal in both cases as well as controls. There was no significant correlation between dietary intake of vitamins with their blood levels except for folic acid ($r = 0.392$, $p = 0.012$).

Conclusion: Dietary intake of vitamins and their blood levels in T1DM children and adolescents is not inferior to that of controls. Majority of the Indian children and adolescents including those with T1DM require supplementation with vitamin D. The study is limited by small sample size and a larger study is needed to confirm the study findings.

P237

Blood levels of minerals and essential trace elements in type 1 diabetic children and adolescents: a pilot study

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Introduction: Dietary restriction in children and adolescents with type 1 diabetes mellitus (T1DM) may lead to deficiency of micronutrients. A study from India has reported lower intake of iron, zinc and calcium than that recommended by ICMR. However, there is no data on the blood levels of minerals and essential trace elements in T1DM children.

Objectives: To assess blood levels of minerals and essential trace elements in children and adolescents with T1DM and correlate them with dietary intake.
Methods: Twenty T1DM (IgA tTG negative) and 20 age-matched apparently healthy children were included in the study. Dietary recall for the previous three days of all participants was taken by a nutritionist and blood samples were collected in the fasting state for estimation of minerals (sodium, potassium, chloride, phosphorus, magnesium) and essential trace elements (copper, iron, zinc, chromium, cobalt, manganese, molybdenum, nickel, selenium, tin and vanadium). Dietary intake of minerals and trace elements and their blood levels were compared between cases and controls.
Results: Serum tin levels were significantly lower (0.99 ± 0.36 vs 1.33 ± 0.35 μg/l, p = 0.005) whereas manganese levels were significantly higher (13.95 ± 4.23 vs 11.78 ± 1.65 μg/l, p = 0.039) in T1DM than controls. Serum iron levels tended to be lower in T1DM than controls (62.79 ± 26.56 vs 81.71 ± 32.89, p = 0.061). Serum sodium was significantly lower in T1DM children but the corrected serum sodium was not statistically significant. There was no significant difference in serum potassium, chloride, phosphorus, magnesium, copper, chromium, selenium, molybdenum, cobalt, nickel, zinc and vanadium between the groups. There was no significant correlation between dietary intake of any mineral or trace element with their blood levels.
Conclusions: Except for serum tin levels, blood mineral and essential trace element levels of T1DM patients are not lower than that of controls. The study is limited by small sample size.

P238
Feeding patterns and mealtime behaviors of children with type 1 diabetes

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Introduction: Children with T1D often experience problems with dietary adherence and do not consume a healthy, balanced diet. In addition, parents of young children report mealtime management to be the most challenging aspect of diabetes care.
Objectives: To evaluate the feeding patterns and mealtime behaviors of children with T1D (subgroups 4-8 years, 9-13 years, 14-18 years), their parents and siblings. To identify if feeding issues and/or mealtime behaviors impact on parental stress and perceived self-efficacy for T1DM management. To evaluate if HbA1c is associated with feeding patterns or mealtime behaviors.
Method: 129 parents of children with T1D (age 4 to 18) completed the Food Inventory, The Behavioral Pediatrics Feeding Assessment Scale (BPFSA), The Parenting Stress-Index Short Form and The Self-Efficacy for Diabetes Scale and had their HbA1c recorded at their regular diabetes clinic.
Results: Food Inventory data analysis revealed that on average, children with T1D had a greater variety of food intake in all categories than their siblings. The mean frequency of feeding problems in children with T1DM was no higher than the normative sample for the BPFAS. Results suggest that parents of children age 4-8 and 14-18 report the lowest levels of diabetes self-efficacy. When compared with the feeding patterns of their parents, children with T1D ate a narrower variety of foods, with the lowest percentage of intake of vegetables. Younger children with T1DM (4-8 years) are most likely to display behavioral problems regarding feeding and had the greatest number of reported feeding problems. No association was found between HbA1c and feeding issues or mealtime behaviors.
Conclusions: These findings could aid in the development of intervention strategies for increasing food consumption of vegetables, which could be targeted at a younger age group, and provide support for parents in both the early and later stages of the T1D diagnosis and its management.

P239
Effect of fat and protein on post-prandial blood glucose level

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Background: Carbohydrate Counting (CC) is going to be popular in Japan. However, modern Japanese food is very various. The elevation of postprandial glucose (PG) level after taking the fat and protein rich foods sometimes cannot be controlled by CC only. Some reports focused on the additional insulin for dietary proteins and lipids. FPU method was proposed by Pańkowska E. Few studies have examined the influence on postprandial blood glucose given by the difference in type of dietary lipid and protein.
Aim: To see the influence of dietary protein and fat types on postprandial blood glucose.
Methods: In type 1 diabetes patients, postprandial glucose profile was analyzed by CGM or FGM after eating various kinds of test foods.
Results: The PG profile was stable after taking Sushi dishes (high carbohydrate, low fat and protein) without additional insulin to CC. The PG profiles were variable among the subjects after taking grilled meat dishes and carbonara spaghetti (high fat and protein) with additional insulin according to FPU to CC. Boiled Chicken meat and boiled Puffer (100% protein) elevated PG. On the other hand, 300 g boiled Squid and boiled Whitebait did not elevate PG level. The olive oil and canola oil did not too.
Discussion: Additional insulin was not needed for protein and fat in the high carbohydrate foods such as Sushi dish. Sometimes, insulin dose calculated by FPU method for high fat and high protein food, induced hypoglycemia several hours after meals. Furthermore, this study showed that there were some differences among the influences on PG profile was greatly dependent on the type of protein.

Poster on Display - Nutrition in Diabetes

P240
Nutritional knowledge in type 1 diabetics and duration of diabetes

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Objectives: The purpose of this study is to investigate if there is a relationship between the score of the nutritional diabetes knowledge survey (NKS), developed and validated by Rovner et al., and the duration of type 1 onset diabetes in children. Our hypothesis is that; based on children's and parent's experience, the longer a child is diagnosed with diabetes, the better his nutritional knowledge and understanding should be.
Methods: All of our 200 type 1 diabetic children and adolescents, aged under 18 years old, followed at our diabetes clinic, and their parents, were invited to complete a nutritional diabetes knowledge survey. The final score could range between 0 and 100%, higher percentage meaning better diabetes nutritional knowledge. Associations between NKS score, duration of diabetes, HbA1c, administration mode of insulin, family income and parent's education were also analyzed.
Results: From the 159 answers received, 129 surveys were valid for analysis. Median NKS score was 73.9% [60.9-82.6]. Most respondents were parents (43.4%), followed by children (40.3%) and by parents along with their child (16.3%). In this sample population, NKS score was inversely associated with diabetes duration (rho = -0.19, P = 0.029) and even more when we looked merely at the parent's score (rho = -0.41, P = 0.002). The furthest they were from the diagnosis, the less success they had in the carbohydrate counting survey category (rho = -0.24, P = 0.006). The score was also inversely associated with HbA1c value (rho = -0.26, P = 0.003) and has been found to be better, regarding parent educational level and administration mode of insulin.
Conclusion: This study revealed a negative association between diabetes duration and diabetic nutritional knowledge, specifically in carbohydrate counting. This is having a clinical impact by demonstrating the importance of improving and emphasizing over time our nutritional teachings to diabetic children and their families.

P241
Assessment of carbohydrate counting skills of families with children having type 1 DM attending the diabetic clinic and its impact on glycemic control

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Introduction: Carbohydrate counting is the most valuable tool to empower the families to attain good glycemic control. Paucity of Indian data on relation between carbohydrate counting skills and glycemic control.
Objectives: To assess the carbohydrate counting skills of families with type 1 DM and its impact on glycemic control.
Methods: A descriptive study is being conducted between March 2018 to July 2018 at the diabetic clinic of Mehta Hospitals, a multispeciality hospital of a developing country. Subjects with type 1 diabetes on Basal bolus insulin regimen with parental ability to read and understand English are selected. The "Self administered quiz for carb. recognition" developed by Singapore is being administered to the families and results being tabulated. In a controlled setting, the family is administered the validated quiz. The quiz consists of 28 questions. The maximum score would be 64. The time for the quiz would be 20 minutes. Study parameters would be collected from the case records. The primary outcome measure is glycosylated Hemoglobin (HBA1C).
Results: Mean age: 9.2 $\pm$ 2.2 years, 40% males. The mean height SD score was -1.0 and mean BMI SD scores was 0.3. The diabetic age of the study population was 1.8 $\pm$ 0.3 years. Mean score is 44.5 $\pm$ 10.0. Children with good glycemic control (HBA1C < 9%) had higher scores 55.3 $\pm$ 8.3 versus 40.3 $\pm$ 9.0 ($p < 0.05$). There was a negative correlation between scores attained and HBA1C.
Conclusion: Carbohydrate counting skills will empower Indian families to attain good glycemic control.

P242
Dietary habits and physical activity level among individuals with type 1 diabetes in Mauritius

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Objectives: Nutrition and physical activity are both key components in management of Type 1 diabetes(T1D). The aims of this study were to assess the impact of macronutrient intake and average daily calorie intake on body mass index and glycated hemoglobin. The contribution of carbohydrate counting and nutrition labeling on achieving healthy glycated hemoglobin (HbA1c). In addition, the physical activity level was also evaluated and compare with health outcome.
Methods: Participants were all (T1D) (n = 42) with mean age = 17.9 $\pm$ 8.6 years and having diabetes for at least 6-month (8.3 $\pm$ 7.6) years. Participants have filled a self-design questionnaire to assess general management of diabetes, dietary habits and nutrition knowledge, followed by a 3-day dietary recall to evaluate calorie and nutrient intake and a physical activity questionnaire (PAQ-c and IPAQ) to estimate physical activity level.
Results: This study shows that amount of calorie taken from fat is positively related to HbA1c which was confirmed with fat content in milk consumed by participants ($p < 0.05$). Carbohydrate counting and reading of nutrition labeling have both reveal that they are key component in management of diabetes and are associated with better glycaemic control. Amount of carbohydrate taken for morning snack has been found to directly influence HbA1c level since it is covered only by the basal-insulin.
Conclusions: Dietary habits have been shown to influence health outcome of patients with (T1D) as a measurement of HbA1c. The association of physical activity level with HbA1c and body mass index were not significant and were not clearly established. Therefore, more emphasis must be bear toward nutrition and physical activity by health care professionals and additional advance studies should be done in the future with larger sample to strengthen these findings.
Keywords: Type 1 diabetes, dietary habit, carbohydrate counting, physical activity, glycated hemoglobin, Mauritius

P243
Insights of dietary pattern among children and adolescents with type 1 diabetes in Delhi

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Introduction: A healthy balanced diet low in simple sugars and high in fiber content is recommended for children with Type 1 Diabetes (T1D).

Objective: To assess the dietary intake in terms of calories, fiber, macro and micro - nutrient intake in children/ adolescents with T1D.

Method: Children with T1D between 7-17 y diagnosed atleast 1 year back were enrolled. Dietary history was taken by 24 hr diet recall, macro and micronutrients were calculated and compared to age and gender based recommended daily allowance (RDA) for Indian children using DietSoft nutrient calculator software.

Results: Thirty children (12 boys,18 girls) with mean age 11.4 ± 2.7years, mean duration of T1D 4.3 ± 3.3years and mean HbA1c of 9.2 ± 1.5% were enrolled. The mean total energy intake for children < 10 y was 1792 ± 273 Kcal and adolescents >10y was 1986 ± 506 Kcal. 63% had an energy intake < RDA. The proportion of energy by carbohydrate, fat and protein was 52%, 30.7% and 15% respectively in children and 52%, 31% and 15.2% respectively in adolescents. Protein intake was found below in 2 children (6.6%). Fat intake exceeded the RDA in all children. Mean intake of dietary fiber was 51.3 ± 13.2gm and free sugar intake was 22.2 ± 12.3gm. We assessed the intake of zinc, calcium, magnesium, iron, selenium and folate. Intake of folate, magnesium were ≥RDA; calcium and selenium was ≥RDA in 90% and 86.6% respectively. Iron intake was < RDA in 76.7% and zinc intake was inadequate in 36.7%.

Conclusion: More than 60% were having energy intake < RDA. To provide less carbohydrate parents end up in increasing the fat content of diet which can be detrimental. The fat proportion can be decreased thereby slightly increasing the portion of carbohydrates(55-60%).Balanced diet incorporated of micronutrients like zinc and iron should be of an importance to prevent any micronutrient deficiency. To decrease the free sugar intake parents need to be educated about the hidden sources of sugar which needs to be eliminated from the diet.

Poster Tour 14 - Genetics, Immunology & the Environment

P244

A study of fecal microbiota in newly diagnosed Egyptian patients with type 1 diabetes mellitus

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Objectives: To evaluate the alteration of gut microbiota in patients with newly diagnosed T1DMand its relation to disease etiology.
Methods: This case control study was carried out on 50 children and adolescents: 30 newly diagnosed TIDM patients (less than 6 months) recruited from Diabetes clinic, children hospital, Ain Shams University, their ages ranged from 1.5 to15 years with mean age of 6.6 ± 4.1 years, they were 18 males (60%) and 12 females (40%), their disease duration ranged from 2 to 180 days with mean duration 43 ± 54 days. In addition 20 age, gender, race, mode of delivery, and duration of breastfeeding matched controls. Data collected regarding; Age, sex, disease duration, weight, height and BMI, HbA1c% and fasting c peptide (for patients), anti-insulin antibody titer (Cutoff value: 10IU/ml), anti-islet cell antibody titer (≥ 0.9 ng/ml is positive) by ELISA. Detection of fecal microbiota by DNA extraction and polymerase chain reaction amplification.
Results: The 4 dominant phyla of microbiota were Bacteriodetes (42%), fermicutis (35%), proteobacteria (10%) and actinobacteria (8%). Total number of microbiota was significantly less in patients (P = 0.023) especially those with antibody positive titer(P = 0.015). Dysgonomonas, Parabacteroides, Clostridium, Ruminococcus, Bilophila and Trabulsiella were significantly increased in controls (P < 0.05) , while; prevotella, Faecalibacterium, Veillonella and Dialister were significantly decreased in controls (P < 0.05). Prevotella significantly increased in patients (p = 0.03) especially those with Antibody positive titers (p = 0.025). Prevotella titer was positively correlated to antiinsulin, antiislet cell antibody titers, HbA1c% and negatively correlated to fasting C-peptide (<0.01).
Conclusion: Patients with newly diagnosed T1DM have decreased gut microbiota and increase in Prevotella species that predominates with antibody positivity indicating a strong link between microbiota (Prevotella) and autoimmunity inT1DM.

P245

Clinical infrastructure to enable studies of the relationship between changes in β-cell function, immune profiles, genetic and environmental factors in new onset T1D patients and subjects at risk

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Objectives: INNODIA is a European consortium with the aim of advancing our ability to evaluate the progression of T1D. One of the objectives of INNODIA is to develop a new European clinical research network with standardized protocol based on repeated measures of C-peptide and comprehensive collection of biological samples for omics, immune, viral and microbiome studies in new onset T1D patients and high-risk subjects.
Methods: A protocol for the harmonization of sample collections in new onset T1D patients (1500) and first degree relatives of patients with T1D (3000) was developed following extensive work involving partners from across all specialties. Core laboratories with experience in their respective field were set up for analysis of autoantibodies, fresh and frozen immune cells and C-peptide. A series of SOPs for sample collections and analysis were agreed. Sample tracking between clinical centers and central laboratories was included into a purposely designed eCRF into which all clinical and laboratory data are captured.
Results: The protocol and age specific participant information sheets and informed consent forms allowing follow-up and recall of subjects (living biobank) was first approval in the UK in Nov 2016. The documents were translated into 10 languages and Ethics approval was granted in all 12 countries of the INNODIA clinical centers. The coordination team visited all clinical centers to assess their infrastructure and all opened for recruitment by Dec 2017. By the end of Apr 2018 we had recruited over 900 participants and had followed the first T1D new onset participant recruited for a full year.
Conclusions: We have established an infrastructure across 12 countries for the harmonized collection of data and samples from T1D patient and at risk family members. The protocol, data collection and sample flow all form the building blocks for the development of novel intervention studies through the Clinical Trial infrastructure of INNODIA.

P246

Detect and prevent type 1 diabetes (T1D) during infancy and early childhood: start of a screening and trial program in Europe - an initiative of The Global Platform for the Prevention of Autoimmune Diabetes (GPPAD*) *: Funded by The Leona M. and Harry B. Helmsley Charitable Trust

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Objectives: In early pre-symptomatic stages the risk of developing T1D can be estimated by the presence of multiple beta-cell autoantibodies. By identifying specific genetic markers, it is possible to state a high risk before autoantibodies arise. Based on this knowledge, GPPAD established a screening program to identify neonates with a high genetic risk for developing T1D and subsequently offer participation in a primary prevention study, the Primary Oral Insulin Trial (POInT).
Methods: Capillary blood samples obtained during newborn screening or first routine checkups at the pediatrician until 4 months of age.

Using a genetic score based on 46 T1D susceptibility SNPs and the first degree-family history for T1D, Infants with a high (>10%) genetic risk for multiple beta-cell autoantibodies by the age of 6 years are identified. In that case, families get a specific counseling and are asked to participate in POInT.
POInT is a randomized, double-blinded, multicenter phase IIb/III intervention study aiming to recruit 1,040 infants until 2022. It is estimated that recruitment will require 400,000 screened infants. Primary endpoint is to determine whether daily administration of oral insulin from age 4-7 months until age of 3 years in children with elevated genetic risk for T1D reduces the cumulative incidence of beta-cell autoantibodies and diabetes in childhood. The study is carried out in Germany (Munich, Dresden, Hanover), Belgium (Leuven), Poland (Warsaw), Sweden (Malmö) and UK (Oxford).
Results: Since Oct. 2017, 11,465 infants (48.4% male) participated in the screening. 11,218 infants (97.9%) came from the general population and 247 (2.2%) were first degree relatives. 166 children (1.5%) are eligible to participate in POInT. Hereof 27 are already enrolled. Overall, the recruitment numbers correspond to current expectations.
Conclusions: The first results show a satisfying participation in the newborn screening program as well as in the follow-up trial.

P247
Environmental LPS exposure and markers of autoimmunity in Mice

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Objectives: A relative lack of environmental or intestinal exposure to LPS provides a plausible explanation for the increased incidence of autoimmunity.
T-helper cells are critical determinants of the specific nature of inflammatory responses. The counter-regulatory model of inflammation, describes regulatory T-cells (T_{reg}) as functioning to reduce inflammatory responses from all other T-cell lineages.
T_{reg} express FoxP3 as a major transcription factor. They are derived from naïve T-cells when antigenically stimulated in the presence of IL-10; TGFβ and retinoic acid.
Human FoxP3 mutations cause IPEX syndrome, which includes severe autoimmunity including type 1 diabetes. The Scurfy mouse model (FoxP3 deleted) is fatal from T-cell driven inflammation.
Hypothesis: Inhaled LPS and intestinal gram-neg' bacteria regulate expression of FoxP3.
Methods: Balb/C dams were exposed to cohort-specific doses of aerosolized LPS daily for 40 minutes for 5 days per week from mid-gestation until pup were 5 weeks old. Simultaneously all cohorts were divided into cages with normal drinking water or Cefoxitin and Gentamicin containing water. This regimen continued until sacrifice when pups were 5 weeks old. Splenocytes were harvested and immunolabeled for flow cytometry.
Results: In splenocytes, mean fluorescence intensity (MFI) for FoxP3 was reduced from cohorts of mice receiving antibiotics, and increased following low dose LPS inhalation. High dose inhaled LPS reversed the increases observed through low dose exposure. In the T_{reg} sub-population of splenocytes, FoxP3 expression was increased in both of the inhaled LPS cohorts (P = 0.025 for low dose inhaled LPS and P = 0.006 for high dose exposure when compared to base-line). FoxP3 was reduced in splenocytes from cohorts of mice receiving antibiotics. [P = 0.043].
Conclusions: These results strengthen the case for LPS as a candidate molecule to explain the hygiene hypothesis.

P248
Circulating neutrophils count and C-peptide levels at T1D onset in children

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Background: Neutrophils pancreatic infiltration and reduction of circulating neutrophils count were reported at onset of Type 1 Diabetes *(Battaglia M.Curr Opin Hematol. 2014 Jan;21(1):8-15)* hypothesizing a relevant involvement of these cells in the pathogenesis of autoimmune acute insulitis.
Objectives: Aims of the present study are to confirm the reduction of circulating neutrophils at T1DM onset in children and to investigate the possible relationship between their number and beta-cell function.
Methods: We compared the neutrophil count between 31 subjects at the onset of T1D and that of the same number of non-diabetic subjects, age and sex adjusted, undergoing elective surgery. In all patients at the beginning of diabetes we measured basal and stimulated (6 minutes after intravenous glucagon administration) c-peptide. Data are reported as median and IQR. Statistical analysis was performed through Mann-Whitney test and simple regression. Statistical significance was set at $p< 0.05$.
Results: The neutrophil count of the patients was similar to that of the controls [3,040(2,020)/mm^2 *vs* 3,350(2,012)/mm^2; $p > 0.05$]. The simple regression analysis showed a statistically significant direct correlation between neutrophils count and neutrophils percent adjusted for age and glucagon stimulated c-peptide level ($p< 0.05$; $r^2$0.31; $p < 0.02$; $r^2$0.38). No significant correlation was found between neutrophils count, HbA1c and insulin requirement.
Conclusions: Although our results do not confirm a significant reduction in circulating neutrophils at the onset of T1DM, they support the hypothesis of a relevant role of pancreatic neutrophils marginalization in beta-cellular functional impairment.

P249
Assessment of pyridoxial 5'- phosphate (PLP) in children newly diagnosed with type 1 diabetes mellitus

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Introduction: Type I diabetes is preceded by autoimmunity to islet antigens, among them the protein glutamic acid decarboxylase, GAD-65.Pyridoxial 5'-phosphate (PLP) which is the active form of vitamin B6, is formed from vitamin B6 by the action of pyridoxal kinase. Interaction of GAD65 with PLP is necessary for GAD65-mediated synthesis of the neurotransmitter γ-aminobutyric acid (GABA). PLP is also a required cofactor for dopamine synthesis by L-aromatic decarboxylase (L-AADC). Both GAD65 and L-AADC are expressed in pancreatic islets.
The aim of the work: was to assess pyridoxal 5'-phosphate level in children newly diagnosed with T1D.
Subjects and Methods: Our study included two groups; Group 1 included 50 children newly diagnosed with T1D, randomly selected from the pediatric endocrinology outpatients' Clinic, Minia University Children Hospital and Group 2 included apparently healthy 50 children, age and sex matched to the diseased group as a control group. They were sibling of the diseased groups. They were subjected to thorough history taking, clinical examination and laboratory investigations included: blood glucose level (fasting and postprandial),glycosylated Hemoglobin (HbA1c %),fasting C-peptide level and PLP level.
Results: The diabetic group had significantly lower levels of PLP than the control group (p 0.03). PLP had insignificant weak positive correlation with fasting blood glucose where (r 0.186&p 0.06) and significant weak & fair positive correlations with postprandial blood glucose and fasting C-peptide where (r 0.20&p 0.04 and r 0.28&p0.02) respectively and had a significant positive weak correlation with HbA1c % where (r 0.21&p 0.03).

Conclusion: Vitamin B6 deficiency is a known cause for a variety of diseases. Here, it is proposed that deficiency in PLP, the activated form of vitamin B6, might contribute to appearance of T1D.If this hypothesis turns out to be correct. T1D could be prevented to some degree by change of lifestyle conditions including nu

P250
Factors influencing glycemic control of patients with type I diabetes in regions affected by war in a sub Saharan country

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Background: Factors of poor glycemic control in patients with diabetes are numerous despite free access to insulin in some low income countries. In the present study, we are studying specific factors in 3 regions affected by war in a Sub-Saharan country, related to poor glycemic control.
Methods: A cross-sectional descriptive and analytical study was conducted in the 03 support centers of the CDiC program in the northern regions of Cameroon during six months from November 2016 to March 2017. We included all patients with diabetes aged 6 to 19 years. The logistic regression model was used to identify the factors associated with glycemic control.
Results: We included 100 participants with a male predominance (73%) and an average age of 16.59 ± 2.54 years. The median HbA1c was 10.08 [8.7-11.63] % and only 19% of participants achieved their glycemic targets. In multi-varied analysis, living in Adamawa Region (less affected by war), living less than 20km from the care clinic, multiple injections therapy, less than three episodes of severe hypoglycemia in the past 6 months, duration of diabetes less than 2 years, and participation in more than 3 therapeutic education sessions, were factors associated with good glycemic control.
Conclusion: We conclude that glycemic control was related to socio demographic factors, accessibility to adequate health care center, severe hypoglycemia, duration of diabetes, therapeutic regimen. The first 2 are critically compromised by war and insecurity and the 3 others may be modifiable through a strong therapeutic education and therefore it appears necessary to focus more on this activity.

P251
Analysis of self-reported color-race, genomic ancestry and metabolic control in adolescents from an admixed population

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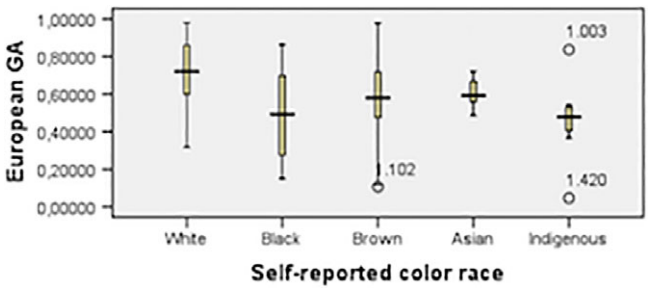
Background: Many studies uses self-reported color to evaluate clinical and lab data in patients with type 1 diabetes (T1D). However, in mixed race populations, like the Brazilian one, these could be a confusion factor.
Objective: Our aims were, in adolescents with T1D from an admixed population: a)To evaluate the relationship between self-reported color-race (SRCR) and genomic ancestry (GA); and b)to evaluate the association of SRCR/GA and glycemic control.
Methods: Cross-sectional, nationwide survey in 14 public clinics from 10 cities from different areas of Brazil. From the initial cohort of 1698 patients, we evaluated 367 adolescents (10-20 years), 184 females (50.1%), mean age of 16.4 ± 1.9 years, age at diagnosis 8.8 ± 4.3, and duration of diabetes of 8.1 ± 4.3 years. Patients self-reported color/race: 176(48,0%) white, 19(5.2%) black, 159(43.3%) brown, 5(1.4%) Asiatic and 8 (2.2%) indigenous. We estimated global and individual GA proportions using a panel of 46 AIM-INDEL markers using Structure software. SRCR was compared to GA, and both with glucose control (A1c,%), overweight /obesity (OW/Ob) and socio-economical conditions.
Results: Proportions [mean (minimum/maximum)] of GA were: European, 64.2 (4.6-98,0%); African, 18.3(0.2-78.8%) and NA ,12.0 (0.3-68.0%). The mean (SD) of HbA1c was 9.6 ± 2.4%. There was a considerable percentage of European GA in patients who self-reported as non-White (fig.1). We found a correlation between A1c and African GA , rho = 0,11, p = 0.03; years of study, rho = 0.093,p = 0.09 and economic status, rho = 0.09 p = 0.06. Using A1c as dependent variable, the only significant variable was economic status [r = 11.8; p = 0.03].



[*Fig. SRCR vs GA*]

Conclusion: In adolescents with T1D from an admixed population, we found that patients self-reported as non-White had a high percentage of European ancestry. Glycemic control was associated to economic status, but the association with genomic ancestry is still an open issue.

P252
Validation of post glucose load C-peptide response with glucagon stimulated C-peptide response as an index of pancreatic beta cell functional reserve

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Objectives: Pancreatic beta cell functional reserve estimation aids in determining type of diabetes but mixed meal preparations and glucagon have limited availability in India causing difficulties thereby. This study aimed to validate C-peptide responses following 75 gm oral glucose load with C-peptide responses following intravenous glucagon in healthy individuals and those with type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM).
Methods: The study was conducted in three sets of participants: T1DM (n = 57), T2DM (n = 25) and normal individuals (n = 9). Those with eGFR< 60ml/min/1.73 m2, acute infection, inflammation, malignancy, pregnancy and secondary diabetes were excluded. Each group underwent glucagon stimulated and 75 gm glucose stimulated C peptide evaluation after attaining good glycaemic control. Blood samples were collected 6 minutes after 1mg glucagon intravenous injection and 60 minutes after 75 gm oral glucose in fasting state.
Results: Mean age was 18.93 (+/-7.21), 26.76 (+/-10.07) and 16.56 (+/-5.36) years for T1DM, T2DM and normal groups respectively. Mean duration of diabetes was 39.75 (+/-45.33) months for T1DM and 19.48 (+/-22.35) months for T2DM groups. Mean fasting plasma glucose was 125.56 (+/-23.13), 140.80 (+/-23.98) and 83.67 (+/-6.14) mg/dl for T1DM, T2DM and normal groups respectively. On comparing post glucagon and post 75 grams glucose C-peptide values in T1DM group, a strongly positive correlation (r = 0.782, p< 0.001) was

found while in T2DM group, a moderately positive correlation (r = 0.486, p = 0.014) was found. In normal individuals, a strongly positive correlation (r = 0.884, p = 0.002) was seen.

Conclusions: Post glucagon and post 75 gm oral glucose C-peptide values correlated strongly for T1DM & normal participants and had moderate correlation in T2DM. Hence, 75 gm oral glucose C peptide can be used as a substitute for post glucagon C peptide in resource poor settings.

Poster on Display – Genetics, Immunology & the Environment

P253

SPINK1 gene N34S heterozygous mutation associated fibrocalculous pancreatic diabetes a case report

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Introduction: Fibrocalculous pancreatic diabetes (FCPD) is a unique form of diabetes secondary to chronic pancreatitis seen in developing countries of the world associated with either overt protein-calorie malnutrition or, more likely, with deficiency of certain micronutrients.
Objectives: But in our case it was due to SPINK1gene N34S mutation.
Methods (case report): FCPD affects young individuals and runs an aggressive course to reach the endpoints of diabetes, pancreatic calculi and exocrine pancreatic dysfunction. There are characteristic features of FCP radiologically, ultrasonographically, on ERCP and on histopathology. While the exact etiology of FCPD is unknown, genetic, nutritional and inflammatory factors have been hypothesized to play a role. Diabetes in FCPD is often brittle and difficult to control; most patients require multiple doses of insulin for control of glycemia. However, in spite of high blood glucose levels, patients rarely develop ketosis.
Results: Here we present 11 years old girl was operated for pseudo pancreatic cyst in the past proven by histopathology, now she developed diabetes without ketosis. USG Pancreas of this girl revealed chronic pancreatitis with fibrosis & shrinkage. Genetic workup showed SPINK1 gene N34S heterozygous mutation positive in both siblings & parent's were negative for the same. Elder sibling also had calculous pancreatic duct obstruction needing pancreatic duct stent, is on pancreatic enzyme replacement therapy. Elder sibling fasting C-peptide were also on the lower range of normal.
Conclusions: Theme behind this case report is to suspect FCPD in children with diabetes without ketosis. Genetic workup, screening for mutation and fasting C-peptide level screening should be done in siblings with FCPD. Basal bolus regimen of insulin or pump therapy is preferred over split mix regimen in FCPD patients.

Poster Tour 19 - Diabetes in Developing Countries

P254

Lifestyle behaviors, vitamin D levels, and metabolic markers in Indigenous Argentinean children living at different altitudes

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Objective: To assess the association between vitamin D and risk for type 2 diabetes in two Indigenous communities from similar ethnic backgrounds, but living at different altitudes.
Methods: A cross-sectional study compared 152 (72 f) indigenous schoolchildren from San Antonio de los Cobres (SAC), 3750 m, with 175 (86 f) from Chicoana (CH), 1400 m, mean age 9 y. Data for children's lifestyle behaviors, anthropometry, blood pressure, lipids, glucose, insulin, and vitamin D, were assessed in the spring season.
Results: The prevalence of children's overweight/obesity was significantly lower in SAC 9.2% (13) than in CH 41.5% (71). Milk intake was lower in SAC (1.7 ± 1.0 glasses/day) than in CH (1.7 ± 1.2) (p = 0.01). SAC watched fewer television (2.4 ± 1.2 hours/day) than CH (2.5 ± 1.2) (p< 0.01). The prevalence of hypertension was significantly higher in SAC 9.9% (15) than in CH 1.2% (2). The prevalence of hypertriglyceridemia was significantly higher in SAC 42.3% (60) than in CH 27.5% (47), and that of low HDL-C was higher in SAC 26.8% (38) than in CH 20.5% (35). Five percent (7) of SAC versus none CH had impaired fasting glucose levels, and none had diabetes. There was a significantly higher prevalence of vitamin D deficiency (< 20 ng/mL) in SAC (n = 105, 73.9%) than in CH (n = 62, 36.3%). SAC showed an inverse correlation between vitamin D and insulinemia (r-0.17, p< 0.05), whereas CH showed an inverse correlation between vitamin D and systolic blood pressure (r-0.19, p< 0.05), z- BMI (r-0.25, p< 0.01), triglycerides (r-0.15, p< 0.05), glucose (r-0.35, p< 0.05), and insulinemia (r-0.24, p< 0.01). Multiple linear regression analysis showed that vitamin D (beta = -0.47; $R^2$0.21), was significantly associated with SAC location, adjusted for age, gender and z-BMI.
Conclusion: Vitamin D levels were significantly and directly associated with altitude and inversely with metabolic markers, suggesting that high altitudes could be associated with higher risk of future type 2 diabetes.

P255

Comparison between heart dimensions of high-altitude indigenous children versus urban children at sea level

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Background: Participants living at high altitude were shown to have lower heart dimensions than those at sea level, likely because of hypoxia adaptation and consequently lower plasma volume.
Objective: To compare echocardiographic heart dimensions in children inhabiting 3,750 m with children living at sea level.
Methods: A cross-sectional study compared 44 (18F) indigenous San Antonio de los Cobres (SAC) schoolchildren living at 3750 m with 44 (26F) Buenos Aires (BA) schoolchildren living at sea level. Anthropometric measurements and blood pressure were assessed. Mode M, 2-dimensional and Doppler transmitral echocardiography were assessed. Left atrial area (LAA), left ventricular posterior wall (LVPWd), interventricular septum (IVSd), shortening fraction (SF), and left ventricular diastolic diameter (LVEDD) left ventricular systolic diameter (LVESD) were measured.
Results: There was not a significant difference in age (8.5 vs. 9 y), z-BMI (0.51 v 0.83), and systolic blood pressure (102 vs.101 mmHg) in SAC than in BA children. SAC had lower height (1.27 vs. 1.36 m) and waist circumference (59 vs. 65 cm), whereas diastolic blood pressure (73 vs. 63 mm Hg) was higher than in BA. Mode M, 2-dimensional and Doppler echocardiography showed that SAC children had significantly lower LAA (6.6 vs 8.8mm), LVEDD (34.3 vs 40.5mm), z- LVEDD (-1.2 vs. 0.1), LVESD (20.3 vs 23.6mm), and z- LVESD (-1.5 vs. -0.8) than BA children. Multiple linear regression analyzes showed that altitude was significantly and inversely associated with children´s AAI (beta 0.47, R^2 = 0.44), LVEDD (Beta 0.44, R^2 = 0.47), and LVESD (Beta 0.26, R^2 = 0.30), adjusted for age, gender, and BMI.
Conclusion: This study demonstrates that SAC children have smaller heart dimensions than BA children. The children living at high altitude had lower dimensions of left ventricular diameters and LAA adjusted for age, gender, and BMI, probably due to a decrease in preload because of high altitude-induced chronic hypoxia.

P256

Use of a flexible catheter for subcutaneous insulin administration in diabetic ketoacidosis. Controlled clinical trial

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Introduction: Hourly subcutaneous administration of regular insulin with a metal needle in DKA produces pain. A device that enables subcutaneous administration of insulin with a single puncture would improve patients comfort.
Objectives: Assess whether the use of a flexible subcutaneous catheter improves comfort in DKA compared to the metal needle treatment. Compare the metabolic evolution of patients with DKA in both groups.
Material and Methods: Open, randomized clinical trial. Entry criteria: Patients 5-18 years old with DKA. If intensive care required they were excluded.
Predictor variable: route of administration of insulin (flexible catheter/rigid needle puncture): time to reach initial stability (hours) and presence of complications. Outcome variable: comfort, measured by visual analog scale for pain (10cm = 0 no pain and 10 maximum pain) shown hourly after insulin administration until metabolic stability was achieved. To test the outcomes, Friedman test, Mann-Whitney U test, T test and Chi-square. Sample size: 10 patients per group. Participants' consent were obtained.
Results: Twenty subjects were included, 10 in each arm, 13 were women (6 in the control group and 7 in the study group). Mean age was 13 ± 3.2 years, with no differences between groups. Sixteen subjects had presented DKA previously (8 in each group). Baseline values for glycaemia; blood urea nitrogen; sodium; bicarbonate and pH similar in both groups. Pain at first insulin application showed an average range in the control group of 4,5 (CI95% 2,7-6,7) vs. 0 (CI95%0-2), *p = 0,00* in the study group; differences between both groups, in every pain assessment made, were observed. Mean time to reach initial stability, in the control group 16 ± 8.4 vs.11.4 ± 4.3 in the study group, *p = 0,001*. No adverse events were observed in either group.
Conclusion: Less pain and quicker metabolic stabilization is observed in the group that used a flexible catheter. No adverse events were observed in either group.

P257
Factors affecting growth in children with type 1 diabetes mellitus

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Introduction: Growth is influenced by various factors including glycemic control in diabetic children.This prospective follow up study was conducted at Pediatric diabetic clinic, SAT Hospital, Trivandrum, Kerala, India.
Objectives: To study the various factors affecting growth in children with Type1 Diabetes and to investigate whether increased body mass index is associated with earlier manifestation of Type 1 diabetes.
Methods: 116 children with Type 1 Diabetes were enrolled in the study and followed up for one year. Data regarding age at diagnosis, auxological parameters like height, weight, body mass index, sexual maturity rating, insulin dose and HbA1c values were collected. Statistical analysis was done by SPSS version 20.
Results: Among cases, 43.1% were males and 56.9% were females. The female to male ratio was 1:0.75.The mean age at diagnosis was 6.3 years. Majority (94.8%) had a normal height at diagnosis. At one year of follow up 44% showed a decline in linear growth of which 38% were males and 48.5% females. 48.3 % of children presented initially with diabetic ketoacidosis. Only 10.7% of children with DKA at diagnosis had growth faltering. The mean age of diagnosis for those without growth faltering was 5.6 and for those with growth faltering was 7.3.Those with growth faltering at one year of follow up had a higher mean HbA1c (10.03) than those without growth faltering (8.34). 31.9% of children had early age of onset of diabetes (before 5 years).The mean BMI at diagnosis was higher (17.85) in those with early onset of diabetes when compared to those with later onset (15.89).
Conclusion: Children who were diagnosed earlier and those with better glycemic control had less growth faltering. Growth faltering was less common in children who presented with DKA at diagnosis. Children with higher BMI developed Type1 Diabetes mellitus at an earlier age.

P258
Practical challenges in diagnosis and management of pediatric type 2 diabetes in India - resource limited settings

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Objectives: 3 challenging case reports illustrating difficulties in diagnosis and management of T2DM
Methods and results:: Case 1:
2013: Age 12M; Weight loss: 70 kg to 66 kg in 3 m; Polys; BG 361 mg/dl. DM: Father, paternal grandmother. BMI 23.9, Acanthosis nigricans neg. FBG 466, PPBG 446; Ketonuria Neg; HbA1C 16.6%; C-pep PP: 4.8 ng/ml (1.1- 5); Insulin: 15.32 µU/ml (12 - 82); **GADAb Unaffordable**
Dx: T1DM vs T2DM. Rx: I Regular 6-6-6-0; I NPH 0-0-0-3, upto 56 u/d. F> 200; PP> 300; HbA1c 13.9
2015: Metformin: 2000 mg/d. HbA1c 9.8!! **GADAb Neg.** Glimepiride 2mg/d; Hypoglycemia: First ever!! Insulin stopped. Sitagliptin [Off label] F 100; PP 200
Final Dx: T2DM
Case 2:
2015: Age 19F; Polys; FBG 396, PPBG 465, HbA1c 16.4, Ketonuria 1 +. DM Mother, Maternal Grand Mother, Maternal Uncle. BMI 19.5
Dx: T1DM. C-Pep F: 0.81 (0.6-4.5). **Rx:** I Regular 10-10-10-0, I NPH 0-0-0-5. **Referred for Insulin Pump- by philanthropic donors!!**
2016: HbA1c: 7.8. **"Pre-Pump counseling",** confessed missing insulin often, finally discontinuing x 1 month. FBG 59-167, PPBG 67-248. C pep F: 1.51, PP: 2.62. **GADAb Neg.** Rx: Metformin 2000 mg/d, Glimepride 1 mg/d
Final Dx: T2DM, Maternally inherited- Mitochondrial Diabetes, MODY?
Case 3:
2006: Age 12F: Polys, weight loss, FBG 320, PPBG 486, HbA1c 13.7, Ketonuria neg
Dx: T1DM. Rx: I Glargine: 9-0-0-0, I Glulisine: 3-3-3-0. FBG: 74-274, PPBG 115-337, HbA1c 7.9. **GADAb/C pep Unaffordable**
2017: Age 23: PCOS 8 y. **Rx Metformin 2000 mg/d for PCOS.** Recurrent hypoglycemia, completely discontinued insulin. C-Pep F: 0.87, PP: 2.5, **GADAb Neg.**
Final Dx: T2DM
Conclusions: Type 2 diabetes accounts only for 1% of childhood diabetes [onset < 18 y] in our **DISHA Free Diabetes Clinic for the Poor [1987 - Ongoing],** Bangalore, India. On the background of increasing obesity among "rich", there is paucity of data on the burden of Pediatric type 2 diabetes in our society. Unaffordability of specialized diagnostic tests complicates the situation

P259
Investigating insulin price components to increase access - country case studies

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Introduction: Access to insulin is poor especially in low- and middle-income countries (LMICs), with high prices a key barrier. Understanding the components that make up the final selling price may help to identify means of improving efficiency and reducing prices within the supply system. Data from studies for various medicines in LMICs show cumulative mark-ups between 11 and 6,894%. However, price components of insulin have not been studied.
Objectives: To investigate price components for insulin products in LMICs in order to inform policy recommendations.
Methods: Adapted WHO/HAI standardized methodology was used in Brazil (Rio de Janeiro), China (Hubei and Shaanxi Provinces), Ghana, India (Haryana State), Indonesia and Uganda. Selected insulin products had their prices traced backwards through the supply chain from public and private sector retail outlets in the capital city and a district town, supplemented with key informant interviews.
Results: Cumulative mark-ups ranged from 8.7% to 565.8% but the magnitude of mark-ups were specific to country situations and variable within and across sectors and regions. The proportion that the manufacturer´s selling price contributed to the patient price varied from 15.0 to 92.0 %. Pricing regulations in China, India and Indonesia reduced wholesale and retail mark-ups but prices were still high in some cases. Most countries had removed import duties (Ghana, India, Indonesia, Uganda), but additional tariffs of 3.5% were still applied in Ghana and private sector value added tax ranged from 5 to 20% across the countries.
Conclusions: There are no obvious trends in the mark-ups applied to insulin or specific differences in the price structure. A standardized approach to improving insulin access through regulating price components is unlikely to be successful in LMICs, but removal of public

sector mark-ups, elimination of duties and taxes, price regulation, and greater price transparency could help.

P260

Diabetes phenotypes, glycemic control determinants, and complications in Haitian youth in Haiti

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Objectives: To assess clinical presentation, glycemic control and chronic complications of diabetes in Haitian youth.
Methods: Retrospective review of youth with diabetes aged 0-25 years followed at a chronic care center in Haiti from 1/2013-3/2018. Symptoms, number of providers consulted before diagnosis, suspected diabetic ketoacidosis (DKA) and coma at diagnosis were extracted. Yearly anthropometric data, total daily insulin dose (TDD), quarterly hemoglobin A1c (A1c), hypertension, and chronic complications were documented. Linear and logistic regression were used to determine predictors of mean A1c and presence of chronic complications.
Results: At diagnosis, 91 patients (60% female, mean age at diagnosis 14.1 ± 4.6 years, mean diabetes duration 4.1 ± 3.6 years, mean A1c 10.6 ± 2%) had DKA (56%) and coma (18%). 54% consulted ≥ 2 providers before diagnosis. Younger age (p = 0.004) and longer diabetes duration (p = 0.001) predicted higher mean A1c, while TDD and coma did not. Chronic complications included hypertension (17.8%), cataracts (13.9%), retinopathy (15.6%), nephropathy (24.3%), and neuropathy (13.6%). Mean TDD was 0.48 ± 0.29 IU/kg/day and remained below 0.5 IU/kg/day in 33% up to 5 years post-diagnosis. Presence of complications was predicted by longer diabetes duration (95% CI 0.001-0.6, p = 0.004), lower BMI z- score (95% CI 0.01-0.8, p = 0.03), and absence of coma at diagnosis (95% CI 0.001-0.6, p = 0.03) but not TDD, while higher mean A1c was marginally predictive (95%CI 0.99-6.5, p = 0.05).
Conclusions: Haitian youth with diabetes present late and often in DKA or coma. Glycemic control is poor despite access to medical care and insulin. At presentation, cachexia and absence of coma in the context of older age and lower insulin requirements compared to Caucasian youth may suggest an attenuated autoimmune process with slower depletion of pancreatic beta cells. This may result in prolonged hyperglycemia before diagnosis and increased early-onset chronic complication risk.

P261

Abstract Withdrawn

Poster on Display – Diabetes in Developing Countries

P262

Pattern of presentation of newly diagnosed children with diabetes mellitus in a rural setting

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Background: Diabetes Mellitus (DM) is the common end-point of a variety of disorders of insulin production and/or insulin action resulting in hyperglycaemia with associated abnormalities of carbohydrate, fat, and protein metabolism. Presentation with diabetic ketoacidosis (DKA) may be associated with significant morbidity and mortality in the pediatric population.
Objective: To examine the pattern of presentation of newly diagnosed children with diabetes mellitus in a rural setting.
Design: Retrospective study of case files of children with diagnosis of diabetes mellitus.
Methods: It was a retrospective review of case files of children younger than 18 years with diagnosis of DM, over a period of 2 years (1st November 2015 to 31st October 2017) at Federal Medical Centre Nguru, Yobe State, Northeastern Nigeria.
Results: A total of 3289 patients were seen during the study period out of which 6 were diagnosed with DM, giving a case prevalence rate of 1.8/1000. The mean age at presentation was 11.1 years, and there were more males 4/6 than females 2/6 among the subjects. All of the patients presented in DKA, other prevalent presenting features were polyuria 6 (100%), polydipsia 6 (100%), dehydration 6 (100%), fever (83.3%), weight loss 4 (66.7%) and weakness 4 (66.7%). Two of the six patients with DKA died with cerebral oedema and one had acute kidney injury during admission.
Conclusion: Presentation with DKA is common despite the glaring symptoms of DM; polyuria, polydipsia and weight loss. However, a relatively low prevalence of DM was found, but this may not be true reflection of the actual population prevalence on account of this being a hospital based data. And the diagnosis of DM may have been missed in the hospital or children may have already died before they reached the hospital. This highlights the need for intensified efforts in education of health workers and the populace at large for quick recognition and prompt diagnosis for management of DM.

P263

Assessment of c-peptide level and diabetes antibodies in Omani children with type 1 diabetes mellitus at Sultan Qaboos University Hospital

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Background and Aims: Type 1 diabetes mellitus (T1DM) is the commonest type of diabetes in infants and children. The diagnosis is clinical . It´s also characterized by low level of c- peptide and presence of autoantibodies. The primary aim of this study is to estimate the proportion of diabetes antibodies (anti- glutamic acid decarboxylase antibody and anti- islet cell antibody) and C-peptide level in children diagnosed with type 1 diabetes mellitus at Sultan Qaboos University Hospital (SQUH), Muscat, Oman. The secondary goal was to investigate the association between them .
Methods and Subjects: A retrospective cross-sectional study included ninety eight patients with T1DM between the age of 0-15 who were referred to Pediatric Endocrinology Unit in Sultan Qaboos University hospital from the period of 2002- 2016. Anti- Glutamic Acid Decarboxylase Antibody, Anti Islet cell antibody and C-peptide level were obtained from track care - SQUH.
Results: The proportion of positive anti- glutamic acid decarboxylase antibody was 71.43% while positive anti- islet cells antibody was 14.29%. 81.63% had low c- peptide levels and 18.37% had normal levels of c- peptide. Association between variables and with age groups was not significant probably due to small sample size.
Conclusion: The proportion of low c- peptide levels among children with T1DM is high duo to low levels of insulin. Testing other diabetic antibodies is essential since some patient were having negative results for both antibodies in whom other antibodies could be positive or they may not have any diabetes autoantibodies. The c-peptide was low as expected in patient with positive antibodies ,however c-peptide positivity was not significant higher among older children.
Keywords: Type 1 diabetes mellitus, c- peptide levels, insulin, glutamic acid decarboxylase antibody, islet cell antibodies

P264

"Bridging the Gap"? Diabetic Kidney Disease [DKD] in poverty associated type 1 childhood diabetes in India: prevalence, correlates and challenges

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Objectives: To study prevalence, clinical correlates and management challenges of DKD in economically 'underprivileged' T1DM children.
Methods: DISHA Free Diabetes Clinic for Poor [1987 - Ongoing]: Since 2011, 386 children are receiving enhanced support - free insulin [Basal bolus(meal time regular + bedtime NPH) 100%], syringes, counseling, 24h help lines, BG meters, 30 BG strips/ month, limited biochemical evaluations [TSH, quarterly HbA1c, annual UACR] **[CDiC + LFAC].** From this cohort, 120 children (Male 39%) were randomly selected for the analysis.
Results: [Mean] DM Duration = 7.8 y; DM Age Onset = 10.4 y; Height = 147 Cm; Weight = 45.9 Kg; BMI = 20.7; Pulse Rate = 100; BP = 113/70; Hemoglobin **Hb** = 12.9 G/dl; HBA1c = 9.5%; Serum Albumin **S Alb** = 3.9 mg/dl; Urine Albumin Creatinine Ratio **UACR**= 59 mcg/mg; Serum Creatinine **S Creat**= 0.61 mg/dl; eGFR= 122 mL/min/1.73 m^2.
Retinopathy: Non-proliferative: 3%; Proliferative 1%. On ACEI/ARB = 25%. **Hypertension HT:** Children with HT [12.5%] were associated with: (a) increased DM duration, BMI and UACR; (b) renal dysfunction; and (c) lower HbA1c.

HT	SBP / DBP	DM DURA	BMI	Hb	HbA1c	S Alb	UACR	S Creat	eGFR
HT -	112 / 69	7.1	20.4	12.9	9.7	4.1	44	0.5	126
HT +	123/79	12.4	23	12.2	8.5	4.0	153	1.2	94
P	*0.01/0.009*	*0.001*	*0.04*	*0.07*	*0.04*	*0.25*	*0.0003*	*0.0000*	*0.0000*

[DKD]

CKD Stages: 1 = 90%; 2 = 8%; and 3/4 = 2%. Higher CKD stages were associated with: (a) increased DM duration, SBP, DBP and UACR; and (b) decreased Hb, S Alb and HbA1c [Pre-existing renal dysfunction associated with: (a) decreased renal insulin clearance and gluconeogenesis; and (b) increased hypoglycemia].
Conclusions: Guidelines based monitoring and interventions are the cornerstone for renal protection and preservation in T1DM children, universally. Innovative strategies and potential care models are imminently needed toward **'bridging' the DKD burden gap,** between the economically 'underprivileged' versus 'privileged'. An indigenous ['Made in India'] hand held **Point of Care POC device** [PathShod multianylate: for different bio-markers [Hb, HbA1c, S Alb, Glycated Albumin, Blood glucose, UACR] has been one supportive step in this direction.

P265
Socio-economic and cultural background and its relevance to diabetes management in Indian children, adolescents and young adults with type 1 diabetes mellitus

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Introduction: In addition to factors known to influence type 1 diabetes (T1DM) outcomes, there may exist unique socio-cultural influences in our country.
Objectives: To evaluate the association of socioeconomic (SE) and cultural factors with HbA1c and diabetes related knowledge of Indian children and young adults with T1DM.
Methods: Consecutive patients with T1DM, 3 to 26 years of age, attending clinic in 2017 (n = 205) were invited; 173 with no associated complication were enrolled. Demographic details, SE scoring, BMI and mean of the last 2 HbA1c values were recorded. A diabetes knowledge test (DKT) was administered.
Results: Mean ± sd age was 14.0 ± 5.0 years, duration of diabetes 5.6 ± 3.8 years, and HbA1c 8.2 ± 1.3%. Overweight / obesity was seen in 35 %. Our patients traveled a median of 125 km and 2.3 hours to reach clinic. Insulin NPH was taken by 39 % patients for their basal needs, due to the higher cost of analogs. Insulin adjustment for high pre-meal BG was practiced by 88 % patients, but adjustment for planned meal intake was only done by 17%. No child except 2 took insulin at school / college. There was no difference in median HbA1c values between males and females, urban and rural residence, parental education ≤ class 12 vs > class 12, or with SE class. Median (range) HbA1c was lower in the age group > 18 to 26 years [7.7% (5.6 -11.0)] vs that in the < 10 year [8.3% (6.3 -10.6)] or 10 to 18 year age groups [(8.3% (5.9 - 12.6, p = 0.02)]. On multivariate regression analysis, HbA1c was associated with higher DKT score and age group, and DKT score by urban residence and maternal education > class 12.
Conclusions: HbA1c and diabetes knowledge were not associated with income. Greater societal awareness about childhood diabetes may favor insulin use at school. Adolescents in India did not appear to decompensate in glycemic control to the extent documented in world literature.

P266
Diabetes mellitus as experienced in a newly established pediatric endocrine unit: the experience over a nine month period

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Background: Diabetes is one of the major non-communicable diseases tending toward epidemic proportions in adults worldwide. In developing countries, there is slowly increasing awareness of the occurrence of diabetes in children and adolescents.
Objective: To determine the pattern of presentation and types of diabetes in the children who presented to the Unit.
Methods: The study design was a retrospective review of prospectively collectively data of diabetes cases seen in the Pediatric Department of the Lagos State University Teaching Hospital, Ikeja, Lagos, Nigeria between March 2017 and November 2017. Records were retrieved from the unit and clinic registers, and univariate analysis was carried out for all major variables of interest.
Results: Of the 57 patient visits to the Pediatric Endocrine Unit in the study period, a total of 12 (21.1%) were patients living with diabetes. The ages ranged from 4 to 15 years with a mean of 9.6 ± 2.5 years. Three (25%) were male, while nine (75%) were female. Three (25%) patients had type 2 diabetes while 9(75%) had type 1 diabetes. All the patients with type 2 diabetes were adolescents. The commonest presentations of diabetes were polyuria (100%), polydypsia (83%), weight loss (75%) and diabetic ketoacidosis (50%). Mean HBA1C and C-peptide levels in the five patients with minimal financial challenges in carrying out the laboratory requests were 9.9 ± 3.2% and 252 ± 125pmol/l respectively.
Conclusions: Widespread training on early recognition and diagnosis of diabetes may reduce the presentations of life-threatening conditions such as ketoacidosis. Financial constraint is a limiting factor in the management of diabetes. There should be increased index of suspicion of Type 2 diabetes among adolescents.
Keywords: type 2 diabetes adolescents screening

P267
Type 1 diabetes in Indian children: experience from a tertiary care center

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Objective: To evaluate the glycemic control by basal bolus insulin therapy in Indian pediatric type 1 diabetic patients.
Material and Methods: It is an open-label, Retrospective study where data was collected from Pediatric and adolescent endocrine clinic at tertiary care hospital from past 2 years. The study population consisted of 373 patients who were on basal bolus therapy. Among these patients 127 patients were on injection degludec, 87 patients were on injection detemir, 159 patients were on Injection Glargine along with rapid acting meal time bolus insulin. 74 patients among degludec were continued on same basal insulin for more than 52 weeks rest changed to other basal insulin/ Continuous Subcutaneous insulin infusion/ Loss to follow up; similarly 46 in detemir group while 102 in Glargine group. Glycemic controls were evaluated in all patients at baseline and after 6 months.
Results: There was a significant decline in HbA1c, FPG and bolus insulin dose from baseline to 52 weeks in the overall population, among degludec group HbA1C decreased from 9.61 ± 2.46 to 7.87 ± 1.83(p< 0.001); in Glargine group 8.96 ± 1.89 to 8.71 ± 1.57(p< 0.001); while in detemir group 8.77 ± 2.28 to 8.32 ± 1.45(p< 0.001).
Conclusion: In our study all long acting basal insulin along with rapid acting mealtime bolus insulin were found to be effective in Indian pediatric population.

P268
Dyslipidemia in childhood type 1 diabetes in India: prevalence, correlates and management challenges in a resource limited setting

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Objectives: To study the prevalence, clinical correlates and management challenges of dyslipidemia in children with type 1 diabetes.

Methods: DISHA Free Diabetes Clinic for the Poor [1987 - Ongoing]: Since 2011, 386 children are receiving enhanced support - free insulin [Basal bolus insulin (meal time regular + bedtime NPH) 100%], syringes, health counseling, 24 h help lines, BG meters, 30 BG strips/month and limited biochemical evaluations [TSH, quarterly HbA1c, annual urine albumin: creatinine ratio] **[Changing Diabetes in Children and Life for a Child with Diabetes].** From this cohort, 120 children (Male 39%) were randomly selected for the analysis.

Results: [Mean] DM Duration = 7.8 y; DM Age Onset = 10.4 y; Height = 147 Cm; Weight = 45.9 Kg; BMI = 20.7; Pulse Rate = 100; BP = 113/70; Hemoglobin **Hb** = 12.9 G/dl; HBA1c = 9.5%; Serum Albumin **S Alb** = 3.9 mg/dl; Urine Albumin Creatinine Ratio **UACR** = 59 mcg/mg; Serum Creatinine **S Creat** = 0.61 mg/dl; eGFR = 122 mL/min/1.73 m^2. **Retinopathy:** Non-proliferative: 3%; Proliferative 1%. On ACE inhibitors / ARB = 25%. **Acute myocardial infarction:** One 20 y girl with T1DM from age 4y. Statin therapy = 5%

Glycemic control HbA1c	HbA1C %	T Chol mg/dl	LDL Chol mg/dl	HDL Chol mg/dl	Trig mg/dl
< 8	7.1	174	93	57	113
8 - 10	8.9	199	101	59	193
>10	11.9	216	104	52	293
P	<0.0001	0.01			<0.0001

[*Lipids*]

HbA1c: Glycemic Control Sub Groups
< 8 = Good; 8.1-10 = Fair; >10 = Poor
In this cohort of "poverty associated" type 1 diabetes children, "Good" glycemic control was associated with: Lower Total [and LDL] Cholesterol, Lower Triglycerides, and Higher HDL Cholesterol.

Conclusions: Philanthropy based highest possible standards of medical care, resulted in improvements in glycemic control and lipid profiles, bestowing future long term positive cardiovascular health benefits, for these young ones. Guidelines based treatment for dyslipidemia in pediatric/ adolescent diabetes needs stronger focus.

Poster on Display – Exercise

P269

Beneficial effect of laughter yoga and clapping exercise in type 1 adolescents diabetic patients in south Delhi metro population

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Objectives: The aim of the present study was to determine the impact of laughter therapy on the blood glucose level, fasting glucose & insulin, glucose tolerance test (GTT), and glycosylated hemoglobin (HbA1c) in type 2 adolescents diabetic patients in south Delhi metro population

Methods: For this purpose, we used laughter yoga, which includes respiratory laughing and fun exercises. The study involved 62 school children participants (age group 7-17 years), of which 31 were involved and 31 were not involved (control group) in laughter yoga. In both groups, the level of blood glucose was measured at arrival after they had standard brunch, a total of 250 Kcal. A 30-minute lecture was followed by 30-minute intense clapping workout for those participants who had laughter yoga included in the program. All group were treated with laughter yoga and clapping for daily one month with balance diet at Shri Mahamaya Vaishnav Devi Mandir research institute, India.

Results: In both groups, the level of blood glucose was measured after 120 minutes. We found the inhibitory effect of laughter on the increase in postprandial blood glucose (P< 0.05). After one month their blood glucose and insulin levels were closer to normal levels with increase in work efficiency in type 1 diabetic patients. Present study highlight that the successful treatment of diabetic children and adolescents not only requires anti-diabetic drugs; but also family care, life style education, harmonized mind-body-soul, awareness, psychological support, preventive approach toward activity of daily living.

Conclusions: Our study indicated the importance of daily opportunities for laughter in patients with diabetes. Therefore preventive diabetes education program & promotion of laughter yoga and clapping will be future plan of action which can be suggested in the form of regular exercise and diet planning for the students as part of an integrated approach.

P270

Introducing “the Body Breaker” making working out fun in group!!! Presenting another perspective to physical activities among teenagers living with type 1 diabetes (T1D) during annual Diabetic Camp in Mauritius

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Objective: The rationale of the game was to touch base on different aspects:

- Promoting the health benefits of recurrent, simple and feasible physical activities daily.
- Awareness of adjusting insulin, carbohydrate monitoring prior, during and after working out.
- Enhancing community characteristic during the camp.

Method: This study was carried out during a winter diabetic camp 2017 by an NPO T1 Diams, Mauritius. 35 beneficiaries, aged between 12 and 30 were initiated to different way of performing physical activity as a fun board game. There were 5 groups of 7 players, 1 team leader for each group. The activity was schedule in the morning from 9 am to 11 am. The rules of the game are similar to monopoly:

The Play: The player moves their token on the board indicated by the dice, each involve the player to perform a full body work out. The participant who has more energy card left is the winner.

Result: Adequate carbohydrate replacement before, during, and after exercise. Reducing insulin doses and blood sugar monitoring maintained. Physical activity and participation in many individual and team sports is possible and highly recommended as part of T1D treatment in managing diabetes. Physical activity, glycaemia control, insulin therapy and carbohydrate counting represent the three cornerstones of care. Participant's glycaemic controls were monitored for the whole day and they were able to differentiate between glycaemic result of previous day and general well being.

Conclusions: It was concluded that enjoyment was key to participation; participants were keen to try the game with prompting and encouragement from team leaders and Physical activity by itself induces health-related benefits which extended to general well- being, controlled glycaemia.

Keywords: T1 Diams,Mauritius,T1D, Physical activity, adolescents, Glycaemia.

[*Fig 1 : Showing medical student using the Body Breaker*]

Poster on Display - New Insulins and Pharmacologic Agents

P271

Comparative use of Tresiba - qualitative and quantitative outcomes

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Introduction: Studies in adults (limited in children) have shown an improvement in nocturnal hypoglycaemia, total daily insulin usage and patient acceptability with the use of Degludec, with no significant difference in metabolic control.

Confident use of Degludec is now gaining momentum in the pediatric population. It offers the advantage of 42 hr half life, a better pharmaco-dynamic profile and neutral pH.

Objective: We evaluated the use of Degludec for children with type 1 diabetes mellitus comparing clinical outcomes with that of Glargine.

Methodology: Retrospective analysis was performed on prospectively collected data from electronic data bases between Jan 2017 and 2018 in children under 19 years on a basal bolus regime. Exclusion criteria: children on pumps or other types of insulin regimes. Outcomes including hypoglycemic episodes, HbA1C levels, blood glucose variability, fasting blood sugar target, BP, BMI, admissions and acceptance to the insulin were analyzed.

Results: 127 children (0-19 years) were analyzed. Blood glucose variability was similar between both groups with a standard deviation of 5.2. There was a difference of 2 mmol in the morning blood sugar between the Degludec and Glargine group with no difference in metabolic control. There was a team bias of a selected group of poor control and new starts within the Degludec group. Diabetes related admissions reduced with more acceptance to insulin in the Degludec group.

Conclusion: The study reinforces the confidence and ease with the use of Degludec as basal insulin in pediatrics. Degludec is more effective in targeting a lower blood glucose level in the morning with reduction in DKA admissions with poorly compliant patients. Patient acceptability around associated pain and flexibility was a huge advantage with our patients and families.

Total =127	Glargine 58	Degludec 69 (29)	Glargine – Degludec 29	Degludec 40
M:F	1:1.1	0.95:1	1:0.93	0.66:1
Age	13.1	13.36	12.9	13.65
BMI	25.22	28.6	20.68	33.8
Hypo events	9	9.3		
Morning BG average	10.2	8.3		
Duration of Diabetes	4.84	4.86	4.84	4.89
Average A1C	68.17	77.12	73.2	80.2
Change	8.2%(5.85)	-3.53%	6.64% (5.19)	-5.5%

[*Degludec and Glargine group differences*]

Poster on Display – Diabetes Acute Complications

P272
Disturbed conscious level in a child with DKA, cerebral edema or cerebral venous thrombosis

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A previously healthy 13 years old female presented to ER by disturbed conscious level, history of vomiting and abdominal pain. RBG was high, acetone in urine 2+ and ABG showing metabolic acidosis. She was diagnosed as DKA and started protocol for management according to ISPAD guidelines. Her conscious level didn't improve (GCS 4), fundus and MRI brain were normal. CRP was 260, 1st hour ESR was 120 and D-dimers were positive. She started antibiotics and antiviral treatment as DKA complicated with encephalitis. The patient gradually improved (GCS 12) then she developed hematemesis, abdominal tenderness and rigidity. PAUS showed moderate turbid ascites, serum amylase and lipase were elevated and she was diagnosed as acute pancreatitis. Two days later the patient developed ARDS, carditis and the conscious level deteriorated (GCS 4). She was ventilated and IV fluids were decreased to 3L/m^2. Her conscious level improved (GCS 13) and was extubated but was blind. The patient was shifted to SC insulin and SMBG was controlled. MRI &V brain showed bilateral sigmoid sinus thrombosis with bilateral occipital hemorrhagic infarction and high parietal deep white matter edema. Fundus showed bilateral papilledema. CSF pressure was high so cerebral dehydrating measures were started with improvement of vision. Therapeutic dose enoxaparin was started for 6 months. Screening for autoantibodies (ANA Anti DNA) and C 3and C4 levels were normal. Thrombophilia screening (protein c & s and antithrombin levels) were normal except for MTHF A1298C which was homozygous mutation. The patient recovered well and clinical examination four weeks later revealed complete recovery of vision.

Conclusion: Neurological deterioration during an episode of DKA is usually caused by cerebral edema however other causes must be sought. When a patient with DKA develops neurological signs and symptoms, the possibility of CVST must be excluded. Proper fluid balance is mandatory in DKA to avoid cerebral edema and CVST.

P273
Severe lead toxicity due to ayurvedic medicine in a child with type 1 diabetes

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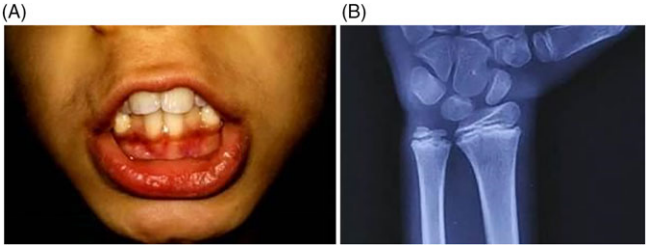
Introduction: In India, parents of children with newly diagnosed type 1 diabetes often consult alternative medical practitioners. It is important to proactively tell all parents at diagnosis not to do so, as it can lead to fatal consequences

Objective: We are presenting a case of acute severe lead toxicity in a child with type 1 diabetes.

Methods: Case, an 11 y old boy diagnosed with type 1 diabetes 6 months ago presented to us with complaints of abdominal pain, constipation, pallor and irritability for few days. There was recent history of diabetic ketoacidosis managed outside, and one episode of afebrile convulsion. The parents were educated professionals, but had consulted a highly revered traditional healer soon after diagnosis, who gave them *bhasma* (oral powder), bark of a tree and tablets to be given daily to the child, with the assurance that he will be cured. He did not charge any money for the 'medicines', which were given as unlabeled loose sachets. As the child's insulin requirement decreased a few weeks after diagnosis as part of honeymoon phase, the parents attributed it to the effect of the *bhasma* and stopped insulin as well as sugar monitoring.

The child had pallor, Burtonian line along gum (Figure 1a), and lead line at metaphyses (Figure 1b).



[*Fig 1a: Burtonian line along gum, Fig 1b: 'Lead line' at metaphyses of radius and ulna*]

Results: Initial blood lead level (BLL) was 172 μg/dl (lethal range), which fell to 110 μg/dl within a week of stopping ayurvedic drugs. Oral chelation with dimercaptosuccinic acid led to clinical improvement, and BLL decreased to 44 μg/dl. Analysis of *bhasma* showed lead content to be extremely high (>100,000 mcg/g).

Conclusions: It is important to know that many ayurvedic *bhasmas*, including those considered as anti-diabetic agents, contain high levels of heavy metals. It is essential to educate parents about the transient honeymoon phase that is seen in many children, which should not be confused with cure.

P274
Diabetic ketoacidosis in sub-Saharan Africa: what about children and adolescents at a referral hospital in Yaounde, Cameroon?

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Introduction: Diabetic ketoacidosis is a life-threatening complication of Type 1 Diabetes mellitus, causing majority of diabetes-related mortality and morbidity in children and adolescents.

Objectives: To investigate the characteristics and outcome of diabetic ketoacidosis (DKA) in children and adolescents with type 1 diabetes mellitus (T1DM) in a referral hospital of Yaounde (Cameroon).

Methods: A retrospective study involving files of children with DKA at the Mother and Child Center/Chantal Biya Foundation from January 2013 to October 2017. Variables included demographic data (age, sex, history of T1DM), clinical presentation (presenting complaint, examination findings), laboratory results (glycaemia, urine ketones and glucose) and the outcome. Results were presented as means ± standard deviation and percentages.

Results: Among the 17 files collected, 7 were females and 10 males (sex ratio 0.7). Mean age was 11.36 ± 3.37 years (range 6 - 16 years). T1DM was newly diagnosed in 11 cases (64.7%). Mean duration of hospitalization was 9.5 ± 3.5 days. Comorbidities were found in three patients (17.6%). Death occurred in 3 patients (17.6%), caused by a comorbidity in 2 of the cases.

Conclusion: DKA was most prevalent in males and newly diagnosed cases of T1DM. Death was often caused by a comorbidity. Hence early diagnosis and appropriate treatment will be beneficial to prevention of DKA and negative outcomes.

P275

Frequency of diabetic ketoacidosis at type 1 diabetes (T1D) onset in children under the age of 15 - experience of one center in the period between 1995 and 2015

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Objective: Rapid progression of T1D or negligence of the first symptoms will cause complex metabolic decompensation and development of diabetic ketoacidosis (DKA). The aim of this study was to determine the frequency of DKA at T1D onset in our center in children under the age of 15 years over a period of 21 years.

Subjects and Methods: The study included patients younger than 15 years in whom T1D was diagnosed between January 1st 1995 and December 31th 2015. Data regarding symptoms and signs at the beginning of the disease and laboratory findings were collected retrospectively from patients´ medical history. DKA was defined in two ways: 1. pH < 7.3 or 2. pH < 7.3 and / or bicarbonate level < 15 mmol/l.

Results: during the observed period 426 children under the age of 15 years (227 girls, 53.3%) were hospitalized due to new onset T1D. Polydipsia (90.4%), polyuria (89.7%), and weight loss (70.4%) were the most common symptoms present at the time of disease onset.

Enuresis was recorded in 8.5% of patients and 43.9% had nicturia. In 20.3% of children, an infectious disease preceded or was present at the time of T1D detection. A total of 31.5% (134) patients had DKA at beginning of the disease when defined at pH < 7.3. According to the definition of DKA at pH < 7.3 and / or bicarbonate < 15 mmol/L DKA was present in 41.5% (177) patients. During the observed period there was no significant change in the DKA frequency in children under the age 15 years, but in children > 10 years there was a significant trend of DKA frequency increase (p 0.009).

Conclusion: The frequency of DKA in children under 15 years at disease onset is high, 31.5%, and does not change in the observed period. One must extract children older than 10 years in which the frequency of DKA is increasing. Therefore, it is necessary to further emphasize the need for early identification of the basic symptoms of T1D in order to avoid a life threatening condition - DKA.

P276

Diabetic neuropathy: an early presentation

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Introduction: Diabetic neuropathy represents a major complication of type 1 diabetes mellitus (T1DM) but there is considerable uncertainty as to its incidence, prevalence, diagnosis and prognosis in pediatric population. We describe a case of a 12 year old girl who presented to us with early onset diabetic motor neuropathy.

Case details: 12 yr old girl was admitted with 2nd episode of diabetic ketoacidosis (HbA1c- 13%) on split mix insulin regime(regular + isophane), 6 months from the time of diagnosis of type1 diabetes mellitus (HbA1c- 16.6%), had cerebral edema requiring mechanical ventilation for 48hrs. She developed weakness of all 4 limbs, lower limbs more than upper limbs with bilateral foot drop. Serum vitamin B12 (>500pg/ml) and peripheral blood smear were normal. Nerve conduction study revealed demyelinating motor neuropathy of both lower limbs. A diagnosis of diabetic neuropathy was made and she was started on amitriptyline and vitamin B12. The weakness has not improved nor progressed over the past 2 months.

Discussion: Type 1 diabetes mellitus is a chronic immune-mediated disease. Diabetic peripheral neuropathy is an important microvascular complication of T1DM, the most important risk factor being poor glycemic control. Diabetic neuropathy is classified as sensory, motor and autonomic neuropathy. A combination of other factors includes high blood pressure and vitamin B deficiency. High blood sugar can injure nerve fibers throughout the body, but diabetic neuropathy often damages nerves in the legs and feet, commonly peroneal nerve, which can lead to pain, numbness and muscle wasting and foot drop. The recommendation for screening of neuropathy in children with type 1 DM is past puberty and/or in children who had had diabetes for at least five years.

Our case reiterates the fact that improving glucose control rapidly reverses slowing of nerve conduction in diabetes and early screening for neuropathy.