

Treatment adherence and BMI reduction are key predictors of HbA1c one year after diagnosis of childhood Type 2 Diabetes in UK

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Background

- We recently reported the 2015-16 UK incidence of T2DM in youth as 0.72/100 000 per year, with significant increases across a decade among South-Asians and females (Candler et al, 2018)
- T2DM in youth has an aggressive clinical course (compared with the disease in adults) as it is associated with an accelerated loss of B-cells and rapid development of diabetes related complications.

Objectives

- To report outcomes from a national cohort of children and adolescents with T2DM one year following diagnosis.

Methods

- A follow-up questionnaire was sent to clinicians who initially reported confirmed cases of T2DM (n=106), 12 months after the case was notified (between April 2016 to April 2017).

Results

Demographics

- 100/106 questionnaires received
- Mean age at follow up = 15.3 years (range 9.3 to 18.4 years)
- White (45%), mixed ethnicity (4%), Asian (33%), BACBB (Black, African, Caribbean or Black British) (14%)

Treatment

- Metformin was the most frequently used treatment at baseline (77%) and follow-up (87%).
- Of the 21 cases using insulin; OD long acting insulin (n=14), basal-bolus regimens (n=6) and BD mixed insulin (n=1).
- Those treated with insulin had a higher HbA1c (60 vs 44 mmol/mol, p=0.017).

Treatment	Baseline treatment (%)	1 year follow up (%)
Diet and Lifestyle alone	18/105 (17.1)	11/94 (11.7)
Insulin alone	6/105 (5.7)	1/94 (1.1)
Metformin alone	54/105 (51.4)	59/94 (62.8)
Insulin and Metformin	27/105 (25.7)	18/94 (19.1)
GLP agonist + Insulin + Metformin	0/105 (0)	1/94 (1.1)
GLP agonist + Metformin	0/105 (0)	3/94 (3.2)
DPP-4 + Insulin + Metformin	0/105 (0)	1/94 (1.1)

Table 1. Treatment of T2DM at diagnosis and at 1-year follow up

HbA1c

- Median (IQR) HbA1c at follow up = 53 mmol/mol (42.5 to 68.5)
- 15.1% = HbA1c <39mmol/mol, 23.7% = 39 – 47 mmol/mol, 45.2 % = 48 – 79 mmol/mol, 16.1% >80 mmol/mol
- There was no difference in HbA1c across genders or ethnicities
- There is strong evidence of a difference between those with and those without reported compliance and attendance concerns (61.5 vs. 45.5 mmol/mol respectively, p<0.0001)

Weight related outcomes

- Median (IQR) weight change over a year was +2.5kg (-1.5 to 6.0)
- 14% reduced ≥5% body weight from baseline
- Overall median (IQR) BMI SDS was 2.81 (2.30 to 3.23) with a decrease in BMI SDS at 1-year follow up (median = -0.13; IQR = -0.30 to 0.10)
- 74.2% were obese and 19.8% overweight
- 58% demonstrated some reduction in BMI SDS.
- 10.5% were able to reduce their BMI SDS ≥ 0.5 SD

Model	Unstandardized Coefficients		% change in HbA1c/ unit increase in predictor	t	Sig.
	β	Std. Error			
(Constant)	1.63	.17		9.86	.00
Ethnic Group 'Mixed'	.01	.07	2.33	.14	.89
Ethnic Group 'Asian'	.02	.03	3.75	.48	.64
Ethnic Group 'BACBB'	.02	.04	5.20	.54	.59
Compliance concerns reported by clinician	.12	.03	32.13	4.26	.00
Number of clinic appointments attended	.004	.009	0.93	.42	.68
Formal social care involvement	.09	.07	22.74	1.24	.22
BMI SDS change at 1year follow up	.13	.05	34.90	2.75	.007
BMI SDS at 1 year follow up	-.03	.02	-5.81	-1.20	.23
Sex	.05	.03	11.94	1.62	.11
Age at follow up	.01	.01	1.39	.729	.47

Table 2. Multiple Linear regression model of predictors of logHbA1c
Dependent Variable = log¹⁰ HbA1c, R² = 0.31, p=0.001

Co-morbidity

- Those with microalbuminuria had higher HbA1c compared to those without (median 49 vs 60 mmol/mol, P=0.033)
- However, there was no difference in HbA1c between those with each of the other comorbidities and those without

Social concerns and Clinic attendance

- 4.3% (4/94) of cases were under formal social care involvement (Child protection or child in need).
- Clinicians reported issues with compliance/adherence to medication and treatment plan in 53% of cases.
- The mean clinic attendance was 75% (S.D. 28) with mean appointments attended 3.8 per year (SD 1.6, min 1, max 10).

Complications reported	Baseline (%)	1 year follow up (%)
Hypertension	20/95 (21.1)	12/86 (14)
Retinopathy	6/105 (5.7)	2/94 (2.1)
Microalbuminuria at last follow up	3/71 (4.2)	11/67 (16.4)
PCOS	11/70 (15.7)	10/63 (15.9)
Nephropathy clinically suspected	3/71 (4.2)	3/94 (3.2)
Dyslipidaemia	9/105 (8.6)	1/94 (1.1)

Table 3. Co-morbidities reported at baseline and 1-year follow up

References

Candler TP, Mahmoud O, Lynn RM, Majbar AA, Barrett TG, Shield JPH. Continuing rise of Type 2 diabetes incidence in children and young people in the UK. Diabet Med. 2018 Feb 20
Topic: Diabetes

