# Paediatrics

## Does childhood obesity increase the risk of type 1 diabetes?

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It is impossible to not be aware of the significant increase in the prevalence of childhood overweight and obesity.

Much research has been undertaken into obesity, yet we are still unclear as to the clinical implications of weight problems in childhood in the short-term, and their implications for adult life. This is important, as with possibly 30% of the paediatric population overweight or obese there does need to be some understanding of who needs the most aggressive weight management.

There are data which show that overweight adolescents can have abnormal "metabolic" profiles, but that a proportion will grow out of these abnormalities during adolescence, even without treatment (Goodman et al, 2007). Yet we have little idea on the long-term risks to younger, pre-pubertal children.

Al Mamun et al (summarised alongside) suggest that childhood BMI, specifically at 5 years of age, is related to adult risk of both type 1 and 2 diabetes. This study used data from the Mater University Study of Pregnancy and its outcomes – a study of over 7000 women and their offspring who were studied at 5, 14 and 21 years. A sub-group of 2639 offspring had complete data for BMI at 5 years of age and self-reported diabetes at the age of 21. The authors, using an age-adjusted model, found that BMI z-score at age 5 was positively correlated with the presence of diabetes at 21 years (odds ratio [OR] 1.61; 95% confidence interval [CI] 1.24, 2.09). They also found that young adults who were overweight at age 5 had an OR of 2.60 (95% CI 1.29–5.22) for having diabetes at the age of 21. The authors concluded that childhood BMI may be central to the increasing incidence of all types of diabetes.

Although there are a number of methodological problems with this study, these data do suggest that overweight or obesity occurring early in childhood could have long-term implications. Yet, these data do not clarify whether this risk is purely with respect to type 1 diabetes. The "accelerator" hypothesis suggests that type 1 and 2 diabetes are likely to have the same acceleration of beta-cell loss set against differing genetic backgrounds, and that the increasing prevalence of even type 1 diabetes is due to excess weight.

Another article reviewed here (Patterson et al; summarised overpage) shows that there has been a year on year increase in the incidence of childhood type 1 diabetes in Europe, with a prediction of a further doubling by 2020. Although it is difficult to link all these data these papers do suggest that aggressive prevention of obesity in early childhood needs to be a public health priority.

Goodman E, Daniels SR, Meigs JB, Dolan LM (2007) Instability in the diagnosis of metabolic syndrome in adolescents. *Circulation* **115**: 2316–22

PEDIATRIC DIABETES

## Pramlintide/insulin combination therapy for childhood T1D

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|---|---|
| Readability | ✓✓✓✓ |
| Applicability to practice | ✓✓✓✓ |
| WOW! factor | ✓✓✓✓ |

1 The authors sought to assess the effect of adjuvant pre-meal pramlintide combined with post-meal insulin on postprandial hyperglycaemia in children with type 1 diabetes (T1D).

2 Eight adolescents participated in this study, which compared postprandial glucose excursions in two groups: Group A (prescribed pre-meal insulin regimen), Group B (pre-meal pramlintide plus post-meal insulin).

3 A significant reduction in postprandial incremental blood glucose was observed in Group B compared with Group A, with area under the curve at 367±132 vs. 1124±174 mmol/L/min ($P$<0.001).

4 Pramlintide suppressed secretion of glucagon for circa 120 minutes following administration ($P$<0.003).

5 The authors concluded that fixed-dose pre-meal pramlintide and post-meal insulin was associated with considerably reduced postprandial hyperglycaemia in adolescents with T1D.

Hassan K, Heptulla RA (2009) Reducing postprandial hyperglycemia with adjuvant premeal pramlintide and postmeal insulin in children with type 1 diabetes mellitus. *Pediatr Diabetes* **10**: 264–8

OBESITY

## Increased BMI in childhood predicts T1D at age 21

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|---|---|
| Readability | ✓✓✓✓ |
| Applicability to practice | ✓✓✓✓ |
| WOW! factor | ✓✓✓✓ |

1 Evidence suggests that the current obesity epidemic is largely responsible for the recent rise in incidence in type 2 diabetes. The association between childhood obesity and type 1 diabetes, however, is unclear.

2 Controlling for early life, childhood and adolescence factors, the authors of this study aimed to examine the prospective association of childhood BMI z-score and overweight or obesity with the development of diabetes in young adults.

3 The study population was a sub-sample of 2639 young adults from the Mater-University Study of Pregnancy – a prospective birth cohort born in Brisbane, Australia – who were measured for height and weight at 5 years and who self-reported diabetes at the age of 21 years.

4 Compared with individuals who had normal BMI at age 5 years, the risk of developing diabetes by the age of 21 years was greater in those who had higher BMI z-score or were overweight at age 5.

5 Being overweight at age 5 was associated with an increased odds ratio of 2.60 (95% confidence interval 1.29, 5.22, in age- and sex-adjusted model) of developing diabetes by the age of 21 years.

6 The authors concluded that being overweight and having an increased BMI z-score at 5 years of age is an independent predictor of developing type 1 and type 2 diabetes by the age of 21 years.

Al Mamun A, Cramb SM, O'Callaghan MJ et al (2009) Childhood overweight status predicts diabetes at age 21 years: a follow-up study. *Obesity (Silver Spring)* **17**: 1255–61

DIABETES CARE

## "Carb" counting reduces $HbA_{1c}$ in children with T1D

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| Readability | ✓✓✓ |
| Applicability to practice | ✓✓✓✓ |
| WOW! factor | ✓✓✓ |

1 This study aimed to evaluate the association between parental knowledge regarding carbohydrate counting (CC) and glycaemic control in children with type 1 diabetes (T1D).

2 A total of 67 children aged 4–12 years with T1D (duration ≥1 year) were assessed. Parental estimation of carbohydrate content was obtained through diet recall.

3 Accuracy and precision were associated with lower $HbA_{1c}$ levels ($P<0.05$). Where parents demonstrated precision, $HbA_{1c}$ levels were 0.8% lower (95% confidence interval –0.1 to –1.4).

4 CC was concluded to be associated with improved $HbA_{1c}$ levels in children with T1D.

Mehta SN, Quinn N, Volkening LK, Laffel LM (2009) Impact of carbohydrate counting on glycemic control in children with type 1 diabetes. *Diabetes Care* **32**: 1014–16

DIABETES CARE

## Etanercept reduces $HbA_{1c}$ in T1D

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| Readability | ✓✓✓✓ |
| Applicability to practice | ✓✓✓✓✓ |
| WOW! factor | ✓✓✓✓ |

1 This 24-week, randomised controlled trial was undertaken to collect preliminary data on the feasibility and efficacy of using etanercept to prolong insulin production in children newly diagnosed with type 1 diabetes (T1D).

2 Eighteen participants (11 male, 7 female, aged 7.8–18.2 years) were randomised to receive either etanercept or placebo.

3 By study end, $HbA_{1c}$ was lower in the etanercept group (5.91±0.5% [41.1±5.5 mmol/mol]) compared with placebo (6.98±1.2% [52.8±13.1 mmol/mol]; $P<0.05$).

4 Percentage change in C-peptide area under the curve showed a 39% increase in the etanercept group compared with a 20% decrease in the placebo group ($P<0.05$). In this study population, etanercept resulted in lower $HbA_{1c}$ and increased insulin production.

Mastrandrea L, Yu J, Behrens T et al (2009) Etanercept treatment in children with new-onset type 1 diabetes: pilot randomized, placebo-controlled, double-blind study. *Diabetes Care* **32**: 1244–9

DIABETES TECHNOLOGY & THERAPEUTICS

## Predicting parental interest in CGM

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|---|---|
| Readability | ✓✓✓✓ |
| Applicability to practice | ✓✓✓✓ |
| WOW! factor | ✓✓✓✓ |

1 The authors of this study undertook an online survey, linked to a US website for childhood diabetes, of parents of children with type 1 diabetes (T1D), to identify predictors of parental interest in the use of continuous glucose monitoring (CGM) in their children.

2 Mean (±SD) age of children was 10±4.1 years and mean $HbA_{1c}$ level was 7.8±1.3% (62±14.2 mmol/mol); 70% of children used continuous subcutaneous insulin infusion (CSII).

3 Over 90% of parents indicated a high level of interest in CGM. Primary variables related to interest were use of CSII ($P=0.002$), checking blood glucose (BG) more than six times a day ($P=0.005$), and parental worry about high or low BG ($P=0.0012$, $P=0.02$, respectively).

4 Use of CSII, frequent BG checks and parental worry were associated with interest in CGM; age of the child and $HbA_{1c}$ level were not related to interest. These factors could assist in highlighting those families who would most benefit from CGM.

Kashmer L, Clarke W, Gurka M (2009) Predictors of parental interest in continuous glucose monitoring for children with type 1 diabetes. *Diabetes Technol Ther* **11**: 373–8

LANCET

## Type 1 diabetes in 5-year-olds set to double by 2020

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| Readability | ✓✓✓ |
| Applicability to practice | ✓✓✓✓ |
| WOW! factor | ✓✓✓✓ |

1 Type 1 diabetes (T1D) is the predominant form of the condition in children in most European countries. Prediction of future numbers will assist in care planning and fund allocation.

2 To describe the 15-year incidence trends for childhood T1D in Europe, the authors reviewed 20 population-based EURODIAB registers from 17 countries, comprising 29 311 new cases of T1D in children before their 15th birthday. Data were collated between 1989 and 2003, and then predictions made for 2005–2020.

3 Age-specific log linear rates of increased incidence of T1D were estimated. Along with published incidence rates and population projections, these enabled an estimation of new cases of T1D throughout Europe in 2005, 2010, 2015 and 2020.

4 Overall annual increase has been 3.9% (95% confidence interval 3.6–4.2). Age-specific increases in age groups 0–4, 5–9 and 10–14 years were 5.4% (4.8–6.1), 4.3% (3.8–4.8) and 2.9% (2.5–3.3), respectively.

5 An estimated 15 000 new cases in 2005 were divided between the age groups: 0–4 years (24%), 5–9 years (35%), 10–14 years (41%).

6 By 2020, the estimated number of new cases will be 24 400, with a doubling in the number of children <5 years of age with the condition.

7 The authors concluded that if current trends continue, the number of new cases of T1D in children aged <5 years in Europe is predicted to double between 2005 and 2020, and that prevalent cases in those aged <15 years will rise by 70%.

Patterson CC, Dahlquist GG, Gyürüs E et al (2009) Incidence trends for childhood type 1 diabetes in Europe during 1989-2003 and predicted new cases 2005-20: a multicentre prospective registration study. *Lancet* **373**: 2027–33

> *"If current trends continue, the number of new cases of type 1 diabetes in children aged <5 years in Europe is predicted to double between 2005 and 2020."*