Paediatrics

DIABETES CARE

Adolescent treatment adherence and HbA$_{1c}$ control

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

1 The authors tested regression models of uni- and bidirectional change between treatment adherence and glycaemic control in children at the cusp of adolescence with T1D, over 2 years.

2 Young people (n=225) with T1D for ≥1 year and aged 9–11 years were routinely recruited from outpatient appointments at US paediatric diabetes clinics.

3 The primary study outcomes were treatment adherence (measured by blood glucose monitoring frequency [BGMF]) and glycaemic control (measured by HbA$_{1c}$). A variety of covariates were also considered, including age, sex, ethnicity and race, pubertal status, insulin delivery method, diabetes duration, maternal education and household composition. Slopes for HbA$_{1c}$ and BGMF were plotted.

4 Over 2 years, HbA$_{1c}$ significantly increased (66 mmol/mol [8.2%] to 70 mmol/mol [8.6%], P<0.001). BGMF decreased from 4.9 to 4.5 checks per day (P<0.02). An increase in HbA$_{1c}$ significantly correlated with a decline in BGMF (P<0.001).

5 In the regression model, none of the covariates were statistically significant in predicting the BGMF slope.

6 The authors concluded that targeting treatment adherence in young adolescents may have significant impact on glycaemic control management. They suggest that future research should study children who are more representative of the general population, over a longer period of time.

Rausch JR, Hood KK, Delamater A et al (2012) Changes in treatment adherence and glycemic control during the transition to adolescence in type 1 diabetes. *Diabetes Care* 2012 **35**: 1219–24

Changes in treatment adherence and glycaemic control during transition to adolescence in T1D

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All those working with children and young people are aware that diabetes management can become much more challenging during adolescence; this is a time when the health beliefs of young people clash with those of all the older people that they work with, including their parents and healthcare professionals. Treatment adherence can deteriorate as the young person struggles to achieve independence whilst trying to fit in with his or her risk-taking peer group. In addition, rapid growth and pubertal development lead to insulin resistance and an increasing insulin requirement that can result in unwanted weight gain, especially in girls (IDF, 2011). This difficult period of adolescence is usually assumed to be associated with teenage years but there are no strict definitions.

The paper by Rausch et al (2012; summarised alongside) presents data from a multicentre study of changes in HbA$_{1c}$ in relation to blood glucose monitoring frequency (BGMF) as a measure of treatment adherence. A study cohort of 225 children, aged 9–11 years and judged to be on the "cusp" of adolescence, were followed over a 2-year period. The majority of the children (68%) were on insulin pump therapy and were expected to perform between four and six capillary blood glucose checks per day. Six-monthly HbA$_{1c}$ measurements were taken and 12-monthly BGMF assessments performed. All the subjects were given $5.00 for supplying a meter or logbook, and data were collected 2 weeks prior to the assessment visit. Data from either the logbook or meter were available for 98.7% of children at baseline and for 96.5% at 2 years (it is not clear how much the money may have helped here).

Trajectory analyses were performed for both HbA$_{1c}$ and BGMF. The average intercept for HbA$_{1c}$ was 8.2 (95% confidence interval [CI], 8.0–8.4, P<0.001) and the average slope over time was 0.2 (95% CI, 0.1–0.3, P<0.001). The average intercept for BGMF was 4.9 (95% CI, 4.7–5.2, P<0.001) and the average slope over time was -0.2 (95% CI, 0.0 to -0.3, P=0.02). This meant that someone following an average trajectory over the 2-year course of the study could expect an increase in HbA$_{1c}$ of 0.4% (4.37 mmol/mol), and a decrease in BGMF from 4.9 to 4.5 tests per day. The authors also performed a unidirectional regression model for the HbA$_{1c}$ slope with the BGMF slope as a predictor. This analysis showed that the BGMF slope was a significant predictor of the HbA$_{1c}$ slope (beta=-1.26 [95% CI, -0.49 to -2.03, P=0.001]). The regression coefficient of -1.26 suggests that for every one less blood glucose check performed, there would be an increase in HbA$_{1c}$ of 1.26% (13.77 mmol/mol).

The study raises a number of concerns. The first is the relatively young age of the subjects in whom a significant deterioration in glycaemic control has been demonstrated. The second is the impact of even one fewer blood test per day on blood glycaemic control; however, it is difficult to know whether this outcome would be the same if children who were on either pump therapy or basal–bolus insulin regimens were studied separately.

In conclusion, it is difficult to know the factors that underpin the disengagement of children with treatment adherence during adolescence, but issues of inadequate knowledge, support and motivation need to be addressed. It looks like children with diabetes are growing up fast.

International Diabetes Federation (IDF) (2011) *Global IDF/ISPAD guideline for diabetes in childhood and adolescence.* IDF, Belgium. Available at: http://bit.ly/Q52zt2 (accessed 12.10.2012)

ANNALS OF BEHAVIORAL MEDICINE

Adolescents with T1D: Coping, self-management and adaptation

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

1 The authors investigated the relationship of coping (primary, secondary and disengagement) and stress reactivity with self-management and diabetes-related outcomes (quality of life [QoL] and metabolic control [determined by HbA_{1c}]) in an ethnically diverse group of adolescents diagnosed with T1D for ≥6 months (n=327).

2 Coping, stress-reactivity and self-management were measured using the "Self Management in Adolescents and Diabetes questionnaire" and the "Responses to Stress questionnaire". QoL was measured using the "Pediatric QoL instrument".

3 The authors also investigated the effect that race/ethnicity and income had on self-management of T1D.

4 Higher levels of self-management were associated with greater use of primary control engagement coping (P<0.001). In contrast, greater levels of stress reactivity were related to lower levels of self-management.

5 Primary control engagement had a significant indirect effect on QoL and HbA_{1c} through self-management (P=0.002 and P=0.004, respectively).

6 Low-income and minority status were related to higher levels of disengagement and lower levels of primary and secondary control coping (problem-solving and acceptance).

7 The authors concluded that self-management was a mediator of the relationship between coping and metabolic control and between coping and QoL in adolescents with T1D.

Jaser SS, Faulkner MS, Whittemore R et al (2012) Coping, self-management, and adaptation in adolescents with type 1 diabetes. *Ann Behav Med* **43**: 311–9

DIABETES CARE

Transition into adult diabetes care

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

1 The authors defined variables related to the transition from paediatric to adult care of T1D, and evaluated their effect on post-transition glycaemic control.

2 A survey characterising the healthcare transition experience (including patient satisfaction and time gap between the last paediatric and first adult diabetes appointment) was completed by emerging adults (aged 22–30 years) with T1D (n=258). Glycaemic control was assessed using the most recent HbA_{1c} measurement.

3 A >6 month gap between paediatric and adult care was reported by 34% of the cohort. Those who felt completely/mostly prepared for transition were significantly less likely to report a time gap (P=0.0009).

4 Post-transition HbA_{1c} was significantly influenced by pretransition HbA_{1c}, current age and education (P=<0.0001, P=0.003 and P=0.01, respectively). Transition preparation had no effect on post-transition HbA_{1c}.

Garvey KC, Wolpert HA, Rhodes ET et al (2012) Health care transition in patients with type 1 diabetes: young adult experiences and relationship to glycemic control. *Diabetes Care* **35**: 1716–22

METABOLISM

Physical activity predicts arterial stiffness in youth

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

1 The authors investigated the relationship between physical activity (PA) and arterial stiffness in young people with T2D, and age- and sex-matched obese and lean people without diabetes.

2 PA was measured over seven consecutive days and people were assigned to a low-, medium- or high-activity group. Three measures of arterial stiffness were performed.

3 Following adjustment for demographic variables and cardiovascular disease (CVD) factors, PA remained a significant independent predictor of two measures of arterial stiffness (augmentation index and brachial distensibility [P<0.001 for both comparisons]), and more so in young people with T2D and obesity.

4 The authors concluded that further exploration is needed into the role of PA in CVD target organ damage in young people

Edwards NM, Daniels SR, Claytor RP et al (2012) Physical activity is independently associated with multiple measures of arterial stiffness in adolescents and young adults. *Metabolism* **61**: 869–72

J CLIN ENDOCRINOL METAB

Early adiposity and CV risk factors

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

1 In 17-year-olds identified from an Australian birth cohort (n=1053), the authors set out to identify a cluster of individuals at high cardiometabolic risk, characterised by adverse cardiovascular (CV) risk factors, including adiposity, waist circumference, BP, fasting insulin, glucose and lipids. Anthropometry and skin-fold measurements were made at nine time points until age 17 years.

2 Adolescents at high and low cardiometabolic risk were compared with respect to birth weight, and serial anthropometry.

3 "High-risk" adolescents had significantly greater systolic BP, waist circumference, insulin and triglycerides compared with the low-risk cluster (P<0.0001 for all comparisons). Birth weight and sex significantly influenced metabolic cluster outcome, with high-risk females tending to be heavier at birth than their low-risk counterparts.

Huang RC, Mori TA, Burrows S et al (2012) Sex dimorphism in the relation between early adiposity and cardiometabolic risk in adolescents. *J Clin Endocrinol Metab* **97**: E1014–22

> *"Self-management was a mediator of the relationship between coping and metabolic control and between coping and quality of life in adolescents with T1D."*