



What's 'appening with diabetes self-management?

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I recently asked one of my junior doctors what medical textbooks they read in bed at night. I was surprised by the response that they didn't read textbooks – "We've got apps". "Well, yes", I retorted – "I've got apps too, and they are great at helping me find my local supermarket but not how to manage an acutely ill individual with diabetes and a rash!" Snorting loudly in disgust I went off to do a virtual ward round by logging into our blood glucose meter hospital network and checking out which of the 300 or so inpatients with diabetes in our hospital had woken up hypo- or hyperglycaemic.

Medicine is changing and so is the way our patients learn how to manage their long-term condition. There are multiple apps to help people

with diabetes count their carbs and calories, monitor their energy expenditure and adjust their insulin.

The paper by Margaret Grey et al (summarised alongside) compared the effect of using two internet-based education programs on HbA_{1c} and quality of life. Those who benefited most had used both educational programmes.

Whilst textbooks at bedtime may have gone out the window for recently qualified doctors, we haven't yet found a proven alternative to traditional patient teaching methods. With the help of educationalists, we need to test these new learning methods to see which apps are best for our patients. We need robust trials to help us find the most effective technologies for the self management of diabetes. ■

Diabetes Care

Restoring hypoglycaemia awareness

Readability ✓✓✓✓

Applicability to practice ✓✓✓✓

WOW! Factor ✓✓✓✓

1 A sub-study of the HypoCOMPASS trial involved 18 adults undergoing different hypoglycaemia avoidance strategies to restore impaired awareness of hypoglycaemia (IAH).

2 The authors used hyperinsulinemic-hypoglycaemic clamp studies to create controlled hypoglycaemic challenges to measure participants' responses to hypoglycaemia. Participants underwent the procedure before and after a 6-month intervention as part of the HypoCOMPASS trial.

3 The study design was based on a 2x2 factorial design with four treatment arms: 1) multiple dose diabetes injections (MDI) with conventional self-monitoring of blood glucose (SMBG); 2) MDI with SMBG and real-time-continuous glucose monitoring (RT-CGM); 3) continuous subcutaneous insulin infusion (CSII) with SMBG; and 4) CSII with SMBG and RT-CGM.

4 Throughout the procedure, symptoms, cognitive function, and other hormone levels were measured, and participants were blinded to their actual glucose values.

5 After intervention, the glucose concentrations at which participants first felt hypoglycaemic increased ($P=0.02$). Cognitive function was unchanged and colour-word Stroop test showed an improvement. IAH can be improved by hypoglycaemia avoidance strategies.

Leelarathna L, Little SA, Walkinshaw E et al (2013) Restoration of self-awareness of hypoglycemia in adults with long-standing type 1 diabetes. *Diabetes Care* **36**: 4063–70

Diabetes Care

Internet-based psycho-education for youths with T1D

Readability ✓✓✓✓

Applicability to practice ✓✓✓✓

WOW! Factor ✓✓✓✓

1 The effectiveness of two internet-based psycho-educational programmes for improving HbA_{1c} and quality of life (QoL) in youths with T1D (11–14 years of age) was compared.

2 TeenCope, developed by the authors, was based on social cognitive theory. Managing Diabetes, the other programme, served as a control and had an education and problem-solving basis. Both programmes released one 30-minute "lesson" each week for 5 consecutive weeks.

3 Participants ($n=320$) were randomised to each programme, and HbA_{1c} and QoL scores were collected at baseline, 3, 6, and 12 months.

4 After completion and 12-month follow-up, participants were invited to complete the other programme.

5 At 12-month follow-up, although there was a slight increase in HbA_{1c} in both groups, there were no significant differences in HbA_{1c} and QoL between the two groups of participants.

6 After 18-months, youth that had completed both programmes had lower HbA_{1c} ($P=0.04$), higher QoL ($P=0.02$), social acceptance ($P=0.01$), and self-efficacy ($P=0.03$), and lower perceived stress ($P=0.02$) and diabetes family conflict ($P=0.02$). There was no significant difference in the proportion of youth that completed each programme.

7 The authors suggest that the skills learned from completing both educational programmes best prepares for a successful transition from youth to adolescence without the risk of poorer outcomes.

Grey M, Whittemore R, Jeon S et al (2013) Internet psycho-education programs improve outcomes in youth with type 1 diabetes. *Diabetes Care* **36**: 2475–82

“Some young people with diabetes are already showing measurable signs of diabetes peripheral neuropathy.”

Diabetes Care

DPN in adolescents and young adults with T1D and T2D

Readability ✓✓✓✓
 Applicability to practice ✓✓✓✓
 WOW! Factor ✓✓✓✓

- The authors estimated the prevalence of diabetes peripheral neuropathy (DPN) in adolescents and young people with T1D and T2D in a pilot study, part of the SEARCH for Diabetes in Youth study. They also aimed to find the factors associated with DPN prevalence.
- In total, there were 399 participants with T1D (mean age 15.7 ± 4.3 years) and 70 participants with T2D (mean age 21.6 ± 4.1 years).
- DPN was assessed using the MNSI exam; a score of >2 was diagnostic for DPN.
- The prevalence of DPN was 8.2% among participants with T1D and 25.7% among those with T2D.
- The unadjusted odds ratio (OR) for having DPN was nearly four-times higher among people with T2D compared to T1D (OR 3.8; 95% confidence intervals 1.9–7.5; $P < 0.0001$). The association remained significant after adjustments for age and sex.
- The authors found that youth with DPN were older, had longer duration of diabetes, were more likely to have T2D, greater central obesity, higher blood pressure, an atherogenic lipid profile, and microalbuminuria.
- Some young people are already showing measurable signs of DPN, and the prevalence of DPN among youth with T2D is approaching rates similar to that seen in adult populations with diabetes.

Jaiswal M, Lauer A, Martin CL et al (2013) Peripheral neuropathy in adolescents and young adults with type 1 and type 2 diabetes from the SEARCH for Diabetes in Youth follow-up cohort: a pilot study. *Diabetes Care* 36: 3903–8

Diabetes Medicine

Depression in young people with T1D

Readability ✓✓✓✓
 Applicability to practice ✓✓✓✓
 WOW! Factor ✓✓✓✓

- The authors investigated whether young people with T1D have an increased rate of depression based on antidepressant prescription records and GP-recorded depression codes taken from the Clinical Practice Research Datalink.

- People with T1D who were diagnosed before the age of 35 years ($n=5548$) were individually age and sex matched with up to two control participants without diabetes ($n=10657$).
- People with T1D were twice as likely to have been prescribed antidepressants and have GP-recorded depression than those without (hazard ratio [HR] 2.08, 95% confidence interval, 1.73–2.50; $P < 0.001$).
- The higher rate of depression among people with T1D was greatest in the first 5 years after diagnosis.

Morgan E, Patterson CC, Cardwell CR (2013) General practice-recorded depression and antidepressant use in young people with newly diagnosed type 1 diabetes. *Diabet Med* 30 Sep [Epub ahead of print]

Diabetes Medicine

Thyroid dysfunction and autoimmunity

Readability ✓✓✓✓
 Applicability to practice ✓✓✓✓
 WOW! Factor ✓✓✓

- The authors completed a systematic review and meta-analysis to review the incidence of thyroid autoimmunity (TA) and thyroid dysfunction (TD) in people with T1D.
- A literature search found 14 eligible studies, which comprised 2972 young people and 789 adults.
- The incidence of TD ranged from 27 (95% confidence intervals [CI], 15–45) to 246 (95% CI, 118–453) per 10 000 patient-years, and the incidence of TA ranged from 13 (95% CI, 0.3–71) to 326 (95% CI, 194–510) per 10 000 patient-years.
- The risk of TD was higher in those with TA and T1D, and was higher in children compared to adults.
- However, the authors note that none of the studies were of good methodological quality based on the Newcastle–Ottawa scale, and that the optimal method or frequency of screening could not be determined, which was a secondary aim of the study.

Shun CB, Donaghue KC, Phelan H et al (2013) Thyroid autoimmunity in type 1 diabetes. *Diabet Med* 16 Sep [Epub ahead of print]

Diabetes

Features of responders to teplizumab treatment

Readability ✓✓✓
 Applicability to practice ✓✓✓
 WOW! Factor ✓✓✓✓

- Teplizumab, an Fc receptor-non-binding anti-CD3 monoclonal antibody, is a Phase III drug designed to reduce the decline of C-peptide in people with newly diagnosed T1D.
- In the Protégé study, teplizumab was administered for 2 weeks after diagnosis and again after 1 year.
- The 2-year results show that those who were treated with teplizumab had a reduced decline in C-peptide, a 75% improvement compared to the control.
- The authors also defined some of the features that separated teplizumab responders and non-responders.
- Post-hoc analysis of a sub-group of the Protégé study ($n=52$, 96% under 18 years of age), showed that responders had lower HbA_{1c} and used less insulin at baseline.

Herold KC, Gitelman SE, Ehlers MR et al (2013) Teplizumab (anti-CD3 mAb) treatment preserves C-peptide responses in patients with new-onset type 1 diabetes in a randomized controlled trial. *Diabetes* 62: 3766–74