

A triumph of hope over evidence: Use of the internet and mobile technology to assist young people with diabetes



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In 2001, I wrote an editorial extolling the need to embrace some of the new technologies to help young people manage their diabetes and improve outcomes (Scott and Donnelly, 2001).

Twelve years on, although we all use the internet for communication and education, there is little evidence of benefit. Grey et al (2013) devised an internet coping skills training programme known as *TeenCope* and an internet diabetes health education programme named *Managing Diabetes*. Use of either programme resulted in improved quality of life, but in both groups HbA_{1c} rose. Twelve years on, mobile and other technologies, such as text messaging, email and social network sites, are all used by healthcare professionals to try and engage young people in their diabetes. Yet the systematic review by Herbert

et al (summarised alongside) shows that there are very few randomised studies, most of which are of poor quality, with high rates of attrition – people get bored of receiving texts and emails from their healthcare professional!

Sadly, 12 years on, outcomes of 16–25 year olds with T1D in Sheffield have not improved one jot (unpublished data). However, before we despair, the reality is that we have more and better tools for communicating with young people. We just need to work out how to use them by undertaking high-quality randomised controlled trials.

“However, before we despair, the reality is that we have more and better tools for communicating with young people.”

Scott AR, Donnelly R (2001) Improving outcomes in young people with type 1 diabetes (Editorial). *Diabet Med* **18**: 863–5

Grey M, Whittemore R, Jeon S et al (2013) Internet psycho-education programs improve outcomes in for youth with type 1 diabetes. *Diabetes Care* **11** Apr [Epub ahead of print]

DIABETES TECHNOL THER

Are text message interventions effective in young people with T1D?

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

1 Mobile health strategies such as text message interventions have been suggested to prevent the deterioration of glycaemic control in young people with diabetes during the transition of care from parent to youth.

2 The authors performed a systematic review to analyse the effects of text message interventions on participant satisfaction and HbA_{1c} levels in young people aged under 25 years with T1D.

3 A total of seven articles with 46 participants were included in the analysis. Outcomes in glycaemic control differed across the studies. Two studies reported no significant difference in HbA_{1c} after a text message intervention whereas another study found a reduction in HbA_{1c} from baseline when text messages were compared to a paper diary intervention.

4 A decrease in HbA_{1c} was observed in one study which provided intensive glycaemic control and a text message programme. In another study, HbA_{1c} levels were maintained in the group receiving text messages, whereas the control group displayed an increase in HbA_{1c}.

5 Although the majority of participants enjoyed receiving the text messages, satisfaction outcomes were varied. Some individuals felt that the text messages intruded on their daily routine.

6 The authors concluded that although text message interventions were reported to be enjoyable, further research is needed to determine their efficacy in maintaining glycaemic control.

Herbert L, Owen V, Pascarella L et al (2013) Text message interventions for children and adolescents with type 1 diabetes: a systematic review. *Diabetes Technol Ther* **15**: 362–70

DIABETES CARE

Early HbA_{1c} measurements are predictive of clinical neuropathy

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

1 The authors investigated whether nerve dysfunction detected via neurophysiological testing could predict the onset of clinical neuropathy in 59 individuals with T1D.

2 Clinical neuropathy developed in 9 (15%) participants. These individuals were reported to have a greater decrease in baseline median peroneal motor nerve conduction velocity (MCV) and sural sensory nerve

action potential ($P < 0.010$ – 0.003).

3 Baseline HbA_{1c} was the greatest predictor of neuropathy ($R^2 = 48\%$, odds ratio [OR] 7.9; $P < 0.002$). Baseline peroneal MCV had the second strongest correlation with the onset of diabetic neuropathy ($R^2 = 38\%$, OR 0.6; $P < 0.006$).

4 A stronger correlation was observed between baseline HbA_{1c} and neuropathy impairment (Spearman's rho = 0.40; $P < 0.002$) compared to that between follow-up HbA_{1c} and neuropathy impairment (Spearman's rho = 0.034; $P < 0.007$).

5 The authors concluded that reductions in nerve conduction and velocity are predictive of neuropathy, but early HbA_{1c} measurements were the greatest predictor of the condition.

Hyllienmark L, Alstrand N, Jonsson B et al (2013) Early electrophysiological abnormalities and clinical neuropathy. *Diabetes Care* **30** May [Epub ahead of print]

“Compared to people in the control group, people receiving mindfulness-based cognitive therapy had reduced levels of stress (Cohen $d=0.70$; $P<0.001$), anxiety ($d=0.44$; $P=0.019$) and depression ($d=0.59$; $P=0.006$).”

DIABETES CARE

Mindfulness-based cognitive therapy can increase QoL

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

- Current estimates suggest that emotional distress affects 20–40% of outpatients with diabetes. Emotional distress can be associated with a decreased quality of life (QoL) and suboptimal glycaemic control.
- The aim of this study was to determine the effects of group therapy with mindfulness-based cognitive therapy (MBCT) on emotional distress, health-related QoL and glycaemic control in people with diabetes.
- A total of 139 people with T1D or T2D and compromised emotional well-being were randomised to receive MBCT ($n=70$) or usual patient care ($n=69$) as a part of this controlled trial.
- Compared to people in the control group, people receiving MBCT had reduced levels of stress (Cohen $d=0.70$; $P<0.001$), anxiety ($d=0.44$; $P=0.019$) and depression ($d=0.59$; $P=0.006$). MBCT was also associated with a greater improvement in both mental ($d=0.55$; $P=0.003$) and physical ($d=0.40$; $P=0.032$) QoL.
- Although MBCT was associated with a reduction in diabetes-specific distress in people with initially high levels ($d=0.70$; $P=0.07$), MBCT was found to have no significant effect on HbA_{1c} or diabetes-specific distress.
- The authors concluded that MBCT was associated with a decrease in emotional distress and an improvement in overall QoL in people who had diabetes and a reduced level of emotional well-being.

van Son J, Nyklicek I, Pop VJ et al (2013) The effects of a mindfulness-based intervention on emotional distress, quality of life, and HbA_{1c} in outpatients with diabetes (DiaMind): a randomized controlled trial. *Diabetes Care* **36**: 823–30

DIABETOLOGIA

Autoimmune T1D in childhood: Are viral infections causative agents?

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

- Viruses have been associated with the pathogenesis of autoimmune T1D, although evidence for this relationship has been much debated.
- The authors hypothesised that children with rapid-onset T1D could have experienced high-dose viral infections preceding the development of islet autoimmunity.
- Therefore, the aim of this study was to identify which viruses could be potential causative agents in the development of T1D by examining viral infections in children that developed T1D within 6 months from the onset of islet autoimmunity.
- Medical records of children with rapid-onset T1D from the Environmental Determinants of Diabetes in the Young (TEDDY) study were analysed for episodes of fever and infection. Next-generation sequencing was employed to analyse plasma samples for viral content.
- Compared to plasma samples from control participants, viral infections were not detected more frequently in children with rapid-onset T1D.
- A comparison of medical histories revealed no significant differences in the incidence of viral infections between controls and children with rapid-onset T1D. The latter group, however, displayed a reduced frequency of fever.
- The authors concluded that their findings were not indicative of an association between viral infection and rapid-onset T1D in children with diabetes.

Lee HS, Briese T, Winkler C et al (2013) Next-generation sequencing for viruses in children with rapid-onset type 1 diabetes. *Diabetologia* **56**: 1705–11

DIABET MED

Measuring hypoglycaemia-related anxiety

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

- The Hypoglycaemia Fear Survey (HFS)-II Behaviour and Worry subscales were designed to measure anxiety associated with hypoglycaemia in people with diabetes. Recent evidence, however, has disputed the reliability of the HFS Behaviour subscale and have questioned its correlation with glucose control.
- The authors aimed to evaluate the HFS Behaviour subscale's internal structure and to investigate the strength of its correlation with diabetes outcomes.
- A total of 1460 adults with T1D completed the HFS-II survey across five countries including Germany, the US, the Netherlands, Turkey and Slovenia. An exploratory factor and item analysis was then performed to determine internal structure and diabetes outcomes.
- A three factor structure was reported, with one subscale from the HFS Behaviour measuring high blood glucose maintenance and the other detecting behavioural avoidance of hypoglycaemia. The HFS Worry subscale was found to measure one aspect of hypoglycaemia-related anxiety.
- All subscales were reported to have acceptable (0.75) or excellent (0.94) internal reliability. There was a significant correlation between HbA_{1c} and scores from the Maintain High Blood Glucose subscale ($r=0.14$; $P<0.001$) and the frequency of severe hypoglycaemia was correlated with all subscales.
- The authors concluded that the HFS Behaviour and Worry subscales are valid and effective measures of hypoglycaemia-related anxiety.

Gonder-Frederick LA, Vajda KA, Schmidt KM et al (2013) Examining the behaviour subscale of the hypoglycaemia fear survey: an international study. *Diabet Med* **30**: 603–9