

Management of type 1 diabetes



Reducing the risk of hypoglycaemia: Moving beyond technology and structured education

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The medical management of type 1 diabetes is complicated by the danger of hypoglycaemia. We know that recurrent episodes of hypoglycaemia result in a decline in the normal warning systems that protect against further hypoglycaemia. Hypoglycaemia awareness is reduced, and this is associated with a greatly increased risk of severe hypoglycaemia. Severe hypoglycaemia is, at best, inconvenient or embarrassing, and, at worst lethal. The fear of hypoglycaemia itself can represent a significant barrier to improving glucose control.

We understand the physiology behind loss of hypoglycaemia awareness. This has been translated into clinical strategies to deal with and prevent the problem. New insulins and new technologies such as insulin pumps and glucose sensors have played their part in allowing improved glucose control with a reduced risk of hypoglycaemia. One of the major developments in recent years has been the understanding that, in flexible insulin therapy, patient education is an essential part of type 1 diabetes management. Dose adjustment for normal eating (DAFNE) is a well-established example of an international structured education programme for adults with type 1 diabetes. DAFNE has played a major part in objectively demonstrating that impaired awareness of hypoglycaemia can be reversed without a deterioration in glucose control. It is also clear that for a proportion of individuals this is not the answer; there are a number of psychological barriers that prevent people recognising and managing the problem of hypoglycaemia.

The linked papers by Shuttlewood et al,

summarised alongside, and De Zoysa and colleagues (2014) present a pilot study of DAFNE-HART (hypoglycaemia awareness therapy), which they describe as a psychoeducational program. This programme was designed for people that had attended DAFNE but still had persistent impaired awareness of hypoglycaemia. This was primarily a group programme that revisited the DAFNE techniques for managing hypoglycaemia and combined them with principles of motivational interviewing and cognitive behavioural therapy. The original paper by De Zoysa et al (2014) described the results of the pilot study on reducing hypoglycaemia unawareness. At 12 months, there was a significant reduction in the rates of severe and moderate hypoglycaemia. Worry and behaviour around hypoglycaemia improved, and there was no significant change in HbA_{1c}. The entertaining paper by Shuttlewood and colleagues gives us the human face of the study. Structured interviews were used to explore the participants' responses to the course and their experiences in changing their behaviours relating to hypoglycaemia. The quotes included in the paper will resonate with anyone involved in the clinical management of hypoglycaemia. We have to acknowledge that the programme is still at the pilot stage, but, if the results are reproduced in a full study, this potentially provides a solution for a major clinical problem. If nothing else, the papers demonstrate the crucial need for psychology support embedded within a diabetes service. ■

de Zoysa N, Rogers H, Stadler M et al (2014) A psychoeducational program to restore hypoglycaemia awareness: the DAFNE-HART pilot study. *Diabetes Care* 37: 863–6

Diabetes Res Clin Pract

DAFNE-HART: a programme to improve IAH

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

- 1 A newly developed psychoeducational programme based on DAFNE with the addition of addressing persistent impaired awareness of hypoglycaemia (IAH [DAFNE-HART]) has been piloted, and the initial findings from semi-structured interviews conducted after the programme were reported.
- 2 DAFNE-HART is a 6-week course that incorporates diabetes education with the addition of motivational interviewing and cognitive behavioural therapy aimed at improving hypoglycaemia avoidance.
- 3 Two groups were initiated at two UK centres and 24 people with T1D took part. After 6 weeks, 21 people were available for interview and data saturation was reached after 19 interviews were analysed.
- 4 The cohort comprised nine female participants with a mean age of 53.3 years and mean years since diagnosis of 31.2±11.3.
- 5 Participants felt that the programme helped them to make changes to their diabetes management, regain the hypoglycaemia "cues" and gain hope and belief that improving hypoglycaemia awareness was possible.
- 6 Participants appreciated the group setting as they reported feeling prompted to make changes alongside people with similar experiences. A trusting relationship with the care provider was also an integral part of the programme that the participants felt was beneficial.

Shuttlewood E, De Zoysa N, Rankin D, Amiel S (2015) A qualitative evaluation of DAFNE-HART: A psychoeducational programme to restore hypoglycaemia awareness. *Diabetes Res Clin Pract* 19 May [Epub ahead of print]

“The authors conclude that children with T1D may enter a state of temporary coeliac disease serology, and that a gluten-free diet should be postponed unless there are clinical symptoms or signs of coeliac disease.”

Diabetes Care

Spontaneous normalisation of coeliac serology in childhood

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

1 Children with T1D have a higher chance of developing coeliac disease (CD) than the general population; however, it has been observed that elevated levels of antitissue transglutaminase (tTG) antibody may spontaneously normalise in children with T1D. The authors sought to investigate this phenomenon, its prevalence and any predictive factors in a large cohort of children.

2 The cohort was 446 children consecutively enrolled in a tertiary referral centre in Italy.

3 The median age at T1D onset was 8.56±4.1 years. Two children had a diagnosis of CD before T1D onset, and none had positive serological evidence for CD (anti-tTG-A and/or EmA) at T1DM onset.

4 During follow-up, 65 children had elevated tTG antibody levels. Thirty-eight underwent biopsies and tested positive for CD; 27 were asymptomatic and had fluctuating tTG antibody levels through follow-up.

5 The study demonstrates that serum anti-tTG antibody levels decrease spontaneously in 40% and become persistently negative in at least 20% while eating a gluten-containing diet.

6 The authors conclude that children with T1D may enter a state of temporary CD serology, and that a gluten-free diet should be postponed unless there are clinical symptoms or signs of CD so as to avoid the unnecessary procedures and added burden affecting quality of life.

Castellaneta S, Piccinno E, Oliva M et al (2015) High rate of spontaneous normalization of coeliac serology in a cohort of 446 children with type 1 diabetes: a prospective study. *Diabetes Care* **38**: 760–6

Diabetes Obes Metab

Overnight closed-loop system at home

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

1 The effect of an overnight closed-loop insulin delivery system was compared to sensor-augmented pump therapy as part of a randomised, crossover unsupervised home study in 40 adults and adolescents with T1D.

2 Individuals underwent two test periods of sensor-augmented

pump therapy: one with and one without the addition of the closed-loop system. The study periods lasted 4 weeks for adults and 3 weeks for adolescents.

3 The proportion of time when sensor glucose was in the target range (3.9–8.0 mmol/L) overnight was 18.5% greater during closed-loop insulin delivery than during sensor-augmented therapy ($P<0.001$). Time spent below and above the target range was also significantly reduced during closed-loop therapy.

Thabit H, Elleri D, Leelarathna L, Allen JM et al (2015) Unsupervised home use of an overnight closed-loop system over 3–4 weeks: a pooled analysis of randomized controlled studies in adults and adolescents with type 1 diabetes. *Diabetes Obes Metab* **17**: 452–8

J Diabetes Complications

MetS prevalence in T1D

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

1 The authors assessed the prevalence of metabolic syndrome (MetS) among 451 people with T1D in Chennai, South India.

2 MetS was diagnosed according to an amalgamation of MetS criteria from different organisations.

3 In total, 22% had MetS. The individuals with MetS tended to be older, had longer diabetes duration, acanthosis nigricans and increased

serum cholesterol.

4 Retinopathy, nephropathy and neuropathy were found to be associated with MetS. After adjustment for baseline characteristics, the association with MetS was only apparent for retinopathy (odds ratio [OR], 2.82 [95% confidence interval (CI), 1.18–6.74] $P=0.020$) and nephropathy (OR, 4.92 [95% CI, 2.59–9.33] $P=0.001$).

5 The people with MetS exhibited some of the characteristics of the “double diabetes” phenomenon; therefore, it is conscientious to be aware of MetS among people with T1D, especially those of South Asian origin.

Billow A, Anjana RM, Ngai M et al (2015) Prevalence and clinical profile of metabolic syndrome among type 1 diabetes mellitus patients in southern India. *J Diabetes Complications* **29**: 659–64

Diabetes Care

Does physical activity reduce HbA_{1c} and CV risk in T1D?

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

1 The authors sought to investigate whether physical activity affects glycaemic control and cardiovascular (CV) risk in T1D as it does in T2D.

2 A database of 18 028 adults was used for the analysis. Individuals

were stratified by how often they self-reported to physical activity.

3 There was an inverse association between the frequency of physical activity and HbA_{1c}, diabetic ketoacidosis, BMI, dyslipidaemia (all $P<0.0001$), hypertension ($P=0.0150$) and retinopathy and microalbuminuria (both $P<0.0001$).

4 Physical activity appeared to be beneficial for glycaemic control and diabetes-related complications, which supports current guidelines.

Bohn B, Herbst A, Pfeifer M et al (2015) Impact of physical activity on glycemic control and prevalence of cardiovascular risk factors in adults with type 1 diabetes: a cross-sectional multicenter study of 18,028 patients. *Diabetes Care* **38**: 1536–43