

Dose Adjustment for Normal Eating: A Role for the Expert Patient?

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The Dose Adjustment for Normal Eating (DAFNE) programme of intensive insulin therapy for type 1 diabetes provides a structured educational intervention to improve glycemic control, reduce hypoglycemia and improve quality of life. Enhancement of self-management skills is a key element of DAFNE and patients acquire detailed skills in insulin dose adjustment. Following DAFNE training, patients report improved confidence in their ability to manage their own insulin dosing, but generally still seek and require the assistance of health professionals when making substantial changes to their insulin regimens. Some DAFNE trained patients may be able to assist their peers in aspects of diabetes management within a group environment, but widespread introduction of the expert patient/peer educator role in the self-management of type 1 diabetes, in particular related to insulin dose management, would require formal and detailed evaluation, preferably in randomized controlled clinical trials, before being introduced into routine clinical practice.

Keywords: Diabetes mellitus, type 1; Dose Adjustment for Normal Eating; Insulin therapy

INTRODUCTION

Problems in type 1 diabetes management

Many people with type 1 diabetes mellitus (T1DM) experience difficulties with the everyday challenges of managing their diabetic condition. In particular, many find it difficult to intensively manage their insulin therapy and achieve near normal blood glucose levels and optimal levels of glycosylated hemoglobin whilst avoiding hypoglycaemia and weight gain.

The landmark Diabetes Control and Complications Study (DCCT) [1], conducted in North America, offered the first clear evidence that intensive glycaemic control in T1DM definitely improves clinical (in particular microvascular) outcomes, but both the DCCT [2] and a subsequent meta-analysis [3] suggested that improved glycaemia as measured by hemoglobin A1c (HbA1c) reduction must inevitably be accompanied by an increased risk of severe hypoglycaemia. This, in addition to the

weight gain associated with intensive therapy have served to discourage many people with diabetes and their treating doctors from attempting more intensive glycaemic control [1].

In contrast to the DCCT, clinicians in Germany, led by the late professor Michael Burger, developed the Diabetes Training and Treatment Programme (DTTP) [4-6], a structured education programme for people with type 1 diabetes which promoted self-management and demonstrated improved glycaemic control without worsening of hypoglycemia.

THE DOSE ADJUSTMENT FOR NORMAL EATING PROGRAMME

The Dose Adjustment for Normal Eating (DAFNE) programme of structured education for people with T1DM was developed in the United Kingdom as a modification of the German DTTP and assessed in a randomized controlled trial [7]. Reported

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benefits of DAFNE training include improved overall glycaemic control, reduced hypoglycaemia, and improved quality of life [7].

Australian clinicians undertook DAFNE training in the United Kingdom in late 2004 and DAFNE courses have been offered in Australia since January 2005 [8]. These involve a 5-day (Monday to Friday over 1 week, 7 to 8 hours/day) outpatient programme of structured education in diabetes self-management for 6 to 8 people with T1DM, with an emphasis on insulin dose adjustment using a flexible dietary intake, detailed estimation of dietary carbohydrate intake and the use of insulin/carbohydrate ratios (units of rapid acting insulin/10 g carbohydrate portion or CP) as the basis for prandial insulin dosing.

Specifically, DAFNE divides insulin doses into 1) background insulin or BI, which generally consists of twice daily isophane insulin or twice daily long acting insulin analogue and 2) quick acting (QA) insulin at mealtimes, consisting of either soluble insulin or a short acting insulin analogue.

The mealtime insulin doses also include a corrective component, used when the premeal glucose level is outside prespecified parameters. Over the course of the DAFNE training week, patients learn the skills of carbohydrate estimation or counting and receive formal instruction regarding many aspects of diabetes care, including the management of insulin adjustments for exercise or alcohol ingestion, the treatment of hypoglycaemia, sick day management, the detection and management of chronic diabetes complications and specific areas such as pregnancy management if relevant to the particular group. Twice daily during the 5-day course, group members present their individual glucose monitoring results and learn skills related to insulin adjustment in an experiential approach, seeing the results of insulin adjustments made both by themselves and by other members of the group.

DAFNE courses are generally facilitated by a dietitian and diabetes nurse educator, who together lead the group through a variety of learning experiences. The dietary elements of the programme have been specifically adapted to Australian food choices, but the core curriculum is entirely consistent with resources developed and used in the United Kingdom. The Oz DAFNE programme has shown results similar to those reported in Germany and the United Kingdom, with reduction in HbA1c, reduced severe hypoglycaemia, improved quality of life and minor weight reduction [9].

THE EXPERT PATIENT

In the early years of the 21 century, coincident with the development of the DAFNE programme in the United Kingdom, the concept of peer involvement in chronic disease management, commonly termed the expert patient approach, was emerging [10]. Although diabetes was frequently included in the list of chronic diseases for which an expert patient approach might prove useful, definite evidence of its utility, especially in the care of T1DM was scant, with conditions such as arthritis and asthma providing more substantial data demonstrating benefits [10]. Although there was some evidence at this time that active patient involvement in diabetes care through structured active participation in clinic visits might improve metabolic control [11], it was also suggested that diabetologists, whilst promoting self-management and patient autonomy in theory, practiced in a much more didactic fashion within their clinic environments [12]. Subsequent publications from the United Kingdom questioned the value of the expert patient approach, or called for a broader framework for consideration of patient/consumer integration into health care delivery [13,14].

No randomized controlled trials exist evaluating the use of expert patients in T1DM management. Two randomized controlled trials have examined the potential role of expert patients in the management of T2DM, with varying results. Cade et al. [15] reported no significant benefits from the use of an expert patient programme in improving dietetic or metabolic parameters in T2DM. In contrast, van der Wulp et al. [16], reported that a peer led self-management approach improved psychological well-being and self-efficacy in T2DM, though these benefits were primarily seen in patients with poor psychological status at baseline.

THE DAFNE PROGRAMME AND SELF-MANAGEMENT

Although the desirability of self-adjustment of insulin doses as compared to clinician-directed dose adjustment is frequently debated, diabetes self-management is an inescapable everyday reality for people with T1DM. It has been estimated that people with diabetes spend on average only 2.6 hours (or 0.03% of their life) per year with health professionals [17]. Since many must make decisions regarding insulin doses four to five times daily, a degree of autonomy in diabetes management is clearly essential. What is less clear is whether they undertake self-man-

agement in a well or poorly informed manner.

The DAFNE programme provides a sound basis for self-adjustment of prandial and basal insulin therapy. Lawton et al. [18] have recently provided useful qualitative data as to how this translates into the real world experiences of patients following DAFNE training. They report that virtually all patients felt confident, motivated and able to adjust their insulin doses immediately after completing the DAFNE course. However, they noted that with longer term (6 to 12 month) follow-up, only a minority of patients described themselves as confident in making independent adjustment to basal insulin doses and prandial insulin/glucose ratios. Many patients felt the need for health professional review and endorsement of their decisions, even when they clearly understood the DAFNE based principles for dose adjustment. Patients described a long history of seeking health professional advice regarding insulin dose adjustments and clearly this ingrained deferential pattern of behaviour did not change substantially after DAFNE instruction. By contrast, patients rapidly adapted to the use of corrective doses of insulin to rapidly and effectively bring their self-monitored glucose readings back towards the normal range. It was reported that patients used corrective dosing as a safety net to control glycemia, rather than making more soundly based long adjustment to prandial insulin/glucose ratios or soliciting health professional input.

Although, the principles of DAFNE insulin dose adjustment are clearly outlined during the one week training course and supported by written handbooks and patient diaries, effective participation in the programme presumes reasonable literacy and numeracy. It has previously been noted that numeracy and glycemic control are inversely related in people with T1DM [19,20] and adequate numeracy has been suggested as a key requirement for successful insulin pump therapy [21].

Optimal patient follow-up after initial structured education courses such as DAFNE remains poorly defined. The Irish DAFNE group have suggested that group follow-up, which clearly includes a high degree of peer interaction, provides equal benefits to one-on-one clinic visits following DAFNE training [22] and some patients have suggested development of a dedicated glycemia support service [18]. As with many patient education programmes, the effects of DAFNE tend to wane over time [23] and optimal patient follow-up is clearly important. The German groups with long standing experience of the DTTP programme have demonstrated the value of refresher courses for patients failing to meet metabolic goals af-

ter initial education in intensified insulin therapy [24].

DAFNE AND THE EXPERT PATIENT

The use of structured patient education as a routine part of diabetes management has been endorsed by the National Institute of Clinical Excellence in the United Kingdom [25], with DAFNE being recognised as one programme which provides a suitable option for people with T1DM. Further, cost modelling in the United Kingdom context has suggested that DAFNE is cost saving [26] or cost effective [27], depending on the assumptions used, due to improved glycemic control and reduced diabetic complications.

The results of the DAFNE programme and its predecessors over many years clearly demonstrate consistent benefits in terms of improvements in glycemic control, reduction in severe hypoglycemia, improved quality of life and the potential for appropriate dietary adjustments to control weight gain [5,6,9,23,28-30]. DAFNE definitely promotes patient autonomy in appropriate adjustment of insulin dosing on a day-to-day basis.

These results contrast with those using primarily models of externally driven diabetes management, such as the DCCT [1]. Whilst the DCCT programme was largely doctor, dietician and nurse driven, with prescription of dietary regimens and clinician adjustment of insulin doses, DAFNE promotes dietary flexibility and self-titration of insulin doses using insulin/carbohydrate ratios.

However, as noted previously, improved knowledge in self-titration of insulin may not necessarily translate into the degree of confidence in self-management needed for patients to take over complete responsibility for their insulin therapy. Given this reticence for patients to entirely assume responsibility for their own insulin dosing, it seems unlikely that the majority of DAFNE graduates would be well equipped to act as peer educators or expert patients in the care of other people with T1DM. Further, because of the risks of severe hypoglycemia and its potentially catastrophic consequences such as motor vehicle accidents, the legal implications of promotion of a formal expert patient role in T1DM would need to be carefully considered.

CONCLUSIONS

The DAFNE programme offers a well-validated means of im-

proving self-management of insulin therapy in people with T1DM. However, although people who complete the course improve their individual skills in managing their diabetic condition on a day-to-day basis, it appears that few individuals achieve the level of confidence and competence required to act as peer educators or “expert patients” in this area. Nonetheless, peer support has other potentially important roles in the overall promotion of effective diabetes care. It is particularly valuable in encouraging long-term implementation of this programme and in advocating for appropriate funding allocations for diabetes self-management.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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