

Critically appraise the education provision available for people with diabetes.

[People](#)



## **Introduction**

Diabetemellitus is a group of metabolic diseases characterised by chronic hyperglycaemia. Its causation is due to an insulin deficiency resulting from the body's inability to produce enough insulin, or an inability at a cellular level to respond to insulin that is produced. These two pathological mechanisms are used to distinguish between the two major classifications of the condition.

In the first case (Type 1), insulin-producing cells in the pancreas have been destroyed, usually as a result of an auto-immune process, whereby the body mistakenly identifies the insulin-producing cells (or beta cells) as foreign, and ultimately destroys them. By the point of diagnosis, whereby the body's inability to produce enough insulin leads to clinically significant blood sugar levels, it is estimated that 60 - 80% of the body's beta cells have been destroyed (Notkins & Lernmark, 2001). The subsequent lack of insulin leads to a typical triad of clinical symptoms; polydipsia (increased thirst), polyuria (frequent urination) and polyphagia (increased hunger).

As insulin is necessary for survival, Type 1 diabetes is fatal unless treated. Missing insulin must be replaced indefinitely in all patients, and is typically administered via injection or insulin pump. Although such treatment can be burdensome for patients, with appropriate clinical care, teamed with patient awareness and training in self-management, it should not significantly impair daily life.

In the case of Type 2 diabetes, the body responds to either a relative reduction in insulin, a resistance to the insulin the body does produce, or a combination of both. Initially the pancreas may begin to over-produce insulin to offset insulin resistance but this mechanism, over time, may fail. Type 2 diabetes is typically associated with obesity and age, usually appearing in people over forty. Although a chronic condition, Type 2 diabetes can be successfully managed by addressing certain lifestyle factors, with a healthy diet and regular exercise forming the basis of Type 2 diabetic care (Vijan, 2010). With even modest weight loss, insulin sensitivity can be restored (Barnard et al 2009) eliminating the need for medication. Where medication is used, orally administered insulin is usually sufficient to restore normal levels of blood sugar (Ripsin, Kang & Urban, 2009).

Global estimates in 2010 put the total number of people worldwide with a diabetic diagnosis at 285 million, or 6% of the total population. People with Type 2 diabetes comprise 90% of this statistic, with the remaining 10% being comprised of patients with Type 1 and gestational diabetes (Meeto, McGovern & Safadi, 2007). In the UK alone, 2.9 million people live with diabetes and a further 850,000 people have diabetes but are unaware of it (Diabetes UK, 2012). The implications of diabetes are serious; complications include cardiovascular disease, retinopathy (eye disease), neuropathy (damage to the nerves), nephropathy (kidney disease) stroke and possibly death. Additionally, the costs incurred by the NHS are vast; every year the NHS spends ? 14 billion treating diabetes and its complications, with the vast majority of this cost (66%) being attributable to inpatient treatment (Kavanos, van den Aardweg & Schurer 2012). Treatment for diabetes-related

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complications is economically troubling due to the increased prevalence of inpatient treatment, and the cost per patient increases proportionally with each complication. By comparison, the cost of glucose reducing medications are relatively low, comprising only 8% of the total annual spend (Kavanos, van den Aardweg & Schurer 2012). This highlights the need for ongoing diabetes policies to address management of the condition in its early stages.

The incidence and prevalence of diabetes, particularly Type 2, is rising to epidemic proportions and represents a grave and growing global health problem, due to the population numbers affected, its associated complications and the costs of controlling the condition (Torres et al. 2009). Health care providers however struggle to manage a chronic condition which requires self-management; the responsibility for non-acute daily care for diabetes lies with the patient. These factors together reinforce the need for effective programs of education that can be successfully incorporated into health systems. Several studies however have indicated that the incidence or severity of diabetes can be successfully managed with lifestyle interventions. Knowler et al. (2004) for example in a large-scale randomised controlled trial assigned patients at a high risk of developing Type 2 diabetes to a placebo, metformin or lifestyle-intervention programme. The lifestyle-intervention programme concentrated on introducing 150 minutes of physical activity per week, plus an overall weight loss of 7 percent. After a three year follow-up, lifestyle changes were significantly more effective at reducing the incidence of Type 2 diabetes than metformin. Lifestyle factors reduced incidence by 58%, whilst metformin reduced incidence by 31%, as compared to placebo. Wing et al. (1987) explored whether modest weight

loss could provide long-term benefits for patients with Type 2 diabetes. They studied 114 patients who had enrolled in a weight control programme, and followed them up for one year. They found that those who had lost at least 5% of their body weight demonstrated significant improvements in blood sugar levels at one year follow-up. Those who had maintained their body weight showed no improvement, and those who had gained weight showed a significant worsening of blood sugar levels. Self-management also plays an important role in the management of Type 1 diabetes. In an integrative review of 18 longitudinal studies Guo and Whittemoor (2011) found a strong positive relationship between diabetes self-management and metabolic control.

Given that self-management plays such a vital role in management of diabetes, it follows that programmes of education that are designed to provide information to patients regarding the condition, and to encourage self-management programme adherence could be of critical importance. In the UK there are currently a number of patient education programmes that are designed to aid people to manage their condition on a daily basis. All aim to increase patient knowledge of their condition and how to manage it including the effect of their lifestyle, and the use of insulin when appropriate. In 2003 the National Institute for Clinical Excellence (NICE) published guidance on the use of patient-education models in the management of diabetes, recommending that:

“...all individuals with diabetes should be offered structured patient education at the time of initial diagnosis and ongoing patient education as

required, based on a formal, regular assessment of need, recognising that needs change over time. In this context, structured patient education is defined as being a planned and graded programme that is comprehensive in scope, flexible in content, responsive to an individual's clinical and psychological needs, and adaptable to his or her educational and cultural background. "

(NICE, 2003: 14)

In the UK, there is a large number of diabetes education programmes offered to patients, and these range widely in length, content and educational style (NICE, 2003). However, for the purposes of this essay a focus on three of the most widely used structured patient education programmes in the UK will be taken. These include DAFNE, DESMOND and X-Pert.

DAFNE is an acronym for Dose Adjustment For Normal Eating and is a structured education programme designed for patients with Type 1 diabetes. It aims to empower people to lead an as normal a life as possible whilst controlling blood sugar levels and therefore protecting against the long-term complications of the condition. Over the course of a five-day intensive training course (with post-course follow-up after eight weeks plus half-yearly refresher courses), participants learn the necessary skills to adjust their daily insulin doses to their carbohydrate intake. Delivered as group training to small groups of 6-8 participants, it offers information on carbohydrate counting, insulin regimens, exercise and blood glucose monitoring (NICE, 2003). It is recommended only to patients aged 17 and over, who have been diagnosed with Type 1 diabetes for at least six months, and who

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demonstrate a commitment to improve their diabetes control. Additionally, participants must be willing to administer insulin up to five times a day, as the regimen that accompanies the course requires two daily injections of long-acting insulin, plus quick-acting insulin after meals and snacks containing carbohydrates.

DAFNE has a strong evidence base; it was the only structured patient education programme to be named in the NICE guidance published in 2003, following the publication of several UK-specific studies into the effectiveness of DAFNE. In 2002, the DAFNE Study Group presented the findings of its UK Feasibility Study. The study used a randomised controlled design, with 169 patients with Type 1 diabetes showing moderate or poor insulin control. Participants either engaged in a DAFNE course immediately as the research began (immediate DAFNE), or acted as waiting list controls, and received the training 6 months later (delayed DAFNE), and continued to receive usual care. The differences between the two groups were measured using a battery of outcome measures. These included laboratory measured levels of glycated haemoglobin, patient reported episodes of hypoglycaemia, and the audit of diabetes-dependent quality of life (ADDQoL) questionnaire, a survey measuring the impact of diabetes on the patient's quality of life. Additionally, treatment satisfaction was measured using the diabetes treatment satisfaction questionnaire (DTSQ), overall psychological wellbeing was measured with the 12-item wellbeing questionnaire (W-BQ12) and a number of health-related outcomes such as weight, blood pressure and cholesterol level were also measured. Overall, the authors concluded that DAFNE was successful; those patients receiving the training immediately showed

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significantly improved blood sugar levels, without episodes of hypoglycaemia. Additionally, patients who received treatment scored significantly better on indices of satisfaction with treatment, psychological wellbeing and quality of life compared to those whose treatment was delayed. This was despite an increase in insulin injections and blood glucose monitoring demands.

It must be noted, that despite the positive findings of this study, it did not meet the rigorous methodological criteria for inclusion in NICE's review of patient education programmes (NICE, 2003), as the concurrent control group ran only for 6 months (after which they received the 'delayed' training). However, its results were still quoted in the guidance, and formed part of NICE's rationale for recommending the programme.

An additional component of the NICE review included the cost-effectiveness of DAFNE. In 2003 it was estimated that the cost per person to attend a DAFNE education course was ? 545, but the resultant saving per patient (as compared to normal treatment) over a 10 year period would be ? 536.

Extrapolating across the population, in 2003 the DAFNE study group estimated that the maximum cumulative cost to provide DAFNE would peak in 2006/07 at ? 19 million, but would be self-financing by 2009, suggesting the potential for self-financing in future years (NICE, 2003). Shearer et al. (2004) also provided support for the cost-effectiveness of DAFNE. Drawing on effectiveness data from three randomised controlled trials conducted in Germany, Austria and the UK. They concluded that DAFNE was effective at a lower cost than usual treatment models for Type 1 diabetes, saving



approximately ? 2200 per patient over a ten year period. They considered this result compelling enough to suggest that DAFNE should be introduced as the standard treatment for people with Type 1 diabetes in the UK.

The second programme for discussion is Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND). It is a programme targeted at those with Type 2 diabetes to help them manage the necessary changes to their lives brought about by diabetes. Crucially, it was developed post-2003, after the publication of the NICE review, and was designed specifically to meet the standards outlined in the resultant national policy. The programme itself has three variations; a newly diagnosed programme, a foundation programme and a version specifically designed for black and minority ethnic patients. It is delivered across six hours of group work by specially trained healthcare professionals, using a written programme to ensure consistency of delivery (DESMOND project, 2012). Its core philosophy is one of patient empowerment; those on the course are encouraged to learn by discovering knowledge for themselves (DESMOND project, 2012).

The programme was originally piloted across 17 primary care trusts in England, and 13 of these sites were included in a randomised controlled trial, including over 800 participants, making it the largest study of educational programmes for Type 2 diabetes conducted to date. The intervention group attended DESMOND within twelve weeks of diagnosis. The control group received an equivalent amount of contact time with healthcare professionals. After 12 months, there were no significant differences in levels of blood

sugar between the groups, but the intervention group showed a significantly higher degree of weight loss, increase in physical activity and reduction in smoking. Additionally, they had significantly more positive views about behaviour change impacting on their illness, and significantly lower levels of depression than the control group (Davies et al. 2008). In 2012, the results of this study were followed up (Khunti et al. 2012) to measure whether the benefits were sustained over three years. The authors managed to contact 731 of the original 824 study participants, and found that none of the biomedical or lifestyle advantages had been maintained over the period. However, the intervention group continued to hold more positive illness-related beliefs. However, the authors concluded that these results did not necessarily indicate a failure of DESMOND. The programme is very much in its infancy, and the authors point out the importance of the psychosocial benefits of the programme. Over time, an association between psychosocial factors and a more effective management of blood sugar levels may emerge (Khunti et al. 2012).

A recent meta-analysis yielded more positive outcomes. Minet et al. (2010) looked at all studies conducted up until late 2007 that used a randomised controlled design to assess the impact of DESMOND-like self-management programmes on adults with Type 2 diabetes. 47 studies including 7677 participants were suitable for inclusion, and showed a small but significant positive effect of such programmes on blood sugar levels. Although closer analysis revealed that studies utilising smaller samples with shorter follow-up periods were more likely to yield positive effects, they also found that

programmes incorporating educational elements (like DESMOND) were also more likely to return significant effects (Minet et al. 2010).

The final programme to be discussed is X-PERT. It is similar to DESMOND in that it is a structured education programme devised for people with Type 2 diabetes; however it has been delivered across the UK and Republic of Ireland to people with both Type 1 and Type 2 diabetes. The two and a half hour group work sessions are delivered weekly over a six week period and aims to empower patients to identify and manage their own diabetes-related problems, and create their own possible lifestyle management solutions. It aims to improve clinical outcomes and quality of life for patients whilst reducing the need for diabetes medication and diabetes-related complications (Diabetes UK, 2012). The work to develop the programme began in 2000, and this included a randomised controlled trial (Deakin, Cade, Williams and Greenwood 2006). 314 patients with Type 2 diabetes were randomly assigned to an intervention (X-PERT) or control (treatment as normal) group, and lifestyle, clinical and psychosocial measures were taken at the outset, and repeated at 4 and 14 month intervals. At 14 months post-evaluation, those in the intervention group ate a healthier diet than controlled, and reported a greater sense of freedom over their diet. The intervention group also took more exercise and demonstrated greater foot care at both follow-up periods. Crucially, those in the intervention group also demonstrated significantly improved glycaemic control, lower BMI, reduced cholesterol reduced waist circumference measurements, and a reduced need for diabetes medication at 14 months post-intervention (Deakin et al. 2006).

Although no study has exclusively analysed the potential cost savings offered by X-PERT, Jacobs-van de Bruggen et al. (2009) performed a review of randomised controlled trials assessing the impact of seven self-management programmes for diabetes, including X-PERT. The results found large differences in health outcomes across the seven trials included, but X-PERT was found to be one of the most effective whilst simultaneously delivering potentially the largest cost savings.

All three programmes therefore have returned some positive results. DAFNE remains the only NICE supported intervention addressing Type 1 diabetes in the UK, and both interventions discussed here to manage Type 2 diabetes demonstrated clinical, psychosocial and lifestyle benefits, with X-PERT in particular delivering sustained improvements to patient health whilst simultaneously being cost-effective. What is clear however is that more research regarding the effectiveness of DAFNE needs to be conducted, involving large populations, randomised controlled trials and adequate follow-up periods. DESMOND and X-PERT which were specifically designed with rigorous assessment in mind are still in their relative infancy; research regarding longer term outcomes will be necessary as the impact of diabetes continues to grow.

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