Patient education models for diabetes

The clinical and cost-effectiveness of patient education models for diabetes: a systematic review and economic evaluation

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Executive summary

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Executive summary

Description of the proposed service

This systematic review examines the clinical and cost-effectiveness of patient education models for adults with Type 1 or Type 2 diabetes.

Epidemiology and background

Diabetes mellitus (diabetes) is characterised by a state of chronic hyperglycaemia (raised blood sugar). There are two main types of diabetes: Type 1 and Type 2. Type 1 diabetes is an autoimmune condition involving a process of destruction of the beta cells of the pancreas, leading to severe insulin deficiency. About one-fifth of patients with diabetes in England and Wales have Type 1 diabetes. Type 2 diabetes is characterised by insulin resistance and relative insulin deficiency and is linked to being overweight or obese, and to physical inactivity. Type 2 diabetes primarily affects people aged over 40 years. The basic target in the treatment of diabetes is the normalisation of blood glucose levels. Poor control of diabetes can in the short term result in diabetic ketoacidosis, a serious and potentially fatal condition, and in the long term can increase the risk of complications such as diabetic retinopathy and nephropathy. However, studies have shown that good diabetic control is associated with a reduced risk of these complications. Diabetic control is affected by both lifestyle factors such as diet, and by pharmacological treatments, and the management of diabetes is largely the responsibility of patients. A key component in empowering patients to manage their own diabetes is education.

Education of patients with diabetes is considered a fundamental aspect of diabetes care and aims to empower patients by improving knowledge and skills. Structured educational programmes for diabetes self-management are often multifaceted interventions providing patients with information not only about diabetes but also management issues such as diet, exercise, self-monitoring of blood glucose and medication use.

Methods

A systematic review of the literature and an economic evaluation were undertaken.

Data sources

Electronic databases were searched, including the Cochrane Library, MEDLINE, EMBASE, PubMed, Science Citation Index, Web of Science Proceedings, DARE and HTA databases, PsychINFO, CINAHL, NHS Economic Evaluation Database and EconLit. References of all retrieved articles were checked for relevant studies, and experts were contacted for advice and peer review and to identify additional published and unpublished references. Sponsor submissions to the National Institute for Clinical Excellence were reviewed.

Study selection

Studies were included if they fulfilled the following criteria:

- Interventions: educational interventions compared with usual care or another educational intervention.
- Participants: adults with Type 1 or Type 2 diabetes mellitus.
- Outcomes: must report glycated haemoglobin, hypoglycaemic episodes, diabetic complications or quality of life. Other reported outcomes from included studies were discussed.
- Evaluation of outcomes ⩾12 months from inception of intervention.
- Design: randomised clinical trials (RCTs), and controlled clinical trial (CCTs) with a concurrent control were included.
- Reporting: studies were only included if they reported sufficient detail of the intervention to be reproducible (e.g. topics covered, who provided the education, how many sessions were available).

Studies in non-English language or available only as abstracts were excluded.

Titles and abstracts were checked by two reviewers. Full texts of selected studies were assessed for inclusion by one reviewer and checked by a second. Differences in opinion were resolved through discussion.

Data extraction and quality assessment

Data extraction and quality assessment were undertaken by one reviewer and checked by a second, with any disagreement resolved through discussion involving a third reviewer if necessary. The quality of included studies was assessed in accordance with Centre for Reviews and Dissemination Report 4.

Data synthesis

Data on clinical effectiveness were synthesised through a narrative review with tabulation of results from included studies. Studies were too diverse to be combined in a meta-analysis. Cost-effectiveness analyses were reported in a narrative review.

Number and quality of studies

Searches identified 24 studies comparing education with either a control group or with another educational intervention. These were 18 RCTs and six CCTs. Four studies included adults with Type 1 diabetes, 16 studies included adults with Type 2 diabetes and four studies included adults with either Type 1 or Type 2 diabetes. The quality of reporting and methodology of the studies was generally poor by today's standards with only two RCTs reporting adequate randomisation procedures and none demonstrating adequate allocation concealment.

Economic evaluations

Literature searches identified only two studies reporting cost-effectiveness results: one cost-utility analysis and one cost-effectiveness analysis using intermediate outcomes only.

Summary of benefits

Studies of education in Type 1 diabetes suggest that education programmes offered as a part of intensified treatment interventions can result in significant and long-lasting improvements in metabolic control and reductions in complications. These are studies in which education is part of a package of care also including treatment changes (for example diet and insulin) and therefore it is not possible to draw conclusions about potential effects of education *per se* in Type 1 diabetes.

Diverse educational programmes in Type 2 diabetes did not yield consistent results. Although some trials reported significant improvements in metabolic control and/or quality of life or other psychological outcomes, many others did not report significant effects of educational interventions. No clear characterisation is possible as to what features of education may be beneficial in this patient group.

Studies that included patients with either Type 1 or Type 2 diabetes also produced mixed results with only poorer quality studies reporting significant effects.

Costs

Literature searches identified a small number of studies offering cost data in relation to patient education models. These were all studies undertaken outside the UK and they covered a variety of methodologies. We are not able to generalise from these studies as to the cost-effectiveness of patient education models. Patient education models will predominantly consist of direct costs for resource inputs to particular education packages, for example staff time (diabetes specialist nurse, dietitian and/or consultant) and education materials. The Dose Adjustment for Normal Eating (DAFNE) intervention is estimated to cost approximately £545 per person attending.

Costs per life year gained

Owing to the absence of accurate data on health outcomes, we are not able to provide cost-effectiveness summary statistics. The evidence base does indicate that improved glycaemic control is likely to have a positive impact on the incidence of long-term diabetic complications. Therefore, where the costs associated with patient education are assumed to be in the region of £500–600 per patient, the benefits over time would have to be very modest to offer an attractive cost-effectiveness profile for the intervention. The submission from the DAFNE study group predicts a scenario in which the DAFNE intervention results in cost savings and added health benefits over time, when compared with usual practice.

Implications

The main implication for the NHS would be staff time, particularly of diabetes specialist nurses, but also dietitians. Provision of increased education may be hindered by a shortage of trained specialist nurses, which will take some years to resolve. ►

Future research needs

The paucity of high-quality trials that have tested education *per se* in diabetes reveals a need for more research. Such research should focus on RCTs with clear designs based on explicit hypotheses and with a range of outcomes evaluated after long follow-up intervals. In order to draw conclusions about the effects of education alone, such trials should manipulate only education rather than confounding education with other factors.

Publication

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