Do patient education interventions improve glycaemic control in adults with diabetes mellitus?

**METHODS**

**Data sources:** Medline, CINAHL, HealthSTAR, ERIC, Science Citation Index, PsycINFO, CRISP, and a database on the American Association of Diabetes Educators website (http://www.aadnet.org).

**Study selection and assessment:** randomised controlled trials (RCTs) that were published from 1990–2000 in English, evaluated educational interventions in adult outpatients with diabetes, and reported on glycated haemoglobin (HbA1c) concentrations before and after the intervention and at >12 weeks after the intervention. An educational intervention was defined as any non-pharmacological educational technique that used physical, intellectual, or psychosocial means to improve the health of patients with diabetes.

**Outcomes:** glycaemic control (HbA1c concentrations).

**MAIN RESULTS**

21 RCTs (28 educational and 21 control interventions) met the selection criteria. 5 studies had >1 intervention group. Study size ranged from 23–320 patients (total 2439 patients). 20 interventions were used in patients with type 2 diabetes, 5 in patients with type 1 diabetes, 2 in patients with either type 1 or type 2 diabetes, and 1 study did not specify the type of diabetes. Follow up ranged from 3–15 months. Various educational techniques were used (didactic teaching [n = 23 interventions], goal setting [n = 10], goal setting negotiated teaching [n = 12], situational problem solving [n = 15], cognitive reframing [n = 4], and other unique teaching methods [n = 13]). In addition, the content of the educational interventions varied (dietary topics [n = 25], exercise [n = 18], self monitoring of blood glucose [n = 15], basic diabetes knowledge [n = 10], medication adherence [n = 8], psychosocial topics [n = 7], and other topics [n = 19]). A fixed effects model was used to combine studies. At the first assessment reported after >3 months of follow up, the intervention group had better glycaemic control than the control group (net HbA1c change −0.32%, 95% CI −0.57 to −0.07). In separate meta-analyses, the net change was −0.29% (CI −0.68 to 0.09) at 12 weeks, −0.49% (CI −0.92 to −0.05) at 24 weeks, and −0.33% (CI −0.76 to 0.10) at 52 weeks. The improvement in glycaemic control was statistically significant at the first assessment after the educational intervention and at 24 weeks. Meta-regression analysis showed that interventions using face to face delivery, cognitive reframing, and exercise content were more likely than other intervention types to improve glycaemic control.

**CONCLUSION**

Patient education interventions, particularly those providing face to face delivery, cognitive reframing, and exercise content, improve glycaemic control in adults with diabetes.

**Commentary**

Although previous reviews of the effects of educational interventions on metabolic control have focused on knowledge, self care management, cardiac risk factor control, and psychological outcomes, the review by Ellis et al. provides an important insight into the characteristics of educational interventions associated with improvement in HbA1c.

In this well conducted meta-analysis, Ellis et al. searched a broad range of databases and, to ensure that quality studies were combined, included only randomised trials. Furthermore, the authors used a previously developed systematic taxonomy for classifying 9 dimensions of the interventions: setting; delivery; teaching method; content; provider; intensity of the intervention; whether the intervention was tailored to initial assessment; whether there was follow up assessment and modification; and whether basic diabetes education was given to both groups before randomisation.

The authors describe the statistically significant results of the meta-analysis as clinically important but modest. However, they note that the overview findings may underestimate the effects of patient education. Firstly, a 25% reduction in microvascular complications has been identified for every 1% decrease in HbA1c, which underscores the importance of small improvements in net HbA1c changes. Secondly, in many of the studies included, control groups were given non-trivial initial education sessions. This likely reduces the observed difference between the 2 groups. Finally, variation in timing of HbA1c measurements, as recently identified by Norris et al. may not show the maximal effect because HbA1c estimates glycaemic control over the previous 8–12 weeks.

Although the measurement of some educational components may be imprecise and some factors contributing to glycaemic control were not assessed, these findings have important implications for those who design, provide, and/or evaluate diabetes education. For researchers, this review highlights the importance of adequately planning and describing educational interventions in evaluative studies.