Increasing diabetes self-management education in community settings: a systematic review

Authors' objectives
The authors appear to study the effectiveness and economic efficiency of diabetes self-management education (DSME) interventions in community settings.

Searching
MEDLINE, ERIC, CINAHL, HealthSTAR, the health promotion and education subfile of CDP, and the diabetes and health promotion and education subfiles of CHID Online were searched from inception to December 2000l the search terms were reported. In addition, the authors reviewed the references lists of included articles and contacted experts for other relevant publications. Studies published as abstracts and dissertations were excluded from the review, as were studies published in languages other than English.

Study selection
Study designs of evaluations included in the review
Primary comparative studies, including studies using a concurrent or before-and-after comparison group, were eligible for inclusion. The included studies were randomised controlled trials (RCTs), non-randomised controlled trials, before-and-after studies and retrospective cohort studies.

Specific interventions included in the review
Studies that evaluated DSME interventions delivered outside clinical settings, such as in community centres, faith institutions, other community gathering places, the home, the worksite, recreational camps and schools, were eligible for inclusion. The studies also had to be conducted in established market economies. The studies included in the review evaluated the following: DSME interventions for adults in community gathering places (faith-based institutions, community centres and a Pritikin residential treatment centre); DSME occurring primarily in the home, DSME interventions delivered in the setting of recreational camps; DSME delivered at the worksite or education of coworkers about diabetes; and education of school personnel about diabetes.

Participants included in the review
Studies of patients with diabetes were eligible for inclusion. Where reported, studies of DSME interventions in community settings included adult patients with type 2 diabetes. Studies of DSME interventions in the home included both adults and children with both type 1 and type 2 diabetes and gestational diabetes. Studies of DSME interventions in the camp setting included children with type 1 diabetes. Studies of DSME interventions at the worksite included adults with both type 1 and type 2 diabetes. Studies in which school personnel were educated about diabetes included children; the type of diabetes was not reported.

Outcomes assessed in the review
Studies which measured one or more of the following intermediate, short-term or long-term outcomes were eligible for inclusion: knowledge, skills, psychosocial outcomes, health care system outcomes, glycaemic control, physiological outcomes, lifestyle outcomes, mental health outcomes, work-related outcomes, macrovascular complications, microvascular complications, mortality, quality of life, economic outcomes and pregnancy-related outcomes. The majority of studies reported glycaemic control and physiological outcomes. Other outcomes measured were knowledge, skills, problem-solving, coping strategies, self-concept, number of urgent visits, rehospitalisation for glucose control, birth weight and gestational age.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection. The authors reviewed the titles and abstracts of articles identified by the search, and the full texts of potentially relevant articles were retrieved.
Assessment of study quality
The studies were characterised as having good, fair or limited quality of execution, based on the number of threats to validity. Only studies characterised as good or fair were included in the review. The authors referred to a separate publication for full details of the quality assessment tool (see Other Publications of Related Interest). The authors did not state how the papers were assessed for quality, or how many reviewers performed the quality assessment.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. The authors used a standardised data extraction form to extract study characteristics (author, year and location of studies, the study design and its suitability, study quality, follow-up interval), patient characteristics (type of diabetes, mean age, gender, race or ethnicity), intervention details and results.

A summary effect measure (the difference between the intervention and comparison groups) was calculated for the outcomes of interest.

Methods of synthesis
How were the studies combined?
Pooled estimates of effect were calculated when there were a sufficient number of studies with comparable outcomes and if the exploratory data analysis revealed potentially diverse results, or if the confidence intervals (CIs) frequently overlapped zero. Point estimates of effect on glycated haemoglobin (GHb) were calculated using both fixed-effect and random-effects models, using the inverse of the variance of the net change in GHb as the study weight.

How were differences between studies investigated?
Heterogeneity was assessed using the chi-squared statistic.

Results of the review
Thirty studies with a total of 3,773 participants were included in the review: 17 RCTs (2,091 participants), one non-randomised controlled trial (60 participants), 11 before-and-after studies (1,536 participants) and one retrospective cohort study (86 participants).

DSME interventions for adults in community gathering places.
DSME interventions in community gathering places statistically significantly reduced GHb levels (-1.9%, 95% CI: -2.4, -1.4; 4 studies) and fasting blood glucose levels (-2.0 mmol/L, 95% CI: -1.3, -0.4; 4 studies). There was a non statistically significant reduction in weight (-5.2 lbs, 95% CI: -9.0, 1.6; 6 studies). Two studies showed a statistically significant reduction in blood-pressure (systolic -12.3 and -8.6 mmHg, diastolic -5.2 and -1.0 mmHg). There was a non statistically significant reduction in total cholesterol (-2.6 mg/dL, 95% CI: -54.0, 6.0; 3 studies), whilst two studies found conflicting results for LDL cholesterol (-35.0 and 7.0 mg/dL) and two studies found a reduction in triglycerides (-39.0 and -20.0 mg/dL).

There was a statistically significant improvement in knowledge scores (P=0.04; 1 study) and the number of minutes of walking (P<0.001; 1 study). A non statistically significant increase in dietary intake (kcal/day) was found for men, while a non statistically significant decrease in dietary intake was found for women (1 study).

DSME interventions in the home.
DSME interventions in the home statistically significantly reduced GHb levels for type 1 diabetes (-1.1%, 95% CI: -1.6, -0.6; 4 studies). There was a non statistically significant reduction in GHb levels for type 2 diabetes (-0.5%, 95% CI: -1.1, 0.1; 2 studies). There were also non statistically significant reductions in blood glucose levels (-49.7 mg/dL, P=0.05; 1 study) and weight (-2.3 kg, 95% CI: -4.5, 0; 3 studies). One study showed a non statistically significant difference in foot appearance.

Knowledge levels were improved in a study of type 2 diabetes and in a study of mixed types 1 and 2, but the change was
not statistically significant in three studies of type 1 diabetes. Two studies found that self-care skills were improved for type 2 diabetes. There was a non statistically significant improvement in self-concept for type 1 diabetes. There was an improvement in the percentage of patients who had an eye examination in the previous 6 months (odds ratio 4.3; 1 study) and a non statistically significant decrease in the number of urgent care visits per person (2 studies). Postpartum admissions for glucose control decreased (P=0.048). There were no statistically significant differences in perinatal outcomes.

DSME interventions delivered in recreational camps.

DSME interventions in camps reduced GHb levels in one study (-1.8%), but there was a slight increase in another study (0.3%). Glycated albumin levels were reduced (-2.0% and -2.7%; 1 study with 2 cohorts). There was a statistically significant improvement in knowledge in four studies and a non significant improvement in three studies. There was also a statistically significant improvement in problem-solving amongst 12- to 15-year-olds (P<0.002; 1 study), although the improvement amongst 10- to 11-year-olds was not statistically significant (1 study). There was no statistically significant improvement in coping strategies (1 study) or self-concept (1 study).

DSME interventions at the worksite.

One study found a small reduction in GHb levels (-1.4%).

Education of school personnel about diabetes.

There was a statistically significant improvement in teacher knowledge of hypoglycaemic symptoms (P<0.001; 1 study) and a non statistically significant improvement in teacher knowledge of hyperglycaemic symptoms (1 study).

Cost information
A study of intensive home care including insulin adjustment and DSME reported the average programme costs to be $50 per child more than for traditional-care patients.

Authors' conclusions
DSME is effective in improving glycaemic control when delivered in community gathering places for adults with type 2 diabetes and in the home for children and adolescents with type 1 diabetes. The authors stated that the evidence was insufficient to assess the effectiveness of DSME interventions at the worksite or in summer camps for either type 1 or type 2 diabetes, or in the home for type 2 diabetes, and to assess the effectiveness of educating coworkers and school personnel about diabetes.

CRD commentary
The review question was clear in terms of the study designs, participants, interventions and outcomes of interest. A number of relevant electronic databases were searched and the subject headings used in the search strategy were given. Unpublished data were sought, although studies published as abstracts and dissertations were excluded from the review. Studies published in languages other than English were also excluded from the review. Thus, the possibility of publication bias and language bias cannot be excluded.

The authors did not give details of how the studies were selected, quality assessed or abstracted; therefore, the potential for reviewer error or bias cannot be assessed. The studies were assessed for quality and only studies that passed certain quality criteria were included in the review.

Adequate details of the included studies were presented. The statistical methods used to combine the studies appear to have been appropriate. Overall, this appears to have been a well-conducted systematic review and the authors' tentative conclusions appear to follow from the evidence presented. The authors also described the applicability of the results of included studies and discussed barriers to the implementation of the interventions reviewed.
Implications of the review for practice and research

Practice: The authors stated that DSME for adults delivered in community gathering places should be coordinated with the person's primary care, and that these interventions should not be considered a replacement for education in the clinical setting until adequate coordination is established.

Research: The authors stated that further research is needed to delineate interventions for optimising long-term health and quality of life outcomes in these settings, to identify which racial, ethnic and socioeconomic populations may benefit the most and how best to identify and recruit these people to such interventions. They also stated that future studies need to address a number of methodological issues.

Bibliographic details

PubMedID
11985934

Other publications of related interest

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Subject indexing assigned by NLM

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.