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CRD summary

This review concluded that multi-component diabetes management programmes that include self-monitoring of blood glucose improve glycaemic control among people with type 2 diabetes who do not require insulin. Generally, this was a well-conducted review and the authors' conclusions are likely to be robust.

Authors' objectives

To assess the effects on glycated haemoglobin (HbA1c) of adding self-monitoring of blood glucose (SMBG) to diabetes management programmes for people with type 2 diabetes who did not require insulin.

Searching

MEDLINE (1966 to 2004), the Cochrane Database of Systematic Reviews, EMBASE (1950 to 2004), Centre for Reviews and Dissemination databases and Online Index Journals of the American Diabetic Association (1978 to 2004) were searched for papers in English or with an English translation; the search terms were reported. To identify further studies, the authors' personal files were searched and the reference lists of retrieved articles were checked.

Study selection

Study designs of evaluations included in the review

Randomised controlled trials (RCTs) were eligible for inclusion. The duration of the studies ranged from 12 to 44 weeks.

Specific interventions included in the review

Studies that compared diabetes management programmes with and without SMBG (using a meter) were eligible for inclusion. Studies of urine glucose self-monitoring were excluded.

Participants included in the review

Studies of adults (aged 18 years or more) with type 2 diabetes who did not require insulin were eligible for inclusion. Studies that only included patients with type 1 diabetes, gestational diabetes or maturity onset diabetes mellitus in young people were excluded. Studies of pregnant patients or people injecting insulin, or taking troglitazone or any experimental medication, were also excluded. In the included studies, the baseline HbA1c levels ranged from 6.1 to 10.45%.

Outcomes assessed in the review

Studies that reported the change in HbA1c from baseline to post-intervention were eligible for inclusion.

How were decisions on the relevance of primary studies made?

Two reviewers screened abstracts. It was not reported whether or not this was done independently.

Assessment of study quality

The studies were assessed for:

- selection bias (allocation concealment and baseline comparability of the treatment groups),
- performance bias (treatment adjustments applied equally to both groups, groups treated the same apart from the intervention of interest).
exclusion bias (intention-to-treat analysis, similar drop-out rates between treatment groups), and
detection bias (blinding of the outcome assessors and similar methods used to assess the outcomes for each treatment
group).

The studies were classified as A if all quality criteria were met, B if one or more criteria were only partially met, or C if
one or more criteria were not met.

Two reviewers independently assessed validity and resolved any disagreements through reaching consensus.

**Data extraction**
The authors did not state how the data were extracted for the review, or how many reviewers performed the data
extraction.

For each study, the mean and standard errors were extracted for HbA1c at baseline and post-intervention for each
treatment group and the difference calculated. Data reported as total glycated haemoglobin were converted to HbA1c,
and variances of differences between treatments were calculated where required (the methods were reported). The
authors of studies reporting results for combinations of insulin- and non-insulin-treated patients were contacted for data
for the non-insulin-treated patients.

**Methods of synthesis**
How were the studies combined?
Pooled mean differences with 95% confidence intervals (CIs) were calculated using both fixed-effect and random-
effects models. The possibility of publication bias was explored using a funnel plot.

How were differences between studies investigated?
Statistical heterogeneity was assessed using the chi-squared statistic. A sensitivity analysis was used to examine the
effect on the results of study quality and confounding of interventions. Differences between the studies were also
discussed in the text with reference to compliance and contributions of individual studies.

**Results of the review**
Eight RCTs (n=1,307) were included.

In terms of study quality, 5 RCTs were graded B and 3 RCTs were graded C. None of the RCTs described allocation
concealment. Other problems included lack of comparability between intervention groups in the treatment programmes.

Interventions that included SMBG significantly reduced HbA1c in comparison with interventions that did not include
SMBG; the reduction was -0.39% (95% CI: -0.54, -0.23) when using the fixed-effect model and -0.42% (95% CI:
-0.63, -0.21) when using the random-effects model. No statistically significant heterogeneity was detected (P=0.19).

The results were similar for a meta-analysis restricted to studies graded B for quality. Studies with confounded
interventions and studies without confounded interventions showed statistically significant reductions with SMBG
interventions.

The funnel plot showed no evidence of publication bias.

**Authors' conclusions**
The inclusion of SMBG in multi-component diabetes management programmes improved glycaemic control in people
with non-insulin-dependent type 2 diabetes.

**CRD commentary**
The review question was clear in terms of the study design, intervention, participants and outcomes. Several relevant sources were searched, but the restriction to studies in English or those with English translations might have resulted in the loss of some relevant data. No attempt was made to locate unpublished studies, thus raising the possibility of publication bias. However appropriate methods were used to assess its presence, and no evidence of it was found. The review methods were not described in full: it was unclear if the study selection was done in duplicate and methods used to extract the data were not described, thus it is not known whether any efforts were made to reduce errors and bias. Validity was assessed using established criteria and methods were used to minimise bias in the assessment.

There was adequate information on the included studies. The data were appropriately pooled in a meta-analysis, statistical heterogeneity was assessed, and the influence of various factors (including quality) was assessed or discussed in the paper. Generally, this was a well-conducted review and the authors' conclusions are likely to be robust.

Johnson and Johnson assisted with the retrieval of studies.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that further research should focus on subgroups of patients willing and able to adjust to treatment. They also suggested that the optimal frequency of testing, cost-benefit of SMBG and quality of life outcomes should be examined.

Bibliographic details

PubMedID
15801988

DOI
10.1185/030079904X20286

Indexing Status
Subject indexing assigned by NLM

MeSH
Aged; Blood Glucose Self-Monitoring; Diabetes Mellitus, Type 2 /blood /prevention & control /therapy; Female; Hemoglobin A, Glycosylated /analysis; Humans; Hyperglycemia /blood /prevention & control; Male; Middle Aged; Program Evaluation

AccessionNumber
12005009952

Date bibliographic record published
30/04/2006

Date abstract record published
30/04/2006

Record Status
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.