Self-monitoring of blood glucose in type-2 diabetes: what is the evidence?
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CRD summary
This review assessed the evidence for self-monitoring of blood glucose in type 2 diabetes and concluded that it could be beneficial in some circumstances (for example, as an educational tool). Although the findings reflected the presented evidence, the poor study quality and uncertainty over parts of the review process suggest that the authors’ conclusions should be treated with caution.

Authors' objectives
To assess the evidence for self-monitoring of blood glucose in type 2 diabetes.

Searching
EMBASE, MEDLINE and The Cochrane library were searched from 1990 to November 2006. Further searches were made using Google and Google Scholar. Reference lists of included studies and reviews were searched to identify additional articles. Search terms were reported. No language restrictions were applied.

Study selection
Randomised controlled trials (RCTs) of at least six months duration and observational studies with at least 50 patients that reported on self-monitoring of blood glucose in type 2 diabetes managed with oral hypoglycaemic agents and/or diet alone were eligible for inclusion. Both retrospective and prospective designs were included. The included RCTs had similar mean baseline glycated haemoglobin (HbA1c 8.4% to 9.0%), body mass index (>30kg/m^2) and mean duration of diabetes (five to 10 years). Mean age was between 50.3 and 61.5 years. For observational studies the mean baseline glycated haemoglobin ranged from 6.4% to 9.9%. Outcomes included frequency of self-monitoring of blood glucose, changes or differences in glycated haemoglobin, weight, body mass index, medication use and adverse events.

The authors stated neither how the papers were selected for the review nor how many reviewers performed the selection.

Assessment of study quality
Study validity of RCTs was assessed using the Jadad scale, to measure adequacy of randomisation, blinding and management of attrition and allocate a score of 1 to 5. Observational studies were assessed on the basis of sample selection and absence of selective bias, such as a comprehensive group or consecutive patients. Both study designs were assessed in terms of identifying and accounting for confounding factors and the use of appropriate statistical techniques.

The authors did not state how the validity assessment was performed.

Data extraction
Changes in glycated haemoglobin, body mass index and weight from baseline, and their standard deviations were extracted from each arm of the study. Data related to medication usage and quality of life were also extracted where reported.

Two reviewers independently extracted the data, but it was not stated how discrepancies were resolved.

Methods of synthesis
Differences between studies were discussed in the text and study details and results tabulated.

Results of the review
RCTs: Three RCTs (1,000 patients) were included, all of which were of poor quality. Use of self-monitoring of blood glucose was associated with a statistically significant lower glycated haemoglobin in two studies, with mean reductions in glycated haemoglobin of about 1.0% and a decrease of 0.5% more in those who used self-monitoring of blood glucose compared with those who did not. There was no significant reduction in weight or changes in behaviour, but...
there was greater involvement with diabetes management.

**Observational studies**: Thirteen observational studies (60,082 patients) were included (range 115 to 31,438 patients), nine of which were retrospective.

A positive association between self-monitoring of blood glucose and a reduction in glycated haemoglobin measured clinically or by laboratory assessment was evident in larger studies (weighted mean HbA1c=8.4%; 10 comparisons; 43,905 patients) that had higher baseline glycated haemoglobin levels; smaller studies (weighted mean HbA1c=7.1%; 10 comparisons; 10,963 patients) with lower baseline glycated haemoglobin levels reported no association between self-monitoring of blood glucose and clinical or laboratory measured glycated haemoglobin.

**Authors’ conclusions**
For type 2 diabetes patients not using insulin who have poor glycaemic control, self-monitoring of blood glucose could be beneficial in some circumstances (for example, as an educational tool).

**CRD commentary**
The review objectives and inclusion criteria were clear. Relevant sources were searched, but it was unclear whether language restrictions were applied, so language bias may have been present. There was no apparent attempt to search for unpublished material, which meant that relevant studies may have been overlooked. Steps were taken to minimise error and bias during the review process by having more than one reviewer independently undertake the data extraction, although it was unclear how discrepancies were resolved. It was unclear whether this also applied to the study selection stage, so it was unclear whether selection bias had been eliminated.

Validity assessment was undertaken for the RCTs, but the authors did not state how the validity assessment was performed. Given the clinical heterogeneity of the included studies it was appropriate to combine the results in a narrative synthesis.

Given the uncertainty over parts of the review process and clinical heterogeneity, the authors’ conclusions should be treated with caution.

**Implications of the review for practice and research**
**Practice**: Patients required training in the use of self-monitoring of blood glucose and how to take appropriate action based on the results.

**Research**: Larger, long duration trials were needed in which patient-centred outcomes were evaluated. Trials also needed to record how self-monitoring of blood glucose was taught and how it would be used to modify patient behaviour.

**Funding**
Pain Research funds, Oxford Pain Relief Trust.

**Bibliographic details**

**PubMedID**
17538940

**DOI**
10.1002/dmrr.749

**Original Paper URL**
Indexing Status
Subject indexing assigned by NLM

MeSH
Blood Glucose Self-Monitoring /standards; Diabetes Mellitus, Type 2 /blood; Evidence-Based Medicine; Humans;
Randomized Controlled Trials as Topic

AccessionNumber
12008009147

Date bibliographic record published
03/11/2008

Date abstract record published
04/11/2009

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.