Does patient blood glucose monitoring improve diabetes control: a systematic review of the literature

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CRD summary
This review concluded that self-monitoring of blood glucose may be effective in controlling blood glucose for patients with type 2 diabetes not on insulin. The review may be subject to publication, language and selection bias. Results from the included studies were mixed, but the authors’ conclusions are suitably cautious.

Authors' objectives
To evaluate the impact of self-monitoring of blood glucose on glycosylated haemoglobin (HbA1c) levels in patients with type 2 diabetes, and to explore mediators and moderators within a self-regulation framework.

Searching
MEDLINE, PsycINFO, the Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials and CINAHL were searched for studies published in English since 1990. Search terms were reported.

Study selection
Experimental and observational studies of patients with type 2 diabetes who were not controlled using insulin, that reported the impact of self-monitoring of blood glucose on glycosylated haemoglobin (HbA1c) levels, were eligible for inclusion in the assessment of efficacy. Cross-sectional and longitudinal studies and randomised controlled trials (RCTs), of any diabetic control in both type 1 and type 2 diabetics, were selected for the assessment of conditions that mediate the efficacy of self-monitoring. Studies of subgroups of patients not representative of the general diabetic population, studies that used fructosamine monitoring, and studies where self-monitoring was a part of a more complex intervention, were excluded.

Where reported, the mean age of participants ranged from 49 to 68, and 29 to 100% were male.

One reviewer screened title and abstracts; it is unclear how selection of full papers was conducted.

Assessment of study quality
The authors did not systematically assess study quality.

Data extraction
HbA1c levels and the presence, and the degree or significance of, any association with self-monitoring, were extracted from each study.

Data extraction was conducted by one reviewer and checked by a second. Results of extraction and queries were discussed by all authors.

Methods of synthesis
Studies were combined in a narrative synthesis, ordered by study design. Differences between studies were discussed in the text and study details and results tabulated.

Results of the review
Twenty nine studies were included in the review; 9 cross-sectional studies (n=6,191 patients, range 84 to 2,855); 9 longitudinal studies (n=29,900 patients, range 38 to 23,412); and 11 RCTs (n=1,759 patients, range 10 to 689).

Results from the cross-sectional studies were inconclusive; two reported self monitoring to be correlated with lower glycosylated haemoglobin (HbA1c), three with higher HbA1c, and four showed no correlation.
Results from the longitudinal studies were also mixed; four reported no association and four a lower HbA1c with self-monitoring.

Of the RCTs, six reported improved glucose control, two reported no effect of a monitoring intervention, one showed improved glycemic control with the use of a booklet, and two reported reductions in HbA1c with monitoring of urine or blood glucose, but no difference between these two methods.

Mediators and moderators of self-monitoring were discussed.

Authors' conclusions
Self-monitoring of blood glucose may be effective in controlling blood glucose for patients with type 2 diabetes not on insulin.

CRD commentary
The review addressed a clear review question with appropriate inclusion criteria. Relevant databases were searched, but the potential for publication and language bias could not be ruled out. Data extraction was conducted in duplicate, but it seemed that similar methods to reduce error and bias during study selection were not implemented. Study quality was not systematically assessed, and insufficient study details were reported to allow the reader to make an assessment. The decision to combine the studies in a narrative synthesis seemed appropriate. The results from the included studies were mixed, and the authors' conclusions are suitably cautious.

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

Research: The authors stated that there was a need for studies that implement all the components of the process for self-regulation to assess whether patient use of self-monitoring blood glucose would improve HbA1c levels.

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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.