Computerized management of diabetes: a synthesis of controlled trials

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Authors' objectives
To explore the relationship between computerized information services and actual changes in the outcome of patient care in diabetes.

Searching
Searched were made of MEDLINE, HealthSTAR, and CINAHL. Details were given of the search strategy. In addition, the multi-year, systematic retrieval effort of the Columbia Registry of Clinical Information Service Trials was used. Manual searches were undertaken and personal contact made with experts.

Study selection
Study designs of evaluations included in the review
Randomised controlled clinical trial (RCTs) that measured the outcome on patient care of patient focused computer generated information were included.

Specific interventions included in the review
Computerized interventions included the following: glucometer data transmission; network data transmission; computerized insulin dosage; computerized diet assessment; computerized diet counselling; and computerised data management.

Participants included in the review
Adults and children with either insulin dependent diabetes mellitus (IDDM) or non-insulin dependent diabetes mellitus (NIDDM) were included.

Outcomes assessed in the review
Outcomes included Hb A1c, blood glucose and hypoglycaemic events.

How were decisions on the relevance of primary studies made?
Titles and/or abstracts were read and judged as potentially eligible by a reviewer.

Assessment of study quality
Validity was assessed using the following criteria: sample definition; testing randomisation; intervention; effect variable definition; blinding; ratio of withdrawals; analysis of effect variables; and numeric data analysis on effect variables (see Other Publications of Related Interest no.1). Trials were scored on validity criteria using a validated scoring system that awards scores from 1 to 100 with the minimum score being set to 20. The authors do not state how the papers were assessed for validity, or how many of the authors performed the validity assessment.

Data extraction
A standardised abstraction form was used to extract the data.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative review. A 'vote counting' approach was used, stating the number of trials finding significant outcomes.

How were differences between studies investigated?
The authors do not state how differences between the studies were investigated.

**Results of the review**

Fifteen RCTs were included (761 patients: 502 adults and 259 children).

Ten studies involved adults and 5 studies involved children. Thirteen studies focused on IDDM, one study focused on NIDDM and 1 study included both types of diabetes.

Mean quality score was 59.3 (standard deviation 18.9). Highest score was 84.

Success: significant benefit for use of computer was reported in 12 of the 15 included trials (80%).

HbA1c (15 studies): 6 studies reported a significantly lower level in the intervention group compared to the control.

Blood glucose levels (number of studies reporting this outcome not stated): 3 studies reported significantly lower levels in the intervention group compared to the control.

Number of hypoglycaemic episodes (number of studies reporting this outcome not stated): 1 study reported significantly fewer episodes in the intervention group compared to the control (1.2 vs 2.3 events per week: P < 0.001).

Number of studies required to overturn results of this study = 225 studies.

**Authors' conclusions**

Patient-computer interaction appears to be a valuable supplement to interaction with clinicians. Considering the need to enhance patient participation in the care of chronic illness, initial evidence indicates computers can play a significant role in the future.

**CRD commentary**

The aims and inclusion criteria were stated. Several databases were searched. Validity was assessed but is was not clear whether some studies were excluded on validity grounds.

No details were given of methods used to select primary studies or extract data. Fuller details of the included studies would have been welcome such as sample size, characteristics of patients, setting, training required in use of computer, acceptability rates of computer use by patients, description of intervention, definitions and ascertainment of outcomes, duration of follow-up and validity score. Statistical heterogeneity was not assessed and discussion of potential sources of heterogeneity was limited to brief mention of the possibility of non-identical patient-computer interaction. It was not stated how many studies were used to assessed some outcomes.

Insufficient information was presented to support the authors conclusions.

**Implications of the review for practice and research**

The authors did not state any implications for further research and practice.

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**Bibliographic details**

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Blood Glucose Self-Monitoring; Diabetes Mellitus /therapy; Hemoglobin A, Glycosylated; Humans; Insulin /administration & dosage; Randomized Controlled Trials as Topic; Self Administration; Therapy, Computer-Assisted; Treatment Outcome

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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.