Blood glucose monitoring in children and adolescents with type 1 diabetes mellitus

Formosa N

CRD summary
The author concluded that frequent self-monitoring of blood glucose resulted in significant reductions in HbA₁c in children and adolescents with type 1 diabetes. The author's conclusion reflects the evidence presented but poor reporting of review methods, lack of quality assessment and reporting of study details, and the limited evidence base question the reliability of the conclusions.

Authors' objectives
To assess the effect of blood glucose monitoring on glycaemic control as measured by HbA₁c in children and adolescents with type 1 diabetes mellitus.

Searching
MEDLINE (from 1950) and EMBASE (from 1980) were searched up to April 2011. Search terms were reported. Reference lists of retrieved articles were examined.

Study selection
Experimental or observational studies that evaluated self monitoring of blood glucose of children and adolescents (18 years of age or younger) with type 1 diabetes were eligible for inclusion. The outcome of interest was HbA₁c.

Studies were conducted in USA and Europe including one in UK. Settings included hospital clinics, diabetes camp and database registries. The age of participants ranged from seven years to less than 18 years. Outcome measures were assessed using questionnaires and data from logbooks or meters. Outcome measurements appeared to be evaluated over a short time period. Where reported, patients had diabetes from five months to one year. Insulin regimens, where reported, varied between studies.

The author did not state now many reviewers selected studies for inclusion.

Assessment of study quality
The author did not state that they assessed quality.

Data extraction
It appeared that data were extracted to calculate the mean change in HbA₁c from baseline to end of study. The author did not state how many reviewers extracted data.

Methods of synthesis
The studies were combined in a narrative synthesis.

Results of the review
Eleven observational studies (31,290 participants, range 93 to 26,723) were included in the review: seven studies used a cross-sectional design, two studies were observational longitudinal design studies and the design of two studies was unreported.

Nine studies reported a significant link between self-monitoring of blood glucose frequency and HbA₁c reductions; self-monitoring of blood glucose monitored four times daily led to a further reduction in HbA₁c of 1% compared to once daily monitoring. The other two studies reported no link between self-monitoring of blood glucose frequency and HbA₁c reductions when measured exclusively by self-report.

Factors believed to be associated with frequent self-monitoring were reported in the review.

Authors' conclusions
Frequent self-monitoring of blood glucose resulted in a significant reduction in HbA₁c in children and adolescents with
CRD commentary
The review question was clear with broadly defined inclusion criteria. A limited search was conducted so potentially relevant data may have been missed. Study quality did not appear to be assessed so it was difficult to assess the reliability of the evidence. The author did not report whether appropriate methods to reduce reviewer error and bias (such as independent reviewers conducting study selection and data extraction) were used throughout the review process.

A narrative synthesis was appropriate given the differences between studies in terms of design, outcomes and outcome measurement. Reporting of study characteristics was limited and it was difficult to assess the generalisability of the results. Use of self-reported data and observational studies were potential limitations. Details of the two negative studies were not discussed.

The author’s conclusion reflects the evidence presented but poor reporting of review methods, lack of quality assessment and reporting of study details, and the limited evidence base question the reliability of the conclusions.

Implications of the review for practice and research
Practice: The author stated that the Department of Health in Malta should provide children and adolescents with type 1 diabetes with an adequate supply of glucose test strips to provide an incentive for them to check their blood glucose regularly.

Research: The author did not state any implications for research.

Funding
Not stated.

Bibliographic details

Original Paper URL

Indexing Status
Subject indexing assigned by CRD

MeSH
Adolescent; Blood Glucose; Child; Diabetes Mellitus, Type 1; Humans; Monitoring, Ambulatory

AccessionNumber
12013020060

Date bibliographic record published
24/04/2013

Date abstract record published
08/08/2013

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.