Can primary care professionals' adherence to Evidence Based Medicine tools improve quality of care in type 2 diabetes mellitus: a systematic review

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CRD summary
This review concluded that primary care providers' adherence to evidence-based medicine tools was likely to improve the process of care rather than outcomes in patients with type 2 diabetes mellitus. Feedback reports and information/communications technology devices may be effective in diabetes management. The limited evidence and data synthesis make it difficult to determine the reliability of the authors’ conclusions.

Authors' objectives
To assess the effectiveness of interventions aimed at improving primary care providers' adherence to Evidence-Based Medicine tools to improve quality of care in the management of type 2 diabetes mellitus.

Searching
PubMed and EMBASE were searched from 1988 to April 2009, and CINAHL and the Cochrane Library were searched without date restrictions. Search terms were reported. The Diabetes Research and clinical Practice, plus Diabetes Care journals were also searched between 1998 and April 2009. The US National Institutes for Health (NIH) Public Access Policy was scanned for unpublished data. In addition, reference lists of relevant articles were manually searched.

Study selection
Randomised controlled trials (RCTs) of one or more interventions to improve adherence to all evidence-based medicine tools, relevant to everyday practice in primary care setting (i.e. practice guidelines, recommendations, clinical and/or integrated care pathways), were eligible for inclusion. Eligible studies had to measure guideline adherence, morbidity, mortality, or some other quality of care process or outcome in patients with type 2 diabetes.

Included trials compared a variety of interventions (educational, computer based, or multifaceted) versus a control (mainly usual care or no intervention). Interventions were classified as: educational training (including face-to-face training with individuals or groups, manuals for self-directed learning, patient management flow-charts, practice based education and newsletters); internal or external audit (including feedback reports on performance and peer review); information and communications technology (ICT) devices (such as computer-based reminders, phone-call reminders and mobile phone text reminders); or a combination of these interventions.

Outcomes of interest were patient outcomes (mortality, morbidity, readmission rates), laboratory direct indicators related to diabetes (blood glucose level, urinary glucose level, glycated haemoglobin concentration), and self perceived quality of life (patient satisfaction, functional status). Process of care indicators were also reported, including resource indicators associated with diabetes management (i.e. referral rate for eye or foot examination), and patient-centred activities (self management monitoring).

Two reviewers screened studies for inclusion, with disagreements resolved through referral to a third reviewer.

Assessment of study quality
Two teams of two reviewers assessed trial quality according to the Scottish Intercollegiate Guidelines Network (SIGN), including criteria on appropriateness of research question, randomisation, allocation concealment, blinding, outcome measurement patterns, loss to follow-up, and intention-to-treat analysis. Trials were assigned an overall quality score of good quality, medium quality, poor quality.

Data extraction
One reviewer extracted outcome data, and where possible mean differences between groups and their 95% confidence intervals (CIs) were calculated.
Methods of synthesis
Where possible, mean differences and their 95% confidence intervals were pooled using a random-effects model to estimate standardised mean differences (SMDs); otherwise data were presented narratively by type of intervention (training/education; audit; ICT; or combination).

Statistical heterogeneity was measured using the $\chi^2$ test and $I^2$ statistic.

Results of the review
Thirteen RCTs (n=347 practices including GPs plus practice nurses; n=82 primary care physicians/clinicians, 390 general practitioners; n=345 internal medicine residents; n=33,573 patients with type 2 diabetes) were included in the review. The majority of RCTs did not address blinding; randomisation was well covered in only three RCTs; allocation concealment was well covered in five RCTs; the majority of RCTs performed intention-to-treat analysis; only six RCTs provided details on statistical power. Overall, four RCTs had poor methodology, five were considered to be of medium quality, and four were of good quality.

Educational interventions (five RCTs): The findings were conflicting for the four RCTs that addressed the adherence of primary care professionals to evidence-based guidelines through the comparison of educational interventions with usual care. Meta-analysis showed no statistically significant difference in glycated haemoglobin percentage reduction (SMD -0.23, 95% CI -0.58 to 0.12; two RCTs). There was evidence of statistical heterogeneity ($I^2$=73%).

Educational and internal/external audit (four RCTs): Two RCTs reported no significant differences between intervention and control groups, while two RCTs reported improvements in the intervention groups. Feedback reports with support from facilitators were likely to increase rates of foot and eye examinations (one RCT; n=185 GPs). Practice-based education was shown to be an effective way to disseminate local developed guidelines (one RCT).

Information and communications technology (ICT) devices (four RCTs): All four RCTs showed improvements in the intervention groups: improvements in patient outcomes (one RCT); significantly improved clinicians' compliance with care guideline recommendations for diabetes, thereby enhancing quality in healthcare delivery (one RCT); improvement in process of care delivery (one RCT); and improvements in glycated haemoglobin, blood pressure control and low-density lipoprotein cholesterol level, and health care professional capacity to change behaviour (one RCT).

Combined training interventions with use of ICT devices (one RCT): There were no statistically significant differences in patient outcomes between the intervention and control group or clinicians' behaviour.

Authors' conclusions
Adherence to evidence based medicine tools was likely to improve process of care, rather than patient outcomes. In addition, feedback reports and ICT devices were likely to be effective in diabetes disease management.

CRD commentary
The review question was clear and was supported by appropriate but broad inclusion criteria. The literature search was adequate and attempted to locate published and unpublished data, reducing the potential for publication bias. It was unclear whether there were any language restrictions, so language bias may have been introduced. Study selection and quality were assessed in duplicate, minimising the potential for reviewer error and bias, but this was not the case for data extraction.

Trial quality was assessed using appropriate criteria, with most trials reported to be of medium to good quality. Meta-analysis was carried out where possible, but included only two RCTs with evidence of statistical heterogeneity. A narrative synthesis was appropriate for the remaining RCTs due to clinical and methodological heterogeneity, but data reported were very limited.

Although parts of this review were well conducted, given the limited evidence and data synthesis, it is difficult to determine the reliability of the authors' conclusions.
Implications of the review for practice and research

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that more robust evidence based research on type 2 diabetes is needed to identify the determinants of health care providers' adherence, what their role is and what the barriers are to implementation.

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