Care management for type 2 diabetes in the United States: a systematic review and meta-analysis


CRD summary
The authors concluded that most care management programmes, for type two diabetes, had limited effects on metabolic outcomes, and unknown effects on outcomes important to patients, such as living longer. Further research was needed. There was potential for error and bias, differences between studies, and potential weaknesses in study quality, so the authors’ conclusions are suitably cautious.

Authors' objectives
To compare the effectiveness of different care management programmes, for patients with type 2 diabetes.

Searching
MEDLINE, MEDLINE In Process and Other Non-Indexed Citations, EMBASE, Current Contents Connect, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Database of Systematic Reviews, and CINAHL were searched for articles published from 1st January 2000 to 21st September 2011. Search terms were reported.

Study selection
Controlled trials that compared a care management programme, with a control group, for US patients with type 2 diabetes, were eligible for inclusion.

In the included trials, most of interventions were delivered in an office; others were telephone, education or web based. In 39% of interventions, more than one delivery method was used. Most interventions were led by non-physician professionals; 29% were physician led. Control groups were usual care, attention control, low-intensity control interventions, or other control groups. The most common outcomes were the change in glycated haemoglobin and low-density lipoprotein (LDL) cholesterol. Process outcomes were reported in 14 studies. Trials lasted from 1.5 to 60 months. The inclusion criteria for participants varied between trials, focusing on specific age groups, ethnic groups, socio-economic status, or patients with certain glycated haemoglobin levels.

Two reviewers independently assessed the full-text articles. Disagreements were resolved by consensus.

Assessment of study quality
The quality of included trials was assessed for randomisation and allocation concealment, comparability of study groups at the start, and losses to follow-up. The authors did not state how many reviewers assessed quality.

Data extraction
Continuous outcomes (changes in glycated haemoglobin and LDL cholesterol) were extracted to calculate the difference in the mean, between groups, with 95% confidence interval, for each trial. The authors did not state how many reviewers extracted the data.

Methods of synthesis
Pooled weighted mean differences, with 95% confidence intervals, were calculated using random-effects meta-analysis. Subgroup analyses were planned for the lead professional, method of delivery, and length of follow-up. Statistical heterogeneity was assessed using $I^2$ ($I^2>50\%$ indicated substantial heterogeneity). Any data that were not amenable to meta-analysis were presented in a narrative.

Results of the review
Fifty-two studies were included in the review (221,314 participants; range 28 to 179,249). Most were parallel-group randomised controlled trials. Some were cluster randomised trials or before-and-after studies, and one was a model-based predictive trial. Methodological weaknesses were contamination (in cluster-randomised trials), lack of reported allocation concealment (randomised trials), baseline differences between groups, short follow-up, high or unclear loss to
follow-up, and a lack of blinding. Follow-up ranged from a few weeks to five years.

Diabetes care management programmes, compared with controls, significantly reduced glycated haemoglobin levels (WMD -0.22%, 95% CI -0.40 to -0.04; 32 comparisons) and LDL cholesterol levels (WMD -3.38mg/dL, 95% CI -6.27 to -0.49; 14 comparisons). Statistical heterogeneity was high for glycated haemoglobin ($I^2 = 94\%$), but not for LDL cholesterol ($I^2 = 27\%$). The authors reported that both reductions were not clinically significant.

Subgroup analyses found no significant reduction in glycated haemoglobin or LDL cholesterol, by length of intervention, professional lead, and delivery method. A brief narrative synthesis was given on the impact of the programmes on other outcomes, such as self-care, quality of life, testing and visit rates, health care use and costs, and process measures, such as adherence to disease monitoring protocols.

**Authors’ conclusions**
Most care management programmes, for type two diabetes, had limited effects on metabolic outcomes, and unknown effects on outcomes that were important to patients, such as feeling better. Further research was needed, comparing different care management models for patients with chronic illness.

**CRD commentary**
The review addressed a clear question. Several relevant databases were searched. It was unclear whether the search was restricted by language, so language bias cannot be ruled out. The authors did not appear to search for unpublished data, and they stated that publication bias could not be statistically assessed because there were too few studies in each analysis. The inclusion criteria were well defined for the intervention and participants, but broad for the outcomes and study design, resulting in differences between studies.

It was unclear whether appropriate steps were taken, throughout the review, to minimise the risk of reviewer error and bias. The quality of the included studies was assessed using relevant criteria, but not a standardised tool. The findings for each study were not reported for all criteria, making it difficult to fully assess study quality. Methodological weaknesses were observed in many studies, undermining the reliability of the findings. Given the high levels of statistical heterogeneity for one of the two meta-analyses, it is unclear whether the methods used to combine the studies were suitable.

In light of the potential for error and bias, differences between studies, and potential weaknesses in study quality, the authors’ conclusions are suitably cautious.

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

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

**Research:** The authors stated that further research was needed, comparing the impact of diabetes care management programmes, versus usual care, on outcomes important to patients, such as living longer, living independently, feeling better, or suffering fewer complications.

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