The effectiveness of disease and case management for people with diabetes: a systematic review

Authors' objectives
To assess the effectiveness and economic efficiency of disease management and case management for people with diabetes.

Searching
MEDLINE (from 1966), ERIC (from 1966), CINAHL (from 1982) and HealthSTAR (from 1975) were searched to 2000 using the MeSH terms 'diabetes', 'case management' and 'disease management', including all subheadings. Searches with textwords were performed on multiple additional terms including 'care model', 'shared care', 'primary health care' and 'medical specialities', 'primary', or 'specialist. The reference lists of the included articles were examined and consultants to the authors provided additional citations. Abstracts and dissertations were excluded.

Study selection
Study designs of evaluations included in the review
All types of comparative primary studies (including concurrent or before-and-after comparison groups) that met the minimum quality standards (validity judged as good or fair) were eligible. Only studies conducted in Established Market Economics were eligible. Randomised controlled trials, before-and-after studies, and cohort studies with comparison groups were included in the review.

Specific interventions included in the review
Studies that examined disease management and case management were eligible. The essential features of both disease and case management were reported in the text.

The review authors defined disease management as 'an organised, proactive, multicomponent approach to health care delivery that involves all members of a population with diabetes'. Most of the disease management interventions were conducted in community clinics and managed care organisations in the USA and Europe. Other settings included academic centres, hospital clinics and an Indian Health Service. The studies were largely conducted in urban centres in the USA.

The review authors defined case management as 'a set of activities whereby the needs of populations of patients at risk for excessive resource utilisation, poor outcomes, or poor coordination of services are identified and addressed through planning, coordination and provision of care'. The studies of case management were predominantly set in managed care organisations, primarily in the USA. Other settings included an academic centre, community clinics, a US military clinic and a US Veterans' hospital. Case management was delivered with and without disease management.

Participants included in the review
Studies of people with diabetes mellitus were eligible. Most of the participants were either adults with type 2 diabetes or populations with mixed type 1 and 2 (predominantly type 2). No disease management studies examined exclusively type 1 patients or children with diabetes. One study of case management was of children with type 1 diabetes.

Outcomes assessed in the review
Studies that provided information on one or more of the following preselected outcomes were eligible: patient process outcomes including knowledge, skills, psychosocial outcomes and satisfaction with care; provider process outcomes including participation, satisfaction, productivity, screening and monitoring treatment; health care system process outcomes including health insurance, provision of services, health care utilisation and public health services; short-term patient related outcomes including glycaemic control, physiologic measures, lifestyle, mental health and work-related outcomes; long-term patient-related outcomes including macrovascular and microvascular complications, mortality, quality of life and pregnancy-related outcomes; and long-term health care system economic outcomes. The follow-up in
case management studies reporting glycated haemoglobin ranged from 6 to 30 months.

How were decisions on the relevance of primary studies made?
The titles of the articles and abstracts were reviewed according to the inclusion criteria.

Assessment of study quality
Validity was assessed according to the suitability of study design for evaluating the effectiveness and quality of execution, and according to threats to validity (see Other Publications of Related Interest nos.1-2). The threats to validity that were considered were: study population and intervention descriptions; sampling, exposure and outcome measurement; data analysis and interpretation of results; and any other threats. Validity was assessed using a standardised form. The studies were characterised as good, fair or limited quality, on the basis of the number of threats to validity (see Other Publications of Related Interest nos.1-2).

Data extraction
The following data were extracted by two reviewers using a standardised form: intervention; context in which the study was conducted, including population and setting; evaluation design and results. Any disagreements were resolved by consensus among the development team (see Other Publications of Related Interest no.3). In addition, details of the author and year of publication and follow-up interval were tabulated in the review. Summary effect measures were calculated for the outcomes of interest for each relevant outcome in each individual study. Absolute differences were used for outcomes with consistent measurement scales, and relative differences were used for outcomes with variable scales or weights of measurement.

Methods of synthesis
How were the studies combined?
When seven or more studies reported an outcome, the interquartileranges of the outcome measures were used as an indication of variability. Otherwise, the range of values was presented.

How were differences between studies investigated?
Conclusions about the applicability of different interventions to various populations and settings were based on data relating to the patient and intervention characteristics, settings, follow-up periods, methods of participant recruitment, and participation rates.

Results of the review
Twenty-seven studies of disease management (number of patients was not reported in the review) and fifteen studies of case management (at least 15,000 patients) were included.

The methodological deficiencies of the studies included inadequate descriptions of patient demographics, delivery system infrastructure and details of the intervention.

Disease management.
Nine of the 27 included studies were considered to have a study design suitable for evaluating effectiveness. Of the remaining studies, the design suitability was moderate for 3 studies and least suitable for 15. The 27 included studies provided evidence of effectiveness for several patient and provider outcomes.

Glycated haemoglobin (19 studies): glycated haemoglobin improved in 18 of the 19 studies. There was a median net change of -0.5% (interquartile range: -1.35, -0.1). There was strong evidence for an improvement in the percentage of providers performing annual monitoring of glycated haemoglobin and for retinopathy screening. The median provider monitoring rates (approximate values taken from the Box plot) were 18% (interquartile range: 5, 40) for glycated haemoglobin and 8% (interquartile range: 5, 18) for retinopathy screening.

There was sufficient evidence on the improvement in screening for foot lesions, peripheral neuropathy, lipid
concentrations and proteinuria, by providers. The median provider monitoring rates (approximate values taken from the Box plot were 24% (interquartile range: 15, 420) for foot examination, 8% (interquartile range: -4, +18) for urine protein, and 26% (interquartile range: 18, 38) for lipids.

There was insufficient evidence to determine the effectiveness of disease management on weight, body mass index, blood-pressure and lipid concentrations.

Case management.

The design suitability was greatest for 8 of the 15 included studies, moderate for one study and least suitable for 6 studies.

Case management was effective in glycated haemoglobin control. The median effect was -0.53% (interquartile range: -0.65, -0.46). The improvement in glycated haemoglobin was similar when case management was delivered in addition to disease management.

The evidence of case management without disease management was insufficient in relation to lipid concentrations, body weight or body mass index and blood-pressure.

The quality of life improved in 2 studies (p=0.07 and p=0.025).

Cost information

Two economic studies of disease management were found. Both studies were classified as good according to the quality assessment criteria. One study, based in Scotland, found that the average annual adjusted costs for integrated care were $143 to $185 versus $101 for traditional care. Integrated care consisted of review in general practice every 3 to 4 months, annual hospital review, patient and doctor consultation reminders, and practices received guidelines; traditional care consisted of review at the clinic every 4 months and appointment reminders. No details were given of methods used to convert the costs from UK pounds to US dollars. The second study was a cost-benefit analysis of preconceptual plus prenatal care versus prenatal care alone for women with established diabetes. It found that the difference between estimated prenatal care alone and the preconception and prenatal care intervention costs was $2702 per enrollee. The incremental benefit-cost ratio was 1.86.

Authors' conclusions

Case management was effective in improving both glycaemic control and provider monitoring of glycaemic control. This evidence is applicable primarily in the U.S. managed care setting for adults with type 2 diabetes. Case management was effective both when delivered in conjunction with disease management and when delivered with one or more additional educational, reminder or support interventions.

CRD commentary

The aims of the review were stated and the inclusion criteria were defined in terms of the interventions, study design and outcomes. Only brief details of the methods used to conduct the review were specified in the text, although sources of more comprehensive information were referenced. Several relevant sources were searched but it was not stated whether any language restrictions were applied. Validity was assessed using defined criteria and only studies that met the minimum quality criteria were eligible for inclusion. Relevant data were extracted but only information for case management studies were tabulated in the review. The data were combined by estimating the median values and interquartile ranges for some outcomes. Statistical heterogeneity among the studies was not statistically assessed, and the influence of study validity on the results was not examined.

Information on the design of the individual studies was lacking. There were no details of what defined a 'good' quality study. Hence, the authors' conclusions should be interpreted with caution.

Implications of the review for practice and research
Practice: The authors state that there is strong evidence that disease management interventions are effective in improving glycaemic control in people with diabetes, and in improving provider monitoring of glycated haemoglobin and screening for diabetic retinopathy. They also state that there is sufficient evidence that disease management is effective in improving provider screening for foot lesions, peripheral neuropathy, proteinuria and lipid levels. The authors found strong evidence that case management improves glycaemic control, and sufficient evidence that the combination of case and disease management is effective in improving provider monitoring of glycated haemoglobin.

Research: The authors state that there were research gaps, particularly in the areas of effectiveness of specific components of the interventions, effects on long-term health and quality of life outcomes, and application to diverse populations and settings. In the review, the authors list specific areas that require research.

Bibliographic details

PubMedID
11985933

Other publications of related interest

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Subject indexing assigned by NLM

MeSH
Case Management; Community Health Services; Diabetes Mellitus /prevention & control; Disease Management; Humans; Preventive Health Services; United States

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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.