A systematic review of randomized trials of disease management programs in heart failure
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Authors' objectives
To determine whether disease management programmes improve outcomes for patients with heart failure.

Searching
MEDLINE (from 1966 to 1999), EMBASE (from 1980 to 1998), CINAHL (from 1982 to 1999), SIGLE (from 1980 to 1998) the Cochrane Controlled Trials Register and the Cochrane EPOC Register of trials were searched. The following textwords and MeSH terms were used: 'case management (exp)', 'comprehensive health care (exp)', 'disease management (exp)', 'health services research (exp)', 'home care services (exp)', 'clinical protocols (exp)', 'patient care planning (exp)', 'quality of health care (exp)', 'nurse led clinics', 'special clinics' and 'heart failure, congestive (exp). The bibliographies of relevant studies were handsearched and experts were contacted for additional studies. Trials reported in any language were considered.

Study selection
Specific designs of evaluations included in the review
Only randomised controlled trials were sought.

Specific interventions included in the review
The inclusion criteria specified disease management programmes, described as multidisciplinary teams employing system approaches (such as guidelines or care paths) and specialised clinics dedicated to comprehensive care. In the included studies, the individual programmes consisted of combinations of the following interventions: nurse-led patient education, dietary and social services consultation, review of medications by geriatric cardiologist, intensive follow-up at home by study team, self-management guidelines for patients, follow-up visits at nurse-run clinics as needed after discharge, home visits by nurse and pharmacist, compliance aids, frequent telephone follow-up, exercise regimen and nurse-coordinated care. When describing the results, the authors distinguished between those that were 'multidisciplinary teams providing specialised follow-up' and 'telephone follow-up and improved communication with primary care physician'. In the included studies, the comparisons were made with groups receiving 'usual care', which the authors stated was defined poorly in the studies. The duration of the intervention ranged from 'one visit' to 12 months, while the duration of the follow-up ranged from 3 to 12 months.

Participants included in the review
Studies of participants with heart failure were sought. Studies that enrolled groups of patients with several different diseases were excluded unless the outcomes were reported separately, or the information could be obtained from the authors. However, one of the included studies described the participants as having 'heart failure or coronary heart disease' and the results were described for this group as a whole. The patients in the included studies were described as those that had been hospitalised, or discharged from hospital, with heart failure and in some cases those with clinical features suggesting a high risk of readmission. The mean ages ranged from 63 to 80 years.

Outcomes assessed in the review
The outcomes assessed in the review were the mortality rates or rates of hospitalisation. Not all of the included studies reported on mortality. The results of the review described all-cause mortality, the numbers of patients readmitted at least once and the total numbers of hospitalisations per treatment. Other end points were the use of medications of proven efficacy, quality of life or functional status (no details given as to how this was assessed) and the costs of the intervention.

How were decisions on the relevance of primary studies made?
Two reviewers independently reviewed the studies for inclusion, and any discrepancies were resolved by consensus.
Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The data were extracted by two reviewers independently using pre-standardised data abstraction forms. Any discrepancies were resolved by consensus. The outcomes were assigned on an intention-to-treat principle. The original investigators were contacted when it was necessary to clarify published data. The data extracted included: year of study; sample size; patients’ diagnostic criteria; country of study; age range and mean age of the participants; key components of the intervention and duration of the intervention; the numbers of deaths (all-cause) and rehospitalisations (at least once) in each arm of the studies, together with the risk ratios (RR) and 95% confidence intervals (CIs).

Methods of synthesis
How were the studies combined?
The pooled RRs and the 95% CIs were calculated. The studies were combined using both a random-effects model (DerSimonian and Laird) and a fixed-effect model (Mantel-Haenszel-Peto). Since the results were similar, only the fixed-effect results were reported.

How were differences between studies investigated?
Heterogeneity was investigated using Cochran’s Q test. Sensitivity analyses were conducted to look at the effects of the duration of the intervention, length of follow-up, year of study completion and elements of the disease management programmes on the summary RRs.

Results of the review
Eleven studies (2,067 participants) were included.

All-cause mortality was reported in 6 studies (1,106 participants). No significant difference was found between the intervention and control groups (summary RR 0.94, 95% CI: 0.75, 1.19). There was no statistical evidence of heterogeneity among the studies (p=0.15). However, one study (97 participants) reported a significant difference at the 18-month follow-up in favour of the intervention group.

Hospitalisation rates appeared to be significantly reduced by the intervention (RR 0.87, 95% CI: 0.79, 0.96). However, there was significant heterogeneity for this result (p=0.003). The authors stated that most of this heterogeneity was attributable to one study which, although having the same patient base and aims as the others, used a somewhat different intervention. This study was then grouped with a further similar study. When the results were analysed as two groups, there were considerable differences in the effects of different interventions on hospitalisation rates: programmes with a multidisciplinary team follow-up had a substantial reduction in hospitalisation (RR 0.77, 95% CI: 0.68, 0.86; 1,366 participants), whereas those employing telephone contact with improved coordination failed to find any benefit (RR 1.15, 95% CI: 0.96, 1.37; 646 participants).

Two of the 3 studies assessing the use of medication of proven efficacy demonstrated a greater use of these therapies in intervention patients. Only one of the 5 studies that assessed quality of life or functional status demonstrated better outcomes in the intervention arm. Of the 8 studies that described the costs, 7 reported that the intervention was cost-saving. The sensitivity analysis showed that the calendar year, duration of intervention or length of follow-up had no effect on the results.

Cost information
The authors stated that 8 studies described the costs. No economic analysis was provided.

Authors' conclusions
Disease management programmes that involve specialised follow-up by a multidisciplinary team reduce hospitalisations and appear to be cost-saving. The data on mortality are inconclusive.

**CRD commentary**
This paper was clearly structured and well written, and adequately described the process used for reviewing the topic. However, the inclusion criteria for selecting the studies were not defined clearly, and the definition of disease management programmes was somewhat broad. In addition, the authors acknowledged that their results might have been hampered by the imprecise descriptions of the interventions in the studies. The search terms appear adequate, although those used to search for randomised controlled trials were not specified. The relatively small number of papers in the initial results suggests the possibility that studies were missed.

When describing the results of the review, the authors divided the included studies into two different treatment groups. Whilst this may be justified, it is difficult from the descriptions of the studies given to see where the differences between some of the studies lie. The authors' choice of total mortality as a primary outcome is significant, but only 5 of the 11 studies reported on this. In addition, as the authors stated, the studies have relatively small sample sizes and the treatment effects might have been overestimated.

The results of this review should be treated with caution in view of these comments.

**Implications of the review for practice and research**
Practice: The authors state that disease management programmes for heart failure should include multidisciplinary teams, emphasise patient education and self-management, and have enhanced access to specialised clinics or home visits.

Research: The authors state that further studies are needed to establish the incremental benefits of the different elements of these programmes. They also suggest that any future programmes that differ from these suggestions should include an evaluation of effectiveness.

**Bibliographic details**

**PubMedID**
11286953

**Other publications of related interest**
This additional published commentary may also be of interest. Harkness K. Review: specialised multidisciplinary follow up reduces hospital admissions but not mortality in patients with heart failure. Evid Based Nurs 2002;5:18.

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Aged; Disease Management; Heart Failure /drug therapy /mortality /therapy; Hospitalization /statistics & numerical data; Humans; Middle Aged; Randomized Controlled Trials as Topic; Risk; Treatment Outcome

**AccessionNumber**
12001000979

**Date bibliographic record published**
30/04/2003
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.