Systematic review of multidisciplinary interventions in heart failure

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CRD summary
This review concluded that multidisciplinary interventions for heart failure reduce hospital admission and all-cause mortality, particularly interventions that are at least partly delivered in the patient's home. This was a well-conducted systematic review and the authors' conclusions are likely to be reliable.

Authors' objectives
To assess the impact of multidisciplinary interventions for heart failure on hospital admission and mortality.

Searching
MEDLINE, EMBASE, CINAHL, AMED, the Cochrane Controlled Trials Register, the Cochrane EPOC Register of trials, BioMed Central, TRIP, meta Register of Controlled Trials, Research Findings Electronic Register, National Research Register, the Cochrane Database of Systematic Reviews and DARE were searched from inception to June 2004. In addition, the reference lists of all included articles and relevant review articles were checked. No language restrictions were applied.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion.

Specific interventions included in the review
Studies of multidisciplinary interventions compared with usual care were eligible for inclusion. Multidisciplinary interventions were nurse-led programmes, medication review, medication adherence interventions, patient education, or enhanced monitoring, carried out in any setting. Studies of pharmaceutical interventions or solely exercise-based interventions were excluded from the review.

Home interventions comprised between 1 and 8 visits (mean of 0.6 visits per month) and most also included telephone contact. Telephone or mailing interventions consisted of between 1 and 17 telephone calls (mean of 1.4 calls per month).

Participants included in the review
Studies of patients with congestive heart failure were eligible for inclusion. The majority of the studies included hospitalised or recently hospitalised patients admitted with heart failure, and excluded patients who were due to be discharged to a long-term care facility or had a terminal disease or severe co-morbidity. The mean age of the included participants ranged from 56 to 86 years and the proportion of men ranged from 27 to 99%.

Outcomes assessed in the review
Studies that reported outcomes for hospital admission, length of hospital stay, mortality or quality of life were eligible for inclusion.

How were decisions on the relevance of primary studies made?
One reviewer assessed the titles of all records retrieved by the literature search. Two reviewers independently assessed the abstracts of potentially relevant records. Full papers were obtained when one or both reviewers considered the abstract potentially relevant; two reviewers then independently assessed these for relevance. Any disagreements were resolved by discussion, or by referral to a third reviewer when necessary.

Assessment of study quality
The quality of the included studies was assessed on the following criteria: concealment of allocation; use of intention-to-treat analysis; explicit inclusion or exclusion criteria; baseline comparability between groups; clearly defined primary outcome; clear diagnostic criteria for heart failure; confirmation of outcomes using at least two sources; and length of follow-up. Studies meeting six or more of these criteria were considered to be high quality. One reviewer performed the quality assessment.

**Data extraction**

One reviewer extracted the data into a piloted electronic data extraction form. Two reviewers, blinded to the trial's results, categorised each of the trials into one of four intervention subgroups: home visiting; home physiological monitoring or televideo contact; telephone or mailing to the patient's home without home visiting; and interventions delivered exclusively in a hospital, clinic or general practice. The interventions were also classified as high intensity (planned contact at least monthly with multifaceted interventions) or low intensity (less frequent contact or narrow interventions).

The data were extracted as relative risks (RRs) for the proportion of patients with one or more hospital admissions (all-cause), heart failure hospital admissions, and all-cause mortality. The weighted mean difference (WMD) was calculated for mean in-patient days. Data on quality of life were also extracted.

The authors of the primary studies were contacted to confirm the data extraction. Additional data were sought when articles did not report one or more of the outcomes of interest.

**Methods of synthesis**

How were the studies combined?
The studies were pooled by meta-analysis using a random-effects model. Publication bias was investigated using funnel plots.

How were differences between studies investigated?
Heterogeneity was assessed using the chi-squared and I-squared statistics.

Subgroup analyses were performed according to the four intervention categories. Sensitivity analyses were performed for the outcomes all-cause admission and all-cause mortality by excluding poorer quality studies, by excluding studies that were not published in peer-reviewed journals, and by excluding studies in which patients with heart failure only comprised a subgroup of the study participants. The analyses were repeated using the fixed-effect model and the results compared against those obtained using the random-effects model. Sensitivity analyses were also performed; these were based on the intensity of the intervention and whether the intervention targeted high-risk heart failure patients or any heart failure patient.

**Results of the review**

Thirty RCTs, with over 8,000 participants, were included in the review.

Twenty-two RCTs met at least five of the eight quality criteria.

**All-cause admission.**

There was a statistically significant reduction in all-cause admission for patients receiving multidisciplinary interventions compared with usual care (RR 0.87, 95% CI: 0.79, 0.95; 21 RCTs); however, significant heterogeneity was found. All-cause admission was statistically significantly reduced in the subgroup of patients receiving home visiting interventions (RR 0.80, 95% CI: 0.71, 0.89; 10 RCTs; no significant heterogeneity), but there was no significant difference between the intervention group and the usual care control group for the subgroups receiving telephone or mailing interventions (RR 0.86, 95% CI: 0.73, 1.02; 9 RCTs) and interventions delivered in a hospital, clinic or general practice (RR 0.99, 95% CI: 0.90, 1.10; 2 RCTs).

**All-cause mortality.**
There was a statistically significant reduction in all-cause mortality for patients receiving multidisciplinary interventions compared with usual care (RR 0.79, 95% CI: 0.69, 0.92; 27 RCTs); however, significant heterogeneity was found. Significant reductions in mortality were seen in the subgroup of patients receiving home or telemonitoring (RR 0.49, 95% CI: 0.33, 0.73; 3 RCTs) and the subgroup receiving telephone or mailing interventions (RR 0.70, 95% CI: 0.53, 0.94; 11 RCTs). There was significant heterogeneity for the telephone/ mailing interventions subgroup. No significant reduction in all-cause mortality was seen for subgroups receiving home visiting interventions (RR 0.87, 95% CI: 0.72, 1.06; 11 RCTs) or interventions delivered in a hospital, clinic or general practice (RR 1.00, 95% CI: 0.84, 1.20; 3 RCTs).

Heart failure admission.

There was a statistically significant reduction in heart failure admission for patients receiving multidisciplinary interventions compared with usual care (RR 0.70, 95% CI: 0.61, 0.81; 16 RCTs); however, significant heterogeneity was found. Significant reductions in heart failure admission were seen in the subgroup of patients receiving home visiting interventions and the subgroup receiving telephone or mailing interventions (RR 0.62, 95% CI: 0.51, 0.74, and RR 0.70, 95% CI: 0.57, 0.85, respectively; no significant heterogeneity). No significant reduction in heart failure admission was seen for the subgroup of patients receiving interventions delivered in a hospital, clinic or general practice (RR 0.94, 95% CI: 0.78, 1.13).

Mean in-patient days.

There was a statistically significant reduction in the overall mean in-patient days of 1.9 days (95% CI: 0.7, 3.1) for patients receiving multidisciplinary interventions compared with usual care; there was no significant heterogeneity.

Quality of life.

Owing to the diversity of the quality-of-life scales used, data on quality of life were not synthesised or reported. The sensitivity analyses showed that the quality of the studies had little impact on the effectiveness estimates for all-cause admission and all-cause mortality. However, when only low-intensity interventions were combined, the reductions in all-cause admission (RR 0.88, 95% CI: 0.76, 1.01) and all-cause mortality (RR 0.84, 95% CI: 0.66, 1.06) were no longer statistically significant. When studies that included only high-risk heart failure patients were pooled, the reduction in all-cause mortality was no longer statistically significant (RR 0.81, 95% CI: 0.58, 1.15).

The authors reported that funnel plots suggested little evidence of publication bias.

Authors' conclusions

Post-discharge multidisciplinary interventions delivering patient education and symptom self-management for heart failure patients reduced both hospital admission and all-cause mortality. Interventions that were at least partly delivered in the patient's home (through home visits, telephone calls or more advanced televideo techniques) appeared particularly effective.

CRD commentary

The review question and inclusion criteria were clearly stated. The authors searched a range of relevant electronic databases with no language restrictions and attempted to identify unpublished studies, thus reducing the potential for language bias and publication bias. The authors investigated the potential for publication bias and stated that there was little evidence of it. Most of the study selection process was undertaken by two reviewers, thereby reducing the potential for error or bias. However, it appeared that only one reviewer performed the data extraction and quality assessment. The data extraction was performed using a piloted electronic form and the authors of the primary studies were contacted to confirm the extraction. Appropriate criteria were used to assess the validity of the included studies, and over two thirds of the studies met the majority of the quality criteria. The authors assessed statistical heterogeneity and performed sensitivity analyses to investigate potential sources of heterogeneity. This was a well-conducted systematic review and the authors' conclusions are likely to be reliable.
Implications of the review for practice and research

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

Research: The authors stated that the effectiveness of multidisciplinary interventions provided by less specialised nurses or community pharmacists should be assessed, as well as the difference in effectiveness between high- and low-intensity interventions, and the relative cost-effectiveness of different intensity interventions.

Bibliographic details


PubMedID
15958358

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10.1136/hrt.2004.048389

Original Paper URL
http://heart.bmj.com/cgi/content/full/91/7/899

Other publications of related interest

This additional published commentary may also be of interest. Stewart S. Review: multidisciplinary interventions reduce hospital admission and all cause mortality in heart failure. Evid Based Nurs 2006;9:23.

Indexing Status

Subject indexing assigned by NLM

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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.