Pharmacist care of patients with heart failure: a systematic review of randomized trials
Koshman S L, Charrois T L, Simpson S H, McAlister F A, Tsuyuki R T

CRD summary
This review, which evaluated the effect of pharmacist care on patient outcomes in heart failure (HF), concluded that pharmacist care greatly reduces the risk of all-cause and HF hospitalisations. The review was generally well-conducted and the authors' conclusions broadly appropriate, though variation between the included studies make it difficult to determine which patient groups would be most likely to benefit from which type of intervention.

Authors' objectives
To perform a systematic review to evaluate the effect of pharmacist care on patient outcomes in heart failure (HF).

Searching
PubMed, MEDLINE, EMBASE, International Pharmaceutical Abstracts, Web of Science, Scopus, Dissertation Abstracts, CINAHL, Pascal and the Cochrane CENTRAL Register were searched, without language restrictions, from their inception to August 2007; the search terms were reported. In addition, the reference lists of retrieved studies were examined for further relevant studies.

Study selection
Randomised controlled trials (RCTs) that evaluated the impact of pharmacist care (compared with no pharmacist care) on patients with HF and reported the primary outcomes of all-cause hospitalisations, HF hospitalisations and all-cause mortality, were eligible for inclusion. The secondary outcomes included health-related quality of life and medication adherence. Pharmacist interventions were defined as pharmacist-directed care (pharmacist-initiated and directed intervention) or pharmacist collaborative care (member of a multidisciplinary team); these were delivered in a range of settings. The mean age of the participants in the included studies ranged from 58 to 80 years and the outcomes were measured at 6 or 12 months.

Two reviewers independently selected studies for inclusion, with any disagreements resolved by consensus.

Assessment of study quality
RCTs were assessed using the Jadad checklist, which evaluates the studies in terms of randomisation, blinding and withdrawals. The authors did not state how many reviewers performed the validity assessment.

Data extraction
Outcomes from the included studies were extracted according to the intention-to-treat principle. For patients with multiple hospitalisations, only the first hospitalisation was counted. Data were extracted to enable the calculation of odds ratios (ORs) or mean differences, where appropriate. Further details of the intervention were obtained by contacting study authors.

Two reviewers independently extracted the data using a standardised form.

Methods of synthesis
A random-effects model was used to estimate pooled ORs with 95% confidence intervals (CIs) for the primary outcomes. Heterogeneity was assessed using the I² statistic. A priori sensitivity analyses were based on Jadad quality score and comparison of type of pharmacist intervention (pharmacist-directed versus collaborative care). The method described by Tobias et al. to assess the influence of a single study result on the pooled estimate was also used.

Results of the review
A total of 12 RCTs (n=2,060) were included in the review.

Study quality was variable, with Jadad scores ranging from 1 to 3 points for the included RCTs (none were double-
blind). Studies with lower scores (1 or 2) had consistently larger effects than those with higher scores (3).

All-cause mortality (12 RCTs, n=2,060): there was a non significant reduction in mortality for pharmacist care versus control (OR 0.84, 95% CI: 0.61, 1.15; $I^2=19\%$).

All-cause hospitalisation (11 RCTs, n=2,026): there was a significant reduction in all-cause hospitalisation for pharmacist care versus control (OR 0.71, 95% CI: 0.54, 0.94), though the study results were somewhat heterogeneous ($I^2=50\%$).

HF hospitalisation rates (11 RCTs, n=1,977): there was a significant reduction in HF hospitalisation for pharmacist care versus control (OR 0.69, 95% CI: 0.51, 0.94), though there was some heterogeneity among study results ($I^2=40\%$).

Subgroup analyses indicated that pharmacist collaborative care was associated with a greater reduction in risk for HF hospitalisation than pharmacist-directed interventions ($p=0.02$). There were no significant differences between the types of intervention on mortality or all-cause hospitalisation ($p=0.40$ for both).

The results for individual study sensitivity analyses were also reported.

**Authors’ conclusions**
Pharmacist care in the treatment of patients with HF greatly reduces the risk of all-cause and HF hospitalisations.

**CRD commentary**
This appears to be a generally well-conducted review: the authors clearly defined their inclusion and exclusion criteria and made efforts, where necessary, to clarify details with the primary study authors. The studies were identified from searches conducted on a range of electronic databases, with further investigation of bibliographies. The search was not restricted by language, thereby minimising the potential for language bias. The validity of the included studies was assessed according to an established checklist, though it is not entirely clear if the same attempts to minimise error and bias in this process were made in the selection of studies and extraction of data. The included studies were described in adequate detail and were synthesised using appropriate statistical techniques. The authors’ conclusions reflect the main results of the meta-analyses, but it should be noted that the studies included in these meta-analyses were heterogeneous in terms of the interventions being evaluated, the patient populations and the study settings. Therefore, it is not entirely clear which patient group or setting would be most likely to benefit from which form of intervention.

**Implications of the review for practice and research**
Practice: The authors stated that the incorporation of pharmacists into HF care teams should be strongly considered.

Research: The authors did not state any implications for research.

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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.