Efficacy of home-based exercise programmes for people with chronic heart failure: a meta-analysis

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CRD summary
This review assessed the effectiveness of home-based exercise programmes compared with usual medical care in patients with chronic heart failure and concluded that there were short-term benefits. The reliability of the conclusions is unclear due to the unexplained variability and lack of information about the quality of included studies.

Authors’ objectives
To assess the effectiveness of home-based exercise programmes compared with usual medical care in patients with chronic heart failure.

Searching
MEDLINE, CINAHL, The Cochrane Library, DARE and PEDro were searched up to 2008 for English-language papers only. The search terms were provided. Reference lists of retrieved articles were searched.

Study selection
Randomised controlled trials of exercise programmes with a home-based component for people with chronic heart failure were eligible for inclusion. Studies of single exercise sessions and studies that used healthy control groups were excluded.

Exercise programmes in the included studies were entirely home-based and involved an initial period of centre-based exercise training followed by home-based exercise or involved concurrent centre-based and home-based exercise training. All studies used aerobic training and in a small number of studies this was combined with strength training. Duration of the home component ranged from eight to 52 weeks. Total exercise time ranged from 40 to 400 minutes per week. Most participants were male and had New York Heart Association Class II or III symptoms. Mean age was 59 years. Mean left ventricular ejection fraction was 25%. The main outcomes of interest were peak oxygen consumption, exercise duration and distance on the six-minute walk test.

The authors did not state how the papers were selected for the review.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Mean scores and standard deviation (SD) were extracted and the mean difference between control and exercise groups and 95% confidence intervals (CI) calculated. Only first arm data were extracted from crossover trials unless the paper stated that there were no carryover effects or there was evidence of washout. Authors were contacted for missing data where necessary.

The authors did not state how data were extracted for the review.

Methods of synthesis
Studies were pooled using a random-effects model. Heterogeneity was assessed using Cochran's Q statistic (p≤0.05 was considered statistically significant). Where there was statistically significant heterogeneity, a subgroup analysis of studies that used only home-based exercise was undertaken.

Results of the review
Nineteen RCTs were included (n=1,083, range 20 to 181): 15 parallel and four crossover trials. Follow-up appeared to
be at the end of the intervention, which ranged from eight to 52 weeks.

There was a statistically significant improvement in peak oxygen consumption (mean difference 2.86mL/kg per minute, 95% CI 1.43 to 4.29) in the exercise group compared to control (16 RCTs, n=737). There was statistically significant heterogeneity in this analysis. When the subgroup of studies that used home-based exercise only were pooled there was still a benefit for the exercise group, although this was smaller (mean difference 1.50 mL/kg per minute, 95% CI 0.97 to 2.03).

There was a statistically significant improvement in exercise duration (mean difference 1.94 minutes, 95% CI 0.89 to 2.98) in the exercise group compared to control (seven RCTs, n=241). There was statistically significant heterogeneity in this analysis which remained when studies that used home-based exercise only were pooled (effect size not reported).

There was a statistically significant improvement in distance walked on the six-minute walk test (mean difference 30.41 metres, 95% CI 6.13 to 54.68) in the exercise group compared to control (six RCTs, n=628). When the subgroup of studies that used home-based exercise only was pooled there was still a benefit for the exercise group (mean difference 46.46 metres, 95% CI 6.23 to 86.68); there was statistically significant heterogeneity in this analysis.

**Authors' conclusions**

Home-based exercise programmes have been shown to benefit people with heart failure in the short-term. Further research was required to investigate the long-term effects and to determine optimal strategies for improved exercise adherence.

**CRD commentary**

There were clearly stated inclusion criteria and a number of relevant sources were searched for studies. Relevant studies may have been missed due to the language restriction. Another review, with what appeared to be the same inclusion criteria, included studies that only partially overlapped with the included studies in this review (see Other Publications of Related Interest). The quality of the primary studies did not appear to have been assessed and it was unclear whether appropriate processes were used to reduce error and bias in study selection and data extraction. There was evidence of variability in results between studies and this was investigated, although only one source was considered. The reliability of the conclusions is unclear due to the unexplained variability and lack of information about the quality of included studies.

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

**Practice:** The authors stated that because most of the trials were of relatively short duration, it was unclear whether improvements would be sustained over the long term.

**Research:** The authors stated that high-quality research was required that used participants representative of the general chronic heart failure population to compare the cost-effectiveness of home and centre-based exercise programmes and identify the optimal strategies to improve exercise adherence in patients with chronic heart failure.

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