Introduction

Heart failure is the final common stage of various heart diseases and has a significant impact on quality of life and prognosis. With improved short- and long-term survival after myocardial infarction, the prevalence of chronic heart failure has increased (Bleumink et al 2004, Davies et al 2001). Clinical features of heart failure include dyspnoea, fatigue, and reduced exercise tolerance. The severity of symptoms and exercise capacity is commonly defined by New York Heart Association classification, from mild to severe (I to IV). Heart failure is also associated with increased morbidity, mortality, significantly decreased quality of life, and high health care costs (Bennett et al 2003, Gwadry-Sridhar et al 2004).


Most of the studies that have established exercise as an effective part of heart failure management have investigated hospital-based exercise (van Tol et al 2006). With more individuals surviving an initial acute event, heart failure management has switched from crisis to chronic care on an out-patient basis (Riegel et al 2002a, Shah et al 1998, Wheeler and Waterhouse 2006). However, only a small proportion of people with heart failure participate, with one factor underpinning non-participation being lack of access to hospital-based exercise. [Chien CL, Lee CM, Wu YW, Chen TA, Wu YT (2008) Home-based exercise increases exercise capacity but not quality of life in people with chronic heart failure: a systematic review. Australian Journal of Physiotherapy 54: 87–93]

Key words: Exercise, Chronic Heart Failure, Quality of Life

Questions: Does home-based exercise improve exercise capacity and quality of life in people with chronic heart failure? Is it safe?

Design: Systematic review with meta-analysis. Participants: Adults with heart failure > 3 months duration. Intervention: Home-based aerobic exercise with or without resistance exercise. Outcome measures: Exercise capacity (measured at the impairment level by peak VO2 and at the activity level by 6-min Walk Test), quality of life (measured by disease-specific scales), and adverse events (measured as death, hospitalisation). Results: 10 randomised controlled trials with 648 participants of New York Heart Association Class II or III were included. Most participants were male ≥ 50 years old with an ejection fraction ≤ 40%. The exercise programs ranged from 6 weeks to 9 months at low to moderate intensity (40–70% of maximum heart rate or heart rate at 70% peak VO2). Home-based exercise increased 6-min walking distance by 41 m (WMD, 95% CI 19 to 63) and peak VO2 by 2.71 ml/kg/min (WMD, 95% CI 0.67 to 4.74) more than usual activity. It did not improve scores on the Minnesota Heart Failure Questionnaire (WMD 0.5 points out of 105, 95% CI –4.4 to 5.4) or increase the odds of hospitalisation (OR 0.75, 95% CI 0.19 to 2.92) more than usual activity. Conclusions: Home-based exercise increased exercise capacity safely but did not improve quality of life in patients with chronic heart failure. It could therefore be used to improve the management of people with chronic heart failure who do not have access to hospital-based exercise. [Chien CL, Lee CM, Wu YW, Chen TA, Wu YT (2008) Home-based exercise increases exercise capacity but not quality of life in people with chronic heart failure: a systematic review. Australian Journal of Physiotherapy 54: 87–93]
Method

Identification and selection of studies

Searches were conducted of PubMed, MEDLINE, EMBASE, CINAHL, Cochrane Library Register of Controlled Trials, PEDro, Chinese Electronic Periodical Service (CEPS), and MD Consult for studies published between January 1980 and July 2006 using the following keywords and MESH terms: heart failure, chronic heart failure, congestive heart failure, ischaemic cardiomyopathy, cardiac failure, left ventricle failure, cardiac rehabilitation, exercise (training), physical training, aerobic training, activity, physical fitness, exercise tolerance, exercise, quality of life. Searches were limited to full studies in English. (See Appendix 1 on the eAddenda for complete search strategy.) We also hand-searched reference lists of all identified studies and previous systematic reviews from 1980 to 2006, and sought expert advice.

Reviewers (TC and YW) reviewed the trials independently using predetermined criteria. There was no blinding to author, place of publication, or results. To be included, studies had to be randomised controlled trials. Participants were required to be adults with chronic heart failure (ie, duration ≥ 3 months) based on clinical presentation or left ventricular ejection fraction. The home-based exercise could be aerobic exercise with or without resistance exercise of peripheral muscles. Studies of simultaneous supervised exercise and home-based exercise, respiratory muscle training, or training of a single muscle were excluded but studies of home-based followed by supervised hospital-based exercise were included. Studies were required to have at least one of the following outcome measures: exercise capacity (measured at the impairment level by peak VO₂ and at the activity level by a graded exercise test or the 6-min Walk Test), health-related quality of life (measured by disease-specific scales such as the Chronic Heart Failure Questionnaire or Minnesota Heart Failure Questionnaire), and adverse events (measured by all-cause mortality, cardiac death, hospitalisation for heart failure).

Assessment of methodological quality of studies

Quality was assessed with the PEDro Scale (Maher et al 2003). Quality was assessed by reviewers (CC and YW) independently. Disagreements regarding methodological quality were resolved by consensus.

Data analysis

Study outcome data were extracted by one reviewer (TC) and checked by a second reviewer (CC). Authors were contacted to provide additional information when necessary.

For continuous outcomes (peak VO₂, 6-min Walk Test, Chronic or Minnesota Heart Failure Questionnaires), the WMD (95% CI) or SMD (95% CI) of the post-intervention scores were calculated. For dichotomous outcomes (deaths, hospitalisations), OR (95% CI) were calculated. For continuous outcomes (peak VO₂, 6-min Walk Test, Chronic or Minnesota Heart Failure Questionnaires), the WMD (95% CI) or SMD (95% CI) of the post-intervention scores were calculated. For dichotomous outcomes (deaths, hospitalisations), OR (95% CI) were calculated. For continuous outcomes (peak VO₂, 6-min Walk Test, Chronic or Minnesota Heart Failure Questionnaires), the WMD (95% CI) or SMD (95% CI) of the post-intervention scores were calculated. For dichotomous outcomes (deaths, hospitalisations), OR (95% CI) were calculated. For continuous outcomes (peak VO₂, 6-min Walk Test, Chronic or Minnesota Heart Failure Questionnaires), the WMD (95% CI) or SMD (95% CI) of the post-intervention scores were calculated. For dichotomous outcomes (deaths, hospitalisations), OR (95% CI) were calculated. For continuous outcomes (peak VO₂, 6-min Walk Test, Chronic or Minnesota Heart Failure Questionnaires), the WMD (95% CI) or SMD (95% CI) of the post-intervention scores were calculated. For dichotomous outcomes (deaths, hospitalisations), OR (95% CI) were calculated. For continuous outcomes (peak VO₂, 6-min Walk Test, Chronic or Minnesota Heart Failure Questionnaires), the WMD (95% CI) or SMD (95% CI) of the post-intervention scores were calculated. For dichotomous outcomes (deaths, hospitalisations), OR (95% CI) were calculated. For continuous outcomes (peak VO₂, 6-min Walk Test, Chronic or Minnesota Heart Failure Questionnaires), the WMD (95% CI) or SMD (95% CI) of the post-intervention scores were calculated. For dichotomous outcomes (deaths, hospitalisations), OR (95% CI) were calculated. For continuous outcomes (peak VO₂, 6-min Walk Test, Chronic or Minnesota Heart Failure Questionnaires), the WMD (95% CI) or SMD (95% CI) of the post-intervention scores were calculated. For dichotomous outcomes (deaths, hospitalisations), OR (95% CI) were calculated. For continuous outcomes (peak VO₂, 6-min Walk Test, Chronic or Minnesota Heart Failure Questionnaires), the WMD (95% CI) or SMD (95% CI) of the post-intervention scores were calculated. For dichotomous outcomes (deaths, hospitalisations), OR (95% CI) were calculated. For continuous outcomes (peak VO₂, 6-min Walk Test, Chronic or Minnesota Heart Failure Questionnaires), the WMD (95% CI) or SMD (95% CI) of the post-intervention scores were calculated. For dichotomous outcomes (deaths, hospitalisations), OR (95% CI) were calculated. For continuous outcomes (peak VO₂, 6-min Walk Test, Chronic or Minnesota Heart Failure Questionnaires), the WMD (95% CI) or SMD (95% CI) of the post-intervention scores were calculated. For dichotomous outcomes (deaths, hospitalisations), OR (95% CI) were calculated. For continuous outcomes (peak VO₂, 6-min Walk Test, Chronic or Minnesota Heart Failure Questionnaires), the WMD (95% CI) or SMD (95% CI) of the post-intervention scores were calculated. For dichotomous outcomes (deaths, hospitalisations), OR (95% CI) were calculated.

For each outcome, a test of heterogeneity was carried out. In case of significant heterogeneity, a random effect meta-analysis was used without aggregating the studies was applied. Fixed effect meta-analysis was used if no significant heterogeneity was detected. All p values < 0.05 were considered significant. The analyses were performed using RevMan.

Results

Identification and selection of studies

We identified 81 studies from the search strategy. After initial screening, 71 potentially-relevant articles met the inclusion criteria. After exclusion of non-RCT studies, 17 articles met the inclusion criteria (Adamopoulos et al 2001, Corvera-Tindel et al 2004, de Mello Franco et al 2006, Evangelista et al 2006, Gary et al 2004, Gielen et al 2005, Hambrecht et al 2000, Harris et al 2003, Kiilavuori et al 2000, Linke et al 2005, McKelvie et al 2002, Niebauer et al 2005, Oka et al 2000, Oka et al 2005, Sabelis et al 2004, Smart et al 2005, Witham et al 2005). Three studies were excluded due to: lack of randomisation (Smart et al 2005), simultaneous supervised and home-based exercise (Sabelis et al 2004), or participant overlap with another study (Oka et al 2005). Also, two studies with randomised cross-over design with incomplete data (Adamopoulos et al 2001, Niebauer et al 2005) and two studies without post-test data (de Mello Franco et al 2006, Kiilavuori et al 2000) were unable to be included in the analysis. Therefore, 10 studies with 648 participants were subsequently analysed (Figure 1). Among them, three studies (Gielen et al 2005, Hambrecht et
Table 1. Summary of included studies.

<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Intervention</th>
<th>Home visit</th>
<th>Outcome measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corvera-Tindel et al (2004)</td>
<td>Incl = HF secondary to IHD and non-IHD, NYHA II–IV, EF 24.7–29.1%, n = Exp 42 (42 male), Con 37 (36 male), Age = 61–63 yr</td>
<td>Exp = 12-week home walking exercise with intensity at 40–65% max HR, 60 min/day, 5 days/week, Con = usual activity</td>
<td>Yes First 6-week: once per week Last 6-week: biweekly</td>
<td>Peak VO$_2$, 6-min Walk Test</td>
</tr>
<tr>
<td>Evangelista et al (2006)</td>
<td>Incl = Advanced HF, BMI $\geq$ 27 kg/m$^2$, NYHA II–IV, EF $\leq$ 40%, n = Exp 48 (37 male), Con 51 (34 male), Age = 53–55 yr</td>
<td>Exp = 6-month home walking program with intensity at 60% max HR, 45 min, combined with resistance exercise, $\geq$ 4 times/week, Con = usual activity</td>
<td>Yes Once per month</td>
<td>Peak VO$_2$, 6-min Walk Test</td>
</tr>
<tr>
<td>Gary et al (2004)</td>
<td>Incl = HF secondary to IHD and non-IHD, NYHA II–III, EF 54–57%, n = Exp 15 (0 male), Con 13 (0 male), Age = 67–69 yr</td>
<td>Exp = 12-week home walking program with intensity at 40–60% max HR, 40 min/day, 3 days/week, 12 weekly home visit with education program, Con = 12 weekly home visits with education program only</td>
<td>Yes 12 weekly home visit</td>
<td>6-min Walk Test QOL (MHFQ)</td>
</tr>
<tr>
<td>Gielen et al (2005)</td>
<td>Incl = HF secondary to DCM and IHD, NYHA II–III, EF 24.7–26.1%, n = Exp 10 (10 male), Con 10 (10 male), Age = 67–69 yr</td>
<td>Exp = 2-week in-patient exercise first and then 6-month home exercise with bicycle ergometer (HR at 70% VO$_2$), and at least one group training session of 60 min/week, Con = usual activity</td>
<td>No</td>
<td>Peak VO$_2$</td>
</tr>
<tr>
<td>Hambrecht et al (2000)</td>
<td>Incl = HF secondary to DCM and IHD, NYHA II–III, EF 28.3–32%, n = Exp 24 (21 male), Con 22 (17 male), Age = 54 yr</td>
<td>Exp = 2-week in-hospital first and then 6-month home-based bicycle ergometer exercise with intensity at 70% VO$_2$, 20 min/day for 6 months, and at least one group session of 60 min/week, Con = usual activity</td>
<td>No</td>
<td>Peak VO$_2$</td>
</tr>
<tr>
<td>Harris et al (2003)</td>
<td>Incl = HF secondary to DCM and IHD, NYHA II–III, EF 28.3–32%, n = Exp 24 (21 male), Con 22 (17 male), Age = 54 yr</td>
<td>Exp = 6-week home bicycle exercise with intensity at 70% max HR, 30 minutes/day, 5 days/week, Con = functional electrical stimulator, no specific exercise</td>
<td>No</td>
<td>Peak VO$_2$, 6-min Walk Test QOL (MHFQ)</td>
</tr>
<tr>
<td>Linke et al (2005)</td>
<td>Incl = HF secondary to DCM and IHD, NYHA II–III, EF 28.3–32%, n = Exp 12 (12 male), Con 11 (11 male), Age = 61–63 yr</td>
<td>Exp = 2-week in-hospital first and then 6-month home bicycle exercise with intensity at HR at 70% VO$_2$, 20 min/day and at least one group session of 60 min/week, Con = usual activity</td>
<td>No</td>
<td>Peak VO$_2$</td>
</tr>
<tr>
<td>McKlevie et al (2002)</td>
<td>Incl = Mixed HF, NYHA I–III, EF $&lt; 40%$, n = Exp 90 (82% male), Con 91 (80% male), Age = 64–68 yr</td>
<td>Exp = 3-month supervised first and then 9-month home-based exercise (aerobic ergometer + free weight weights strengthening) with intensity at 60–70% peak HR, 3 times/week, Con = usual activity</td>
<td>Yes All participants reviewed monthly throughout the study</td>
<td>Peak VO$_2$, 6-min Walk Test QOL (MHFQ)</td>
</tr>
<tr>
<td>Oka et al (2000)</td>
<td>Incl = Mixed HF, NYHA II–III, EF 22.3–24.9%, n = Exp 20 (17 male), Con 20 (14 male), Age = unknown</td>
<td>Exp = 12-week aerobic walking (70% max HR), 40–60 min/day, 3 days/week, Resistance training = 75% 1RM, 30–40 min/day, 2 days/week, Con = usual care</td>
<td>Weekly phone call</td>
<td>Peak VO$_2$, QOL (CHFQ)</td>
</tr>
<tr>
<td>Witham et al (2005)</td>
<td>Incl = Mixed HF, NYHA II–III, EF 12–15%, n = Exp 36 (26 male), Con 32 (19 male), Age = 80–81 yr</td>
<td>Exp = 3-month supervised exercise first and then 3-month home exercise, 2–3 times/week with video or audio aid, Con = usual care</td>
<td>Weekly phone call</td>
<td>6-min Walk Test QOL (CHFQ)</td>
</tr>
</tbody>
</table>

HF = heart failure, IHD = ischaemic heart disease, NYHA = New York Heart Association (Functional Class I–IV), EF = ejection fraction, n = number of participants randomised, Exp = exercise group; Con = control group, BMI = body mass index, DCM = dilated cardiomyopathy, RM = repetition maximum, QOL = quality of life, MHFQ = Minnesota Heart Failure Questionnaire, CHFQ = Chronic Heart Failure Questionnaire

Description of studies

The studies included adults ≥ 50 years with ischaemic heart disease or dilated cardiomyopathy of either primary or secondary origin, with clinically-stable heart failure symptoms, a New York Heart Association functional class II or III, and an ejection fraction ≤ 40%. Participants were predominantly men with the exception of one study that recruited only women (Gary et al. 2004). The duration of home-based exercise ranged from 6 weeks to 9 months. All programs included aerobic exercise (walking or cycling), some in combination with resistance exercise. Most studies were of exercise at a low to moderate intensity: 40–70% of maximum heart rate (HR) or 70% peak VO₂. The control groups maintained usual activity or usual care during the study period with one exception (Harris et al. 2003) where the control group carried out home-based electrical stimulation (Table 1). The 10 studies used in the analysis had a mean adherence to exercise of over 60% although Oka et al. (2000) reported that adherence slowly declined over the intervention period. All included studies scored over 4 (out of 10) on the PEDro scale (Table 2).

Effect of home-based exercise

The effect of home-based exercise on peak VO₂ was examined by pooling post-intervention data from 7 studies with 355 participants using a random effects model. Home-based exercise increased peak VO₂ by 2.7 ml/kg/min (95% CI 0.7 to 4.7) more than usual activity (Figure 2, see also Figure 3 on the eAddenda for detailed forest plot).

The effect of home-based exercise on 6-min Walk Test was examined by pooling post-intervention data from 5 studies with 320 participants using a fixed effects model. Home-based exercise increased 6-min Walk Test distance by 41 m (95% CI 19 to 63) more than usual activity (Figure 4, see also Figure 5 on the eAddenda for detailed forest plot).

The effect of home-based exercise on quality of life was examined by pooling post-intervention data from three studies using the Minnesota Heart Failure Questionnaire with 198 participants. Home-based exercise did not improve quality of life (WMD 0.5 points out of 105, 95% CI –4.4 to 5.4) more than usual activity (Figure 6, see also Figure 7 on the eAddenda for detailed forest plot). Another two studies that measured quality of life with Chronic Heart Failure Questionnaire were not included in the analysis due to the variability in domains studied (Oka et al. 2000, Witham et al. 2005). Only one of these studies reported significant improvement in quality of life after training.

Safety of home-based exercise

Adverse events were examined by pooling hospitalisation due to cardiac events from two studies with 143 participants. Home-based exercise did not increase the odds of hospitalisation (OR 0.75, 95% CI 0.19 to 2.92) more than usual activity (Figure 8, see also Figure 9 on the eAddenda for detailed forest plot). Some studies indicated that death caused some dropouts (Corvera-Tindel et al. 2004, Hambrecht et al. 2000, Witham et al. 2005), however, none of them reported that the cardiac events were directly related to exercise.

Table 2. PEDro scores for included studies (n = 10).

<table>
<thead>
<tr>
<th>Study</th>
<th>Random allocation</th>
<th>Concealed allocation</th>
<th>Point estimate</th>
<th>Variability</th>
<th>Between-group difference reported</th>
<th>Therapist blinding</th>
<th>Assessor blinding</th>
<th>Groups similar at baseline</th>
<th>Participant blinding</th>
<th>Groups at baseline similar</th>
<th>Analysis</th>
<th>Dropouts</th>
<th>Intention-to-treat analysis</th>
<th>PEDro score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corvera-Tindel et al. (2004)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Intent-to-treat analysis</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evangelista et al. (2006)</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Intention to treat analysis</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gary et al. (2004)</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Analysis</td>
<td>&lt; 15%</td>
<td>Y</td>
<td>5</td>
</tr>
<tr>
<td>Gielen et al. (2005)</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Analysis</td>
<td>4 to 10</td>
<td>N</td>
<td>4</td>
</tr>
<tr>
<td>Hambrecht (2000)</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Analysis</td>
<td>&lt; 15%</td>
<td>Y</td>
<td>6</td>
</tr>
<tr>
<td>Harris et al. (2003)</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Analysis</td>
<td>&lt; 15%</td>
<td>Y</td>
<td>6</td>
</tr>
<tr>
<td>Linke et al (2005)</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Analysis</td>
<td>&lt; 15%</td>
<td>Y</td>
<td>5</td>
</tr>
<tr>
<td>McKelvie et al. (2002)</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Analysis</td>
<td>&lt; 15%</td>
<td>Y</td>
<td>7</td>
</tr>
<tr>
<td>Oka et al (2000)</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Analysis</td>
<td>&lt; 15%</td>
<td>Y</td>
<td>5</td>
</tr>
<tr>
<td>Witham et al (2005)</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Analysis</td>
<td>&lt; 15%</td>
<td>Y</td>
<td>7</td>
</tr>
</tbody>
</table>
Discussion

Meta-analysis of the data in this systematic review has confirmed that home-based exercise has significant benefits in chronic heart failure in terms of exercise capacity at both the impairment and the activity level. The effect on quality of life was based on only three studies and no significant effect was demonstrated. Of note, home-based exercise has no direct and deleterious effect and can therefore be used safely in people with chronic heart failure.

The increase of 2.71 ml/kg/min in peak oxygen consumption after home-based exercise compared with usual activity was comparable to hospital-based exercise previously reported by Rees and colleagues (2004) (WMD 2.16 ml/kg/min, 95% CI 1.49 to 2.82) and by van Tol and colleagues (2006) (WMD 2.06 ml/kg/min, 95% CI 0.42 to 0.79). The increase of 41 m in the 6-min Walk Test after home-based exercise compared with usual activity is clinically significant since it is more than the minimum clinically-worthwhile difference of 30 m proposed by Guyatt et al (1984). Also, the magnitude of the effect was comparable to hospital-based exercise previously reported by Rees et al (2004) (WMD 41 m, 95% CI 17 to 65), and by van Tol et al (2006) (WMD 46 m, 95% CI 0.36 to 0.69).

van Tol et al (2006) reported that the Minnesota Heart Failure Questionnaire score improved by 10 points out of 105 after exercise which is more than the minimum clinically-worthwhile difference of 5 points proposed by Riegel et al (2002b). Westlake et al (2002) reported that quality of life was correlated with New York Heart Association class and 6-min Walk Test in people with heart failure. It was therefore unexpected that no benefit in terms of quality of life was observed in our meta-analysis even though 6-min Walk Test and peak oxygen consumption improved significantly. However, only one study (Gary et al 2004) contributed meta-analysable data to both exercise capacity and quality of life.

It has been reported that quality of life is better maintained in adherent compared to non-adherent people with heart failure (Smart et al 2005). Previous investigations found that adherence to home-based exercise by people with heart failure was not comparable to supervised exercise and thus may not induce an equivalent training effect (de Mello Franco et al 2006, McKelvie et al 2002). Three of the studies included in our meta-analysis (Corvera-Tindel et al 2004, Hambrecht et al 2000, Oka et al 2000) reported that initial adherence of 60–70% declined progressively during the home-based exercise. Non-adherence could therefore be the cause of less improvement in quality of life with home-based program. Development of strategies to improve exercise adherence and to reduce barriers to home exercise in people with heart failure should be investigated as a possible means to increase the effectiveness of home-based exercise on quality of life.

People with heart failure are at higher risk of cardiac events (Corvera-Tindel et al 2004, Hambrecht et al 2000). Our systematic review found no increase in hospitalisation due to cardiac events. However, most studies included in the meta-analysis were not principally designed to assess safety and data were scarce. Not enough information exists to identify high-risk people who were more likely to
experience cardiac events (Nishi et al 2007). Further studies on safety are needed.

Our conclusions are constrained by the low to moderate exercise intensity adopted in these studies, by the vast majority of participants in these trials being clinically stable (NYHA class II or III), and by people with severe co-morbidities often being excluded. Such features are not typical of the demographic profile in population-based studies of people with heart failure. Most studies did not report systolic function of the left ventricle or quality of life as outcomes. Where quality of life was measured, several tools were used. It is difficult to compare the results of different quality of life evaluation tools, thus we limited the meta-analysis to Minnesota Heart Failure Questionnaire. Other possible confounders were variability in number of home visits and prior experience of hospital-based exercise that might have influenced adherence to home-based exercise.

In conclusion, home-based exercise had a significant benefit on exercise capacity (6-min Walk Test and peak VO2) but did not affect on quality of life in people with chronic heart failure. It did not adversely affect hospitalisations due to cardiac events suggesting it is safe. Home-based exercise may improve management for people with heart failure especially for those who have limited access to hospital-based programs.

eAddenda: Figures 3, 5, 7, and 9, and Appendix I available at www.physiotherapy.asn.au


Acknowledgements: We thank Dr Jau-Yih Tsauo for her statistical consultation and assistance.

Correspondence: Ying-Tai Wu, School and Graduate of Physical Therapy, College of Medicine, National Taiwan University, Floor 3, No.17, Xuzhou Rd, Zhongzheng District, Taipei City 10020, Taipei, Taiwan. Email: ytw@ntu.edu.tw

References


special attention to older women with heart failure. *Journal of Cardiac Failure* 10: 165–173.


