

# Review: exercise based cardiac rehabilitation reduces all cause and cardiac mortality in coronary heart disease

Taylor RS, Brown A, Ebrahim S, *et al.* Exercise-based rehabilitation for patients with coronary heart disease: systematic review and meta-analysis of randomized controlled trials. *Am J Med* 2004;116:682–92.

Clinical impact ratings GP/FP/Primary care ★★★★★☆☆ IM/Ambulatory care ★★★★★☆☆ Cardiology ★★★★★☆☆

## Q Is exercise based cardiac rehabilitation effective in patients with coronary heart disease (CHD)?

### METHODS

**Data sources:** previously published systematic reviews and meta-analyses; Medline, EMBASE/Excerpta Medica, CINAHL, and SciSearch (to March 2003); the Cochrane Library; specialised rehabilitation databases; health technology assessment web sites; clinical trial registries; bibliographies of selected articles; and contact with experts and agencies.

**Study selection and assessment:** randomised controlled trials (RCTs) comparing exercise based cardiac rehabilitation (alone or combined with psychosocial or educational interventions) with usual care that did not include any form of structured exercise training or advice in patients with CHD and had ≥6 month follow up. Study quality was assessed in terms of the method of randomisation, allocation concealment, blinding of outcome assessment, and loss to follow up.

**Outcomes:** all cause mortality, cardiac mortality, non-fatal myocardial infarction (MI), revascularisation, change from baseline in modifiable cardiac risk factors (lipid concentrations, triglyceride concentrations, blood pressure, and smoking), and health related quality of life (HRQOL).

### MAIN RESULTS

48 RCTs (8940 patients, mean age 55 y) met the inclusion criteria. The median intervention duration was 3 months (range 0.25–30 mo) and the median follow up was 15 months (range 6–72 mo). Patients who received exercise based cardiac rehabilitation had less all cause and cardiac mortality than did patients who received usual care (table). Groups did not differ for rates of non-fatal MI (odds ratio [OR] 0.79, 95% CI 0.59 to 1.09), coronary artery bypass grafting (OR 0.87, CI 0.65 to 1.06), or percutaneous coronary intervention (OR 0.81, CI 0.49 to 1.34). Cardiac rehabilitation was associated with reductions in total cholesterol and triglyceride concentrations (table); no differences were seen in low or high density lipoprotein concentrations. Systolic blood pressure and patient reported smoking were also reduced with cardiac rehabilitation. HRQOL was assessed in 12 RCTs: all trials showed an improvement in HRQOL in both cardiac rehabilitation and usual care groups, with greater improvement with cardiac rehabilitation seen in only 2 RCTs.

### CONCLUSION

In patients with coronary heart disease, exercise based cardiac rehabilitation reduces all cause and cardiac mortality and improves a number of cardiac risk factors.

Abstract and commentary also appear in *ACP Journal Club*.

Commentary appears on facing page.

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Exercise-based cardiac rehabilitation v usual care in coronary heart disease at mean 15 months\*

Outcomes	Number of trials (number of patients)	Odds ratio (95% CI)	RRR (CI)	NNT (CI)
All cause mortality†	33 (8432)	0.80 (0.68 to 0.93)	19% (6.4 to 30)	59 (37 to 170)
Cardiac mortality†	16 (5371)	0.74 (0.61 to 0.90)	24% (9.1 to 37)	42 (28 to 110)
Patient reported smoking†	13 (1734)	0.64 (0.50 to 0.83)	31% (14 to 44)	16 (11 to 35)
<b>Weighted mean difference (CI)</b>				
Total cholesterol‡	17	-0.37 (-0.63 to -0.11)		
Triglycerides‡	13	-0.23 (-0.39 to -0.07)		
Systolic blood pressure‡	8	-3.19 (-5.44 to -0.95)		

\*Abbreviations defined in glossary; RRR, NNT, and CI calculated from odds ratios and control event rates in article.

†A fixed effects model was used.

‡A random effects model was used.