How much do the benefits cost? Effects of a home-based training programme on cardiovascular fitness, quality of life, programme cost and adherence for patients with coronary disease

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
This study evaluated the costs and effectiveness of a personalised exercise programme, for cardiac rehabilitation at home, for low-risk patients with coronary disease. The authors concluded that their findings suggested that the programme was beneficial to these patients at a low cost. The study was generally well reported, but the use of within-group rather than between-group statistical analysis means that the conclusions may not be justifiable.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study evaluated the costs, adherence, effects, and quality of life of a home-based cardiac rehabilitation programme for low-risk patients with coronary disease.

Interventions
A personalised exercise programme for cardiac rehabilitation at home was compared with standard care. The programme consisted of two exercise classes, followed by thrice weekly exercise. The two classes consisted of 10 minutes of walking and stretching to warm-up, 40 minutes of aerobic walking, and 10 minutes of walking to cool down. The regular exercise was personally prescribed based on the two exercise classes to achieve target intensities of between 60% and 80% of peak heart rate. Patients were telephoned every two weeks by the doctor to monitor their progress, and they and their exercise logs were reviewed monthly by a doctor.

With standard care, patients were encouraged to improve their physical activity, with no active intervention.

Location/setting
Brazil/public health.

Methods
Analytical approach:
The economic evaluation was conducted as part of a randomised controlled trial of 39 patients. Outcomes were assessed at the start, and at three months. The authors did not report the study perspective.

Effectiveness data:
The data were from the trial, which recruited patients from August 2003 to June 2005. Strict inclusion and exclusion criteria were defined. A total of 220 patients were evaluated, 141 agreed to participate, and 39 met the inclusion criteria; 19 were randomised to the intervention and 20 to usual care. Randomisation was by sealed opaque envelope, opened after consent and initial data were obtained. Blinding was not undertaken. Several cardiovascular outcomes were reported: peak heart rate, heart rate reserve, rate-pressure product, ventilatory threshold, peak volume of oxygen, peak oxygen pulse, peak expiratory exchange ratio, work rate, and treadmill exercise time. Quality of life was measured using the SF-36 health survey. Adherence was measured using exercise logbooks.

Monetary benefit and utility valuations:
Not relevant.
Measure of benefit:
A summary measure of benefit was not derived; the effectiveness outcomes were the measures of benefit.

Cost data:
It was assumed that standard care incurred no cost, so the costs were only collected for the exercise programme. A detailed breakdown of the costs was given. The categories included the initial evaluation, exercise prescription, and follow-up. Initial evaluation included the doctor visit, with electrocardiogram, blood lipid profile, glucose level, cardiopulmonary exercise test, chest X-ray and echocardiogram. Exercise prescription included two sessions without electrocardiogram monitoring. Follow-up was three doctor visits, each with electrocardiogram and a cardiopulmonary exercise test. The programme costs were from Brazilian government sources, reported in US $.

Analysis of uncertainty:
The effectiveness outcomes for each group were compared with initial values in the same group, and assessed for statistical significance.

Results
After three months, the intervention group demonstrated significant improvement in peak volume of oxygen, peak heart rate, heart rate reserve, work rate and treadmill exercise time (p<0.05), and a positive effect on blood pressure, with a decrease in resting systolic blood pressure (p<0.05). This group also had significant improvements in all domains of the SF-36 compared with initial values. Adherence to the intervention was high, with patients averaging 2.8 exercise sessions per week.

The usual care group had improvement in three out of eight SF-36 domains, compared with the start, including emotional, mental health and social functioning.

The total average cost per patient with the exercise programme was $502.71 over three months.

Authors’ conclusions
The authors concluded that their findings suggested that a home-based training programme was beneficial to low-risk patients, at a low cost.

CRD commentary
Interventions:
The interventions were well defined and included standard care.

Effectiveness/benefits:
As acknowledged by the authors, the trial excluded many patients and had a highly restricted population. This will limit the generalisability of the results. It was unclear whether the programme was feasible for a wider, less restrictive, population. The effectiveness measures were reported with good detail. The initial patient characteristics were compared and were shown not to be statically different, but exercise performance and SF-36 scores were not considered and these appear to have differed between the two groups.

Costs:
The costs were clearly reported, but they did not include the resource use or costs outside of the intervention protocol, such as the additional health care use by intervention or control patients. It is likely that the cost for treating control patients was more than zero, and that there were health care costs for intervention patients. The study perspective was not stated, but appears to have been that of the Brazilian health service. The price year was not stated, which limits the generalisability of the study.

Analysis and results:
As the effectiveness of the interventions was judged on the mean change from the start (a within-group analysis) and not compared between the interventions (a between-group comparison) the conclusions may not be justified. Randomised groups should be compared using two-sample methods, and separate tests against the start can be highly misleading. The authors highlighted and discussed some limitations, including a lack of women in their analysis. The analysis was small and short; the authors stated that 30% to 40% of patients drop out of exercise programmes within six
months, and 50% drop out within a year, but these patients were only followed-up for three months.

**Concluding remarks:**
The study was generally well reported, but the use of within-group rather than between-group statistical analysis means that the conclusions may not be justifiable.

**Funding**
Not stated.

**Bibliographic details**

**PubMedID**
18955430

**DOI**
10.1177/0269215508093331

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Analysis of Variance; Brazil; Coronary Disease /economics /rehabilitation; Cost-Benefit Analysis /economics; Exercise Therapy /methods; Female; Heart Rate /physiology; Home Care Services, Hospital-Based /organization & administration; Hospitals, University; Humans; Male; Middle Aged; Oxygen Consumption; Patient Compliance; Physical Fitness; Prospective Studies; Quality of Life; Reproducibility of Results; Risk; Treatment Outcome

**AccessionNumber**
22009100068

**Date bibliographic record published**
24/06/2009

**Date abstract record published**
04/03/2014