The Birmingham rehabilitation uptake maximisation study (BRUM): a randomised controlled trial comparing home-based with centre-based cardiac rehabilitation

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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 examined the cost-effectiveness of home-based versus centre-based cardiac rehabilitation after myocardial infarction or coronary revascularisation. The authors concluded that the home-based rehabilitation service was as effective and expensive as the traditional centre-based programme in the UK. The study was well conducted and was generally well reported. The authors’ conclusions appear to be valid.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study examined the cost-effectiveness of home-based versus centre-based cardiac rehabilitation after myocardial infarction or coronary revascularisation such as percutaneous transluminal coronary angioplasty or coronary artery bypass graft.

Interventions
The rehabilitation programme was delivered either at home or in the hospital. In both settings, it included exercise, relaxation, education, and lifestyle counselling. The home-based programme consisted of a manual, three home visits, and telephone contact at three weeks, while the centre-based programme differed according to the centre providing the programme.

Location/setting
UK/hospital and community.

Methods
Analytical approach:
This economic evaluation was based on data from a single study and had a time horizon of one year. The authors stated that the perspectives of both the UK National Health Service (NHS) and society were adopted.

Effectiveness data:
The clinical evidence came from a prospective, randomised controlled trial (RCT), which was carried out at four hospitals in the West Midlands (England). The study enrolled 525 patients, with 263 in the home-based group and 262 in the centre-based group. The length of follow-up was one year and outcomes were assessed by a nurse, who was blind to treatment allocation. A number of cardiac risk factors were considered as the primary endpoints. These included serum cholesterol, blood pressure, distance walked on the incremental shuttle walking test (ISWT), psychological morbidity assessed by the Hospital Anxiety and Depression Scale, and smoking cessation assessed by urinary nicotine metabolites. Other secondary outcomes were also reported. The potential impact of baseline differences was taken into account in a statistical analysis.

Monetary benefit and utility valuations:
The utility valuations associated with health-related quality of life were estimated using the European Quality of life (EQ-5D) questionnaire in the RCT. The data were collected at baseline, and six-month and one-year follow-ups.

Measure of benefit:
Health outcomes were left disaggregated and no summary benefit measure was used. The primary clinical outcomes were serum cholesterol, blood pressure, distance walked on the ISWT, psychological morbidity, smoking cessation assessed by urinary nicotine metabolites, and EQ-5D scores.

Cost data:
The economic analysis included the costs of staff, primary care and home visits, telephone contacts, hospital services, cardiac-related hospitalisations, drugs for secondary prevention, drug use, travel expenses, and patients’ time. The resource use data were based on the actual consumption of these items in the sample of patients enrolled in the RCT. The estimated cost of patients’ travel to the hospital was added to total NHS costs to achieve societal costs. Personnel costs were estimated using Personal Social Services Research Unit data. Travel costs were based on the NHS costs and Automobile Association rates for patients. The sources of other costs were not explicitly reported. All costs were in UK pounds sterling (£) and the price year was not explicitly reported.

Analysis of uncertainty:
In the base case analysis, missing values were replaced using a random approach and, in an alternative scenario, these data were assumed to be “missing, not at random” using regression analysis. In another scenario, changes in the service organisation were considered. Mean changes in costs and in EQ-5D scores in each arm of the trial were bootstrapped to generate confidence interval (CI)s.

Results
The clinical outcomes were not statistically different between groups. For instance, the mean difference in systolic blood pressure was 1.37 (95% CI: -2.27 to 5.01). The difference in smoking prevalence was 2% (95% CI: -5.3 to 9.3). This lack of statistical significance persisted even when the clinical estimates were adjusted by baseline characteristics. In general, the clinical outcomes improved significantly within each group from baseline to one-year follow-up. The change in EQ-5D was slightly higher in the centre-based group but this difference was not statistically significant.

From the NHS perspective, the mean total costs per patient were £157 (95% CI: 139 to 175) in the hospital group and £198 (95% CI: 189 to 208) in the home group. This difference was statistically significant. From the societal perspective, however, the difference was not statistically significant; the per patient cost was £896 (95% CI: 745 to 1,047) in the hospital group and £807 (95% CI: 684 to 930) in the home group.

Cost differences were sensitive to variations in how the service was organised. For example, if telephone consultations replaced all nurse visits in the home arm, home-based rehabilitation was less expensive.

Authors’ conclusions
The authors concluded that the home-based rehabilitation service was as effective and expensive as the traditional centre-based programme in the UK.

CRD commentary
Interventions:
The selection of the comparators was appropriate in that the two settings available for the rehabilitation programme were considered. A clear description of the two programmes was provided.

Effectiveness/benefits:
The use of a RCT as the source of clinical evidence was appropriate given the strengths of its design. In the RCT, power calculations were performed to justify the sample size and the clinical endpoints were analysed using the intention-to-treat principle. The study groups were well balanced at baseline with respect to their clinical and demographic characteristics. Details on the flow of patients through the study (initial exclusion, lost to follow-up, reasons for refusal, etc.) were described and some form of blinding was performed. In general, these characteristics tend to enhance the internal validity of the clinical analysis. The authors considered a disease-specific clinical endpoint as well as a generic measure of the impact of the programmes on quality of life (i.e. the EQ-5D).

Costs:
The analysis of costs was consistent with the stated perspectives. The selection of two different viewpoints makes the
findings relevant for different payers and highlights the importance of including the cost of time spent attending sessions. In general, little information on the sources of costs and few details such as the price year and unit costs were reported, but further data were available in an online appendix. Confidence intervals around the cost estimates were appropriately reported to show the variation around these estimates. Some forms of overlapping were observed, especially from the perspective of the society.

Analysis and results:
The results were clearly reported, but no attempt to calculate a cost-effectiveness ratio was made. Therefore, in effect, a cost-consequences analysis was performed. The sensitivity analysis was restricted to the assessment of specific aspects of uncertainty. The authors compared their results with those of other published clinical trials, which had similar findings. The authors acknowledged some limitations of their study such as the heterogeneity among centres that participated in the trial and the lack of power to perform some subgroup analyses.

Concluding remarks:
The study was well conducted and was generally well reported. The authors’ conclusions appear to be valid.

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