Long-term outcomes and costs of an integrated rehabilitation program for chronic knee pain: a pragmatic, cluster randomized, controlled trial

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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 investigated the long-term cost-effectiveness of a rehabilitation programme, combining self-management with exercise, for patients with chronic knee pain. The authors concluded that the relatively brief knee pain programme could produce sustained clinical benefit and cost savings, and would not be difficult to implement. The study was generally well reported, handled missing data well, and its methods were sound. The authors’ conclusions appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study investigated the long-term cost-effectiveness of a rehabilitation programme, combining self-management with exercise, for patients with chronic knee pain.

Interventions
Usual care was compared with the Enabling Self-management and Coping with Arthritic Knee Pain through Exercise (ESCAPE) knee pain programme. Usual care included whatever services or interventions that the physician considered were appropriate.

Patients in the ESCAPE knee pain programme received usual care and were invited to attend twice weekly supervised individual or small-group sessions, for six weeks. In these sessions, coping strategies for knee pain were addressed and individualised exercise programmes were performed, under the supervision of an experienced physiotherapist. After six weeks, these patients were discharged and encouraged to exercise at home.

Location/setting
UK/primary care.

Methods
Analytical approach:
The cost-effectiveness analysis was based on one clinical study, with results from a follow-up at 30 months. The time horizon of the analysis was 30 months. The authors stated that perspectives of the health and social care payer, and society were adopted.

Effectiveness data:
The key clinical data were the change in the Western Ontario and McMaster University (WOMAC) Osteoarthritis Index, from baseline. The outcomes were assessed at baseline, six weeks, six months, 18 months, and 30 months. These data were from the ESCAPE knee pain cluster-randomised controlled trial, which included 54 primary care surgeries in Southeast London. The surgeries were randomised by an external research centre by personnel not involved in the trial; 178 patients received usual care, and 278 received the ESCAPE knee pain programme. The outcome assessors were blinded to allocation. Multi-level statistical modelling was used to estimate the group means and outcome effects. All of the models were adjusted for the patients' baseline WOMAC Osteoarthritis Index function scores.

Monetary benefit and utility valuations:
Measure of benefit:
The measure of benefit was the number of patients who experienced an improvement in their WOMAC Osteoarthritis Index of 15% or more. Benefits were discounted at an annual rate of 3.5%.

Cost data:
The costs included those of knee pain medications, knee pain social care services used in hospital and community settings, and the ESCAPE knee pain programme. The programme costs included personnel, equipment, and overheads. The resource data were measured retrospectively, for the six months prior to the baseline assessment, and in between assessments, using an adapted Client Services Receipt Inventory. The mean differences between the treatment groups, with 95% confidence intervals, were estimated using linear regression, with cluster adjustments and a covariate for the baseline costs. Nonparametric bootstrapping was used to account for the non-normal distribution of cost data. The costs were discounted at 3.5% annually, and reported in 2003 to 2004 UK £.

Analysis of uncertainty:
The authors reported two sensitivity analyses. The first investigated the effect of removing outliers (patients with a cost of three or more z-scores away from the mean). The second imputed missing cost data using multiple imputation predicted by intervention, age, gender, baseline WOMAC Osteoarthritis Index function score, and baseline costs. Bootstrapped results were presented in a cost-effectiveness acceptability curve.

Results
The ESCAPE knee pain programme resulted in a statistically significant improvement in the WOMAC Osteoarthritis Index, compared with usual care, at all stages of follow-up. This was the same when missing data were imputed. At early time points, the difference was greater than 15%, which was prespecified as clinically significant, but the difference declined over time. The number-needed-to-treat for an additional patient have a 15% improvement in their WOMAC Osteoarthritis Index was seven.

The cost differences were not statistically significant in the main analysis, and in the sensitivity analyses, at any length of follow-up, but programme participants had lower average costs. Removing outliers resulted in usual care being less costly, as one outlier was identified in that group.

At a willingness-to-pay threshold of zero for a 1% increase in patients with clinical meaningful improvement, the likelihood of the ESCAPE knee pain programme being cost-effective was 81%; at a threshold of £9,750, it was 100%.

Authors' conclusions
The authors concluded that the relatively brief ESCAPE knee pain programme could produce sustained clinical benefit and cost savings, and would not be difficult to implement.

CRD commentary
Interventions:
The interventions were well reported and described. The usual care arm of the trial included variation in practice, which more representative of treatment for osteoarthritis of the knee, than any prespecified treatment. The authors described the treatments included in usual care, which will allow the results to be applied to other similar settings.

Effectiveness/benefits:
The WOMAC Osteoarthritis Index function score was an acceptable measure of clinical benefit. The authors provided a reference to justify their choice of a 15% improvement in the index as a conservative minimum clinical benefit. The reporting was thorough, and the estimates appear to have been generalisable and valid. The function score only captured one aspect of osteoarthritis symptoms, and it was unclear why other aspects or the composite score were not used.

Costs:
The costs were well reported, with details available in an appendix. They were appropriately derived from UK sources and updated to 2003 to 2004 values, using UK inflation rates. Nonparametric bootstrapping was used to account for the skew in the cost data, and the differences between usual care and the treatment programme were reported. A wide
variety of services were included in the costs, which enhances the validity of the study and provides a good framework for evaluating generalisability. The costs were analysed with and without multiple-level imputation to account for missing data, but only the difference between the costs for the multiple imputation were reported, and not the actual costs, which makes it difficult to fully evaluate the effects of the missing data. Many of the cost estimates provided in the appendix were based on very few events, as acknowledged by the authors.

Analysis and results:
The authors conducted appropriate analyses to assess the effects of missing data, and they used appropriate statistical methods to analyse the data. The cost-effectiveness acceptability curve was difficult to interpret as a 1% change in the number of patients achieving a clinical improvement depended on their baseline value. The curve included only patients with complete cost and outcome data, so it did not account for missing data, which the authors stated could have underestimated the differences in the costs and outcomes, in turn underestimating the cost-effectiveness of the programme. The authors compared their results with those of other studies and explained the differences in the conclusions, enhancing their external validity.

Concluding remarks:
The study was generally well reported, handled missing data well, and its methods were sound. The authors’ conclusions appear to be appropriate.

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