Cost-utility analysis of physiotherapy treatment compared with physiotherapy advice in low back pain

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.

Health technology
The use of therapeutic physiotherapy was compared with physiotherapy advice in patients with low back pain. Advice consisted of a session given by a physiotherapist, along with a standardised advice book (the principal advice being to remain active). Physiotherapy treatment consisted of five 30-minutes treatment sessions, in addition to the advice book. The techniques that could be used, according to the treatment package devised for the patient in light of the clinical findings, were joint mobilisation, soft tissue techniques, individual exercise programmes, heat or cold treatment, and advice.

Type of intervention
Treatment and rehabilitation.

Economic study type
Cost-utility analysis.

Study population
The study population comprised individuals with low back pain that had lasted more than 6 weeks, with mild to moderate back pain disability (as measured by the Oswestry Disability Index). Further details were given in the report of the clinical trial (Frost et al. 2004, see 'Other Publications of Related Interest' below for bibliographic details).

Setting
The setting was outpatient care. The economic study was performed in the UK, in normal NHS service settings.

Dates to which data relate
The dates when the clinical and resource use data were collected were not reported. The price year was 2004.

Link between effectiveness and cost data
The costing was carried out prospectively on the same sample of patients as that used in the effective analysis.

Study sample
The trial was powered to detect a 4% difference in the primary outcome (Oswestry Disability Index) between groups. The sample selection method was not reported. From 508 eligible individuals, 286 were randomised. There were 144 individuals in the physiotherapy group and 142 in the advice group. No details of any exclusions were given.

Study design
This was a pragmatic, multi-centre, randomised controlled trial with a 12-month follow-up. The method of
randomisation, allocation concealment and loss to follow-up were not reported in this paper (see Frost et al. 2004).

**Analysis of effectiveness**
The primary end point was the Oswestry Disability Index. The secondary outcomes included the Roland and Morris disability questionnaire, the SF-36 and patient-perceived benefits. An intention to treat analysis was reported. The groups were comparable at baseline.

**Effectiveness results**
No numerical data were reported in the current paper. There were no differences between groups in terms of the Oswestry Disability Index, the Roland and Morris disability questionnaire and the SF-36, though patients in the physiotherapy group reported higher perceived benefits.

**Clinical conclusions**
The trial found no significant differences between the two strategies in terms of the primary outcome (the Oswestry Disability Index) or most secondary outcomes (the Roland and Morris disability questionnaire and the SF-36). Nevertheless, patients in the physiotherapy group perceived more benefit.

**Measure of benefits used in the economic analysis**
The benefits were measured in quality-adjusted life-years (QALYs), derived from patient responses to the generic valuation matrix Euroqol EQ-5D. These were calculated as the area under the health-utility profile using straight-line interpolation between values at each follow-up. Utility values were based on a representative British sample and used the time trade-off method (Dolan et al. 1996, see 'Other Publications of Related Interest' below for bibliographic details). Discounting was not carried out as the time horizon was too short.

**Direct costs**
The two main direct cost categories were the NHS costs and health care purchased by the patient. NHS costs included general practitioners' visits, NHS consultants' and physiotherapists' visits, hospitalisations and prescriptions. Health care purchased by the patient included private consultations and over-the-counter medication. Resource use was directly surveyed from patients at 2, 6 and 12 months of follow-up. The unit costs were obtained from standard publications and were reported in 2004 prices. Discounting was not necessary given the short time horizon (1 year). The resource use data were reported clearly, whereas the unit cost data were not.

**Statistical analysis of costs**
The data were treated stochastically. The mean difference between groups was calculated and the independent t-test was used to test the null hypothesis of no mean difference.

**Indirect Costs**
Days off work were directly surveyed from patients and valued through national income statistics. Days off work were reported clearly, whereas their unit cost was not. The price year was 2004. Discounting was not necessary given the short time horizon (1 year).

**Currency**
UK pounds sterling ( ).

**Sensitivity analysis**
Variation in patient level (stochastic) uncertainty was investigated and reported using confidence intervals (CIs). A cost-
effectiveness acceptability curve was produced to show the uncertainty in the results for different willingness-to-pay thresholds. As patients in the advice groups received more than the originally intended sessions, and this was an important cost-driver, a sensitivity analysis of this variable was performed.

**Estimated benefits used in the economic analysis**

The mean QALYs over the trial period were 0.74 (standard deviation, SD=0.18) for the physiotherapy group and 0.69 (SD=0.23) for the advice group.

The mean QALY difference, adjusted for baseline differences, was non significant (0.02, 95% CI: -0.02 to 0.07).

Intermediate follow-up values were also reported in the paper. The complete-case analysis showed similar results.

**Cost results**

The mean total costs per patient, excluding or including employment-related costs (societal perspective) respectively, were 264 (SD=287) and 724 (SD=2,810) for the physiotherapy group and 204 (SD=277) and 913 (SD=3,384) for the advice group.

The mean differences between groups were non significant, 60 (95% CI: -5 to 126) when excluding employment costs and -189 (95% CI: -901 to 523) when including employment-related costs.

Physiotherapy costs were on average 52 (95% CI: 41 to 63) more expensive than the advice group, as were directly purchased costs (difference of 41, 95% CI: 9 to 71).

No significant differences were found in any other cost category. The complete-case analysis showed similar results.

**Synthesis of costs and benefits**

Incremental cost-effectiveness ratios (ICERs) were reported although no statistical differences in utilities were found.

The point estimate for the ICER was 3,010 per QALY gained.

As the CIs overlapped the four quadrants of the cost-effectiveness plane, CIs for the ICER were not reported as they were not meaningful.

The acceptability curve showed that, if a decision-maker were willing to pay 5,000 per QALY gained, there would be about a 60% probability that physiotherapy would be cost-effective. The probability did not increase above 73% even at much higher levels of willingness-to-pay, reflecting the absence of a significant effect difference.

The assumption that the advice group did not receive more physiotherapy than originally intended only had a small effect on the cost-effectiveness results.

**Authors' conclusions**

The study showed no significant difference between groups in either National Health Service (NHS) costs or effects. However, the significantly higher patient expenses in the physiotherapy group suggest that the advice strategy should be considered as the first-line approach for this group of patients.

**CRD COMMENTARY - Selection of comparators**

The comparator was explicitly justified and was intended to reflect routine practice in the NHS. The reader should consider if it is an adequate comparator in their own setting.

**Validity of estimate of measure of effectiveness**
The analysis was based on a randomised controlled trial with adequate data on power and sample size calculations. This was adequate to answer the primary clinical question on back pain disability. The patient sample was representative of the population of patients with mild to moderate back pain disability. There was little detail in this report about the specific methodology of the randomised trial, hence it was difficult to assess its internal validity (the reader is referred to Frost et al. 2004 for further detail). Nevertheless, the authors stated that a 22% non-response rate for the main outcome at 12 months limited the internal validity. Statistical analysis, and different analytical strategies to account for this, were handed credibly and explained in detail. An unpublished per protocol analysis was performed because of the unintentional use of physiotherapy in the advice group, and it was reported that this showed similar results.

Validity of estimate of measure of benefit
QALYs were used as the summary benefit measure. Their derivation and analysis were reported in detail.

Validity of estimate of costs
The study was conducted from both health care and societal perspectives. Relevant cost categories, as well as their relevant costs, were taken into consideration. Resource use was collected alongside the clinical trial and the unit costs (expressed in 2004 currency) came from published sources. The dates of when the resource use data were collected were not reported, which may hinder future extrapolation exercises if there are secular trends in resource use. The authors did not discount the costs or benefits, which was appropriate given the 1-year time horizon. A similar problem and the handling of missing data occurred with resource use. Both parametric and non-parametric approaches to evaluate cost variability were used and reported. Uncertainty in the costs was evaluated jointly with the effectiveness data and reported as CIs and a confidence ellipse in the cost-effectiveness plane, as well as in the form of a cost-effectiveness acceptability curve. The price year, resource use and unit costs were adequately reported.

Other issues
The authors made adequate comparisons with other study findings, and demonstrated some important uncertainty around the cost-effectiveness of these treatments. They acknowledged differences in effectiveness among severity subgroups, but did not evaluate their impact directly. The authors did not present the results of the study selectively and their conclusions reflected the scope of the analysis. The authors reported some limitations and handled them credibly, including a 22% non-response rate for the main outcome at 12 months.

Implications of the study
Though no difference was found in cost-effectiveness, the significantly higher patient expenses in the physiotherapy group suggest that the advice strategy should be considered the first-line approach for this group of patients. In this study, advice by physiotherapists appears to have been cheaper than general practitioner advice, as reported by another important advice trial.

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No commercial funding was received.

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Other publications of related interest
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MeSH
Acute Disease; Adult; Chronic Disease; Cost-Benefit Analysis; Counseling /economics; Disability Evaluation; Female; Great Britain; Health Care Costs; Health Resources /utilization; Humans; Low Back Pain /physiopathology /therapy; Male; Middle Aged; Physical Therapy Modalities /economics; Physical Therapy Specialty /methods; Quality-Adjusted Life Years; State Medicine

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