Using patient-reported outcome measures to estimate cost-effectiveness of hip replacements in English hospitals

Appleby J, Poteliakhoff E, Shah K, Devlin N

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
The study objective was to assess the cost-effectiveness of hip replacement surgery in adults and examine between-hospital variation. The authors concluded that hip replacement was on average cost-effective but there was wide variation between hospitals. Unless significant future health care costs would be incurred were no hip surgery to be provided, the authors’ conclusion appears appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The study objective was to assess the cost-effectiveness of hip replacement surgery in adults and examine between-hospital variation.

Interventions
The intervention was any hip replacement surgery. The comparator was the hypothetical situation of no operation.

Location/setting
UK/secondary care

Methods
Analytical approach:
Patient-Reported Outcome Measures (PROMs) data from April 2009 to August 2010 were combined with national cost data to estimate the cost-effectiveness of hip replacement surgery over 15 years. The authors did not state the perspective but appeared to adopt a hospital perspective.

Effectiveness data:
The effectiveness of hip replacement was assessed in terms of the change in patient utility. From 2009, all hospitals had to ask hip replacement surgery patients to complete the EQ-5D questionnaire before surgery and six months afterwards and record the results as part of a national initiative. The authors assumed that each hip replacement had a 15-year lifespan, which they stated was based on current knowledge of revision times.

Monetary benefit and utility valuations:
Patient health status was measured using the EQ-5D questionnaire. A total of 25,463 individual patient records from 162 hospitals (24 non-NHS) were used. The change in EQ-5D scores was measured as the difference between each hospital’s case-mix adjusted postoperative score and the pre-operative national average score. Two alternative future health projections were analysed: one in which health remained constant at the post-operative level and one in which it degraded evenly over 15 years down to the preoperative level. For the comparator of no operation it was assumed that there was no degradation in health, which was considered a conservative assumption.

Measure of benefit:
The health benefit was measured in quality-adjusted life-years (QALYs). Future QALYs were discounted at an annual rate of 3.5%.
Cost data:
Hospital costs associated with hip replacement surgery were included in the analysis. For NHS hospitals, costs were derived from the 2009-2010 National Reference Costs data-set. Costs for each hospital were based on volume of activity and cost for each individual healthcare resource group classification in the data-set. For non-NHS hospitals, a weighted average of the 2010-2011 NHS tariff prices for the healthcare resource groups covered by the PROMs initiative was used; this represented the cost that NHS commissioners pay independent hospitals for carrying out hip replacements on NHS patients.

Analysis of uncertainty:
Ranges were reported alongside each of the outcomes except for non-NHS hospital costs.

Results
Compared to no operation, over 15 years and assuming no degradation in post-operative health, hip replacements produced a mean change in QALYs of 5.05 (range 3.76 to 5.85) in NHS hospitals compared to 5.41 (range 4.53 to 6.42) in non-NHS hospitals. Assuming degradation in postoperative health, the mean change in QALYs was 2.77 (range 2.06 to 3.21) in NHS hospitals compared to 2.97 (range 2.49 to 3.21) in non-NHS hospitals.

The unit cost of a hip replacement in NHS hospitals was £5,844 (range 1,650 to 13,350) compared to £5,530 in non-NHS hospitals. More than 90% of providers' costs fell between £4,000 and £8,000. Assuming no health degradation, the cost per QALY was £1,167 (range 309 to 3,012) in NHS hospitals compared to £1,028 in non-NHS hospitals. Assuming health degradation, the cost per QALY was £2,128 in NHS hospitals compared to £1,875 in non-NHS hospitals. Most of the variation between hospitals' cost per QALY values was closely associated with variation in unit costs rather than QALYs.

Authors' conclusions
The authors concluded that hip replacement was on average cost-effective but there was wide variation between hospitals.

CRD commentary
Interventions:
The intervention and comparator were clearly stated but limited details were supplied. The authors did not discuss any relevant alternative interventions. The authors did not discuss what treatments or care would be provided to patients who did not receive hip replacements so the exact nature of the comparator was unclear.

Effectiveness/benefits:
Two key assumptions were made regarding patient utility: there would be no degradation of health in the comparator arm and postoperative health would steadily deteriorate over 15 years down to the pre-operate national average level. Given the absence of quality comparative effectiveness data, a conservative assumption regarding the effectiveness of the comparator was sensible. The authors highlighted that alternative assumptions could be made regarding the health utility projections. In particular faster rates of postoperative deterioration could have been considered. It was unclear how the EQ-5D health scores were valued in order to generate QALYs.

The authors highlighted that one of the limitations of their analysis was that EQ-5D data covered only 20% of all eligible patients who underwent hip replacement operations. This comparatively small proportion may introduce bias if patients not included in the study sample systematically differed from those included.

Costs:
The final cost values were reported clearly and were based on appropriate sources. The source used to derive costs was appropriate but understandably numbers of patients in each healthcare resource group code in the hospitals were not stated. The cost would not take account of differences in healthcare resource utilisation between the groups after hospital discharge; it was reasonable to suppose that patients not receiving hip replacements would go on to utilise more healthcare in the future. This meant that the cost analysis may not be an accurate assessment of the difference in costs between the groups over 15 years.

Analysis and results:
Results of the analysis were reported clearly. The authors highlighted that the cost/price per QALY obtained for non-NHS hospitals needed to be interpreted somewhat differently from the cost per QALY for NHS hospitals; the latter represented a measure of provider productivity and the former represented the value to the commissioner of purchasing from the non-NHS provider.

The authors highlighted the wide variation between results across different hospitals. In general the results indicated that the cost per QALY associated with hip surgery was very low in relation to the UK's £20,000 per QALY willingness to pay threshold.

Concluding remarks:
Unless significant future health care costs would be incurred were no hip surgery to be provided, the authors’ conclusion appears appropriate.

Funding
None declared.

Bibliographic details

PubMedID
23759892

DOI
10.1177/0141076813489678

Original Paper URL
http://jrs.sagepub.com/content/106/8/323.abstract

Indexing Status
Subject indexing assigned by NLM

MeSH
Activities of Daily Living; Arthroplasty, Replacement, Hip /economics; Cost-Benefit Analysis; England; Female; Hip /surgery; Hip Joint /surgery; Hospital Costs; Hospitals; Humans; Male; National Health Programs /economics; Outcome Assessment (Health Care) /economics; Patient Satisfaction /economics; Quality of Life; Quality-Adjusted Life Years

AccessionNumber
22013024294

Date bibliographic record published
08/07/2013

Date abstract record published
24/09/2013