Waiting for hip arthroplasty: economic costs and health outcomes

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 study examined the use of total hip arthroplasty (THA) for patients with osteoarthritis.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients on an orthopaedic hospital waiting list for a THA. Patients aged 20 years or older who had primary or secondary osteoarthritis of the hip severe enough to require primary THA were eligible. Patients who had received a successful THA in the opposite hip at least 1 year before were also included. Patients with arthritis of the hip other than osteoarthritis were excluded, as were those with a history of developmental hip dysplasia, any condition likely to cause death within 2 years, and those with symptomatic arthritis of the opposite hip.

Setting
The setting was a hospital. The economic study was carried out in New Zealand.

Dates to which data relate
The effectiveness and resource use data were gathered between April 1999 and March 2002. The price year was not reported.

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

Study sample
Power calculations were not performed. An initial sample of 161 potentially eligible patients was contacted by telephone and invited to take part in the study. One hundred and fifty-three patients entered the study. Of the 153 participating patients, 3 died, 3 were exempted (1 whose surgery was delayed indefinitely and 2 who were removed from the list), and 1 was still waiting at the completion of the study (this person had waited 28 months). This left 146 eligible patients, of which 20 withdrew and 4 were lost to follow-up. Withdrawals were due to serious illness, cancer or stroke in themselves (10) or their spouse (4), being too busy (5), or no longer wanted surgery (1). Therefore, the final sample comprised 122 participants (84% of the eligible population). Participants were 35 to 85 years of age, with a mean age of 66 years (median age 69). Sixty-five per cent were women.
Study design
This was a within-group comparison study in that a single group of patients was enrolled. The participants were enrolled at three metropolitan publicly owned hospitals and one provincial publicly owned hospital across three District Health Boards in New Zealand. The length of follow-up was 6 months post-THA. Four patients initially included in the study sample were lost to follow-up. Blinding was not performed.

Analysis of effectiveness
The analysis of the effectiveness was restricted to those patients who provided complete follow-up data. The primary clinical outcome measure was health-related quality of life, which was estimated using two self-administered instruments (the WOMAC and the EQ-5D). The two instruments were described in detail. A regression analysis was performed to identify those variables related to postsurgical improvement.

Effectiveness results
Forty per cent of patients waited less than 3 months for THA, 33% waited 3 to 6 months, 20% waited 6 to 12 months, and 6% waited more than 12 months. Eighty-six patients had surgery within 6 months, while 36 patients waited for 6 months or more.

The analysis showed that whilst waiting for a THA, WOMAC scores worsened on the physical function dimensions, with no improvement in the dimensions of pain and stiffness, thus indicating deterioration of the health status. After surgery, average health status improved up to the final assessment at 6 months postoperatively.

With the EQ-5D, deterioration between the initial and final preoperative assessments was evident on all measures, although only the ability to perform usual activities declined to an extent that was statistically significant. Improvements in the EQ-5D measures from preoperatively to postoperatively indicated significant incremental improvements up to 6 months postoperatively.

The regression analysis showed that initial health status had the strongest influence on the outcomes. Patients with poor health status at their initial visit were 6 and 8 times more likely to improve. Other factors such as female gender, having a community services card, waiting 6 months or more, or being older than 64 years of age had no impact on health status.

Clinical conclusions
The effectiveness analysis showed that patients experienced a significant deterioration in their health status when waiting for a THA. Significant improvements in quality of life were instead experienced postoperatively, especially in those patients with poor initial health status.

Measure of benefits used in the economic analysis
The health outcomes were left disaggregated and no summary benefit measure was used. In effect, a cost-consequences analysis was performed.

Direct costs
The analysis of the costs was performed from a societal perspective. It included the direct costs associated with medical services (costs borne by government for expenditure on medical care through New Zealand's publicly financed health care system) and personal expenditure (private expenditure paid for medical care such as user charges, privately funded care, travel, and help required because of hip condition). The costs incurred at the time of surgery were not considered as they were incurred for all patients, regardless of waiting times. The unit costs were not presented separately from the quantities of resources used. Resource use was derived from the sample of patients included in the analysis of effectiveness using specific waiting-cost diaries. The sources of the direct costs were not stated. Discounting was not performed as it was not relevant. The price year was not reported.
**Statistical analysis of costs**

Differences in costs between those who had surgery within 6 months of their initial assessment and those who waited for 6 months or more were examined using non-parametric tests (the Wilcoxon 2-sample rank sums test). A regression analysis was carried out to assess the correlation between the total costs and other variables such as waiting time, age and gender.

**Indirect Costs**

Societal costs associated with time away from work or usual activities because of the hip condition were included in the analysis. Days off work were estimated using the cost diaries when participants could identify a monetary value. Otherwise, costs were valued using average wages adjusted for times when leisure or household activities were affected. The price year was not reported. Discounting was not relevant.

**Currency**

New Zealand dollars (NZD). The costs were also presented in US dollars ($). The exchange rate was NZD 1 = $0.668.

**Sensitivity analysis**

The issue of uncertainty was not addressed.

**Estimated benefits used in the economic analysis**

See the 'Effectiveness Results' section.

**Cost results**

When considering the whole sample, the mean total costs per patient were NZD 4,305 ($2,876) and the median total costs were NZD 3,123 ($2,086).

The median total costs per patient were NZD 2,828 ($1,889) in patients who had THA within 6 months and NZD 4,278 ($2,858) in patients that waited for 6 months or more. The difference was statistically significant, (p<0.01).

In particular, statistically significant differences between the two groups were found in personal costs (NZD 239 versus NZD 649) and productivity costs (NZD 1,951 versus NZD 2,669). The medical costs were similar.

The regression analysis showed that waiting for 6 months or more was the strongest predictor of high total costs and this correlation was statistically significant, (p=0.04).

**Synthesis of costs and benefits**

A synthesis of the costs and benefits was not relevant as a cost-consequences analysis was carried out.

**Authors' conclusions**

Waiting for a total hip arthroplasty (THA) led to poorer physical function preoperatively, especially in those patients with poor initial health status. Longer waiting for THA led to statistically significantly greater societal costs. Thus, waiting time for THA can be considered as a strong predictor of higher total costs and poorer patient quality of life.

**CRD COMMENTARY - Selection of comparators**

Waiting times shorter or longer than 6 months were considered in the analysis. This time threshold appears to have been chosen arbitrarily. You should decide whether this represents a valid threshold in your own setting.
Validity of estimate of measure of effectiveness
The effectiveness data came from a single sample of patients. Two groups of patients were then generated depending on the time waiting for a THA. The size of the sample was not justified on the basis of statistical analyses. The process of sample selection was described and reasons for patient exclusion or loss to follow-up were reported. The analysis was restricted to those patients with complete data. The evidence came from several centres, making the study sample representative of the patient population. A logistic regression analysis was appropriately carried out to take baseline factors that had the strongest impact on the clinical results into account. The use of both a disease-specific and a general health-related quality of life instrument represents a further strength of the analysis. The results of the two instruments suggested that the EQ-5D might not be sensitive enough to detect changes related only to hip osteoarthritis and its treatment.

Validity of estimate of measure of benefit
No summary benefit measure was used in the analysis because a cost-consequences analysis was conducted. Please refer to the comments in the ‘Validity of estimate of measure of effectiveness’ field (above).

Validity of estimate of costs
The choice of the perspective was appropriate given the objective of the study. A breakdown of the cost items was not given, and there was no information on the unit costs and quantities of resources used. This limits the possibility of replicating the analysis in other settings. Further, the sources of the direct costs were not reported and the price year was not given, which limits the possibility of performing reflation exercises in other time periods. Statistical analyses of the costs were performed, but the use of alternative cost estimates was not investigated.

Other issues
The authors stated that waiting times observed in the current study were shorter than those observed in a Canadian study and in a previous New Zealand study. However, it was noted that the government made additional wait-list funding available during recruitment for the study. The deterioration observed in health-related quality of life was similar to that found in other studies. The issue of the generalisability of the study results to other settings was not addressed and sensitivity analyses were not performed. Thus, the external validity of the analysis was limited and the results of the study should be considered specific to the study context.

Implications of the study
The authors’ results suggest that longer waiting times might severely affect the health-related quality of life of patients requiring a THA, with an increase in the total cost per patient mainly due to preoperatively productivity costs.

Source of funding
Supported by Arthritis New Zealand and the Wellington Surgical Research Team.

Bibliographic details

PubMedID
16376253

DOI

Other publications of related interest
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**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Adult; Aged; Aged, 80 and over; Arthroplasty, Replacement, Hip /economics; Costs and Cost Analysis; Female; Humans; Logistic Models; Male; Middle Aged; Osteoarthritis, Hip /surgery; Outcome Assessment (Health Care); Prospective Studies; Quality of Life; Statistics, Nonparametric; Surveys and Questionnaires; Waiting Lists

**AccessionNumber**
22006000176

**Date bibliographic record published**
31/07/2007

**Date abstract record published**
31/07/2007