Increased use of hip protectors in nursing homes: economic analysis of a cluster randomized, controlled trial


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 hip protectors for elderly nursing home residents and a programme of structured education for nurses who subsequently educated residents. The comparator was no provision of hip protectors, except for two to each nursing home, with only brief information provided to the nominated study coordinator.

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised elderly residents in nursing homes who were older than 70 years and not bedridden.

Setting
The setting was institutional care. The economic study was carried out in Hamburg, Germany.

Dates to which data relate
The effectiveness and resource use data in the model were derived from a study conducted for 18 months between 1999 and 2001. The price year was 2001.

Source of effectiveness data
The effectiveness data were derived from a single study.

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

Study sample
A total of 459 residents from 25 nursing homes were included in the intervention group, whereas 483 residents from 24 nursing homes made up the control group. Details of power calculations and numbers who refused to participate were not reported.

Study design
This was a prospective, multi-centred, cluster-randomised trial that was conducted over 18 months. Cluster allocation to...
the study or control group was based on computer-generated randomisation lists. The design of the trial and methods have been described elsewhere (Meyer et al. 2003, see 'Other Publications of Related Interest' below for bibliographic details). The trial was terminated for 167 participants in the intervention group and 207 in the control group because of death or moving.

Analysis of effectiveness
The analysis of the clinical study was conducted on an intention to treat basis. The main outcome measured was the number of hip fractures. The comparability of the groups at baseline was not reported.

Effectiveness results
There were 21 hip fractures in 21 intervention group residents and 42 in 39 control group residents.

Clinical conclusions
The intervention group had an absolute risk reduction in hip fracture of 4.1%.

Measure of benefits used in the economic analysis
The measure of benefit used was the number of hip fractures avoided.

Direct costs
The quantities and resource costs were estimated using data from the study. Health service costs and the hip protector costs charged to patients were included. The unit costs were reported. The costs of educational material, hip protectors and mobility aids were taken from manufacturers' invoices. Hospital admission costs and nurses' salaries were from the finance department of the hospital and nursing home. Resource use for hip fracture and outpatient physiotherapy was obtained from health insurance data. Year 1999 - 2001 prices were used. Discounting was not carried out, but it was not relevant as the costs were incurred during less than 2 years. Protocol-driven costs were not excluded from the study calculations.

Statistical analysis of costs
The mean costs, standard deviations (SDs), and 10th and 90th percentiles were calculated across clusters. For between-group mean differences, 95% bootstrap confidence intervals (CIs) were calculated using a percentile method based on 10,000 bootstrap replications.

Indirect Costs
The indirect costs were not included.

Currency
US dollars ($). The costs were converted from Euros (EUR) at the rate applicable in December 2000, EUR 1.00 = $1.00.

Sensitivity analysis
Multi-way sensitivity analyses were performed to investigate the uncertainty in the estimates used. The parameters varied were the costs of educational material, nursing training costs for a single nurse, and extending the time horizon of the expected increase of degree of disablement to 22 months. In another analysis, nursing care related to hip protector use was increased from 20 to 30 minutes per trial participant, per month. The effect of changing the absolute risk reduction in hip fractures by +/- 10% was also tested. The ranges of variation were based on authors' assumptions. Finally, the cost of hip protectors was varied to the break-even point.
Estimated benefits used in the economic analysis
Hip fractures avoided were used to estimate benefits in the economic analysis. The number of hip fractures was reported under the 'Effectiveness Results' section.

Cost results
The mean cost per participant was $634 (SD=439) (10th to 90th centile: 257 to 1,213) in the intervention group and $583 (SD=570) (10th to 90th centile: 7.7 to 1,396) in the control group.

The difference was $51 (95% CI: -242 to 325) per participant in favour of the control group.

Synthesis of costs and benefits
An incremental cost-effectiveness ratio was calculated for the intervention group compared with the control group. The cost per additional hip fracture avoided was $1,234.

Varying the costs of staff education and educational material, and extending the time horizon of the expected increase of degree of disablement to 22 months, produced a mean cost-difference in favour of the control group of $18 (95% CI: -334 to 351) per participant. This gave the intervention group an incremental cost-effectiveness ratio of $439.

Varying the absolute risk reduction by +/- 10% did not substantially alter the results of the base-case analysis.

Hip protectors start to be cost-saving at a price of $22 in the base-case.

Authors' conclusions
A programme consisting of education and the provision of hip protectors is cost-effective. It might also produce a slight increase in costs or even be cost-saving if the price of hip protectors could be decreased.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparator was clear. The comparator is standard practice in the authors' setting. You should consider whether the comparator represents current practice in your own setting.

Validity of estimate of measure of effectiveness
The analysis was based on a prospective, multi-centred, cluster-randomised trial, which was appropriate for the study question. The study sample was representative of the study population. The patient groups were not shown to be comparable at analysis. Appropriate statistical analyses were undertaken to account for potential biases and confounding factors.

Validity of estimate of measure of benefit
The estimate of benefits used in the economic analysis was the number of fractures avoided. This measure may not fully reflect the utility to the patient of both interventions.

Validity of estimate of costs
All the categories of cost relevant to the perspective adopted were included in the analysis. The unit costs were quoted but the quantities were not reported separately. The authors reported the sources of their cost data. Discounting was not necessary and, appropriately, was not carried out. The price year was specified.

Other issues
The authors provided a comprehensive discussion of their results and highlighted relevant caveats. They made appropriate comparisons of their findings with those from other studies, and the issue of generalisability to other settings was addressed through the sensitivity analysis. The authors reported limitations of their study, especially in relation to it being powered on the primary outcome measure (hip fractures) rather than on cost.

**Implications of the study**
There were no recommendations for further research.

**Source of funding**
Funded by the Public Health Research Network of Northern Germany.

**Bibliographic details**

**PubMedID**
16398901

**DOI**
10.1111/j.1532-5415.2005.00490.x

**Other publications of related interest**

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Aged; Aged, 80 and over; Cluster Analysis; Cost-Benefit Analysis; Germany; Health Care Costs; Hip Fractures/economics /prevention & control; Humans; Nursing Homes /economics; Protective Devices /economics /utilization

**AccessionNumber**
22006007576

**Date bibliographic record published**
30/09/2006

**Date abstract record published**
30/09/2006