Are hip protectors cost effective?
Kumar B A, Parker M J

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 wearing of hip protectors to prevent proximal femoral fractures (hip fractures). The comparator was no hip protector.

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised the elderly. The evaluation used samples of patients enrolled on randomised clinical trials of hip protectors. The data were reported for men and women aged 50 to 85 years and over.

Setting
The setting was secondary care. The study was carried out in Peterborough, UK.

Dates to which data relate
The effectiveness data related to the period 1988 to 1998. The data on the incidence of hip fractures were collected between 1994 and 1997. The resource use data were not obtained. The price year was not reported.

Source of effectiveness data
The data were derived from a review conducted by the Cochrane Musculoskeletal Injuries Group (see Other Publications of Related Interest), and from a prospective audit.

Outcomes assessed in the review
The outcomes assessed were:
the incidence of hip fractures, according to the age group;
the effectiveness of hip protectors in reducing the incidence of hip fractures; and
compliance with wearing the hip protectors.

Study designs and other criteria for inclusion in the review
The effectiveness of hip protectors and compliance were estimated from randomised trials identified by the Cochrane Musculoskeletal Injuries Group. The authors did not report the inclusion or exclusion criteria, although these would
have been described in the Cochrane protocol (see Other Publications of Related Interest). The incidence of hip fractures was estimated from a prospective audit of all hip fractures in one hospital from 1994 to 1997.

**Sources searched to identify primary studies**
Not reported. However, the authors did refer to the report of the systematic review (see Other Publications of Related Interest).

**Criteria used to ensure the validity of primary studies**
Not reported. However, the authors did refer to the report of the systematic review.

**Methods used to judge relevance and validity, and for extracting data**
Not reported. However, the authors did refer to the report of the systematic review.

**Number of primary studies included**
Five primary studies were included in the evaluation.

**Methods of combining primary studies**
Not reported. However, the authors did refer to the report of the systematic review.

**Investigation of differences between primary studies**
Not reported. However, the authors did refer to the report of the systematic review.

**Results of the review**
A total of 920 patients participated in the studies included in the Cochrane review. The hip protectors were found to have reduced the occurrence of hip fractures from 59.8 (6.5%) per year to 14.1 (2.3%) per year.

The incidence of hip fractures per 1000 population per year was estimated as follows:

- for age 50 to 59 years, 0.13 with no hip protector and 0.05 with the hip protector;
- for age 60 to 64 years, 0.72 with no hip protector and 0.26 with the hip protector;
- for age 65 to 69 years, 1.29 with no hip protector and 0.46 with the hip protector;
- for age 70 to 74 years, 2.77 with no hip protector and 0.98 with the hip protector;
- for age 75 to 79 years, 6.43 with no hip protector and 2.28 with the hip protector;
- for age 80 to 84 years, 11.92 with no hip protector and 4.22 with the hip protector;
- for age 85 years and over, 25.34 with no hip protector and 8.97 with the hip protector; and
- for people in institutional care, 34.45 with no hip protector and 12.19 with the hip protector.

The studies showed that compliance with wearing the hip protectors was obtained in 251 (36%) of the 694 trial participants allocated them.

**Measure of benefits used in the economic analysis**

NHS Economic Evaluation Database (NHS EED)
Produced by the Centre for Reviews and Dissemination
Copyright © 2017 University of York
The measure of benefit used in the economic analysis was the number of hip fractures prevented.

**Direct costs**
The resource quantities and the costs were reported separately. The authors did not state the perspective from which the study was conducted. However, the analysis included the annual cost of the hip protectors for those who complied with wearing them. The number of hip protectors used per person per year was estimated from discussion with the authors of other published studies. The unit cost of the hip protectors was obtained from the manufacturer. Discounting was unnecessary since all the costs were incurred over one year. The average cost of treating a hip fracture was not included in the analysis but was reported in the discussion. The cost of treating a hip fracture was estimated from a paper published in 1995, then adjusted to 1998 prices. The study calculated the cost per fracture prevented.

**Statistical analysis of costs**
The authors did not report a statistical analysis of costs.

**Indirect Costs**
The authors did not include the indirect costs in the analysis.

**Currency**
UK pounds sterling (£). No currency conversions were reported.

**Sensitivity analysis**
The authors did not report a sensitivity analysis.

**Estimated benefits used in the economic analysis**
The estimated benefit used in the economic analysis was the number of fractures prevented, according to the age group. The reductions in hip fractures per 1000 population per year, for those patients wearing hip protectors were:

- 0.08 for patients aged 50 to 59 years;
- 0.46 for patients aged 60 to 64 years;
- 0.83 for patients aged 65 to 69 years;
- 1.79 for patients aged 70 to 74 years;
- 4.15 for patients aged 75 to 79 years;
- 4.22 for patients aged 80 to 84 years;
- 8.97 for patients aged 85 years and over; and
- 22.26 for patients in institutional care.

**Cost results**
The average cost of the hip protectors was £113 per person per year. The average cost of treating a hip fracture was £7,200.

**Synthesis of costs and benefits**
The cost per fracture prevented was:

- 508,500 per year for patients aged 50 to 59 years;
- 88,435 per year for patients aged 60 to 64 years;
- 49,012 per year for patients aged 65 to 69 years;
- 22,726 per year for patients aged 70 to 74 years;
- 9,802 per year for patients aged 75 to 79 years;
- 5,283 per year for patients aged 80 to 84 years;
- 2,485 per year for patients aged 85 years and over; and
- 1,827 per year for patients in institutional care.

This included the cost of hip protectors for those people who complied with wearing them. No other costs were included.

**Authors' conclusions**
The authors concluded that the wearing of hip protectors by people over the age of 84 years appeared to be cost-effective.

**CRD COMMENTARY - Selection of comparators**
The authors did not explicitly report their rationale for the choice of the comparator (no hip protector). You should consider whether the practice of not wearing a hip protector is relevant for the elderly people in your own setting.

**Validity of estimate of measure of effectiveness**
The authors used a systematic review undertaken by the Cochrane Collaboration. They did not provide details of the methods used for the review, but instead referred to the report of the review (see Other Publications of Related Interest). The reduction in hip fractures, and the rate of compliance associated with the hip protectors, was estimated from four trials included in the systematic review. These data were then applied to prospective audit data of the incidence of hip fractures treated in one district general hospital, to estimate the incidence of hip fracture (with and without hip protectors) according to the age group. The characteristics of the study sample included in the trials were not reported. There were also no details of the methods used to combine the data or to investigate differences between the trials. The authors did not provide any information on the methods and study sample for the prospective audit.

**Validity of estimate of measure of benefit**
The benefits (hip fractures prevented) were estimated directly from the effectiveness analysis. The summary measure of benefit used does not include the impact of hip protectors on the morbidity and mortality of people who have falls and associated hip fractures. Neither does it include the impact of wearing hip protectors on the patients’ health and social well-being. The low rate of compliance (36%) suggests that this could be an important area to consider.

**Validity of estimate of costs**
The authors did not report the perspective from which the study was conducted. The analysis only included the number and cost per year of hip protectors for those people who complied with wearing them. This underestimates the total costs per year by excluding the costs of those hip protectors issued but not used. The authors did not include the costs of treating hip fractures or other costs associated with hip fractures or hip protectors. The number of people wearing hip protectors was not reported. The authors reported the cost of treating a hip fracture separately in the discussion but did
The costs and the quantities were reported separately. The prices were obtained from the manufacturer of the hip protectors. The number used per year was an estimate obtained from authors of other published papers. No sensitivity analysis of the prices was conducted. Discounting was unnecessary since all the costs were incurred over one year.

**Other issues**
The authors did not compare their findings with those from other studies. However, the issue of the scope of the study and its generalisability to other populations was addressed, in as much as the authors recommended further studies in different patient groups. Changes in the design of the hip protectors may improve compliance. The authors stated that the results should be interpreted with caution, as they were based on a series of calculations and estimations.

**Implications of the study**
Hip protectors should be routinely provided to all those aged 80 years and above, and to all residents in institutional care. Further evaluation of their effectiveness, costs and compliance is needed. In addition, it is essential that the incidence of hip fractures should be studied within groups at high risk of hip fractures, but aged less than 80 years. Changes in the design of hip protectors may improve compliance.

**Source of funding**
None given.

**Bibliographic details**

**PubMedID**
11084156

**Other publications of related interest**

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Aged; Aged, 80 and over; Cost-Benefit Analysis; Female; Health Care Costs; Hip Fractures /economics /prevention & control; Humans; Male; Middle Aged; Patient Compliance; Prospective Studies; Protective Devices /economics; Treatment Outcome

**AccessionNumber**
2200001923

**Date bibliographic record published**
30/06/2002

**Date abstract record published**
30/06/2002