Evaluating the cost-effectiveness of fall prevention programs that reduce fall-related hip fractures in older adults

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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
This study evaluated the cost-effectiveness of fall-prevention programmes for older adults. Home modifications were the most cost-effective intervention for fall prevention, if medical management and Tai Chi were assumed to be hard to sustain for this population. The cost-effectiveness analysis appeared to be satisfactory, but there were a few limitations. In general, the authors’ conclusions appear to be appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The aim was to evaluate the cost-effectiveness of programmes for preventing falls in older adults.

Interventions
Seven fall-prevention interventions were assessed: multifactorial approaches for all elderly people; multifactorial approaches for high-risk groups; home modifications for high-risk groups; vitamin D supplements; medical management of central nervous system drugs (withdrawal of psychotropic drugs); muscle or balance training; and Tai Chi. These interventions were compared with the standard care.

Location/setting
USA/primary care.

Methods
Analytical approach:
A mathematic model was used to simulate the clinical and economic impact of the seven interventions, over a lifetime horizon. The authors stated that they took the perspective of the health care system.

Effectiveness data:
The effectiveness of the interventions came from a Cochrane review (Gillespie, et al. 2003, see ‘Other Publications of Related Interest’ below for bibliographic details) and the remaining epidemiological data were from other published studies. The key clinical parameters were the prevention of falls and the incidence and health impact of fall-related hip fractures.

Monetary benefit and utility valuations:
The utility estimates for the general population and those with hip fractures were derived from published studies and the US census.

Measure of benefit:
The measure of benefit was the number of quality-adjusted life-years (QALYs), which were discounted at an annual rate of 3%.

Cost data:
The analysis included those direct medical costs associated with hip fractures, which were from three studies, and those of fall-prevention programmes, which were based on the hours of work associated with the intervention (Gillespie, et al. 2003).
2003) and the market wages for the health care staff. These data were from national databases, such as those of the Bureau of Labor Statistics and the American Medical Association. The costs were in US dollars ($), for the price year 2007, inflated using medical care inflation rates, and discounted at a rate of 3%.

Analysis of uncertainty:
A probabilistic sensitivity analysis was performed to assess the impact of variations in the key parameter inputs on the results.

Results
Management of psychotropic medicines was the cheapest and most effective intervention and Tai Chi was the next cheapest and most effective, but these two interventions were hard to sustain.

Vitamin D supplements and home modification were the most cost-effective of the sustainable interventions. Vitamin D supplements saved more (were cheaper) than home modification, but were also less effective. Compared with vitamin D supplements, home modification had an incremental cost of $14,794 per QALY. The remaining interventions were all dominated as they were less effective and more expensive than home modification.

At a willingness-to-pay of $50,000 per QALY, home modification had the highest net benefit in 54% of the replications compared with vitamin D in 30% of the replications.

Authors’ conclusions
The authors concluded that medical management was the most cost-effective intervention for fall prevention, if it was sustainable, otherwise, home modifications were the most cost-effective, but further research was needed.

CRD commentary
Interventions:
The interventions appeared to be appropriate comparators as they were identified through a comprehensive review. This review was not up to date and so the authors included more recent studies, but it was not clear whether they also looked for new interventions. The interventions were not extensively described, but references were given. Usual care was also not well defined, which makes it difficult to assess whether the results would be applicable to other settings.

Effectiveness/benefits:
The data were appropriate to the study setting and their sources appeared to be robust and were referenced. The authors did not report the literature review methods, such as the inclusion criteria and databases searched, so it was not clear if the review was systematic. The key risk reductions were provided in a table, but their derivation was not described. The approach used to determine the utility data was only partly reported; one study used the Rosser matrix, but the methods of other studies were not reported. QALYs were an appropriate benefit measure given the impact of falls on survival and quality of life. Future benefits were discounted.

Costs:
The perspective was clearly defined and the key costs were included. These costs were reported as totals for the interventions and a full breakdown of the cost items was not given, which limits the ability to replicate the analysis for other settings. Other details, such as the price year, sources of data, and use of discounting, were given. Where possible it seems that medical care inflation was used to adjust the costs and this was appropriate.

Analysis and results:
The model structure was not described in detail and no diagram was provided. Medical management was more effective and cheaper than all other treatments, but the authors did a second analysis excluding this intervention and Tai Chi on the grounds that they were unlikely to be sustainable in the elderly population. It would have been preferable, if the data were available, to have included the sustainability of the interventions in the model and this would have eliminated the need for a second analysis. The incremental approach was appropriate for comparing the relative cost-effectiveness of the different interventions with that of usual care. The probabilistic sensitivity analysis was useful for assessing the impact of the parameter uncertainty. The results were reported reasonably well, in a graph, but the costs and effectiveness figures were not reported and only the one non-dominated cost-effectiveness figure was clearly reported.
The authors also discussed the strengths and limitations of their approach.

Concluding remarks:
This cost-effectiveness analysis was satisfactory in the selection of the clinical and economic data and in the reporting of the results, but there were a few limitations. The results lacked some detail, but generally the authors’ conclusions appear to be appropriate.

Funding
Not stated.

Bibliographic details

PubMedID
20122044

DOI
10.1111/j.1532-5415.2009.02575.x

Original Paper URL
http://onlinelibrary.wiley.com/journal/123232557/abstract

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Accidental Falls /economics /prevention & control; Aged; Cost-Benefit Analysis; Hip Fractures /economics /etiology /prevention & control; Humans; Models, Theoretical

AccessionNumber
22010000384

Date bibliographic record published
21/04/2010

Date abstract record published
09/06/2010