Cost-utility analysis of a shock-absorbing floor intervention to prevent injuries from falls in hospital wards for older people

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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 a shock-absorbing floor to prevent injury from falls, in older people in hospital. The authors concluded that the floor was likely to be cost-effective, but research was required into whether it increased the rate of falls. The methods and results were clear, but initial patient characteristics were missing, significant assumptions were required, and the uncertainty was not fully assessed. It is not clear if the authors’ conclusions are reliable or generalisable.

Type of economic evaluation
Cost-utility analysis

Study objective
This study evaluated the cost-effectiveness of a shock-absorbing floor, to prevent injury from falls, on hospital wards for older people.

Interventions
The shock-absorbing floor was made by Tarkett Omnisports EXCEL, it was installed in one bay of four hospitals. This was compared with the standard hospital floor in another four hospitals.

Location/setting
UK/in-patient care.

Methods
Analytical approach:
A decision tree was created to model the effects of falls on patient utility and costs. Most data were from the Helping Injury Prevention in Hospitalised Older People (HIP-HOP) trial (see Other Publications of Related Interest). The analysis had a lifetime horizon, and the authors stated that they took an NHS and Personal Social Services perspective.

Effectiveness data:
The effectiveness data were from the HIP-HOP trial. This was a prospective pilot cluster randomised controlled trial in eight hospitals in England. There were 226 patients in each group and they were followed-up for three months after discharge from hospital. The main clinical effectiveness estimates were the probability of falling and the probability of injury due to a fall. These were both derived from the HIP-HOP trial. Some other effectiveness estimates were from the HIP-HOP trial, such as discharge outcomes and patient mortality. Authors’ assumptions were used to supplement these estimates.

Monetary benefit and utility valuations:
The utility values were derived using the the EQ-5D questionnaire, which was completed by 123 patients in the HIP-HOP trial, at three months after discharge. Utility scores were generated for the various fall states by multiplying the utility rate for no fall, by rate ratios from a published study.

Measure of benefit:
The benefit measure was quality-adjusted life-years (QALYs), which were discounted at an annual rate of 3.5%.
Cost data:  
The cost categories were installation of the shock-absorbing floor, excess stay due to a fall, and care after discharge. The resource use estimates were from the HIP-HOP trial. The costs of care after discharge were from the Personal Social Services Research Unit, and NHS reference costs for 2009 to 2010. These included hospital readmissions, general practitioner visits, and out-patient visits. There were few patients with moderate or major falls, so assumptions were made, based on data from the published utility study, to adjust the costs of the falls. All costs were in UK £, discounted at an annual rate of 3.5%.

Analysis of uncertainty:  
Several scenarios were analysed, varying one or two parameters at a time. Parameters included: assuming an equivalent risk of falling, using utility scores from the published utility study, reducing the cost differences between fall categories, and assuming full ward occupancy. All combined scenarios included an equivalent risk of falling.

Results  
The estimated costs were £39,100 with the usual floor, and £38,257 with the shock-absorbing floor. The total QALYs were 0.425 with the usual floor, and 0.419 with the shock-absorbing floor. The shock-absorbing floor had an incremental cost-effectiveness ratio (ICER) of £134,903 per QALY gained.

The scenario analyses found that the results were extremely sensitive to varying the overall risk of falling, but not to varying the utilities, costs, and occupancy rates.

Authors’ conclusions  
The authors concluded that the shock-absorbing floor was likely to be cost-effective, but research was needed into whether it increased the rate of falls.

CRD commentary  
Interventions:  
The interventions were described with appropriate detail. Standard practice was appropriately included.

Effectiveness/benefits:  
The effectiveness data were from a small trial, with several authors’ assumptions, due to a lack of data. The small sample, and the need for assumptions, increase the uncertainty in the estimates. No initial patient characteristics were reported, and it was unclear if there was any control for confounding factors. The mean survival was projected to be 1.24 years for patients who did not fall, and 0.81 years for those who did fall. These patients may have been very specific, and the authors’ conclusion may not be generalisable. The authors acknowledged that they assumed identical survival for all patients who fell, regardless of injury, due to the small number of events. Alternative survival assumptions could have been tested in sensitivity analyses. The utility measure was described. The authors acknowledged that their utilities were much lower than those in the published utility study, so the impact of a fall may have differed between the studies, but they still used the relative risks from the utility study. The model assumed that all reductions in utility were permanent, which assumes that patients did not recover from falls, which may have been inappropriate.

Costs:  
The perspective was clearly stated and the cost categories seem to have been appropriate. The cost of residential care was not included, and it was relevant to the NHS perspective. Including residential care, could have increased the costs of the standard floor as more patients were discharged to residential care. This could have affected the study’s conclusions. The resource use estimates and the unit cost sources were clearly reported, but assumptions were needed for some estimates, which increases the uncertainty in them. The costs were appropriately discounted and appear to have been appropriately adjusted for inflation.

Analysis and results:  
The analytic approach was appropriate. The model was described and a diagram was provided. The primary results of the study were well reported, as were the assumptions made for sensitivity analyses. The sensitivity analysis was limited and it seems unlikely that the uncertainty in the study’s estimates was fully explored. Given the number of assumptions, a probabilistic sensitivity analysis, simultaneously varying all the parameters, could have provided a better picture of the
total effect of uncertainty on the results. The main limitation of the study was that the source trial was small, with high rates of missing data for some parameters. The authors were appropriately cautious in their conclusions and acknowledged the limitations of the pilot trial; further analysis was warranted.

Concluding remarks:
The methods and results were clearly reported. The initial patient characteristics were not presented; a significant number of assumptions were required; and the uncertainty could have been addressed more fully. It is not clear if the authors' conclusions are reliable or generalisable.

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Other publications of related interest

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