Economic evaluation of a community based exercise programme to prevent falls

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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.

Health technology
The use of a home-based muscle strengthening and balance retraining programme for older women. The exercise programme also included suggestions for a walking plan, individually prescribed by the research physiotherapist.

Type of intervention
Prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population consisted of women aged at least 80 years who were living in the community, and who were invited by their general practitioner (GP) to take part. Patients were excluded if they were unable to walk around their own residence, were receiving physiotherapy, or were unable to understand the study requirements.

Setting
The study was carried out in a community setting, but the patients were selected from primary care and some were admitted to hospital as a result of a fall. The economic study took place in Dunedin, New Zealand.

Dates to which data relate
The effectiveness and resource data were collected between 1995 and 1997. The monetary values were reported at 1995 prices.

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

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

Study sample
Sample size calculations and reasons for non-participation have been reported previously (see Other Publications of Related Interest). However, the authors did report that the study numbers were based on the expectation of a 20% reduction in the proportion of women who fell during one year of follow-up. In addition, they allowed for a significance level of 0.05, a power of 0.80, and a drop-out rate of 20%. Women aged 80 years and older from 17 general practices were invited by their GP to take part. The participants were randomised to either an exercise programme (n=116) or usual care plus social visits (n=117).
Study design
The study was a RCT. The method of random allocation and assessment of blinding were reported elsewhere (see Other Publications of Related Interest). The study participants were taken from 17 general practices in Dunedin, New Zealand. Those participants remaining in the study at the end of the first year were invited to continue in the study for a further year, and 71% (152 of the 213) agreed.

Analysis of effectiveness
The analysis was conducted on an intention to treat basis. The primary health outcome used in the analysis was the number of falls and the number of injurious falls (moderate and severe). The falls were monitored using return addressed, postage paid, tear-off, monthly, postcard calendars to record the falls daily. If the card was not returned, the research staff telephoned the person. Also recorded was self-perceived health status (measured by SF-36). The authors stated that the baseline characteristics of the women in the two groups were comparable, although the actual details were reported elsewhere (see Other Publications of Related Interest).

Effectiveness results
In year one, there were 152 falls in the control group and 88 in the exercise group. The relative hazard for the exercise group in comparison with the control group was 0.68 (95% CI: 0.52 - 0.90).

There were 134 falls per 100 person-years in the control group and 80.9 in the exercise group.

In year two, there were 77 injurious falls (13 serious and 64 moderate) in the control group and 33 (21 moderate and 12 serious) in the exercise group. The relative hazard was 0.61 (95% CI: 0.39 - 0.97).

There were 67.8 injurious falls per 100 person-years in the control group and 30.3 in the exercise group.

Medical care was sought for 29 falls in the control group and 27 in the exercise group.

In year two, there were 68 falls in the control group and 50 in the exercise group. The relative hazard over two years was 0.69 (95% CI: 0.49 - 0.97).

There were 94.2 falls per 100 person-years in the control group and 85.7 in the exercise group.

There were 21 injurious falls (4 serious and 17 moderate) in the control group and 14 (9 moderate and 5 serious) in the exercise group. The relative hazard over two years was 0.63 (95% CI: 0.41 - 0.95).

There were 29.1 injurious falls per 100 person-years in the control group and 24.0 in the exercise group.

Medical care was sought for 14 falls in the control group and 7 in the exercise group.

The mean change in the SF-36 physical functioning score from baseline to one year was the only SF-36 component score that differed significantly for the two groups.

The participants in the exercise group reported improved physical functioning at one year, compared with the control group. The mean score change was 4.7 (standard deviation, SD=16.4) for the exercise group and -1.3 (SD=13.6) for the control group, with a difference of 6.0 (95% confidence interval, CI: 1.9 - 10.1).

Clinical conclusions
The main clinical conclusion was a clinically significant improvement in self-assessed physical functioning.

Measure of benefits used in the economic analysis
The outcome measures used in the economic analysis were falls prevented, as stated in Analysis of Effectiveness.
Direct costs
The costs and the resource quantities were estimated from actual data. The costs and the quantities were reported separately. The authors provided a comprehensive list of the costs and the quantities that were used in the study. The direct costs were for implementing the exercise programme (obtained from study records using actual costs when available), hospital and other health care services as a result of a fall, and the total health care costs during the time each person was in the study. Most of the information was derived from the financial records of Dunedin Hospital, while the self-reported information was used for the health care services from other providers. The costs included inpatient and outpatient costs, home care services, and hospital overheads. Discounting was not felt to be appropriate as the duration of the trial was only 2 years. The monetary values were reported in 1995 prices.

Statistical analysis of costs
The costs of health care services were compared using Student's t-test. The authors reported that health care costs and hospital days were first converted to their natural logarithm value, in order to transform the data from a skewed to a normal distribution. The authors also pointed out in the “Discussion” section that the calculations for study sample size were based on effectiveness and not cost measures.

Indirect Costs
The indirect costs were not included and were not applicable given the age of the participants.

Currency
New Zealand dollars (NS$).

Sensitivity analysis
One-way sensitivity analyses were performed, primarily to test the generalisability of the results.

Estimated benefits used in the economic analysis
Please refer to the Effectiveness Results section above.

Cost results
The exercise programme cost $173 per person to deliver in year one, and a further $22 per person in the second year. The costs were not given fully by group. The total costs were not given according to group. Twenty-seven per cent of the total hospital inpatient costs during the trial were related to falls. However, there were no statistically significant differences in health service costs between the two groups. For example, in terms of the inpatient costs, the number of hospital days, the outpatient costs, or the combined emergency, outpatient clinic and community service costs.

Synthesis of costs and benefits
Implementing the exercise programme for one year cost $314 per fall prevented and $457 per injurious fall prevented. The corresponding implementation costs for two years were $265 per fall prevented and $426 per injurious fall prevented. The cost-effectiveness ratios were lower after two years than after one year, and they appeared to be robust to changes in the cost scenarios.

Authors' conclusions
"The costs resulting from falls make up a substantial proportion of the hospital costs for older people. Despite a reduction in falls as a result of this home exercise programme, there was no significant reduction in healthcare costs."
CRD COMMENTARY - Selection of comparators
The comparator was chosen because it was usual care and, in addition, the number of social visits was equivalent to the number of visits made by the exercise instructor. You should consider whether these are widely used programmes in your own setting (the authors’ comprehensive description of the cost aspects, i.e. quantities of actual resources used, should make this easier).

Validity of estimate of measure of effectiveness
The validity of the study should have been improved on account of it being an RCT and having sufficient power to detect any clinically significant differences. Also, the groups were said to be comparable at baseline, although details were provided in another paper.

Validity of estimate of measure of benefit
The benefit measure was falls prevented. However, while this is clearly an important goal, it does not account for other aspects of quality of life. This will make comparison with other technologies difficult.

Validity of estimate of costs
The costs and the quantities were dealt with thoroughly by the authors. For example, the sources were clearly identified and they were analysed separately. In addition, statistical and sensitivity analyses of the costs were conducted. However, the authors recognised that power calculations were not conducted to test whether the sample size was sufficient to detect any economically significant differences between the groups.

Other issues
The authors discussed the lack of comparable studies and made comparisons with other studies that were relevant. They also discussed a number of factors that may affect the generalisability of their results. For example, having a dedicated team of health professionals in a certain setting. The results were reported fully in terms of the effectiveness and cost breakdown. However, the total costs by group were not reported.

Implications of the study
"Although the programme did not result in net savings, it was not expensive to implement and resulted in extensive benefits for participants. We recommend that those developing community health programmes for older people consider incorporating an exercise programme designed specifically to reduce falls."

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Funded by the Accident Rehabilitation and Compensation Insurance Corporation of New Zealand, and the Department of Veteran Affairs, USA.

Bibliographic details

Other publications of related interest


**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
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