A home-based, nurse-delivered exercise programme reduced falls and serious injuries in people ⩾ 80 years of age

Robertson MC, Devlin N, Gardner MM, Campbell AJ. ***Effectiveness and economic evaluation of a nurse delivered home exercise programme to prevent falls. 1: randomised controlled trial.*** *BMJ 2001 Mar 24;**322**:697–701.*

QUESTION: In people ⩾ 75 years of age, is a home-based exercise programme that includes strength and balance retraining delivered by a nurse effective for reducing falls and related injuries?

Design
Randomised {allocation concealed*}†, blinded (outcome assessors),* controlled trial with 1 year of follow up.

Setting
A home health service in a geriatric assessment and rehabilitation hospital in New Zealand.

Participants
240 people who were ⩾ 75 years of age (mean age 81 y, 68% women) and were living in their own homes. Exclusion criteria were inability to walk around their own residence, current receipt of physiotherapy, or inability to understand the study. 88% of participants completed 1 year of follow up.

Intervention
121 participants were allocated to a home-based exercise programme run by a district nurse. The programme was implemented as part of the nurse's usual work and included muscle strengthening and balance-retraining exercises of increasing difficulty as well as a walking programme. Individually tailored exercise prescriptions took place during 5 home visits. Participants were to exercise ⩾ 3 times weekly (30 min/session) and walk twice weekly for 1 year. Between home visits, telephone calls were used to increase motivation and discuss problems. {Programme materials are available from the author.}† 119 participants received usual care.

Main outcome measures
Number of falls and injuries related to falls, cost of implementation, and hospital costs related to falls.

Main results
43% of participants in the exercise group met the exercise goals. Participants in the exercise group had fewer falls than did participants in the control group (80 *v* 109, p = 0.02). Subgroup analysis showed that this reduction occurred only in participants ⩾ 80 years of age (43 *v* 81 falls, p = 0.007). Fewer serious injurious falls occurred in the exercise group (table), but the groups did not differ for total number of injurious falls, moderate injurious falls, and falls for which medical care was sought.

The cost of the programme was NZ $432 per person for the first year. The incremental cost per fall prevented was NZ $1803 for all participants. The exercise programme was more cost effective for older participants. When implementation costs and hospital costs averted were both considered for participants ⩾ 80 years of age, the cost savings were NZ $576 per fall prevented and NZ $1563 per injurious fall prevented.

Conclusion
A home-based exercise programme for older people implemented by a nurse reduced falls and serious injuries from falls, and was more cost effective in people ⩾ 80 years of age.

Home-based exercise v usual care for people ⩾ 75 years of age‡

Outcome at 1 year	Exercise	Usual care	RRR (95% CI)	NNT (CI)
Serious injury from falling	1.7%	7.6%	78% (13 to 95)	17 (9 to 140)

‡Abbreviations defined in glossary; RRR, NNT, and CI calculated from data in article.

Source of funding: Health Funding Authority Northern Division, New Zealand.

For correspondence: Dr M C Robertson, Department of Medical and Surgical Sciences, Otago Medical School, P.O. Box 913, Dunedin, New Zealand. Fax +64 3 474 7641.

A modified version of this abstract also appears in Evidence-Based Nursing.

*See glossary.
†Information provided by author.

COMMENTARY

Hospital-based treatment of injuries, especially those requiring admission to hospital or fracture care, is expensive. Exercise has been shown to prevent falls in the elderly.[1] It is logical to expect that an exercise programme would decrease injuries. To show decreased risk for serious injury in a reasonably sized population, the baseline risk must be high. This fact probably explains why Robertson *et al* found the intervention to be most effective in older participants.

The shortcoming in the research design is the lack of sham intervention in the control group. Did the nurses or participants, or both, need any training in exercise, or could 10 hours of home nursing time per participant have achieved the same results without exercise training? The compliance rate with the exercise programme was 43%, but for the intention to treat model it was 40%. It would be interesting to know whether compliance with the exercise programme was related to fall prevention.

The bottom line is that serious injuries are expensive to treat, and any intervention that has potential for preventing them in a high-risk population is worth the effort. In the study by Robertson *et al*, the number needed to treat to prevent 1 additional serious injury from a fall is 17. This number is more reasonable than that for many treatments in current use. We can be less sure from this study what the actual "treatment" needs to be and who should provide it.

John A Robbins, MD
University of California, Davis
Sacramento, California, USA

1 Province MA, Hadley EC, Hornbrook MC, *et al.* The effects of exercise on falls in elderly patients. A preplanned meta-analysis of the FICSIT Trials. Frailty and Injuries: Cooperative Studies of Intervention Techniques. *JAMA* 1995;**273**:1341–7.

Authors' response

Our research clearly shows that this programme, specifically designed to prevent falls in elderly people by addressing muscle weakness and balance problems, reduces falls and injuries better than does usual care or social visits. The results should be reviewed in conjunction with the other published trials of the programme.

M Clare Robertson, PhD
A John Campbell, MD