Exercise for fall risk reduction in community-dwelling older adults: a systematic review

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CRD summary
This review concluded that falls and falls risk can be reduced with group exercise programmes and individualised exercise prescriptions in the community-dwelling older population. The most effective exercise variables were unknown. The authors' conclusions reflected the data presented, but their reliability is unclear as language and publication bias could not be ruled out.

Authors' objectives
To investigate the effect of exercise on falls and falls risk reduction in community-dwelling older adults.

Searching
MEDLINE, CINAHL, PEDro, EMBASE and AMED were searched (January 2000 to July 2006) for studies published in English. Search terms were reported.

Study selection
Randomised controlled trials (RCTs) of a physical activity or exercise intervention compared with control (activity or usual treatment), sham control or another intervention that did not include exercise were eligible for inclusion. Eligible studies were of community-dwelling (defined as ambulatory and not depending on someone else for basic activities of daily living or walking) older adults aged over 50 years.

The included studies had a female to male ratio of 3:1, 4:1 or 5:1 or were 100% female. Mean ages ranged from 72 to 84 years (where reported). Some studies were of healthy participants; others included participants with other conditions (such as visual impairment, stroke, osteoporosis, history of bed rest or hospitalisation). A wide variety of interventions were included (such as group, individual or combined programmes and land-based or water-based exercise) with the objective of improving strength and/or balance. Education and vitamin D supplementation were provided in some programmes. Some programmes provided follow-up with a health professional (physiotherapists, occupational therapists, nurses, physicians).

Outcomes of interest fell into six categories that described fall risk: muscle strength (isolated strength measurement; typically lower body strength), functional tasks that included timed up-and-go (rising from a chair or rising from a chair and walking), balance (static or dynamic), gait (velocity over a short distance), fear of falls or falls efficacy, self-reported functional status and a composite measure of several factors. Other falls outcomes were reported (such as fall rate, number of multiple fallers, number of injurious falls and home safety).

Two reviewers independently selected studies for inclusion. Disagreements were resolved by a third reviewer.

Assessment of study quality
Methodological quality was assessed by two reviewers using published criteria set out by Van Tulder et al. to assess aspects of internal validity (scored out of 10), descriptive criteria (scored out of 5) and statistical criteria (scored out of 2). Included studies had to score at least 5 for internal validity. A validity score out of the total 17 was calculated for the included studies. Disagreements were resolved by a third reviewer.

Data extraction
Data were extracted for the outcomes of interest.

The authors did not report the number of reviewers who performed data extraction.

Methods of synthesis
The studies were presented in a narrative synthesis.
Results of the review

Twenty-two studies were included in the review (n=5,467). Overall quality scores ranged from 9 to 15 out of 17 (median 13); scores for internal validity ranged from 5 to 8 out of 10 (median 6). Study duration ranged from two weeks to one year.

Muscle strength and functional tasks: One out of six studies found that the exercise group experienced a significant improvement in lower extremity muscle strength compared with control.

Balance: Nine of 15 studies found improvement in all or some balance measures compared with the control group.

Gait: One out of seven studies (a study of older adults diagnosed with stroke) reported a positive effect in the exercise group compared with control.

Composite measures: Improvement was reported in the exercise group of the two studies that reported a composite measure of fall risk (using the Physiological Profile Assessment).

Falls efficacy and self-reported function: Ten studies measured falls efficacy or fear of falling. Three used Tai Chi as an intervention and these studies reported an improvement in these in the exercise group. Two of the remaining seven studies reported a significant improvement in falls efficacy compared with control. One out of seven studies reported an improvement in general health status (disability score).

Falls: Eight out of fourteen studies reported a positive outcome for falls or fall rates

Authors’ conclusions

Falls and falls risk can be reduced with group exercise programmes and individualised exercise prescriptions in the community dwelling older population. The most effective exercise variables were unknown.

CRD commentary

The research question was supported by inclusion criteria for participants, intervention, comparator and study design. Only studies published in English were included, so publication and language bias could not be ruled out. Assessment of study quality and screening were performed by two reviewers; it was unclear whether such steps to reduce error and bias were performed for data extraction. Validity was assessed with appropriate criteria. Narrative synthesis appeared appropriate, given the diversity of interventions and outcome measures included.

The authors’ conclusions reflected the data presented, but their reliability is unclear as language and publication bias could not be ruled out.

Implications of the review for practice and research

Practice: The authors stated that there were still no best practice guideline for type, frequency, intensity or duration of exercise to prevent falls and for optimal outcome measures to evaluate fall risk.

Research: The authors stated that further research was needed. This should include populations with comorbidities known to increase fall risk together to help determine optimal condition-specific fall-prevention programmes and use best measures of balance (a key risk factor) when evaluating participants at risk of falling. The authors outlined a number of further suggestions for future research.

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