The effectiveness of physical therapist-administered group-based exercise on fall prevention: a systematic review of randomized controlled trials

Martin JT, Wolf A, Moore JL, Rolenz E, DiNinno A, Reneker JC

CRD summary
This review concluded that preliminary evidence suggests that group-based exercise is effective for falls prevention, quality of life enhancement and balance improvement in older adults, with comparable results to home exercise programmes. Limitations of the small evidence base and review methodology/reporting and the generally small magnitude of effects observed suggest that these conclusions may be overstated.

Authors' objectives
To evaluate the effectiveness of physical therapy-administered group-based exercise versus controls for fall prevention and improvement of quality of life.

Searching
PubMed and CINAHL were searched from December 2001 to June 2012 for studies published in English. Search terms were reported. Reference lists of included studies were searched manually.

Study selection
Eligible studies were randomised controlled trials that compared the efficacy of physical therapist-developed/supervised group exercise versus control (no intervention or a traditional individual physical therapy intervention). Studies had to be conducted among ambulatory men and women aged 65 years or older living in the community and/or an institution. Eligible outcomes were related to functional balance and/or quality of life (specific outcome measures were prespecified).

Most studies were conducted on people living in the community and most compared group-based exercise against a non-exercise control group (no intervention or education alone). A small number of studies compared group-based exercise (alone or in combination with a home exercise programme/other interdisciplinary services) versus a home exercise programme. Mean age of participants ranged from 72 to 81 years. Group exercise sessions were 40 to 90 minutes long and usually took place one to three times a week. Total intervention durations ranged from six weeks to one year.

Two reviewers selected studies for inclusion in the review; any discrepancies were resolved by consensus or involvement of a third reviewer.

Assessment of study quality
Study quality was assessed using the PEDro scale (scores from 0 to 10; a score of 6 or more indicates high quality).

Two reviewers independently performed the quality assessment; any discrepancies were resolved by consensus.

Data extraction
Data (standardised mean change scores or postintervention scores) from measures of balance, functional mobility and quality of life were extracted to calculate effect sizes. Self-reported data on fear of falling, fall rate and fall-related injuries were extracted. Effect size categories were less than 0.20 (trivial), between 0.20 and 0.50 (small), between 0.50 and 0.80 (medium) and greater than 0.80 (large).

Authors were contacted where data were insufficient. Mean differences between intervention and control groups were extracted/calculated where no sufficient data could be obtained for calculation of effect sizes.

The authors did not state how many reviewers extracted these data.

Methods of synthesis
Effect sizes from the individual studies were presented in a narrative synthesis, according to the outcomes reported. No details of statistical methods of pooling were provided.
Results of the review
Ten studies were included in the review (2,293 participants, range 32 to 1,090 per study). Total PEDro scores were 7 (five studies), 6 (three studies) and 5 (two studies).

Comparisons of group-based exercise and no intervention (seven studies): Compared with controls, significant benefits were observed in intervention groups in the number of falls self-reported (four studies; effect sizes were calculable for two studies and were 0.19 and 0.25), injury rates associated with falls (two studies; one effect size was 0.17 and one was not calculable), scores on the Berg Balance test (one study; effect size 0.49), scores on conditions 5 and 6 on the Clinical Test of Sensory Integration and Balance (one study; effect sizes not reported) and scores on the coordinated stability test (two studies; effect sizes not calculable).

Benefits in intervention groups were found for measures of postural sway (one study; effect size range 0.17 to 0.26), single-leg stance (one study; effect size 0.32), scores on the TUG/8 Foot Up and Go test (one study; effect size 0.12), scores on the 15D test of health-related quality of life (effect sizes not calculable), scores on the Osteoporosis Assessment Questionnaire (OPAQ) (one study; effect size range 0.46 to 0.76) and scores on OPAQ relating to fear of falls (one study; effect size 0.65).

There were no significant differences between groups for gait speed (one study; effect size 0), scores on the SF-36 (one study; effect size range 0.01-0.09) and fear of falling (one study; effect size not reported).

Comparisons of group-based exercise and home exercise programmes (three studies): One study found no significant decrease in fall rate in either the intervention or the control group. One study found improvements in both groups on berg Balance Test scores, single-leg stance and the tandem stance but neither effect size nor statistical significance were calculable. One study used the SF-36 instrument to measure quality of life; results showed significant improvements in the intervention group for the role emotional category (effect size 0.17).

No significant differences between study groups were found in relation to self-reported fall rates (one study; effect size not calculable), gait speed (one study; effect size 0), scores on the Tug/8 Foot Up and Go test (two studies; one with an effect size of 0.10 and one with an effect size that was not calculable) and fear of falling (one study; effect size not calculable).

Authors' conclusions
Preliminary evidence suggests that group-based exercise is effective for falls prevention, quality of life enhancement and balance improvement in older adults, with comparable results to traditional home exercise programmes.

CRD commentary
The review question and inclusion criteria were clearly defined. A small number of relevant electronic databases were searched. The restriction to publications in English meant that some relevant studies may have been missed. Efforts were made to minimise risk of reviewer error and/or bias during the processes of study selection and quality assessment but this was unclear for data extraction. A suitable quality assessment tool was employed; most studies were rated high quality. Study details were limited and details that were given demonstrated heterogeneity between studies in intervention intensity and the outcomes assessed. Thus, the narrative method of synthesis seemed appropriate.

Review limitations included the small number of studies found to be eligible for inclusion and that effect sizes and/or statistical significance were not always calculable. Where effect sizes were calculable, most were trivial or small which suggested that the authors' conclusions may be overstated. The recommendations made for further research appear justified.

Implications of the review for practice and research
Practice: The authors did not state any implications for future practice.
Research: The authors stated that additional high-quality research was needed to confirm the findings of this review and explore the benefits of group-based exercise compared to traditional outpatient physical therapy intervention. Further research was suggested to determine the feasibility and cost-effectiveness of implementing group-based exercise programmes for at-risk older adults, in place of traditional outpatient service, home exercise programmes or educational interventions. The use of the same outcome measures across multiple researchers would allow for easier comparison of
study results (through meta-analysis) and more conclusive findings overall.

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