Adherence to and efficacy of home exercise programs to prevent falls: a systematic review and meta-analysis of the impact of exercise program characteristics

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CRD summary
The adherence, by older adults, to home exercise programmes for the prevention of falls, was low and might be affected by specific intervention characteristics. There was no evidence to link adherence with intervention efficacy. Despite high variation and limitations in the included trials and the analyses, these cautious conclusions broadly reflect the evidence and are likely to be reliable.

Authors' objectives
To assess whether adherence to home exercise interventions for the prevention of falls, in older adults, related to programme characteristics and intervention efficacy.

Searching
MEDLINE, CINAHL, Cochrane Central Register of Controlled Trials (CENTRAL) and EMBASE were searched, for studies in English, up to November 2011. Search terms were reported.

Study selection
Randomised controlled trials (RCTs) of a home exercise intervention, aimed at preventing falls, that could be applied for the whole population, were eligible for inclusion. More than 80% of participants in each trial had to be adults aged 60 years or older. Trials had to report a measure of adherence, defined as the proportion of participants who fully (100%) or partly (closer to 50% of sessions) completed a prescribed number of home exercise sessions, at a set frequency. Trials of programmes delivered in a community house, hospital or high-care facility, those delivered to groups of participants, and those of inconsistent duration between participants, were excluded.

Most of the included trials examined a mixed population of older adults, with or without a recent history of a fall. The types and components of the interventions varied. Lower limb strength, with or without balance training, was the most common exercise. Most trials provided support through home visits. Interventions were implemented over between eight and 78 weeks, and sessions lasted between 10 and 60 minutes.

Two reviewers independently selected the trials, with disagreements resolved by discussion.

Assessment of study quality
The risk of bias was assessed for reporting of participant characteristics, description of the intervention, and data relating to adherence (method and timing of recording, period of retrospective recall, independent verification, and handling of missing or indeterminate data).

The authors did not state how many reviewers evaluated trial quality.

Data extraction
The data were extracted to calculate the proportions of participants who were fully and partly adherent to the intervention, including and excluding drop-outs. Trial authors were contacted for missing data. Efficacy data on the prevention of falls were extracted.

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

Methods of synthesis
The pooled proportion of participants who were fully adherent was calculated, using random-effects meta-analysis. Heterogeneity was assessed using $I^2$. Meta-regression was used to explore the association between adherence and a large number of variables, including the intervention characteristics, varying definitions and methods of calculating partial adherence, and the intervention efficacy. Sensitivity analyses were run to evaluate the effects on the results of the
analyses, of including and excluding drop-outs, who were classified as adherent.

Results of the review
Twenty-three trials were selected, including 2,163 patients who received a home exercise intervention (the number of control participants was not reported for all trials). Quality scores ranged from 1 to 6 out of 7. The reporting of patient characteristics was inadequate in eight trials. The methods (reported in 19 trials), timing (16 trials) and period of retrospective recall (17 trials) for adherence data collection, varied across the trials. Few reported independent verification of adherence data (one trial) and the handling of indeterminate or missing participant data (six trials).

The percentage of participants who were fully adherent was 21 (95% CI 15 to 29). There was evidence of substantial heterogeneity among the trials (I²=94%).

Sensitivity analyses yielded similar results. Meta-regression analyses showed higher percentages of full adherence with interventions containing balance or walking exercise, moderate home visit support, physiotherapist-led delivery, and no flexibility training. Higher percentages of partial adherence were found with interventions containing home visit or telephone support, a participant health service recruitment approach, and no group exercise training.

Neither full nor partial adherence was significantly associated with intervention efficacy, even when the analysis was adjusted for potential confounders.

Authors' conclusions
The adherence, by older adults, to home exercise programmes for the prevention of falls, was low and might be affected by specific intervention characteristics. There was no evidence to link adherence with intervention efficacy.

CRD commentary
The review question and selection criteria were clear. Several sources were searched, but language restrictions were applied, so some trials might have been missed. Steps were taken to minimise reviewer error and bias in study selection. It was unclear if data extraction and quality assessment were performed by two people independently.

The results of the quality assessment were reported, and they indicated a number of limitations to the included trials. Variations in the collection and handling of adherence data, and clinical and substantial statistical variation, mean that pooling of the data might not have been appropriate. Heterogeneity was explored and the meta-regression appears to have been appropriate for the question, but the results might not be reliable, as the large number of variables explored, and the imprecise estimates, suggest a high risk of false-positive results. Estimates of the association between treatment adherence and efficacy were imprecise, so the conclusion that evidence was absent, rather than there was evidence of no association, was appropriate.

Despite limitations in the included trials and in the analyses, and high variability, the conclusions of the review were cautious and broadly reflect the evidence, making them likely to be reliable.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that further research was needed to examine the dose-response relationship between the exercise and the prevention of falls.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.