

# Program-related factors are associated with adherence to group exercise interventions for the prevention of falls: a systematic review

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**Questions:** What factors are associated with adherence of older adults to group exercise interventions for the prevention of falls? What is the relationship between adherence and the falls prevention efficacy of the intervention? **Design:** Systematic review with meta-analysis of randomised trials. **Participants:** Older adults (60 years and older) undertaking a group exercise intervention for falls prevention. **Intervention:** Group exercise not in combination with a home program and intended at least in part for falls prevention. **Outcome measures:** Adherence was measured as the mean proportion of sessions attended, including participants who discontinued the intervention. Falls prevention efficacy was measured as the proportion of fallers in the intervention versus the control group at follow-up. Various program-related factors, including intervention duration, session frequency, and components of the exercise regimen were examined for each of the studies. **Results:** Of the 210 articles identified, 18 studies met the inclusion criteria and were analysed. The pooled estimate of adherence across the studies was 0.74 (95% CI 0.67 to 0.80). Lower levels of adherence were associated with group exercise interventions that had a duration of 20 weeks or more, two or fewer sessions per week, or a flexibility component. No significant relationship was found between adherence and falls prevention efficacy. **Conclusion:** Program-related factors may influence adherence to group exercise interventions for the prevention of falls. Further research is encouraged to more precisely determine the effect of intervention level factors on adherence, and the effect of adherence on intervention efficacy. [McPhate L, Simek EM, Haines TP (2013) Program-related factors are associated with adherence to group exercise interventions for the prevention of falls: a systematic review. *Journal of Physiotherapy* 59: 81–92]

**Key words:** Accidental falls, Exercise, Frail elderly, Aged

## Introduction

A fall is defined as a sudden, unintentional change in position, causing the individual to land at a lower level (Tinetti et al 1997). Falls among older adults (60 years of age or older) present a challenging issue, and one that requires urgent intervention (WHO 2011a, WHO 2011b). Falls in this age group account for about one-third of hospitalised injury and about one-fifth of fatal injuries (Department of Human Services 2007). In addition, the marked increase in mortality amongst people 85 years and older is said to be directly affected by falls (Australian Bureau of Statistics 2006). Moreover, the number of fall-related injuries is expected to rise over the coming years in relation to the ageing population (Hendrie et al 2003). This increase in morbidity amongst the older population undoubtedly has financial ramifications. In 2003–04, the estimated total cost of hospital care for fall-related injuries in Australia was \$566 million (Bradley and Pointer 2008). However, this figure does not take into account the indirect and intangible costs associated with falls. Pain, suffering, and loss of independence and productivity are all associated with fall-related injuries. It is estimated that in Australia, these ‘lifetime’ costs exceed \$1 billion per year (Bradley and Pointer 2008).

To counteract these economic and social issues, governments have focused on falls prevention. A recent Cochrane review identified that a population-based approach decreases the number of falls in community-dwelling older adults

(Department of Human Services 2007, McClure et al 2005). The effectiveness of group exercise in preventing falls has been widely documented. Cochrane reviews have found that group exercise interventions involving resistance and balance training or modalities such as Tai Chi are effective, and offer a cost-effective, population-based approach for falls prevention (Gillespie et al 2012, Howe et al 2007). However, adherence to these interventions is drastically reduced as time from first exposure passes (Department of Human Services 2007). In a trial analysing views held by healthcare providers, patient compliance was the most reported barrier to delivering a successful falls prevention

**What is already known on this topic:** Falls among older adults are an important public health issue. Group exercise programs involving resistance and balance training or modalities such as Tai Chi decrease the number of falls in community-dwelling older adults. However, adherence to these population-based programs for falls prevention reduces markedly over time.

**What this study adds:** Average adherence to group-based exercise programs intended (at least in part) for falls prevention in older adults was about 75%. Lower adherence was associated with group exercise interventions that had a duration of 20 weeks or more, involved 2 or fewer sessions per week, or had a flexibility component.

intervention (Fortinsky et al 2004). Governments have pledged to investigate evidence-based strategies and countermeasures, including exercise interventions to facilitate falls prevention (Department of Human Services 2007). However, to guide government policy, sound evidence is required to indicate best practice in falls prevention.

There has been little empirical investigation of the effects of adherence on the efficacy of falls prevention interventions. Previous literature has focussed primarily on patient-level factors that affect adherence to interventions for the prevention of falls. The patient's perspective of barriers and facilitators to exercise adherence has previously been reported. For example, transport to and from the venue, cost, loss of interest, and injury all influence adherence to a schedule of exercise classes (Bunn et al 2008, de Groot and Fagerstrom 2011, Forkan et al 2006, Lee et al 2010). However, the influence of intervention-level factors extrinsic to the patient, such as exercise mode, duration, and frequency, remain widely unanalysed. Merom and colleagues (2012) conducted an observational study examining participation in different forms of exercise for the prevention of falls. However, it only identified whether participants were participating in exercise, and did not provide a numerical measure of adherence which would be more sensitive to change. Exploration of the association between program-related factors and adherence is paramount, as it is these factors that can be modified by program providers to enhance adherence to interventions.

A recent systematic review sought to identify the likely overall participation rate in community-based interventions for the prevention of falls, including group exercise interventions (Nyman and Victor 2012). However, this research did not specify whether the adherence rates they used were inclusive of drop-out participants, and the pooled adherence rates calculated were not weighted for study size. Further, no analyses were undertaken to examine the factors that are associated with adherence, nor the association between adherence and the efficacy of the intervention. As this review aspires to guide future practice in developing

**Box 1.** Inclusion criteria.

<p><b>Design</b></p> <ul style="list-style-type: none"> <li>• Randomised trials</li> <li>• English language</li> </ul> <p><b>Participants</b></p> <ul style="list-style-type: none"> <li>• Older adults, ie, at least 80% of participants were at least 60 years old</li> <li>• Community dwelling, ie, not in hospital or high-care living facility</li> <li>• Not affected globally by underlying neurological pathology</li> </ul> <p><b>Intervention</b></p> <ul style="list-style-type: none"> <li>• Group exercise (group of four or more participants) exclusively, ie, not in combination with a home exercise program</li> <li>• A falls prevention component was stated or implied in the introduction or methods sections of the paper</li> </ul> <p><b>Outcome measures</b></p> <ul style="list-style-type: none"> <li>• Adherence data was stated in the form of mean sessions attended by participants, including those who discontinued the intervention</li> <li>• The paper provided a measure of falls prevention as an outcome measure for the intervention</li> </ul>
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population-wide, community-based interventions for the prevention of falls, trials conducted in high-care living facilities or hospitals were not examined in this review.

Therefore the research questions for this study were, in community-dwelling older adults:

1. What are the program-related factors that are associated with adherence to group exercise interventions for the prevention of falls?
2. What are the adherence rates to group exercise interventions for the prevention of falls?
3. Are there any relationships present between adherence and the falls prevention efficacy of the intervention?

**Table 1.** Definitions of program-related factors extracted from the included studies.

Factor	Definition
Balance component	The exercise program description stated a balance component.
Strength component	The exercise program description stated a strength component.
Flexibility component	The exercise program description stated a flexibility component.
Endurance component	The exercise program description stated an endurance component.
Functional activities component	The exercise program description stated a functional activities component.
Education component	The exercise intervention included an education class as well as group exercise.
Supervisor	The supervisor of the program, eg, physiotherapist, peer
Intervention setting	The setting of the program, eg, community gym, pool
Group-based set up	The exercise program had a group-based set up, eg, Tai Chi, aerobics, rather than a circuit-based set up, eg, resistance training.
Group size ≤ 20 participants	Exercise training occurred in groups of less than 20 participants.
Session duration ≤ 60 min	The exercise session duration was less than 60 minutes.
Session frequency ≤ 2 per wk	The frequency of exercise sessions was less than or equal to 2 per week.
Intervention duration ≥ 20 wk	The duration of the intervention was greater than or equal to 20 weeks.
Health service recruitment	Participants were recruited via a referral, or random sample, from a health service.
Music	The exercise sessions were conducted to music.
Payment	The participants were paid.

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