



Fear of falling reduced by a lay led home-based program in frail community-dwelling older adults: A randomised controlled trial



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ABSTRACT

Background: In older adults, fear of falling (FOF) leads to a decline in daily physical activity quality of life and an increased risk of falling. The aim of this randomised controlled trial was to assess the effects of a 12-week home-based intervention program carried out by lay volunteers on FOF in frail older adults.

Methods: Thirty-nine participants were randomised to a physical training and nutrition (PTN) group and 41 participants to a social support (SOSU) group. In the PTN group, strength training and conversation about optimising nutrition were performed twice weekly, and the SOSU group received home visits without intervention. FOF and change of FOF were assessed using the Falls Efficacy Scale – International (FES-I). The Short Physical Performance Battery (SPPB), the Physical Activity Scale for the Elderly (PASE) and maximum handgrip strength and their changes were also assessed.

Results: The mean FES-I score at baseline was 42.7 points and was significantly associated with the SPPB and PASE scores. The FES-I score significantly changed in the PTN group from 44.1 to 39.9 points over the course of the intervention. Twenty-seven percent of the participants showed a decreased FES-I score of at least 4 points. This decrease was associated with an increase in the SPPB score and an increase in handgrip strength.

Conclusion: A 12-week structured physical training and nutrition intervention carried out by lay volunteers, which leads to an increase in physical activity and improved physical performance, can reduce FOF by about 10%.

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1. Introduction

“Falls in advanced age breaks not only bones, but also self-esteem, confidence and activity” (Runge, 1998). This sentence summarises the complexity of fear of falling (FOF) very well. In older individuals, FOF and falls interact with each other, i.e. in older adults with a previous fall history, the prevalence of FOF ranges between 29% and 92%; in people without a previous fall history, the rate is between 12% and 65% (Murphy, Williams, & Gill, 2002). FOF is a major health problem in frail older adults living in the community (Zijlstra, van Haastregt, van Eijk et al., 2007). In general, a vicious cycle has been identified: FOF leads to a decline in daily physical activity, quality of life, a change in gait parameters, an increased risk of falling and a loss of self-confidence, which in

turn may lead to a complete loss of independence (Friedman, Munoz, West, Rubin, & Fried, 2002). In fact, age-associated falls are not only indicators for a high risk of immobility, care dependency, infringements and mortality, but also an indicator for frailty (Fried et al., 2001).

There are two systematic reviews which have focused on the benefits of interventions to reduce FOF in older people living in the community (Kendrick et al., 2014; Zijlstra, van Haastregt, van Rossum et al., 2007). In summary, the authors postulated that without increasing the risk or frequency of falls, a multifactorial approach, such as balance in combination with strength training or community-based tai chi delivered in group format, can reduce FOF to a limited extent immediately after the intervention. However, in these systematic reviews (Kendrick et al., 2014; Zijlstra, van Haastregt, van Rossum et al., 2007), the interventions were conducted by professionals such as nurses, physiotherapists or professional trainers. Unfortunately, due to the ongoing ageing process of the population, a lack of healthcare professionals has already been noticed in many European countries (Habermann &

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Stagge, 2015). To compensate for this lack of healthcare professionals, new approaches to providing exercise interventions are required. Furthermore, it should also be kept in mind that many frail older adults suffer from mobility handicaps and are tied to their own homes. For these older people, home-based exercise programs are necessary, which are both limited and expensive. Health promotion delivered by non-professional volunteers, including physical training, could be an appropriate approach to tackle this problem.

According to a systematic review (French, Olander, Chisholm, & Mc Sharry, 2014), older people are more receptive to assistance when the exercises are carried out by someone of the same background (e.g. comparable age, life experience). Due to this fact, the link between lay volunteers and frail older people could offer additional support for the healthcare system. In fact, according to the Austrian Volunteer Report (Bundesministerium für Arbeit, 2015), voluntary work, especially in the field of sports and exercise, has slightly increased over the last 6 years. To date, only two studies have been conducted that have focused on interventions delivered by lay volunteers (Lamb, Bartlett, Ashley, & Bird, 2002; Rantanen et al., 2015). These studies suggested that interventions delivered by lay volunteers can influence general health in a positive way. Thus, it can be assumed that physical training, as delivered by lay volunteers, may have a similar potential to decrease FOF in frail older adults as interventions delivered by healthcare professionals.

The aim of this study was to assess the association between physical parameters and FOF and the effects of a 12-week home-based program carried out by lay volunteers on FOF in frail older adults residing in the community.

2. Materials and methods

2.1. Design and study sample

A detailed description of the whole study protocol has previously been published (Dorner et al., 2013). The study comprised a randomized controlled trial comparing a physical training and nutritional intervention program (PTN group) versus a social support intervention (SoSu group). In brief, a program was developed which was not performed by health professionals. Instead, it was carried out by lay volunteers (age ≥ 50 years) called “buddies”. These buddies were trained by health professionals and supervised over the study period. Each buddy visited one frail older person at home twice a week, and performed structured strength training and talked about aspects of healthy nutrition (the physical training and nutrition (PTN) group) or just visited the person without training (the social support (SOSU) group). The frail older adults were recruited in three different hospitals in Vienna or they responded to an invitation to participate following reports on the project on television or in the newspapers. Recruitment was performed between September 2013 and October 2014.

The study was approved by the local ethics committee of the Medical University of Vienna (Reference number: 1416/2013) and complied with the Declaration of Helsinki. The protocol was also registered at clinicaltrials.gov (Identifier: NCT01991639). The study methods were in accordance with the CONSORT guidelines for reporting randomized trials (Schulz, Altman, & Moher, 2010)

2.2. Participants frail older adults

Each self-selected possible participant was screened for eligibility. Participants were included in the study if they met the following criteria: ≥ 65 years; and prefrail or frail according to the Frailty Instrument of the Survey of Health, Ageing and Retirement in Europe (SHARE-FI) (Romero-Ortuno, Walsh, Lawlor,

& Kenny, 2010). Further inclusion criteria were: malnutrition or at risk of malnutrition according to the Mini Nutritional Assessment Short-Form (MNA[®]-SF) (Kaiser et al., 2009); living at home; no medical contraindication for the performance of strength training (“No” to the question: ‘Has your doctor recently told you that you should not exercise?’); and able to walk (with or without a walking aid). Older individuals were excluded from the study for the following reasons: living in a nursing home or planned admission to a nursing home; chemo- or radio-therapy due to cancer, at the moment or planned; nursing level 6 (more than 180 h per month of care is necessary; care cannot be planned or is permanently required) or 7 (more than 180 h per month of care is necessary; person cannot move without help); insulin-treated diabetes mellitus; chronic obstructive pulmonary disease stage III or IV; dialysis patient or chronic kidney insufficiency with protein restriction; or impaired cognitive function according to the MMSE (≤ 17 points).

2.3. Buddies

Buddies were physically fit volunteers of ≥ 50 years of age, recruited in cooperation with the “Wiener Hilfswerk”, a non-governmental provider of social care services, which is experienced with working with volunteers in many other fields. All volunteers underwent a four-day training course with approximately 4 h instruction each day, in which they learned to perform the exercises, important nutrition aspects for elderly people and how to motivate older persons. During the training course, frailty, important nutritional messages, strength training, social interaction and safety in the exercises were discussed and practised. Moreover, role-playing of the home-based program and situations that could happen during volunteering were also practised. To ensure the lay-persons’ confidence, a hotline to call health professionals, including a physiotherapist and a dietician, was established (Dorner et al., 2013).

2.4. Sample size

Based on an assumed 20% drop-out rate (including loss to follow-up), we estimated that for 80% statistical power to detect a clinically relevant difference of 2 kg (standard deviation: 3) in handgrip strength between the two groups a total sample size of 80 persons (40 in each group) was required. Details of the sample size calculation have been previously published (Dorner et al., 2013).

2.5. Randomisation and blinding

The frail older adults were matched to one lay buddy, dependent on the place of residence, and randomly assigned to the PTN group or to the SOSU group. Randomisation was stratified by using sex-specific handgrip strength thresholds (males < 22 kg and females < 15 kg). (Dorner et al., 2013). Due to the nature of exercise based interventions, blinding of all outcome assessors and participants was hardly possible for this type of study.

2.6. PTN group

Buddies visited the frail older persons for approximately one hour each time, twice a week. The training session followed a standard format with a 10-min warm-up (mobility and balance exercises) and a 25-min strength training routine, which were performed in circuit form:

- mini squat in front of a chair (lower limbs)
- chest press against an elastic resistance band (pectoral muscles)

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