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Does a fall prevention educational programme improve knowledge and change exercise prescribing behaviour in health and exercise professionals? A study protocol for a randomised controlled trial

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ABSTRACT

Introduction: Falling in older age is a serious and costly problem. At least one in three older people fall annually. Although exercise is recognised as an effective fall prevention intervention, low numbers of older people engage in suitable programmes. Health and exercise professionals play a crucial role in addressing fall risk in older adults. This trial aims to evaluate the effect of participation in a fall prevention educational programme, compared with a wait-list control group, on health and exercise professionals' knowledge about fall prevention and the effect on fall prevention exercise prescription behaviour and confidence to prescribe the exercises to older people.

Methods and analysis: A randomised controlled trial involving 220 consenting health and exercise professionals will be conducted. Participants will be individually randomised to an intervention group (n=110) to receive an educational workshop plus access to internet-based support resources, or a wait-list control group (n=110). The two primary outcomes, measured 3 months after randomisation, are: (1) knowledge about fall prevention and (2) self-perceived change in fall prevention exercise prescription behaviour. Secondary outcomes include: (1) participants' confidence to prescribe fall prevention exercises; (2) the proportion of people aged 60+ years seen by trial participants in the past month who were prescribed fall prevention exercise; and (3) the proportion of fall prevention exercises prescribed by participants to older people in the past month that comply with evidence-based guidelines. Outcomes will be measured with a self-report questionnaire designed specifically for the trial.

Ethics and dissemination: The trial protocol was approved by the Human Research Ethics Committee, The University of Sydney, Australia. Trial results will be disseminated via peer reviewed journals, presentations at international conferences and participants' newsletters.

Trial registration number: Trial protocol was registered with the Australian and New Zealand Clinical Trials Registry (Number ACTRN12614000224628) on 3 March 2014.

INTRODUCTION

Falling in older age is a serious and common public health issue that can result in significant injury and ongoing disability. At least one-third of people aged 65 years and over fall once or more annually.[1] Exercise programmes that are ongoing and that include balance challenging exercises are effective as a single intervention in preventing falls in community-dwelling older people,[2 3] but uptake of evidence-based fall prevention exercise programmes by older people is low.[4] Given the size and scope of the problem of falls in older age, it is crucial that health and exercise professionals have the knowledge and skills to address fall risk in their daily practice.

Large systematic reviews have found that there are significant improvements in health workers' clinical behaviour after attending educational workshops,[5] following 'educational outreach' visits[6] and by audits of clinical care followed by providing feedback.[7] A Cochrane review also found that the use of guidelines by health workers can improve the quality of patient care.[8] Educational meetings using a range of teaching and learning strategies have also increased physiotherapists' use of care strategies recommended in clinical guidelines.[9]

The impact of educational interventions has been extensively researched in some areas of healthcare, such as the management of diabetes.[10] However, very little research has been conducted into interventions that target staff behavioural change in the fall prevention area. One trial that examined the effect of an educational intervention aimed at encouraging general practitioners to conduct medication reviews with their older patients resulted in short-term reductions in the use of medications known to increase risk of falling and an overall reduction in the risk of falling in older patients after 12 months.[11] No trials have investigated the impact of interventions aimed at increasing the likelihood of health and exercise professionals prescribing fall prevention exercises to older people, despite the demonstrated effectiveness of exercise to prevent falls in numerous randomised controlled trials.[2]

The aim of this trial is to evaluate the effect of participation in a fall prevention educational programme, compared with a wait-list control group, on health and exercise professionals' levels of knowledge about fall prevention and the effect on fall prevention exercise prescription behaviour and levels of confidence to prescribe the exercises to older people.

METHODS AND ANALYSIS

Trial design

We will conduct a randomised controlled trial. The design of the trial is shown in figure 1. This trial has been designed according to the CONsolidated Standards Of Reporting Trials (CONSORT) statement,[12] and is reported according to the Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) statement[13] and with reference to the Template for Intervention Description and Replication (TIDieR) checklist.[14]

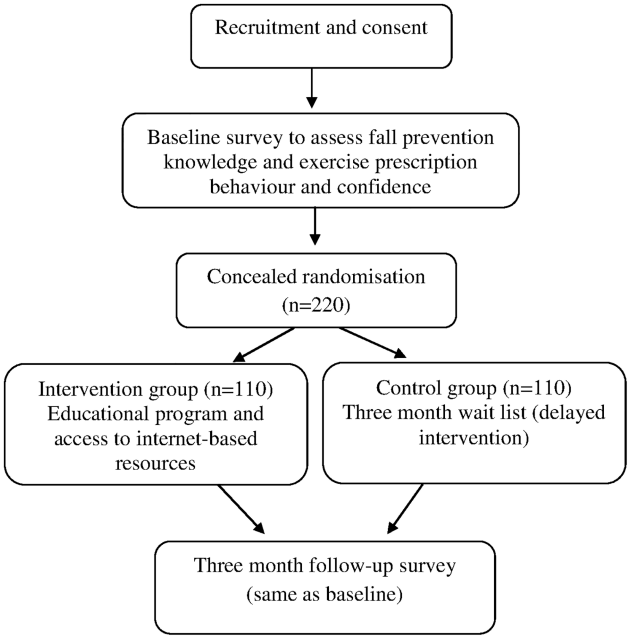

Figure 1 Trial design.

Eligibility criteria

Two hundred and twenty consenting health and exercise professionals residing in New South Wales, Australia will be randomised to either the intervention group (educational workshop and access to internet-based resources) or a control group (waiting list). People will be eligible for inclusion in the trial if they are a health or exercise professional whose clientele currently includes individuals or groups of people who are aged 60 years and over. Potential participants who are not fluent in written and spoken English will be excluded.

Recruitment

Participants will be recruited via advertisements published in newsletters of professional organisations and distributed to existing mailing lists of appropriate organisations (eg, Exercise and Sports Science Australia, Australian Physiotherapy Association, NSW Falls Prevention Network, exercise providers listed on the NSW Ministry of Health Active and Healthy website (http://www.activeandhealthy.nsw.gov.au)). Participant recruitment will start in January 2015. Consenting participants will be asked to indicate their availability to attend an educational workshop by nominating two calendar dates out of a possible four on offer in their geographic location, where one date occurs within the following month (which the intervention group will attend) and a second date that is 3 months after the first date (control group).

Randomisation

Participants will be individually randomised to intervention or control group in equal numbers after baseline measurement of fall prevention knowledge and exercise prescription practice and confidence. To ensure allocation concealment, randomisation to groups will be undertaken by an investigator not involved in recruitment using a computer-generated random number schedule with randomly permuted block sizes of 2–6.

Intervention

The educational programme will be an updated version of a programme previously developed by the research team.[15] It will be delivered in a face-to-face workshop format by experienced researchers for up to 35 attendees at a time over a 1-day period using didactic and interactive teaching strategies including formative feedback. The content of the programme is based on findings from an exercise meta-analysis[3] which were subsequently incorporated into best practice recommendations by the authors.[16] It will include information about the physiology of falls, risk factors for falls, and theoretical and practical aspects of the prescription of exercise-based interventions to prevent falls including the provision of internet-based support resources. Table 1 summarises the intervention content.

Table 1 Intervention description using the Template for Intervention Description and Replication (TIDieR) checklist

1. Brief name	Educational workshop for health and exercise professionals on effective prescription of exercise to prevent falls in older age
2. Why	The framework of the programme has been designed based on evidence from a Cochrane systematic review of 30 trials,[5] which found educational programmes for health professionals that are based on a mixture of didactic and interactive teaching strategies have greater effects on clinical practice than purely didactic sessions. The education programme has been designed using concepts of adult learning, including Knowles' Theory of Andragogy.[17] The programme will facilitate participant behavioural change and build confidence by providing goal setting, formative feedback about exercise prescription, social support and other relevant behavioural change strategies[5 18]
3. What materials	Information will be presented with a mix of audiovisual resources and group-based practical activities. Participants will receive a printed copy of the information presented and printed information about how to access the internet-based resources to assist with the prescription of evidence-based fall prevention exercise. The presentations will contain information about the social and economic burden of falls, fall risk factors, the physiological consequences of ageing, biomechanical and physiological principles of balance and effective exercise-based fall prevention strategies. The internet-based resources may include the Physiotherapy Exercises database (http://www.physiotherapyexercises.com), Active and Healthy website produced by the NSW Ministry of Health (http://www.activeandhealthy.nsw.gov.au) and online training for the Otago Exercise Programme offered through the North Carolina Area Health Education Centre (http://www.aheconnect.com/newahec/cdetail.asp?courseid=cgec3).www.aheconnect.com/newahec/cdetail.asp?courseid=cgec3www.aheconnect.com/newahec/cdetail.asp?courseid=cgec3).
4. What procedures	There will be a series of topics covered in the educational workshop as outlined below Module 1 ▶ Epidemiology of falls ▶ The physiology of balance and falls ▶ The biomechanics of balance and falls ▶ Gait assessment, practical activity Module 2 ▶ Fall risk assessment ▶ Fall risk assessment, practical activity Module 3 ▶ Fall prevention strategies: how to interpret the evidence ▶ Exercise prescription for older people and fall prevention ▶ Prescribing exercise to prevent falls, practical activity Module 4 ▶ Medical conditions impacting exercise tolerance ▶ Fall prevention programme implementation and management ▶ Tailoring exercise programmes for clinical groups, practical activity Formative feedback activities such as self-report quizzes and guided practical instruction on how to prescribe exercises will be undertaken during each module
5. Who provided	Two fall prevention experts, with clinical training in physiotherapy or exercise physiology and over 10 years of research experience will deliver each of the workshops
6. How	The educational workshop will be delivered face-to-face to groups of up to 35 people at a time
7. Where	The educational workshops will be delivered in a number of locations in NSW
8. When and how much	Participants will each attend one workshop of 7 h in total and will have ongoing access to internet-based support resources
9. Tailoring	All participants will receive the same workshop content and access to the same internet-based resources

As the meta-analysis by Sherrington *et al*[3] found larger effects on falls from higher dose programmes, participants will be encouraged to prescribe group-based exercise programmes with additional exercise for clients to do at home and to refer people who are finishing one-on-one, supervised interventions to community-based exercise opportunities. This meta-analysis[3] also found larger fall prevention effects from exercises that provide a high challenge to balance, so participants will be trained to use specific strategies to safely teach balance challenging exercise.

Control group

Participants allocated to the control group will continue with their usual practice. They will receive the educational workshop following the 3 months follow-up period after outcome measures have been reassessed.

Outcomes

All outcomes will be determined by asking participants to complete a questionnaire developed specifically for this trial, which will be administered either in electronic or paper format. The questionnaire will be administered at baseline prior to randomisation and 3 months after randomisation.

Primary outcome measures

The two primary outcomes will be:

1. Knowledge about fall prevention. This component of the questionnaire will require participants to respond to multiple choice and short answer questions. It will test participants' knowledge about falls, fall risk factors, fall prevention strategies and evidence-based prescription of fall prevention exercise for older people.
2. Change in fall prevention exercise prescription behaviour. This component of the questionnaire will ask participants to reflect on their exercise prescribing behaviour in the preceding 3 months. It will include two questions:

   "Do you think you have changed the way you prescribe fall prevention exercise in the past 3 months?" (measured with a 5-point Likert scale anchored at one end with "Yes, strongly agree" and at the other end with "No, strongly disagree"); and "If you strongly agree or agree to the question above, give one example of how you have changed the way you prescribed fall prevention exercise in the past month".

Secondary outcome measures

The three secondary outcomes will be:

1. Participants' self-reported confidence to prescribe fall prevention exercises to people aged 60+ years. This component of the questionnaire will require participants to rate their confidence in prescribing fall prevention exercises to older people. An 11-point Likert scale will be used, anchored at one end with "Most confident" and at the other end with "Least confident".
2. The proportion of people aged 60+ years seen by the study participants in the past month who were prescribed fall prevention exercises, according to records kept by participants. This component of the questionnaire will require the participants to determine, from their clinical records, the number of older clients/patients they saw in the past month and of those, the number of people that were prescribed exercise to prevent falls.
3. The proportion of fall prevention exercises prescribed by participants to people aged 60+ years in the past month that comply with evidence-based guidelines. This component of the questionnaire will require participants to list the specific exercises prescribed and the exercise duration and frequency of exercise prescribed. Fall prevention exercises will be classified using the evidence-based guidelines previously described,[16] and will be defined as being evidence-based if they meet the two criteria listed in table 2.

In addition to the primary and secondary outcomes, open-ended response questions will be included in the 3-month follow-up questionnaire for intervention group participants to explore their satisfaction with the intervention and motivation to implement the knowledge gained.

Analysis of outcomes

Between-group differences on the knowledge assessment (primary outcome) at follow-up will be analysed with linear regression with trial group as the independent variable, knowledge score at follow-up as the dependent variable, and baseline score on the knowledge assessment as a covariate. The difference in the proportion of people reporting a change in fall prevention exercise prescription behaviour (primary outcome) between the intervention and control groups will be assessed with the relative risk statistic.

Between-group comparisons of the secondary outcomes of: (1) confidence to prescribe fall prevention exercises; (2) the proportion of people aged 60+ years seen in the last month for whom fall prevention exercise was prescribed; and (3) the proportion of fall prevention

Table 2 Criteria for defining evidence-based fall prevention exercises*

Exercise programme characteristics	Description
1. Exercise modality: exercise should provide a significant challenge to balance (two or more of the criteria on the right should be met)	a. Exercise in standing with feet close together or on one leg (or movement from one leg to the other) b. Exercises undertaken while standing with minimum use of hands to assist c. Exercises undertaken with controlled movement of the whole body while standing (eg, reaching while standing, tai chi, etc)
2. Exercise dose	Exercises are recommended to be carried out for 2 h or more per week

*In order to be classified as evidence-based fall prevention exercise, the exercises must meet criteria 1 and 2.

exercises prescribed by participants to older people in the past month that comply with evidence-based guidelines will be undertaken using the relative risk statistic.

Qualitative programme evaluation open-ended responses will be analysed thematically[19] to identify barriers and enablers to behavioural change. An intention-to-treat approach will be used for all analyses. Analyses will be conducted on de-identified data using the SPSS and Stata software packages.

Sample size justification

Sample size calculations indicate that a 20% difference in the proportion of participants reporting an increase in exercise prescription behaviour will be detected with a sample size of 220 (control group rate 50%, intervention group rate 70%, power=80%, α=5%, 15% dropouts). The proportion estimates included in the calculation were based on a previous study of university undergraduates.[15] This sample size will also provide 80% power to detect a 20% between-group difference in the proportion of participants who improved on the knowledge test at 3-month follow-up (control group rate 50%, intervention group rate 70%, α=5%, 15% dropouts). This sample size will also be sufficient to detect between-group differences in the order of 20% for the secondary outcome measures.

ETHICS AND DISSEMINATION

The study protocol has been approved by the Human Research Ethics Committee at The University of Sydney, Sydney, Australia (approval number 15162). The results of this trial will be disseminated via peer reviewed journal articles, presentations at international conferences and participants newsletters.

DISCUSSION

Evidence that demonstrates that exercise interventions reduce the risk of falling in community-dwelling older people is well established. Exercise interventions that contain a moderate to high dose of balance, are undertaken regularly and progressed as required can reduce the rate of falls in older people by almost 40%.[3] Despite this evidence, there have been almost no investigations to evaluate uptake and adherence to fall prevention guidelines among health and exercise professionals. This trial aims to evaluate if a 1-day educational workshop and access to internet-based support resources results in significant improvements in exercise prescription behaviour and fall prevention knowledge over a 3-month period compared to a wait-list control group.

This education programme has the potential to improve knowledge about falls in older age and about the prescription and delivery of effective fall prevention exercises to older people. The programme aims to train health and exercise professionals to implement evidence-based exercise strategies regarding fall prevention in their daily practice. If effective, this will increase the proportions of older people who undertake effective fall prevention exercises and reduce falls in the aged population. This education programme, if effective, can be easily and widely disseminated to increase the workforce capacity to reduce falls in older people.

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Contributors CS, AT, SRL and LC conceived of the study. AT, CS, A-MH, LL and SRL initiated the study design and DLS assisted with implementation. AT, CS, SRL and LC are grant holders. AT and CS are conducting the primary statistical analysis. All authors contributed to refinement of the study protocol and approved the final manuscript.

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Competing interests None.

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