



The long-term benefits of a multi-component exercise intervention to balance and mobility in healthy older adults

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ABSTRACT

We examined the long-term effects of a multi-component exercise program on balance, mobility and exercise behavior. The benefits of a community-based resistance and flexibility exercise intervention in a group of healthy older (60–75 years) individuals were recorded 12 months after completion of the randomized control intervention. Differences between those participants who continued to exercise and those who discontinued were investigated. Significant improvements from baseline in sit to stand ($p < 0.001$), timed up and go ($p = 0.001$), and sway ($p < 0.001$) remained at follow up in the exercise intervention group, with a control group unchanged. Participants who continued exercising had significantly greater improvements in strength immediately after the intervention, compared to those who discontinued ($p = 0.004$). Those who continued regular resistance training performed better in the step test at 12-month follow up ($p = 0.009$) and believed that the program was of more benefit to their physical activity ($p < 0.001$) than those who discontinued exercising. Benefits to balance and mobility persist 1 year after participation in a multi-component exercise program, due in part to some continuing participation in resistance training. Motivation to continue resistance training may be related real and perceived benefits attained from the intervention as well as the environmental context of the intervention.

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1. Introduction

Physical and psychological benefits to older adults of participating in many different types of exercise programs have been widely reported, however adherence to physical activity outside of formal programs is still poor (Rhodes et al., 1999). Physical activity participation rates for older adults (>65 years) remain low, with only 16% meeting the recommendations of the American College of Sports Medicine Guidelines (US Department of Health and Human Services, 2000). In a large review of 5537 adults over 65 years old, it was reported that 11% of older adults in the community participate in resistance training at a level to maintain strength, although for those who are considered active (Pate et al., 1995), this percentage rises to 24.7% (Kruger et al., 2004).

While supervised physical activity interventions have been successful in increasing physical activity in older adults over the duration of the exercise intervention, there is poor maintenance of exercise behaviors in the longer term (Rejeski and Mihalko, 2001). Without maintenance strategies in place, three out of four studies

found no improvement in physical activity behavior over the control at follow up at 12 months, and a general decline in physical activity behavior between early and late follow up (6–24 months) (Müller-Riemenschneider et al., 2008).

A review of physical activity interventions for older adults outlines the lack of effectiveness, or lack of data to support effectiveness, at long-term follow up (Van Der Bij et al., 2002). King (1998) reports, in a review of 29 studies, that 11 of these provide some form of data regarding follow up of periods from 3 months to 11.5 years, describing changes in physical activity or fitness parameters compared to controls. Only two of these report on balance or fall risks (Wolf et al., 1996; Buchner et al., 1997), with decrease in fall risk at 18 months and reduced risk of multiple falls at 8 months recorded respectively.

Howze et al. (1989) outlines the importance of the awareness of the participant to the benefits experienced by participating in exercise as one of three factors in an exercise behavior modification index. Motivation to exercise has been linked to generalized feelings of well being brought about by exercise programs (Kutner et al., 1997). Feedback from supervision enhances benefits in resistance training (Mazzetti et al., 2000).

The aim of this study was to identify long-term changes in balance, strength, mobility and activity levels in a group who

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participated in a flexibility and resistance training program in a community gymnasium compared to a control group. Secondary aims were to identify perceptions of improvements in function at 12 months, and for the exercise group, factors influencing ongoing exercise participation.

2. Materials and methods

2.1. Participants

Forty-five inactive community dwelling older adults participated in the original exercise study, with 33 returning for further testing 1 year after cessation of the exercise regime. Group allocation is outlined in Fig. 1.

2.2. Method

Following baseline testing consenting participants were randomized to either 16 weeks of resistance training followed by 16

weeks of flexibility training or vice versa. A non-training control group was also established. Participants were requested to maintain their usual activity levels outside of the training intervention for the duration of the programs, and compliance to this request was measured with a Physical Activity Scale for the Elderly (PASE) questionnaire (Washburn et al., 1999). Ethical approval was given by the Health and Medical Human Research Ethics Committee (Tasmania) Network, and informed consent was gained by all participants.

All physical performance measures were undertaken at baseline, at the end of the first intervention (17 weeks), after 4-week washout (22 weeks) and following the second exercise intervention (39 weeks). Control participants underwent testing at baseline and 16 weeks. All available participants underwent the same series of tests again 12 months later. At the 12-month follow up, the participants were also interviewed regarding ongoing activity and to gain their perceptions of the benefit of the program. Participants who were part of the exercise intervention who continued performing resistance training (ExC) have been separated from

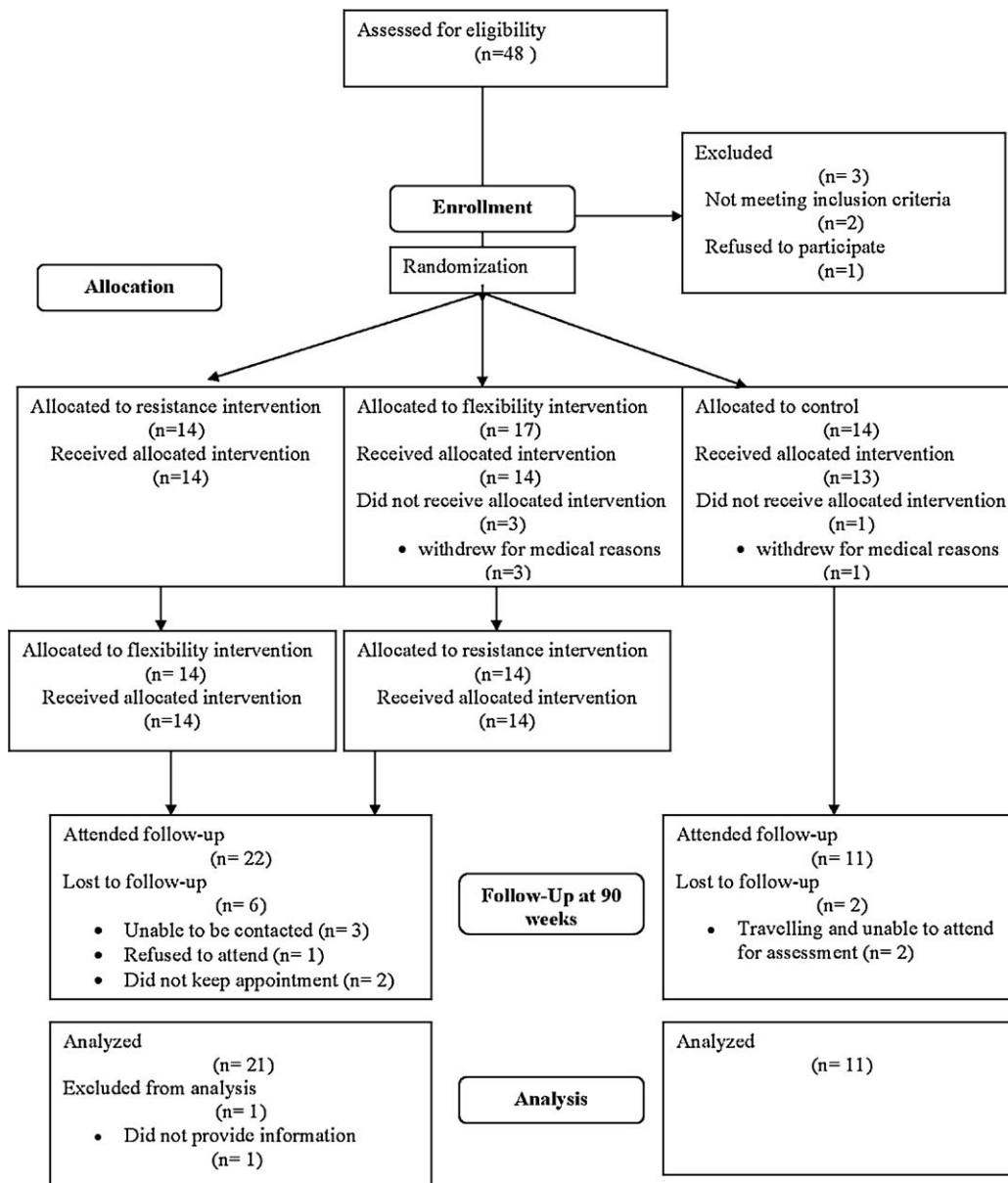


Fig. 1. Flow chart outlining participant data at relevant time points.

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