



Feature Article

Effectiveness of a balance-training program provided by qualified care workers for community-based older adults: A preliminary study

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ARTICLE INFO

Article history:

Received 27 November 2014

Received in revised form

4 February 2015

Accepted 7 February 2015

Available online 4 April 2015

Keywords:

Balance training

Older adults

Qualified care workers

ABSTRACT

The purpose of this study was to determine the effectiveness of a balance-training program provided by qualified care workers (QCWs) to community-based older adults attending day centers. Weekly balance training was conducted by QCWs working at day centers over a 6-month period. Fall risk factors, fear of falling, and physical function were compared between balance-training ($n = 22$) and control ($n = 23$) groups at baseline and after 6 months of intervention. Physical function assessments included the following: one-leg standing test, chair-standing test (CST), timed up-and-go test (TUGT), and a lower-extremity muscle strength test (LEST). Participants who underwent balance training significantly improved in the CST and LEST, and had reduced fear and risk of falling compared with the control group ($p < 0.05$). In the balance-training group, the TUGT was significantly better at 6 months than at baseline ($p < 0.05$). A balance-training program for community-dwelling older adults can be effectively implemented by QCWs.

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Introduction

Falls and fall-induced injuries are common in older adults in all countries, and aging populations increase the fall-related burden and cost to health care systems.¹ Falls that do not result in injury often begin a downward cycle of fear, which leads to inactivity and decreased strength, agility, and balance.² Many studies have identified risk factors for falls; poor balance and muscle weakness have been associated with an increased risk of falling in older adults.³ Physical functions, such as balance and lower-extremity muscle strength, can predict falls in community-dwelling older adults.⁴ Therefore, the aging-associated deterioration of physical function that occurs in older adults is a major risk factor for falls.

Exercise programs aimed at improving balance and muscle strength have been conducted for community-dwelling older adults.^{5–9} We previously reported that a balance-training program

performed using a foam rubber pad and supervised by physiotherapists effectively improved balance over a 2-month period, which was faster than the improvements seen with balance training on a stable surface.¹⁰ Additionally, balance-training effectively improved lower-extremity muscle strength and reduced the fear of falling, which suggests that our balance-training program is effective for improving physical function.

In Japan, the number of frail older adults living in the community has increased, and physical deterioration has been reported to be the main reason for their frailty.⁵ Consequently, exercise classes are often provided for this population group to improve physical function and activity levels^{5,10}; however, there are a limited number of physiotherapists working in the community who are available to supervise these classes.^{5,11} Therefore, the development of an effective exercise program that can be conducted by non-physiotherapists is urgently needed.

Qualified care workers (QCWs) are a valuable resource because they provide the vast majority of care services for frail older adults in Japanese community day centers and residential facilities.¹² They have the professional skills to provide support to disabled adults. There are several differences between QCWs and nurses. First,

Conflicts of interest and source of funding: The authors declare no conflicts of interest or sources of funding.

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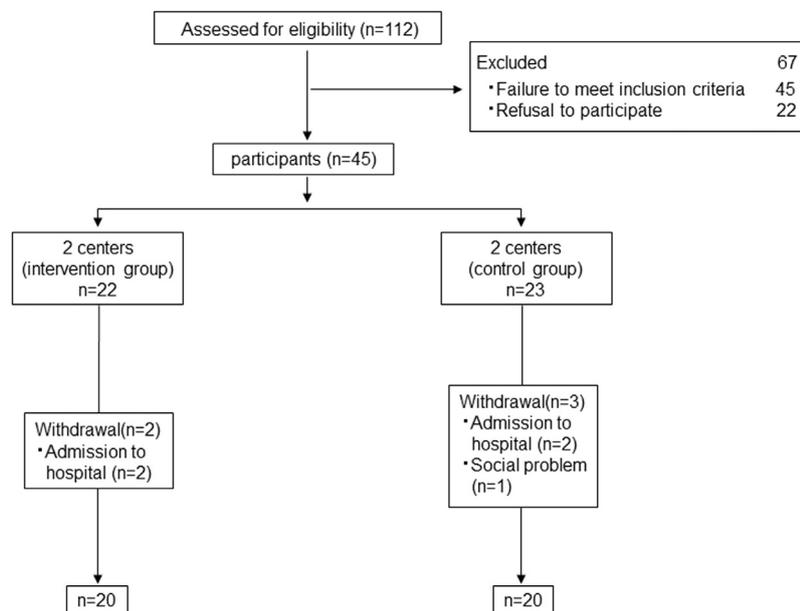


Fig. 1. Number and origin of the participants in each group.

licenses in direct care working are held by QCWs and homehelpers; unlike nurses, QCWs do not hold a professional specialization. Second, medical practice by QCWs is prohibited, except for suction and gastrostomy tube feeding of residents in special nursing homes. Nurses are more likely to perform medical procedures, although QCWs handle the day-to-day care of frail older adults and disabled adults.¹³ There are fewer nurses than QCWs in community day centers and residential facilities.

In communities with a shortage of physiotherapists and nurses, the role of QCWs working in community day centers could include leading exercise classes for frail older adults. Previous studies have reported that exercise programs provided by public health nurses, trained and supervised by physiotherapists, improved physical function in older adults^{5,14}; however, it is unclear whether exercise programs provided by QCWs are effective. If successful, such programs would benefit both clients and service providers because they would not only improve the physical function of older adults, but would also reduce the amount of supervision required by physiotherapists in the community. Thus, the present study tested the hypothesis that a balance-training program for older adults, conducted by QCWs, would effectively improve balance and lower-extremity muscle strength, which are risk factors for falls.

Methods

Participants

The study participants were older adults using community day centers once or twice a week. We selected four day centers supported by a senior physiotherapist. QCWs at each day center were asked to choose potential participants who were over 65 years old, lived at home, were able to walk with or without a cane, and had at least four risk factors for falls as identified using the questionnaire for fall-assessment described by Suzuki.¹⁵ This questionnaire consists of 15 items and has been shown to predict falls with a sensitivity and specificity of 59.4% and 83.1%, respectively. We defined older adults with at least four risk factors for falling as high-risk fallers.¹⁶

Participants were excluded if they had participated in exercise at least four times in the month prior to the intervention or if they had musculoskeletal, neurological, or cardiovascular disorders that could be aggravated by exercise. Participants were also excluded if cognitive impairment rendered them unable to respond to interview questions.

A flowchart outlining study participation is shown in Fig. 1. In all, 112 potential participants were identified. Of these, 22 refused to participate in the study and 45 did not meet the inclusion criteria. Of the 45 potential participants who were excluded, 11 had severe musculoskeletal or cardiovascular disorders and 34 had exercised regularly four or more times in the month before the initial interview. The remaining individuals ($n = 45$) were enrolled in the study and were assigned to either the balance-training group ($n = 22$) or the control group ($n = 23$).

Written informed consent was obtained from each participant in accordance with the guidelines of the Nagasaki University Graduate School of Medicine and the Declaration of Helsinki.

Study design

We chose a multi-center controlled trial for this study because we had concerns regarding the potential difficulty of enrolling participants into the control group owing to the general popularity of exercise classes among frail older adults.⁵ Furthermore, we wanted to determine the feasibility of conducting exercise classes in the participants' communities. The four day centers were non-randomly assigned to either a balance-training group (two centers) or a control group (two centers). Assignments were made in such a way as to keep the number of participants in the two groups as similar as possible. The physiotherapists supporting the day centers assessed the participants' physical function, and the QCWs working at the day centers implemented the intervention program.

Intervention

Participants in the balance-training group attended a 1-h exercise class once weekly for 6 months. All classes consisted of 10 min of warm-up exercises, 40 min of balance training, and 10 min of

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