Hong Kong Physiotherapy Journal (2015) 33, 34–41

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.hkpj-online.com

RESEARCH REPORT

Walking devices used by community-dwelling elderly: Proportion, types, and associated factors

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KEYWORDS
cane;
functional decline;
medical service;
older adult;
walker

Abstract *Background:* Advancing age is likely to increase the requirement for walking devices. However, the existing evidence mostly involves all types of external devices used from participants in developed countries with or without medical problems. The findings may be different from the data on the use of walking devices exclusively, particularly for the elderly who live in a rural community of a developing country.
Objective: This study explored the proportion, types, and factors associated with the use of walking devices in 343 elderly aged $\geq$ 65 years who live in a rural area of Thailand.
Methods: The participants were interviewed and assessed for their walking device used and functional mobility.
Results: The data demonstrated that 74 participants (22%) used a walking device for mobility. Most of them used a modified walking stick (70%), followed by a standard single cane (27%), and a walker (3%). Although most of these participants used a walking device due to their own determination with only a few of them using it according to medical prescription, their functional ability was significantly poorer than those who walked without a walking device ($p < 0.05$). Being unable to walk faster than 1 m/s and having a caregiver had the strongest relationship with the use of a walking device. The findings may be related to the study's locations. Being in a rural community of a developing country with a low level of education, participants may encounter some difficulty in accessing proper medical services. Therefore they used a device that could possibly help them to execute daily activities independently.

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http://dx.doi.org/10.1016/j.hkpj.2014.11.001

Conclusion: Our findings may provide an insight into planning programmes for health monitoring and promotion, and medical services for community-dwelling elderly who live in a similar context.

Introduction

Recently, the number of elderly has increased dramatically, including those in developing countries such as Thailand and those in the Association of South East Asian Nations [1]. Advancing age is associated with reduced functioning of many body systems, which enhances the risk of chronic diseases and disability. These changes subsequently compromise the ability to perform daily activities independently and increase the requirement for external assistance from persons or devices [2,3].

The existing evidence reports that 3—74% of the participants use external devices [4—6]. Being a rural resident, increasing age, being female, having a chronic condition, requiring regular medication, having movement difficulty or disability were significantly associated with the use of external devices [4,7,8]. However, these data considered all different types of assistive devices (including wheelchairs, scooter, daily-living bathing aids, and balance aids) and the participants were recruited from developed countries with and without an orthopaedic problem. The findings may be different among the elderly living in a rural community of a developing country, and who did not have any life-threatening illnesses. In addition, incorporating objective assessments may provide useful data to monitor the mobility status and promote levels of independence of these individuals. Therefore, this study explored the proportion, types and factors associated with the use of a walking device among older adults living in rural Thailand. It was hypothesized that a high proportion of elderly, particularly those aged $\geq$ 75 years needed a walking device for daily mobility. In addition, the impaired functional ability was significantly associated with the requirement for a walking device among the participants.

Methods

Participants

This was a cross-sectional study. The participants were recruited from April 2013 to March 2014. Inclusion criteria were: community-dwelling elderly people (age $\geq$ 65 years) who were able to walk independently with or without a walking device, and did not have any life-threatened illnesses. The elderly were excluded if they had any abnormal signs and symptoms that affected walking and balance abilities, i.e., Parkinson's disease and stroke, impaired cognitive functions (Thai Mini Mental State Examination score $<$ 23, based on education level), visual impairments that could not be corrected using spectacles or contact lenses, and deformity in the lower extremities that could be visually observed.

The device users were defined as individuals who commonly used a walking device at least once a fortnight whereas the nondevice users were those who did not require any walking devices for daily activities [8]. Our *a priori* power analysis (2-tailed analysis, power = 0.90, and α = 0.05) revealed that at least 317 participants would be required. Protocols of the study were approved by the Khon Kaen University Ethics Committee for Human Research, Khon Kaen, Thailand. The participants needed to sign a written informed consent prior to participation in the study. All procedures were done according to the Declaration of Helsinki.

Study protocols

The eligible participants were interviewed using a questionnaire that was developed and modified from the data of previous studies [4,7,8]. Then the questionnaire was assessed for the content validity through the method of expert panel discussion using three rehabilitation experts including a physician, physical therapist, and nurse who had good clinical experience in geriatrics. The items in the questionnaire were divided into three parts, including baseline demographics, types and the number of walking device used, and health status. The interview process took approximately 20 minutes per participant.

Thereafter, participants were assessed for their functional capacity, including the timed up and go test (TUG), five times sit-to-stand test (FTSST), 10-meter walk test (10MWT), and 6-minute walk test (6MWT) using the following procedures.

(1) TUG: The TUG measures dynamic balance performance during walking and changing postures [9—11]. Participants were instructed to rise from an armrest chair, walk around a traffic cone that was placed 3 m ahead of the chair, and return to sit down on the chair at a fastest and safe speed with or without a walking device. The test recorded the time from the command "Go" until the participant's back was against the backrest of the chair. Then the average time required over the three trials was used for data analysis [12]. Bischoff et al [10] found that the time required to complete the TUG of at least 12 seconds indicates the necessity of a mobility assessment and early intervention. Therefore, the results of the TUG time were categorized into two groups: (i) $<$ 12 seconds and (ii) $\geq$ 12 seconds.
(2) FTSST: The FTSST assessed lower-extremity muscle strength and dynamic balance while changing from sitting to standing [13,14]. Participants stood up from an armless chair with the hips and knees in full extension and sat down five times as a fastest and safe