

# Walking Devices Used by the Elderly Living in Rural Areas of Thailand

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Submitted: 10 Sep 2014

Accepted: 3 Feb 2014

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## Abstract

**Background:** The use of all types of external devices was previously investigated for elderly with and without orthopaedic problems of a developed country. This study describes the proportion, types and the reasons of using a walking device in elderly who live in many rural areas of Thailand.

**Methods:** Participants (n = 390) were interviewed using a questionnaire to ascertain their demographics, health status and types of walking device required for daily activities.

**Results:** Forty-one participants (11%) used a walking device, particularly when walking long distances due to a fear of falling, musculoskeletal pain, and impaired walking ability. The proportion of walking devices used dramatically increased in participants aged 75 years and over (six times of those aged 60–74 years). Most of the participants used a modified walking stick by their own determination (81%), while only 7% used one according to medical prescription. A significant increase in the need of a walking device was seen in participants aged 75 years and over (OR = 13.9; 95% CI 5.9–32.7;  $P < 0.001$ ), with a medical problem (OR = 45.9; 95% CI 6.7–73.4;  $P < 0.001$ ) and who required regular medication (OR = 12.7; 95% CI 5.0–33.6;  $P = 0.001$ ).

**Conclusion:** The findings emphasise the importance of a community health service to promote health status, particularly before 75 years of age.

**Keywords:** older adult, cane, walker, rehabilitation, health promotion

## Introduction

Advancing age is often accompanied by the functional decline of many body systems, particularly in those aged 75 years and over (1,2). These changes increase the risk of chronic diseases and disability, which subsequently decrease the ability to perform daily activities independently and increase the requirement of external assistance from other persons or devices (3–5). Previous studies have reported that 3–74% of participants use external devices (6–8). However, these data included all assistive devices (including wheelchairs, scooters, and aids for activities in daily living) required for participants in a developed country, with and

without an orthopaedic or medical problem. Living in a developed country, participants may have different socio-demographics and contextual conditions from those living in a developing country, particularly in a rural area. An orthopaedic problem may reduce the ability of the lower extremities to support the body weight, thus requiring assistance from the upper extremities. Therefore, existing data may not be applicable to the community-dwelling elderly who have significantly less severe life-threatening diseases or illnesses than those living in a nursing home or institutional care (9). Therefore, this study explored the proportion of the community-

dwelling elderly living in a rural area of Thailand who use walking devices, the types walking devices they use and their reasons for using them. The findings were reported separately for those aged less than 75 years and those aged 75 years and over in order to provide a clear database for the preparation and development of a proper health service specifically for the elderly.

## Methods

Participants aged at least 60 years from many rural areas in Thailand were conveniently recruited through direct contact with community leaders to participate in the study. From sample size calculations based on the data from a pilot study ( $n = 100$ ), the study required 385 participants. Eligible participants were required to be able to walk independently with or without a walking device and be free from any life-threatening illnesses. Participants were excluded if they had any abnormal signs and symptoms that might affect walking and balance control abilities (i.e. Parkinson's disease, stroke, impaired cognitive functions [Thai Mental State Exam < 23 scores, based on education level], visual impairments that could not be corrected by spectacles or contact lenses), and deformity in the lower extremities that could be visually observed. The device users were defined as individuals who commonly use a walking device at least once a fortnight, whereas the non-device users were those who did not require any walking devices in their daily activities (6). A walking device referred to equipment used to improve the walking ability of elderly, including walkers, crutches, canes, and other modified walking devices. Protocols of the study were approved by the Khon Kaen University Ethics Committee for Human Research (HE 562198). Eligible participants were required to sign a written informed consent form prior to participating in the study.

The eligible participants were interviewed for information on their demographics, health status, and types of walking device required for daily walking using a questionnaire that was developed and modified from the data of previous studies (10,11). The questionnaire was verified for its content (face) validity using an expert panel discussion of three rehabilitation experts including a physician, a physical therapist, and a nurse who had good clinical experience with elderly populations. The questionnaire was preliminarily used to interview 10 elderly who walked with or without a walking device, and some items were subsequently modified,

rearranged and deleted to improve the clarity and completeness of the questionnaire. Finally, the items in the questionnaire were divided into three parts including baseline demographics (i.e. age, gender, level of education and living arrangement), health status (i.e. underlying disease(s), regular medication(s), medical problem(s), types of exercise, and perceived health status), and details of walking devices used (including type, duration, frequency, reasons for and attitude toward using a walking device). The interview process was executed by two physical therapists who had good clinical experience with the elderly population and had sufficient discussion for the data required in the questionnaire. The process took approximately 20 minutes per subject.

## Data analysis

Data analyses were performed using SPSS software (SPSS Statistic 17.0, IBM Corporation, 1 New Orchard Road Armonk, New York 10504-1722, USA, serial number: 5068054). Descriptive statistics were applied to explain baseline demographics and findings of the study. Comparisons between the groups were performed using the independent samples t test for the continuous variables and the chi-square test for the categorical data. Logistic regression analysis (reported using a crude odds ratio (crude OR) and adjusted odds ratio (aOR) with corresponding 95% confidence intervals (95% CI)) was used to explain the association between the participants' socio-demographic factors and walking device requirements. The level of statistical significance was set at  $P < 0.05$ .

## Results

Four hundred and ninety-five elderly from several rural communities in Thailand were screened according to the criteria of the study, and 390 were found to be eligible to participate. The majority were females with a low level of education (graduated from primary school or were uneducated). Forty-one participants (11%) used a walking device 3–7 days a week, particularly when walking long distances outside their homes. Most of them used a modified walking stick (i.e. a piece of bamboo, a spade or a handmade wooden stick, 7%), followed by a standard single (one tip) stick or cane (3%) and a standard walker (a simple metal framework with four unadjustable legs, 1%).

When the data were analysed according to age groups, 5% of participants aged less than 75 years and 31% of those aged 75 years and over used a walking device; the proportion clearly

increased with age for all types of walking devices (Figure 1a). In each age group, participants who walked with a walking device were significantly older, had medical problems and required regular medications compared to the participants who walked without a walking device ( $P < 0.001$ ; Table 1). Most participants reported that they used a walking device (81%, Figure 1b) mostly due to a fear of falling, back pain and impaired walking ability (Figure 2). Data from multiple logistic regression analysis clearly indicated that participants aged at

least 75 years (aOR = 13.9; 95% CI 5.9–32.7;  $P < .001$ ), with a medical problem (aOR = 45.9; 95% CI 6.7–73.4;  $P < .001$ ) and who required regular medications had a significantly increased need for a walking device (aOR = 12.7; 95% CI 5.0–33.6;  $P = .001$ ; Table 2). The participants reported that using a walking device helped them to improve their walking ability, balance control, and self-confidence while walking, and reduce the amount of weight supported by the leg, which alleviated joint pain or promoted muscle function, and

**Table 1:** Characteristics and health statuses of the subjects who walked with and without a walking device

| Variable  | Age 60-74 years (n = 307)  |                       |         | Age 75 years and over (n = 83) |                       |         |
|---|----------------------------|-----------------------|---------|--------------------------------|-----------------------|---------|
|   | Non-device users (n = 292) | Device users (n = 15) | P value | Non-device users (n = 57)      | Device users (n = 26) | P value |
| Age <sup>a</sup> (years)                          | 65.6 (3.5)                 | 70.5 (4.1)            | < 0.001 | 78.2 (0.5)                     | 81.1 (0.8)            | 0.002   |
| Body mass index <sup>a</sup> (kg/m <sup>2</sup> ) | 22.3 (3.9)                 | 22.4 (3.6)            | 0.942   | 21.7 (0.4)                     | 21.1 (0.6)            | 0.312   |
| Gender <sup>b</sup> : Female/Male                 | 147/145                    | 8/7                   | 0.340   | 29/28                          | 16/10                 | 0.232   |
| Having medical problems <sup>b</sup> : Yes/No     | 97/195                     | 14/1                  | < 0.001 | 12/45                          | 23/3                  | < 0.001 |
| Need regular medications <sup>b</sup> : Yes/No    | 93/199                     | 12/3                  | < 0.001 | 12/45                          | 23/3                  | < 0.001 |

Note;

<sup>a</sup> The data are reported using mean (standard deviation). The data between the groups were compared using the independent samples t test.

<sup>b</sup> The data are reported using number of subjects. The data between the groups were compared using the chi-square test.

**Table 2:** Factors related to the requirements of walking device of the subjects

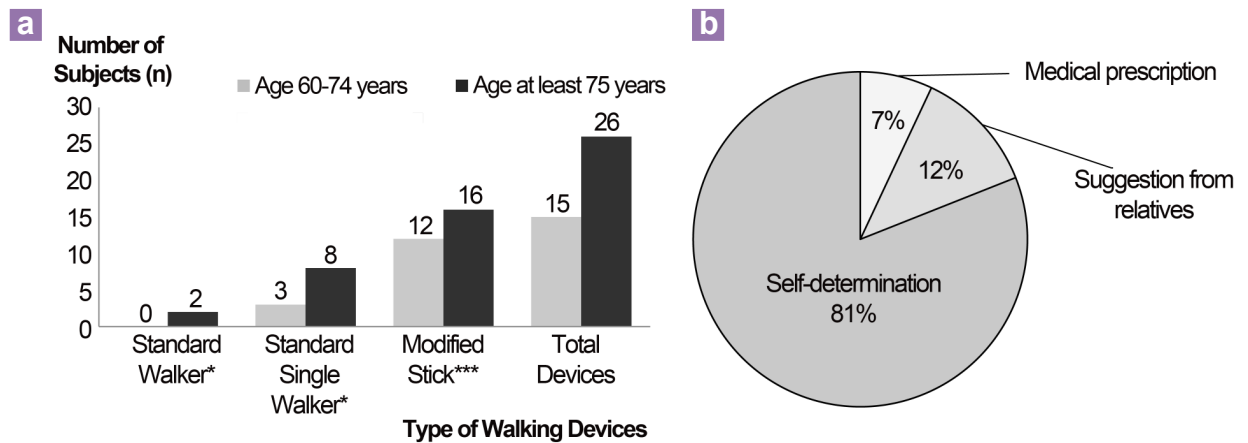
| Variable                    | Total (n) | Non-device user, n (%) | Device user, n (%) | Crude Odds ratio (95%CI) | P value  | Adjusted Odds Ratio (95%CI) | P value  |
|-----------------------------|-----------|------------------------|--------------------|--------------------------|----------|-----------------------------|----------|
| Age                         |           |                        |                    |                          |          |                             |          |
| 60–74 years                 | 307       | 292 (95.1)             | 15 (4.9)           | 1                        | < 0.001* | 1                           | < 0.001* |
| 75 and over                 | 83        | 57 (68.7)              | 26 (31.3)          | 8.8 (4.4–17.8)           |          | 13.9 (5.9–32.7)             |          |
| Having medical problem      |           |                        |                    |                          |          |                             |          |
| No                          | 244       | 240 (98.4)             | 4 (1.6)            | 1                        | < 0.001* | 1                           | < 0.001* |
| Yes                         | 146       | 109 (74.7)             | 37 (25.3)          | 20.4 (7.0–58.6)          |          | 45.9 (6.7–73.4)             |          |
| Required regular medication |           |                        |                    |                          |          |                             |          |
| No                          | 250       | 244 (97.6)             | 6 (2.4)            | 1                        | < 0.001* | 1                           | 0.001*   |
| Yes                         | 140       | 105 (75.0)             | 35 (25.0)          | 13.6 (5.5–33.2)          |          | 12.7 (5.0–33.6)             |          |

increased their level of independence. However, some participants who did not use a walking device indicated that using one might lead to a poor health status and increase their walking burden and feelings of embarrassment.

**Discussion**

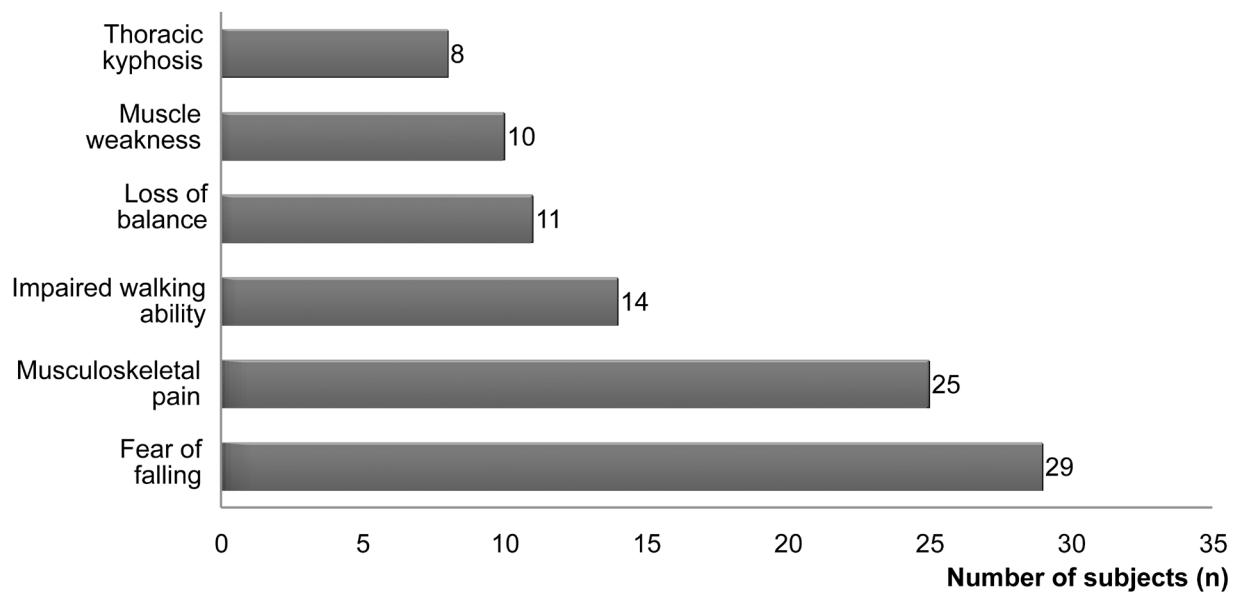
This study subjectively explored the use of walking devices in Thai elderly aged at least

60 years, who lived in a rural community. The findings demonstrated that 11% of the participants used a walking device, particularly when walking long distances. The majority used a modified walking stick, followed by a standard single stick or cane and a standard walker. When considering the data according to age groups, the proportion of walking devices used by participants aged 75 years and over dramatically increased (six times of those aged less than 75 years). Most participants



**Figure 1:** Walking device use of the subjects; (a) Proportion of walking devices used in subjects age less than 75 years and those aged 75 years and over (Note: \*a simple metal framework with unadjustable four legs, \*\*a standard single (one tip) stick or cane, \*\*\*a piece of bamboo, spade or handmade wooden stick). (b) The determinants for walking devices used of the subjects.

**Causes of walking device used**



**Figure 2:** Causes of walking device used of the subjects. Note: the data are presented using the number of subjects and each subject reported more than 1 factor.

reported that they used a walking device according to their own determination because of a fear of falling, back pain and impaired walking ability. The findings further indicated that advancing age (particularly 75 years and over), having medical problems and requiring regular medications were significantly related to the use of a walking device.

Previous studies found that 3–74% of participants used external devices (6–8). The different findings compared to those found in the current study may be associated with the characteristics of the participants, the types of external devices reported and the sampling methods. Kaye et al. (7) found that 3% of their participants aged less than 18 years to 65 years and over used external devices including a standard cane, crutches, walker, wheelchair, and scooter. Van der Esh et al. (8), randomly recruited participants with osteoarthritis and rheumatoid arthritis and found that 49% of them used a walking device. An orthopaedic problem may reduce the ability of the lower extremities to support the body weight. Therefore, nearly half of the participants needed assistance from the upper extremities to partially support their body weight while walking. This assumption was similar to the data found in this study, as the participants also indicated that pain in the lower extremities was a major reason for using a walking device (Figure 2). Furthermore, Edward and Jones (6) reported that 74% of participants aged over 65 years, who were randomly selected from three health services, owned one or more types of mobility devices, including bathroom and lavatory appliances, stair rails and bed hoists (i.e. a hoist to assist in lifting an individual from their bed). Participants living in a nursing home or institutional care may have a significantly greater number of severe diseases and symptoms of illness than community-dwelling individuals (9). Comorbidity has a crucial influence on physical functions, and thus a high proportion of the participants needed assistance from external devices (6). Similarly, this study found that medical problems and regular medication use significantly increased the need for a walking device (45.9 times those who did not have medical problems and 12.7 times those who did not require regular medications).

The lower proportion of walking device use in the present study may relate to the participants' characteristics. This study recruited community-dwelling elderly aged at least 60 years without any life-threatening illnesses or other disorders that might crucially affect their walking ability. Such criteria may limit the participation of individuals with significant functional impairments; thus,

this study found only 11% of walking device users. However, when considering the findings according to age groups, the requirement for a walking device clearly increased in participants aged at least 75 years (13.9 times those aged 60–74 years). Previous studies reported that 75 years old is considered a watershed for the significant deterioration of many body systems (12,13). Consequently, a number of these participants required a walking device for daily walking, particularly when walking long distances. The findings were coherent with the previous reports, which also found a clear increased requirement for walking devices in participants aged 75 years and over (6,8).

Living in a rural community of a developing country with a low level of education, participants may encounter some difficulty accessing a proper medical service. Therefore, most of them used a modified walking device to help them execute their daily activities, i.e. a piece of bamboo, a spade or a handmade wooden stick. These participants reported that a walking device helped them to improve their walking ability, balance control and self-confidence while walking, and reduced the weight-bearing load on the leg, which alleviated joint pain and promoted their independence. On the contrary, participants who did not use a walking device thought that using a walking device might deteriorate their health status, increase their walking burden, and make them feel ashamed. Faruqui and Jaebalon (14), reported that a large number of patients decided to use a walking device without any prescription from a health professional. Since a walking device has both beneficial and harmful effects on the user, the findings may lead to an interesting exploration on the actual necessity, suitability and benefit of the modified walking devices used by these participants. Nevertheless, the reasons for using a walking device reported by the participants were associated with the previous reports (8,15,16). A fear of falling was frequently reported by individuals lacking the self-confidence to perform physical activities independently (15). Having musculoskeletal pain, particularly in the lower extremities and back, reduces the ability of weight bearing (8,16). Consequently, these individuals had a significantly increased need for external assistance from a person (caregiver) or walking device to increase the body base of support, augment their self-confidence while moving and reduce pain, particularly when walking long distances.

The findings provide additional data related to walking devices used particularly by

elderly from rural areas of a developing country. However, the data contained some limitations. First, the participants were conveniently recruited through direct contact with community leaders to participate in the study. Thus, the findings may not represent the requirement for walking devices at the country level. Second, the sample size was calculated for the number of participants required for the study, and the data were gathered mainly from subjective reports of the participants. Although, the researchers attempted to minimise the errors of the findings by interviewing the participants' relatives or caregivers, a further study that randomly recruits and calculates the number of participants required for each age group would confirm the findings. Furthermore, some participants who may need a walking device chose not to use one because they were embarrassed to do so. A further prospective study is therefore needed to explore the actual needs, benefits and possible harmful effects of using a walking device on levels of independence in the elderly. Moreover, a study on functional ability relating to the requirement of a walking device is needed to promote the health status and minimise the need for walking devices by the elderly.

## Conclusions

The findings emphasise the importance of a community health service to prepare a health promotion system, particularly before individuals reach 75 years of age. To minimise the requirement of a walking device, clinicians need to incorporate a method to increase self-confidence while walking, minimise musculoskeletal and other medical problems, increase functional endurance and promote functional ability of the elderly.

## Acknowledgement

This study was supported by funding from the Improvement of Physical Performance and Quality of Life (IPQ) research group and Khon Kaen University, Khon Kaen, Thailand.

## Conflict of interest

None.

## Funds

Improvement of Physical Performance and Quality of Life research group, Khon Kaen University.

## Authors' Contributions

Conception and design: PS, TT, JS, SA  
 Analysis and interpretation of the data: PS, TT, JS  
 Drafting of the article: PS  
 Critical revision of the article for the important intellectual content, final approval of the article, obtaining of funding, administrative, technical or logistic support: SA  
 Provision of study materials or patient: PS, TT, SA  
 Statistical expertise: JS  
 Collection and assembly of data: PS, TT, SK, CK

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