Journal of the Formosan Medical Association (2017) 116, 72–79

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.jfma-online.com

ORIGINAL ARTICLE

Functional mobility and its contributing factors for older adults in different cities in Taiwan

Sang-I. Lin [a], Hsuei-Chen Lee [b], Ku-Chou Chang [c], Yi-Ching Yang [d], Jau-Yih Tsauo [e,*]

[a] Department of Physical Therapy, National Cheng Kung University, Tainan, Taiwan
[b] Department of Physical Therapy and Assistive Technology, National Yang-Ming University, Taipei, Taiwan
[c] Division of Cerebrovascular Diseases, Department of Neurology, Chang Gung Memorial Hospital, Kaohsiung, Taiwan
[d] Department of Family Medicine, National Cheng Kung University, Tainan, Taiwan
[e] School and Graduate Institute of Physical Therapy, National Taiwan University, Taipei, Taiwan

Received 27 August 2013; received in revised form 25 January 2016; accepted 26 January 2016

KEYWORDS
aging;
environment;
functional capacity;
mobility;
sensorimotor function

Background/purpose: Impaired mobility is one of the primary causes of declined functional capacity in old age. The timed up-and-go test (TUG), a common mobility test, has been studied extensively in Western countries. The purposes of this study were to compare and identify factors associated with TUG performance in older adults with impaired mobility and living in different cities in Taiwan.

Methods: Older adults living in Taipei, Tainan, and Niaosong cities were screened for mobility impairments and then recruited. A series of questionnaires and physical and functional tests were used to obtain information and measurements for potential contributing factors and TUG. Regression analysis was conducted to determine factors contributing to TUG.

Results: A total of 413 older adults participated in the study. The mean TUG was 14.3 seconds for participants across the three cities, and was significantly shorter in Tainan. Age, number of medications, fear of falling, depression, high intensity activity time, reaction time, single leg stance time, and functional reach distance were found to have significant contribution. These factors accounted for approximately half of the variance in TUG. The regression equations were not equal for the different cities, with depression being the only common determinant.

Conflicts of interest: The authors have no conflicts of interest relevant to this article.

* Corresponding author. School and Graduate Institute of Physical Therapy, National Taiwan University, Floor 3, 17 Xuzhou Road, Taipei City 100, Taiwan.
E-mail address: jytsauo@ntu.edu.tw (J.-Y. Tsauo).

http://dx.doi.org/10.1016/j.jfma.2016.01.011

Conclusion: Taiwanese older adults with mobility problems living in different cities performed differently in TUG and the contributing factors were also different. These findings indicate a need of further studies examining older adults in different environments.

Introduction

Aging is inevitably accompanied by changes in the functions of many systems of the body. As a result, deterioration in health and functional capacity is often seen in older adults. How best to reduce these age-related problems and healthcare costs is of crucial importance, especially for developing countries.[1]

Taiwan has become an aging society in the past 15 years.[2] Since then, the older population in Taiwan has been increasing at a rate that is twice of that in the USA.[3] With such a rapid growth, there is no doubt that the promotion of health and functional capacity of Taiwanese elderly deserves special attention. However, in spite of a large number of studies focusing on health promotion in Taiwan, research pertaining to a better understanding of functional capacity is scarce. Particularly lacking is information that could help to identify the underlying risk factors for declined functional capacity of older adults living in different environments or cities.

One of the primary causes of declined functional capacity is impaired mobility. The ability to move from one place to another safely is the building block of activities of daily living, and thus is crucial to independent living. Impaired mobility is common in old age and has been found to be associated with a greater risk of falling within the following year, further deterioration of functional capacity, and subsequent institutionalization.[4–12] These findings suggest that older adults who already have mobility problems are likely to suffer greater adverse effects of aging and thus it is reasonable to view such a population as the prime target for functional capacity promotion.

A variety of performance-based tests are used clinically and in research to measure mobility. The timed up-and-go test (TUG) is among the most frequently used. The TUG measures the time taken to rise from a seated position, walk 3 m at a natural pace, walk back to the chair, and sit down.[13,14] The test requires only a stopwatch and a chair and is easy to administer. The reliability of the TUG has been demonstrated in the literature to be good.[14–16] When tested against other mobility tests, such as Tinetti Mobility Index or Barthel Index, the TUG was also found to have good validity.[14,15]

In studies from the USA, the range of TUG performance varies widely. When individuals who did not have histories of diabetes mellitus, substantial neurological disorders, or acute musculoskeletal disorders were instructed to walk quickly during the test, the mean TUG time ranged from 7.27 seconds to 8.54 seconds for metropolitan adults aged 60–79 years.[17] A much longer time (15 seconds) was reported when 60–90-year-old individuals in an inner city were instructed to walk at a self-paced speed for 10 feet (3.05 m).[18] In studies from the USA that instructed participants to walk at their self-selected pace for 3 m during the TUG, the performance also ranged widely: for 60–89-year-old participants, excluding those with conditions that could affect the test performance, the mean TUG time ranged from 8 seconds to 11 seconds.[19,20] It is not clear what type of environment the participants were recruited from in the above studies.

The TUG is also used widely in Taiwan to measure mobility of older adults clinically and in research. In 2004, a study tested 1200 Taiwanese older adults living in a rural area and reported a mean TUG time of 13.3 seconds.[16] As for older adults who have impaired mobility or live in different cities, information pertaining to performance of the TUG and its contributing factors is lacking. The purposes of this study were to compare the performance of TUG and identify its contributing factors in older adults with impaired mobility living in Taipei, Tainan, and Niaosong, three cities differing in their level of urbanization in Taiwan. The findings will help to provide information for intervention planning for the promotion of functional capacity for older adults in Taiwan.

Methods

Participants

This was a cross-sectional study conducted simultaneously in Taipei, Tainan, and Niaosong district, in Kaohsiung, Taiwan. Participants were recruited on a voluntary basis via posters at local senior leisure activity centers and news releases to local newspapers and radio stations. Specially trained research assistants first interviewed the volunteers to screen for their qualifications. The inclusion criteria were older than 65 years, living in the community, and having any of the following conditions: (1) histories of multiple falls or seeking medical help for fall-related problems in the past year; (2) difficulties in sit-to-stand transfer; or (3) unsteady, asymmetrical or slow gait. Those who were unable to comprehend simple movement instructions, with acute pain or inflammation that would affect mobility, or required hands-on assistance in transfer or walking 3 meters were excluded. The screening tests and subsequent measurements were conducted in the community senior leisure activity centers or research facilities that were near the participants' homes or could be easily accessed via public transportation. This study was approved by the institutions where the study was conducted and written informed consent was obtained from all participants.