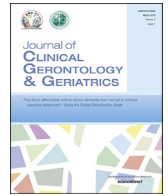




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Original article

Slower gait speed predicts decline in Instrumental Activities of Daily Living in community-dwelling elderly: 3-year prospective finding from Living Profiles of Older People Survey in Korea

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ABSTRACT

Background/Purpose: Slower gait speed is a good predictor of falls, dependency, disability, and mortality. However, the cutoff point of the gait speed to best predict the bad outcomes is controversial. The purpose of this study was to determine the cutoff point of gait speed that best predicts Instrumental Activities of Daily Living (IADL) dependency.

Methods: The study targeted 8000 people aged ≥ 65 years who had been enrolled in 2008 and followed up in 2011 for the Living Profiles of Older People Survey in Korea. The population was divided into an independent group and a dependent group with 2011 Korean Instrumental Activities of Daily Living (K-IADL) scores of 10 and ≥ 11 , respectively. The gait speed was measured as the time taken to walk 2.5 m at a usual pace without any help, and the best result of two trials was chosen for analysis.

Results: The area under the curve was highest (0.642) at gait speed of 0.6 m/s, with a sensitivity and specificity of 68.44% and 55.09%, respectively. The dependency hazard ratio of IADL was statistically significant in the group with gait speed less than 0.6 m/s, 1.974 (95% confidence interval, 1.646–2.367). The dependency hazard ratio of IADL was also statistically significant in the same group after adjusting for all relevant variables, 1.613 (95% confidence interval, 1.332–1.955).

Conclusion: The gait speed of 0.6 m/s may be considered as the new standard of a screening tool to predict IADL dependency in Korean people aged ≥ 65 years.

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1. Introduction

The population of Korea is aging very rapidly, and the quality of life for the elderly population is very important. In the elderly population, maintaining functional independence is an important factor to their quality of life. Functional independence is closely related to age, disability, disease, cognitive disorder, and physical performance. Walking is an essential component of physical

performance. Moreover, gait speed is the most important and simplest measure to evaluate walking that can be easily used in the clinic.¹

One study reported a lower incidence of falls in people aged ≥ 80 years with gait speed ≥ 1 m/s compared to those with gait speed < 0.5 m/s.² Another study reported gait speed below 1 m/s as a high-risk factor for various diseases.^{3,4} Slower gait speed is a good predictor of falls, dependency, disability, and mortality. Gait speed has been also suggested as a good cutoff point to predict dependency or disability.

There have been various studies conducted to measure dependency. One of the tools that have been frequently used in previous studies is ADL. In Western countries, 1 m/s has been

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presented as a cutoff point when screening to predict ADL dependency.^{5–7} However, for community-dwelling elderly, Instrumental Activities of Daily Living (IADL) is more important than the ADL. Using gait speed to predict the IADL is a new approach.

Therefore, the authors aimed to find out the cutoff point of gait speed to predict dependency in IADL scale with the hypothesis that older people with slower gait speed would have decreased IADL.

2. Methods

2.1. Participants

The data of 2008 and 2011 Korean Older People Surveys were used for this study. The Korean Older People Survey is conducted every 3 years among people aged ≥ 60 years living in Korea to collect basic data and indices required to establish policies for older people.

Older people who participated in the 2008 Older People Survey were first screened for survival and residence. Then, trained surveyors visited them at their places of residence to conduct questionnaires on their general characteristics, health condition, and living environment. Of the 15,148 older people who participated in the 2008 and 2011 Korean Older People Surveys, older people aged < 65 years at the time of the survey in 2008 ($n = 3061$), those with a history of falls ($n = 186$), and those who did not respond to any of the 2011 K-IADL items ($n = 3905$) were excluded, leaving a total of 8000 older people (Figure 1).

2.2. Study tools and methods of measurement

2.2.1. Sociodemographic characteristics and variables

A total of 8000 participants were divided into two groups according to the K-IADL score in 2011: those with a score of 10 (complete independence in all items) and those with a score of ≥ 11 (partial dependence in 1 or more items). The sociodemographic characteristics of the two groups included age, sex, body mass index, marital status, educational level, occupational status, income level, smoking, alcohol intake, and exercise. The possible set of variables that may affect daily living and gait were considered to be grip strength, morbidity (depressive symptoms, degree of dementia and cognitive dysfunction, incontinence, visual disturbance, auditory disturbance, arthralgia, fracture, history of falls), and sleep (use of sedatives, depth and duration of sleep).

2.2.2. Gait speed

The participants were asked to walk 2.5 m at their usual pace, and the time taken to walk the distance was measured twice and used as the gait speed. The participants were asked to stand on both

feet at the starting point, and walk past the ending point at a usual pace; the assessor measured the time taken to walk between two points. This process was performed twice, the speed was calculated using 2.5 m as the distance and the time taken, and the shortest time taken was chosen for evaluation.^{4,8,9}

2.2.3. IADL evaluation

The Korean Instrumental Activities of Daily Living (K-IADL) scale measures the ability of an individual to perform basic activities of daily living. The assessor asks a series of questions about personal hygiene and grooming housekeeping, preparing meals, doing laundry, managing medication, keeping track of finances, transportation within the community, handling changes, ability to use the telephone, using transportation, and digitizes the answers on a scale of 1–3, where 1 = complete independence, 2 = partial dependence, and 3 = complete dependence.

Trained surveyors visited each participant at home and applied K-IADL. K-IADL is calculated using 10 items: personal hygiene and grooming, housekeeping, preparing meals, doing laundry, taking medications as prescribed, handling finances, transportation within the community, handling change, ability to use the telephone, and use of transportation. Each item was categorized into complete independence, partial dependence, and complete dependence and analyzed.

2.3. Ethics statement

This study was approved by the Institutional Review Board of Kyung Hee University Hospital, Seoul, Korea (approval ID: KMC IRB 1608-07).

2.4. Statistical analysis

The population was divided into a 10-point group and an ≥ 11 -point group according to the K-IADL scale, and the groups were assessed for their baseline characteristics and compared using independent t test for continuous variables, and Chi-square test and Fisher's exact test for categorical variables. Receiver operating characteristic (ROC) analysis was also performed for gait speed. The population was divided into groups by gait speed 0.1 m/s, and the ROC curve was calculated for each group according to the decrease in K-IADL, and the optimal cutoff point whose sensitivity and specificity were both high. Multiple regression analysis was performed to compensate for the variables that presented significant differences in univariate analysis, and the backward method was applied for variable selection. The statistical analysis was performed using SPSS Statistics (version 18; IBM Corporation, Armonk, NY, USA). All statistical analyses with $p < 0.05$ were deemed statistically significant.

3. Results

3.1. Sociodemographic characteristics and variables

The population was divided into complete independence group ($n = 6739$; 84%) and dependence group ($n = 1261$; 16%). The mean ages of the complete independence group and the dependence group were approximately 71 years and 75 years, respectively. The ratio of men was 42.2% and 32.0% in the complete independence and dependence group, respectively. There was a difference in the ratios of participants exercising at least 150 minutes a week, with that for the complete independence group being 7.1% and that for the dependence group being 2.1%. The ratio of participants complaining of depressive symptoms in 2011 was 25.2% and 46.7% in the complete independence and the dependence group,

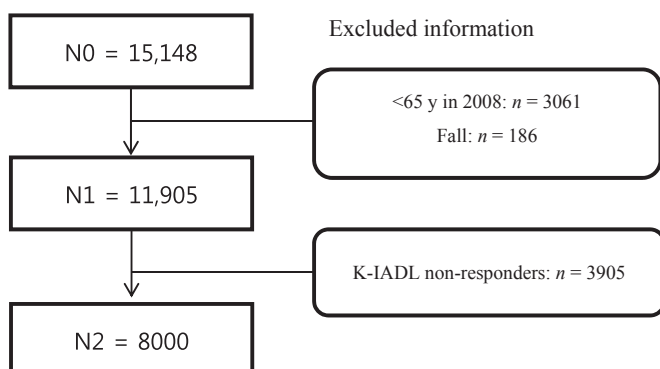


Figure 1. Flowchart of included and excluded participants through the study.

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