Association Between Gait Speed and Activities of Daily Living: A Study of Older Adults in Vietnam

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INTRODUCTION

Aging can be associated with a decline in physical function that eventually leads to a loss of autonomy in the activities of daily living (ADLs). In particular, mobility is the most studied and most relevant physical ability affecting quality of life with strong prognostic value for disability and life expectancy.[1] Walking is a very common ADLs, important for main determinants of quality of life in older age, and it requires the integration of many physiological systems. Gait speed has been described as the 'sixth vital sign' because it is a core indicator of health and function in aging and disease.[2] In fact, gait speed is suggested as being a criterion standard in rehabilitation reflecting of physical functioning, with slower performances associated with mobility disability and other adverse health-related outcomes in older age.[3] Gait speed lower than 0.8 m/sec may be a reliable cut-off to identify subjects at increased risk for disability, hospitalization, institutionalization, and increased mortality [4], while improvement of usual gait speed may ensure a longer survival in older adults.[5]

In Vietnam, where the aging population is rapidly growing, understanding the relationship between gait speed and ADLs is crucial for enhancing the quality of life for older adults. Despite the recognized importance of these factors, there is limited research examining their interrelationship within the Vietnamese elderly population. Vietnam's unique cultural practices, family structures, and healthcare challenges necessitate a context-specific understanding of how gait speed influences ADLs. This study aims to investigate the relationship between gait speed and the ability to perform ADLs in older adults in Vietnam. By exploring this relationship, we seek to identify potential predictive markers and modifiable risk factors that could inform healthcare strategies and policies to support the aging population in Vietnam.

METHOD

We used baseline survey data collected in 2018 from the Longitudinal Study of Ageing and Health in Vietnam (LSAHV) conducted across seven regions and comprising 6,039 people aged 60 years and over in Vietnam. Of these, we selected 5,340 people with gait speed data to include in the study.

Activities of daily living consist of the following seven items: bathing, dressing, eating, standing and sitting, walking in house, walking outside, and toileting. Besides, we also accessed two physical activities: Walking 200 to 300 meters and Climbing 10 steps without resting. Respondents were asked whether they experienced any difficulty performing each activity and to rate their own health on an ordinal scale ranging from very healthy to very unhealthy.

To measure usual gait speed, the participant was instructed to walk in a straight line at normal speed, and the time taken to walk a distance of 5 meters was measured using a stopwatch. Gait speed was calculated in m/s from the time taken to walk a distance of 5 meters.

Covariates included socio-demographics (age, gender, marital status) and health (state of health, heart disease, cerebrovascular disease, arthritis, neuralgia or rheumatism and osteoporosis).

All statistical analyses were conducted using STATA 16.0 software. Logistic regression models were used to define the association between gait speed and daily living activities of older people. P-values below 0.05 were considered as statistical significance. False Discovery Rate was used for statistical corrections for multiple comparisons.[6]

A cut-off point of ≤ 0.8 m/s on gait speed to define slow gait and to identify disability risk. We examined the association of this gait speed cutscore with community-based activity limitations using logistic regression. Activities limitations were categorized into four groups for this secondary analysis: 0 (reference), 1, 2 and three or more out of nine.

RESULT

Study population

In our mobility study of 5340 eligible subjects, the mean age was 71.9 years. There were 2293 men (43%) and 3047 women (57%). Mean gait speed was 0.5 ± 0.2 m/s. Nearly 75% of the older people reported their health status as average or better and 7.8% reported a fall over the last 12 months. 61.2% were married and 32.2% were widowed.

Gait speed

Table 1: Association of gait speed (per 1 cm/sec decrease) with limitations in activities of daily living

Activity limitation			**Gait speed (m/s)**						
			Unadjusted			**Adjusted***			**P_{value}****
	N	%	OR*	95%CI	P_{value}	OR*	95%CI	P_{value}	
Walk 200 to 300 meters	973	18.98	0.03	0.02 – 0.05	<0.001	0.15	0.09 – 0.27	<0.001	0.03
Climb 10 steps without resting	1514	30.60	0.05	0.04 – 0.07	<0.001	0.29	0.18 – 0.47	<0.001	0.025

Take a shower by yourself	251	4.77	0.006	0.003 – 0.012	<0.001	0.02	0.005 – 0.08	<0.001	0.04
Dress	191	3.62	0.008	0.004 – 0.019	<0.001	0.06	0.02 – 0.25	<0.001	0.03
Eat	83	1.57	0.005	0.002 – 0.018	<0.001	0.04	0.004 – 0.45	<0.001	0.02
Stand up from a bed/ sit down on a chair	302	5.75	0.01	0.006 – 0.02	<0.001	0.04	0.01 – 0.12	<0.001	0.04
Walk	222	4.21	0.006	0.003 – 0.013	<0.001	0.04	0.01 – 0.15	<0.001	0.006
Go outside	467	8.97	0.01	0.006 – 0.017	<0.001	0.06	0.02 – 0.14	<0.001	0.009
Using the toilet	142	2.70	0.004	0.002 – 0.01	<0.001	0.026	0.004 – 0.16	<0.001	0.02

** Adjusted for age, gender, marital status, health status, heart disease, cerebrovascular disease, arthritis, osteoporosis, history of fall*

***after statistical corrections for multiple comparisons*

Table 1 shows that gait speed was associated with self-reported difficulty on all activities. These associations remained significant even after statistical corrections for multiple comparisons. For example, with OR (95% CI) = 0.15 (0.09 - 0.27) and p-value < 0.001, older people with a gait speed higher by 1 m/s have only 15% of the likelihood of experiencing difficulty walking 200-300 meters compared to those with a lower gait speed.

Table 2: Association between a gait speed of ≤ 0.8 m/s and risk of experiencing any one, two or three limitations out of activities

Number of activity limitations	N	Gait Speed		p-value
		OR	95%CI	
One of nine activities	805	2.41	1.69 – 3.45	< 0.001
Two of nine activities	512	3.01	1.86 - 4.88	< 0.001
Three or more of nine activities	474	10.29	4.24 – 25.02	< 0.001

Of the 5340 subjects, 1791 (33.5%) reported difficulty on one or more ADLs from our list. Using the category of no difficulty in any ADL as the reference, Table 2 indicates that gait speed of ≤ 0.8 m/s was associated with increased risk of limitations in any one of the nine activities, in any two of the nine activities, and in any three or more of the nine activities

DISCUSSION

In our study, the ADLs were not chosen to be an exhaustive list. Rather, we sought to study a range of home-based activities that were both dependent as well as independent of gait. While it may be expected that gait speed best identifies activities that are gait related, it also captures limitations in a broader range of activities. Gait speed is influenced by variables such as fitness, cognition, and mood. Hence, measuring gait speed might help capture limitations in those activities that are dependent on the integrity of these underlying processes.

CONCLUSION

This study highlights gait speed as a crucial indicator of physical function and its role in predicting ADL limitations in older adults. Our findings show a significant association between slower gait speed and increased difficulty in performing various ADLs. Specifically, a gait speed cut-off of ≤ 0.8 m/s effectively predicted limitations across multiple daily activities. These results highlight the importance of incorporating gait speed assessments into routine geriatric evaluations, particularly in rapidly aging populations like Vietnam. Further research should continue to explore culturally specific factors influencing mobility and daily functioning to optimize care strategies for the elderly.

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