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LETTER TO THE EDITOR

RESEARCH STUDY

Twenty-year prospective cohort study of the association between gait speed and incident disability: The NILS-LSA project

Dear Editor,

In 2019, researchers from Asian countries gathered to discuss how to diagnose sarcopenia. The report from this meeting, the Asian Working Group for Sarcopenia 2019 (AWGS2019), suggested a 6-m walk <1.0 m/s as a criterion for sarcopenia diagnosis.[1] In addition, the recently revised Japanese version of the Cardiovascular Health Study criteria (revised J-CHS criteria), which is used to diagnose frailty in Japanese older adults, also adopted a gait speed <1.0 m/s as a criterion to measure slowness for frailty.[2] Although sarcopenia and frailty perform well in predicting some adverse health outcomes (e.g. dementia, disability and mortality), from the perspective of primary prevention, it is also important to explore a cut-off point of gait speed for clinical intervention and prevention of adverse health outcomes before older adults develop frailty or sarcopenia.

We aimed to investigate the association between gait speed and incident disability in a long-term (up to 20 years) prospective cohort study of older Japanese community-dwellers. Data were collected as part of the National Institute for Longevity Sciences-Longitudinal Study of Aging (NILS-LSA) project.[3] Participants were selected from the second (April 2000 to May 2002) to seventh (July 2010 to July 2012) waves of the NILS-LSA, because the Long-term Care Insurance information was available since April 2000. In this study, for each participant, their first participation after reaching old age (≥65 years) was used as the baseline (April 2000 to July 2012), and follow up started from the date of baseline participation and ended on 31 August 2020. Of the 1779 first-participated older individuals who had not been certified as having a disability (defined as requiring care level 1 or higher on the Long-term Care Insurance certificate) before/at the baseline survey, those whose gait speed and covariate data were incomplete at baseline were excluded. Thus, 1567 Japanese older individuals (767 men and 800 women, age 65–82 years, mean age 70.7 years [SD 4.8 years]) were analyzed in this study.

The mean gait speed (m/s) was 1.30 (SD 0.19) for all participants, 1.32 (SD 0.19) for men and 1.27 (SD 0.19) for women. When gait speed was stratified into quintile groups, participants in the higher quintile groups (i.e. with faster gait speed) were younger, less likely to be women, to have a history of stroke or hypertension and to have depressive symptoms. Meanwhile, they were more likely to have a higher total physical activity level and to have a higher education level (data not shown).

The median follow-up duration was 12.1 years (interquartile range 8.4–15.8 years). Compared with participants in the Q3 group (representing the average gait speed level of the participants), the multivariate-adjusted HR for participants in the Q1 (the lowest quintile) group was 1.57 (95% CI 1.23–2.00; *P*-value <0.001). The results did not change when stratified by sex. Additionally, the highest quintile (Q5) group of gait speed was associated with a lower risk of incident disability in men (Table 1).

Our findings suggest that even a gait speed of >1 m/s might be associated with a higher risk of incident disability, and the cut-off of 1.1 m/s (the maximum value of the first quintile) can be used for the new cut-off, which almost equals 4 km/h and could be used for public health promotion. Although the use of quintiles based on the study population might not provide an accurate cut-off point for preventing disability for the whole older Japanese population, the average gait speed of our participants was comparable to previous studies, which indicates that our results are, to some extent, justified.[4–6] However, further studies carried out in different settings are still warranted.

Previous studies have reported that Japanese community-dwelling older individuals tend to walk faster than other older individuals of other ethnic backgrounds,[7] and the gait speed for older Japanese adults has increased in the past 20 years.[8,9] The development of more appropriate standards for the primary prevention of adverse health outcomes among old Japanese community-dwellers is of great significance to the formulation of public health policies and the promotion of healthy aging in the future.

Disclosure statement

The authors declare no conflict of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Table 1 Association between gait speed (m/s) and incident disability in participants of the National Institute for Longevity Sciences-Longitudinal Study of Aging project ($n = 1567$)*

Gait speed (m/s)	Quintile 1					Quintile 2					Quintile 3					Quintile 4					Quintile 5				
	No.	Mean	SD	Min	Max	*n*	Mean	SD	Min	Max	*n*	Mean	SD	Min	Max	*n*	Mean	SD	Min	Max	*n*	Mean	SD	Min	Max
Total	305	1.02	0.11	0.47	1.13	299	1.19	0.03	1.15	1.23	304	1.29	0.03	1.25	1.33	335	1.40	0.03	1.35	1.45	324	1.56	0.09	1.47	1.97
Men	144	1.04	0.11	0.47	1.15	137	1.21	0.03	1.17	1.25	177	1.32	0.03	1.27	1.37	143	1.42	0.03	1.38	1.47	166	1.57	0.09	1.48	1.97
Women	160	1.00	0.11	0.47	1.12	157	1.17	0.03	1.13	1.22	141	1.26	0.02	1.23	1.30	168	1.37	0.03	1.32	1.42	174	1.53	0.08	1.43	1.78
	Cases	Person-years	HRs	95% CI		Cases	Person-years	HRs	95% CI		Cases	Person-years	HRs	95% CI		Cases	Person-years	HRs	95% CI		Cases	Person-years	HRs	95% CI	
Total																									
Model 1†	182	3057.0	1.63	1.29	2.07	147	3468.0	1.29	1.01	1.65	116	3702.9	1.00	Ref.		112	4083.5	1.15	0.88	1.49	77	4146.8	0.81	0.60	1.09
Model 2‡			1.58	1.25	2.02			1.26	0.99	1.61			1.00	Ref.				1.17	0.90	1.53			0.84	0.63	1.13
Model 3§			1.57	1.23	2.00			1.24	0.97	1.59			1.00	Ref.				1.18	0.91	1.55			0.88	0.66	1.19
Men																									
Model 1†	88	1354.2	1.52	1.12	2.08	66	1558.0	1.11	0.80	1.55	80	1995.8	1.00	Ref.		43	1749.9	1.01	0.69	1.48	38	2158.7	0.60	0.40	0.89
Model 2‡			1.46	1.07	2.00			1.12	0.81	1.56			1.00	Ref.				1.04	0.70	1.53			0.61	0.41	0.91
Model 3§			1.41	1.02	1.93			1.10	0.79	1.53			1.00	Ref.				1.08	0.73	1.60			0.65	0.44	0.97
Women																									
Model 1†	96	1661.6	1.74	1.21	2.50	76	1854.9	1.33	0.92	1.93	45	1809.5	1.00	Ref.		58	2056.1	1.28	0.86	1.89	44	2259.5	1.02	0.67	1.55
Model 2‡			1.81	1.26	2.61			1.37	0.94	1.99			1.00	Ref.				1.37	0.92	2.03			1.11	0.72	1.70
Model 3§			1.87	1.30	2.70			1.37	0.94	1.99			1.00	Ref.				1.39	0.93	2.07			1.15	0.75	1.76

*Analysis by a Cox proportional hazards model.

†Adjusted for baseline information on age (65–69, 70–74, 75–79, ≥80 years), sex and participation wave.

‡Adjusted for model 1 + baseline information on body mass index (<18.5, 18.5 – <25 or ≥25 kg/m^2), smoking status (never/former, or current), education level (≤9, 10–12, or ≥13 years) and depressive symptoms (CES-D score; ≤15 or ≥16).

§Adjusted for model 2 + baseline information on history of disease (stroke, hypertension and diabetes mellitus; yes or no, for each), and total physical activity (METs × h/day; tertile groups).

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COMMENTS

Response to the letter to the editor "sedation strategy for retrograde cholangiopancreatography in older patients" by He *et al.*

Keywords: elderly, ERCP, ketamine, midazolam.

Dear Editor,

We would like to thank He *et al.*[1] for their interest and comments, which gave us a chance to elucidate further some methodological details on our study.[2]

In Group B, the sedation regimen was administered as midazolam at a dose of 2 mg, then additional doses of 1 mg every 5 min, and after starting ketamine at 1 mg/kg, additional doses were administered every 5 min at a dose of 0.5 mg/kg.[3] In Group A, taking into account the frequency of comorbid diseases and possible side effects, midazolam administered at a dose of 1 mg, then additional doses of 0.5 mg every 5 min, and after starting ketamine at 0.5 mg/kg, additional doses were administered every 5 min at a dose of 0.25 mg/kg. The low-dose protocol in Group B was applied to patients with comorbid diseases or those over 60 years of age in Group A. Pethidine was not used in all patients because of the pronounced analgesic effect of ketamine and the high-risk factors for respiratory complications in most elderly patients.

The Richmond Agitation Score System (RASS) was used for the depth of sedation.[4] Additional doses were administered according to the general condition of the patient and response to verbal and physical stimuli.

To support patients' airway patency in all ERCP procedures, a technician performed a jaw thrust maneuver and intermittent oropharyngeal aspiration to drain excess secretions.[5] We hypothesize that the use of lower than recommended doses in induction and maintenance, in addition to these maneuvers, is effective in such a low rate of hypoxia.

Although we tried at the beginning of the study, an assessment of patient satisfaction could not be completed because most of the elderly patients did not understand the grading due to the progressive loss in their cognitive functions and gave inappropriate answers.

Finally, as we stated in the discussion, none of the patients developed cardiopulmonary arrest or required interruption of the procedure due to cardiopulmonary instability.

Author contributions

Sa.Tok. conceived and designed the study; Sa.Tok. and M.F.C obtained the subjects and/or data; Sa.Tok. analyzed and interpreted the data; Sa.Tok. and Se.Tor. prepared the manuscript; M.F.C reviewed the literature.

Disclosure statement

The authors declare no conflict of interest.

Data availability statement

No additional data are available

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