ORIGINAL RESEARCH

DOI: 10.4274/ejgg.galenos.2024.2024-12-8
Eur J Geriatr Gerontol

Longitudinal Associations of the Yubi-Wakka Test with Sarcopenia: A Two-Year Study Among Thai Older Adults

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Abstract

Objective: Sarcopenia increases risks of adverse outcomes and healthcare costs while reducing independence and quality of life. Early detection allows timely interventions, but advanced diagnostic tools are often inaccessible. The Yubi-Wakka test (finger-ring) test is an easy-to-use and cost-effective screening tool that may serve as a practical alternative. This study examines its association with sarcopenia and its predictive value for new-onset cases in Thai older adults.

Materials and Methods: This cohort study followed 460 older adults from the Outpatient Department at Phramongkutklao Hospital. Sarcopenia was diagnosed according to the 2019 criteria established by the Asian Working Group for Sarcopenia. Participants were grouped into "bigger", "just fits", and "smaller" categories according to their Yubi-Wakka (finger-ring) test outcomes. Baseline and longitudinal relationships were analyzed using multinomial logistic regression and Cox proportional hazard models.

Results: Participants in the "just fits" group had 3.28 times higher [odds ratio (OR) =3.28, 95% confidence interval (CI): 1.56-6.88] and those in the "smaller" group had 6.91 times higher (OR =6.91, 95% CI: 3.78-12.64) of sarcopenia at baseline compared to the "bigger" group. Over two years, the risk of developing new-onset sarcopenia was 2.1 times higher [hazard ratio (HR) =2.1, 95% CI: 1.40-3.16] in the "just fits" group and 3.3 times higher (HR =3.3, 95% CI: 2.37-4.58) in the "smaller" group.

Conclusion: The Yubi-Wakka test or finger-ring test proves to be an effective, low-cost screening tool for sarcopenia, with strong predictive value for both its presence and future onset. Its simplicity makes it highly suitable for resource-constrained environments.

Keywords: Aging, clinical geriatrics, geriatric syndromes, geriatrics, sarcopenia

Introduction

Sarcopenia, characterized by a progressive and generalized decline in skeletal muscle mass (ASM) and strength, is increasingly recognized as a significant health concern, particularly in older adults. The European Working Group on Sarcopenia in Older People identifies low muscle strength as the primary diagnostic criterion, supported by reduced muscle mass and compromised physical performance (1). Similarly, the Asian Working Group for Sarcopenia (AWGS) 2019 recommends diagnostic methods such as handgrip strength for muscle function, bioelectrical impedance analysis (BIA) or dual-energy X-ray absorptiometry (DEXA) for assessing muscle mass, and gait speed and chair stand tests for evaluating physical performance (2,3). Although these methods are reliable, their reliance on specialized equipment and trained personnel often restricts their availability in resource-limited environments, presenting challenges for broader implementation.

The clinical significance of sarcopenia lies in its association with numerous adverse outcomes, including increased risk of frailty, falls, fractures, hospitalizations, and even mortality (4,5).

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Received: 24.12.2024 **Accepted:** 25.04.2025 **Epub:** 21.07.2025

Cite this article as: Lawongsa K, Tepakorn J, Hiri-O-Tappa P, Tejavanija S, Gesakomol K, Srisuwan P. Longitudinal associations of the Yubi-Wakka test with sarcopenia: a two-year study among thai older adults. Eur J Geriatr Gerontol. [Epub Ahead of Print]

Moreover, sarcopenia contributes to a decline in functional independence, negatively impacting the quality of life and increasing healthcare expenditures (6-11). Early detection is crucial to enable timely interventions, such as resistance training, adequate protein intake, and other therapeutic measures, which have been shown to mitigate its progression (12). However, the unavailability of advanced diagnostic tools in many healthcare settings has highlighted the need for practical, cost-effective screening methods for early risk identification.

To address this issue, several sarcopenia screening tools have been proposed, ranging from questionnaire-based assessments like the SARC-F to physical measurements such as gait speed and grip strength (13). One particularly simple and accessible method is the Yubi-Wakka or finger-ring test. This test involves encircling the maximum circumference of the non-dominant calf with a ring created by forming a circle using the thumbs and index fingers of both hands. Based on the fit of the ring around the calf, individuals are categorized as “bigger” (calf circumference larger than the ring), “just fits” (equal to the ring), or “smaller” (calf circumference smaller than the ring) (14). As an indirect measure of muscle mass, this method is cost-effective, easy to administer, and has been shown to have moderate accuracy for predicting sarcopenia (15). Its simplicity makes it particularly suited for use in community settings or regions with limited healthcare resources.

This study aims to investigate the relationship between initial Yubi-Wakka test findings and subsequent health outcomes among Thai older adults. Specifically, we evaluate its relationship with baseline sarcopenia and new-onset sarcopenia over a two-year period. By assessing the accuracy and predictive value of this simple screening tool, we aim to provide evidence for its broader application in community and clinical settings to improve early detection and risk management of sarcopenia, ultimately enhancing health outcomes in aging populations.

Materials and Methods

Setting and Participants

The prospective cohort study invited 460 older adults aged 60 years and above from the family and internal medicine outpatient departments at Phramongkutklao Hospital, Bangkok, Thailand. The participants completed baseline assessments conducted between October and December 2022. Exclusion criteria included individuals with physical or mental limitations that prevented assessment completion, such as severe dementia or being bedridden. Additionally, we excluded individuals with unilateral muscle atrophy due to conditions such as hemiplegia, cerebrovascular accident (stroke), or rheumatological disorders affecting limb symmetry. Participants with contraindications to BIA or conditions such as significant leg edema, which could affect calf measurements and the Yubi-Wakka test, were also excluded. A longitudinal analysis was conducted, focuseding on new-onset sarcopenia, using data from annual follow-ups over two years (October 2022 to September 2024). Cross-sectional analysis utilized baseline data.

Measure

The Yubi-Wakka test assessed calf circumference by asking participants to encircle the largest part of their non-dominant calf with their thumb and index finger while seated, with knees at a 90-degree angle. Results were categorized as “smaller”, “just fits”, or “bigger” compared to the circle of thumb and index finger (16,17). To enhance measurement consistency and minimize potential bias, the Yubi-Wakka test was self-administered by participants, based on standardized verbal and visual instructions, while trained healthcare professionals closely supervised the process and provided guidance as needed. Although participants performed the test themselves, the presence of healthcare personnel helped reduce variability and improve the reliability of the measurements.

Anthropometric data included standing weight, height, calf circumference (measured while seated using standardized methods), and pedal edema. Sarcopenia was diagnosed following the AWGS 2019 criteria, with thresholds including muscle mass <5.7 kg/m² for women and <7.0 kg/m² for men, handgrip strength <28 kg for men, and <18 kg for women, or inability to complete a five-time chair stand test within 12 seconds (2).

Measures of body composition, particularly appendicular ASM and body fat, were measured by means of the InBody720 device for BIA after a 12-hour fast and avoidance of water, coffee, or alcohol four hours prior (18). ASM was calculated by summing muscle mass from all limbs, and adjusting for height squared [ASM/height² (kg/m²)] (2,19).

Muscle strength was measured with a Smedley-type handgrip dynamometer (TKK-5401, Takei Equipment Industries, Japan), using the higher of two readings from the dominant hand (16). Physical performance was measured via the five-time chair stand test, where participants were timed standing up and sitting down five times; inability to complete the task indicated poor performance (20).

Calf circumference was measured with 0.1 cm precision using a non-elastic tape, by averaging the largest circumferences from both calves.

The collected demographic data included sex, age, income, education, physical activity, living arrangements, and chronic conditions, which were recorded via questionnaires. Physical inactivity, for the purposes of this study, referred to not engaging in regular exercise, and previous laboratory tests provided information on serum albumin levels.

For the two-year follow-up assessment, the same measurement protocols were applied to ensure consistency. The same InBody720 device was used for BIA to assess body composition, including ASM. Additionally, the same Smedley handgrip dynamometer and five-time chair stand test were used to reassess muscle strength and physical performance, respectively. This consistency in measurement methods aimed to minimize variability and ensure accurate longitudinal comparisons.

Statistics

Multiple logistic regression was conducted to assess the association between sarcopenia and Yubi-Wakka test outcomes. Cox proportional hazard modeling was used to analyze new-onset sarcopenia, with the non-onset group as the reference. adjusted odds ratios (OR) and hazard ratios (HR) with 95% confidence intervals (CI) accounting for potential confounders such as age, physical inactivity, and education, while controlling for chronic conditions and body fat percentage. All analytical procedures were executed in IBM SPSS Statistics version 26 (IBM Corp., Armonk, NY, USA), with significance set at $p<0.05$.

Ethical Considerations

The study was approved by the Institutional Review Board of the Royal Thai Army Medical Department (approval number: IRBRTA1468/2565, date: 04.11.2022) and conducted in compliance with the ethical standards of the Declaration of Helsinki. Prior to participation, all individuals received clear explanations of the study's aims and procedures, and written informed consent was obtained. Participants were assured of the confidentiality of their information and were informed of their right to withdraw from the study at any time without any repercussions.

Results

Study Participants

The study analyzed 460 participants, of whom 76 (16.5%) were classified as sarcopenic and 384 (83.5%) as non-sarcopenic. Based on the Yubi-Wakka test, 56.1% were categorized as "bigger", 16.5% as "just fit", and 27.4% as "smaller". Among sarcopenic participants, the majority were in the "smaller" group (56.6%), significantly higher than in the "bigger" (23.7%) and "just fit" (19.7%) groups, ($p<0.001$). The baseline characteristics of participants grouped by sarcopenia status are shown in Table 1. Sarcopenic participants were older, with a mean age of 71±6 years, compared to 69±6 years for non-sarcopenic participants. Also had fewer years of education [median 6 years, interquartile range (IQR) 6-12] compared to the non-sarcopenic group (median 9 years, IQR 6-16). Physical inactivity was more common in sarcopenic individuals (22.4%) than in those without sarcopenia (7.6%) ($p<0.001$). In terms of anthropometric measures, sarcopenic participants had lower mean height (154±8 cm vs. 159±8 cm), weight (54.9±10 kg vs. 65±13.6 kg), and body mass index (23.2±3.2 kg/m² vs. 25.7±4.8 kg/m²). Additionally, their calf circumference was smaller (34.0±2.6 cm vs. 36.8±3.7 cm). However, there was no notable difference in body fat percentage between the two groups (34.5% vs. 34%). Physical function was significantly poorer in sarcopenic participants, with lower handgrip strength (18.7±5.7 kg vs. 24.2±7.7 kg) and longer times to complete the five-time chair stand test (10.6±3.0 seconds vs. 9.7±3.3 seconds). Nutritional status, measured by serum albumin levels, was slightly lower in the sarcopenic group (median 4.2 g/mL, IQR 4.0-4.4) compared to the non-sarcopenic group (median 4.3 g/mL, IQR 4.2-4.4). Regarding chronic conditions, sarcopenic participants had a significantly lower prevalence of chronic renal failure (1.3% vs. 13.3%, $p=0.003$), while the prevalence of other conditions, such as hypertension, diabetes mellitus, dyslipidemia, and osteoporosis showed no significant differences.

Longitudinal Analysis of Sarcopenia and the Yubi-Wakka Test

The findings from both the cross-sectional and longitudinal analyses showed the strong relationship between Yubi-Wakka test outcomes and sarcopenia. In the cross-sectional analysis, participants in the "just fits" group had 3.28 times higher odds of sarcopenia (OR) =3.28, 95% CI: 1.56-6.88, $p=0.002$) compared to those in the "bigger" group, while participants in the "Smaller" group had 6.91 times higher odds (OR =6.91, 95% CI: 3.78-12.64, $p<0.001$). Stratified by sex, men in the "just fits" group had odds 4.64 times higher (OR =4.64, 95% CI: 1.16-18.61, $p=0.001$); and men in the "smaller" group had odds 8.56 times higher (OR =8.56, 95% CI: 2.77-26.41, $p=0.031$). Among women, the "just fits" group had odds of 2.56 times (OR = 2.56, 95% CI: 1.07-6.09, $p=0.034$), while the "Smaller" group showed odds of 7.33 times of sarcopenia (OR =7.33, 95% CI: 3.55-15.14, $p<0.001$) (Table 2).

In the longitudinal analysis, participants in the "just fits" group demonstrated a 2.1-fold higher risk of developing new-onset sarcopenia (HR =2.1, 95% CI: 1.40-3.16, $p<0.001$), while those in the "smaller" group had a 3.3-fold higher risk (HR =3.3, 95% CI: 2.37-4.58, $p<0.001$) compared to the "bigger" group. Among men, the "just fits" group had a 1.91-fold increased risk (HR =1.91, 95% CI: 1.04-3.50, $p=0.037$), and the "smaller" group had a 3.06-fold higher risk (HR =3.06, 95% CI: 1.96-4.78, $p<0.001$). In women, participants in the "just fits" group showed a 2.05-fold greater risk of developing sarcopenia (HR =2.05, 95% CI: 1.27-3.33, $p=0.004$), while those in the "smaller" group had a 3.01-fold higher risk (HR = 3.01, 95% CI: 1.96–4.62, $p<0.001$). These results highlight that participants classified as "just fits" and "smaller" in the Yubi-Wakka test were at significantly higher odds of having sarcopenia and at elevated risk of developing sarcopenia over the two-year follow-up, with similar patterns observed in both men and women (Table 2).

Table 1. Demographic and baseline characteristics of the study participants				
Variables (unit)	**Overall**	**Non-sarcopenia**	**Sarcopenia**	**p**
No. participants		384 (83.5%)	76 (16.5%)	
Yubi-Wakka (finger ring) test				
Bigger	258 (56.1%)	240 (62.5%)	18 (23.7%)	<0.001
Just fit	76 (16.5%)	61(15.9%)	15 (19.7%)	
Smaller	126 (27.4%)	83 (21.6%)	43 (56.6%)	
Basic attributes				
Age (years)	69 (6)	69 (6)	71 (6)	
Years of education (years)	9 (6.16)	9 (6.16)	6 (6.12)	
living arrangement (alone)	184 (40.0%)	155 (40.4%)	29 (38.2%)	0.72
Physical activity (inactive)	46 (10%)	29 (7.6%)	17 (22.4%)	<0.001
Anthropometric measurements				
Height (cm)	158 (8)	159 (8)	154 (8)	
Weight (kg)	63.3 (13.6)	65 (13.6)	54.9 (10)	
BMI (kg/m²)	25.2 (4.7)	25.7 (4.8)	23.2 (3.2)	
Calf circumferrence (cm)	36.4 (3.7)	36.8 (3.7)	34.0 (2.6)	
BIA measurements				
ASMI (kg/m²)	6.6 (1.1)	6.8 (1.0)	5.8 (1.0)	
body fat rate (%)	34.1 (8.5)	34 (8.8)	34.5 (6.6)	
Physical function				
Handgrip strength (kg)	23.3 (7.7)	24.2 (7.7)	18.7 (5.7)	
5-time chair stand test (sec)	9.9 (3.2)	9.7 (3.3)	10.6 (3.0)	
Nutrition status				
Serum albumin (g/mL)	4.3 (3.9,4.4)	4.3 (4.2,4.4)	4.2 (4.0,4.4)	
Present chronic condition				
Hypertension	344 (74.8%)	289 (75.3%)	55 (72.4%)	0.596
Diabetes mellitus	104 (22.6%)	90 (23.4%)	14 (18.4%)	0.339
Osteoporosis	16 (3.5%)	12 (3.1%)	4 (5.3%)	0.353
Dyslipidemia	400 (87.0%)	339 (88.3%)	61 (80.3%)	0.058
Malignant neoplasm	12 (2.6%)	9 (2.3%)	3 (3.9%)	0.423
Heart disease	8 (1.7%)	7 (1.8%)	1 (1.3%)	0.757
Chronic renal failure	52 (11.3%)	51 (13.3%)	1 (1.3%)	0.003

Values are shown as mean (±standard deviation), median (25 percentile, 75 percentile)or number of participants (%)
ASMI: Appendicular muscle mass index; BMI: Body mass index, BIA: Bioelectrical impedance analysis

The Kaplan-Meier curves (Figure 1) illustrate the two-year cumulative survival probabilities according to the Yubi-wakka test (add space between "wakka" and "test") (finger-ring) test results at baseline, stratified by the overall population, men, and women. In the overall population, participants in the "bigger" group consistently exhibited the highest survival rates throughout the follow-up period, while those in the "smaller" group showed significantly reduced survival, indicating a higher mortality risk. The "just fits" group displayed intermediate survival outcomes, positioned between the "bigger" and "smaller" groups. Similar trends were observed in the sex-stratified analyses. Among men, the "bigger" group maintained the highest survival probabilities, whereas the "smaller" group experienced a sharp decline, with the "just fits" group showing survival outcomes in between. Women followed the same pattern, with the "bigger" group demonstrating the most favorable survival rates; the "smaller" group showing the steepest decline; and the "just fits" group displaying intermediate outcomes. Findings consistently

Table 2 Analysis of cross-sectional and longitudinal relationships of the "Yubi-Wakka" test.

			Overall				Men				Women	
	n		95%CI	p	n		95%CI	p-value	n		95%CI	p
Outcome: Sarcopenia												
Cross-sectional analysis												
"Yubi-wakka" test		OR				OR				OR		
Bigger	18/258	1	(Referent)		4/93	1	(Referent)		14/165	1	(Referent)	
Just fits	15/76	3.28	(1.56-6.88)	0.002	6/24	4.64	(1.16-18.61)	0.001	9/52	2.56	(1.07-6.09)	0.034
Smaller	43/126	6.91	(3.78-12.64)	<0.001	18/65	8.56	(2.77-26.41)	0.031	25/61	7.33	(3.55-15.14)	<0.001
Longitudinal analysis												
"Yubi-wakka" test		HR				HR				HR		
Bigger	73/258	1	(Referent)		35/93	1	(Referent)		38/165	1	(Referent)	
Just fits	34/76	2.1	(1.40-3.16)	<0.001	10/24	1.91	(1.04-3.50)	0.037	24/52	2.05	(1.27-3.33)	0.004
Smaller	70/126	3.3	(2.37-4.58)	<0.001	38/65	3.06	(1.96-4.78)	<0.001	32/61	3.01	(1.96-4.62)	<0.001

The odds ratios for the "just fit" and "smaller" categories compared to the "bigger" category were calculated based on the baseline prevalence of sarcopenia. Hazard ratios for the risk of sarcopenia in the "just fit" and "smaller" groups, relative to the "bigger" group, were determined for a two-year follow-up period. Participants with baseline sarcopenia or those who missed follow-up assessments were excluded. All ratios were adjusted for baseline factors, including age, education, physical activity, chronic conditions, and body fat percentage
CI: Confidence interval, HR: Hazard ratio, OR: Odds ratio

highlight that a smaller calf circumference, as assessed using the Yubi-Wakka test, is linked to an increased risk of mortality, making it a valuable predictor of survival across all participants.

Changes in Sarcopenia Parameters Over Two Years

Over the two-year follow-up period, key sarcopenia-related parameters showed notable declines. Handgrip strength decreased from 23.3±7.7 kg at baseline to 21.5±7.5 kg at follow-up, while calf circumference was reduced from 36.4±3.7 cm to 35.2±3.5 cm. The appendicular ASM Index declined from 6.6±1.1 kg/m² to 6.4±1.0 kg/m². Additionally, physical function deteriorated as indicated by a longer five-time chair stand test duration, increasing from 9.9±3.2 seconds to 11.0±3.5 seconds. The prevalence of sarcopenia also rose from 16.5% at baseline to 22.0% at follow-up, reflecting the progressive decline in muscle health among aging individuals. These findings highlight the importance of early detection and intervention to mitigate sarcopenia progression (Table 3).

Discussion

This study highlights the clinical utility of the Yubi-Wakka test as an applicable and accessible self-screening tool for sarcopenia among older adults in Thailand. The findings demonstrate that individuals categorized as "smaller" using the Yubi-Wakka test were significantly more likely to have sarcopenia at baseline, and to develop new-onset sarcopenia over the two-year observation period. These results reinforce the potential of the Yubi-Wakka test in predicting sarcopenia and related adverse health outcomes, particularly in resource constrained settings where more sophisticated diagnostic instruments may not be available.

The cross-sectional analysis revealed that participants in the "smaller" group had nearly sevenfold increased odds of sarcopenia in comparison with those in the "bigger" group. Additionally, those in the "just fits" group also showed increased odds, although to a lesser degree. These findings are consistent with prior research conducted in Japanese populations, which reported that the "smaller" classification in the Yubi-Wakka test demonstrated an association with significantly elevated odds of sarcopenia, as well as a higher likelihood of developing disability and mortality (14). Notably, this study provides new evidence supporting the applicability of the Yubi-Wakka test in a Thai population, addressing a critical research gap in the literature.

The longitudinal analysis further underscores the prognostic value of the Yubi-Wakka test. Over the two-year follow-up interval, participants in the smaller group were more than three times as likely to develop new-onset sarcopenia compared to those in the bigger group. This finding aligns with recent studies suggesting that reduced muscle mass, as indicated by smaller calf circumference, is a strong predictor of sarcopenia progression and its associated complications (21). Importantly, the hazard ratios observed in this study highlight the test's potential utility in stratifying risk and guiding early intervention efforts.

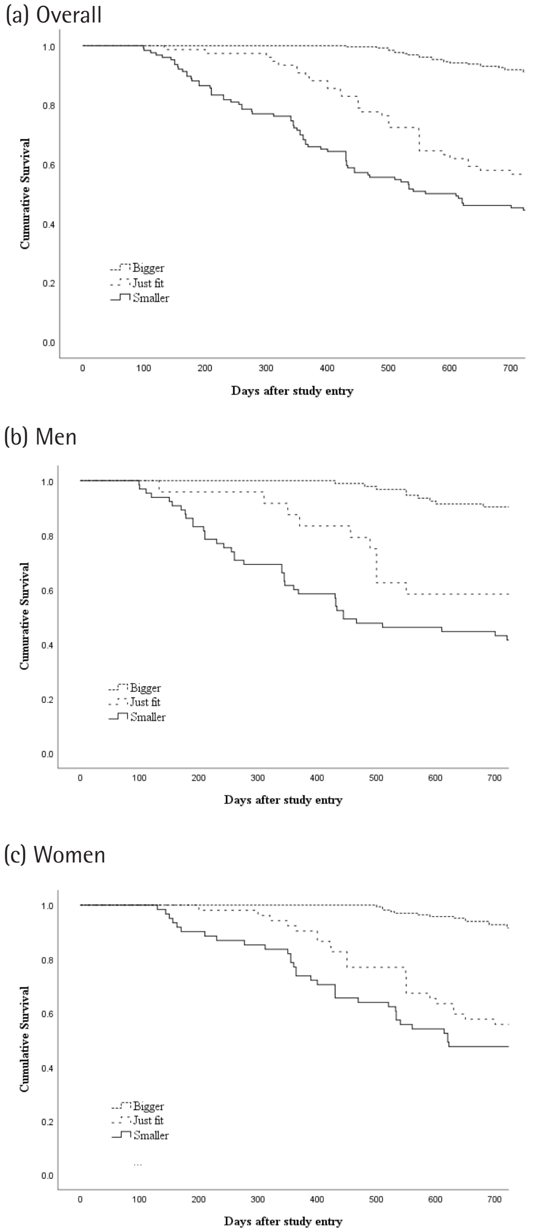

Figure 1. Kaplan-Meier survival curves illustrating two-year follow-up outcomes based on baseline "Yubi-Wakka" test categories. The graphs depict cumulative all-cause mortality events adjusted for age, shown for (a) the overall cohort for (b) men and (c) women

The association between measurements of calf circumference and performance on the Yubi-Wakka test is particularly noteworthy, as calf circumference is commonly utilized as an indirect measure of muscle mass in both clinical and epidemiological studies (2). The Yubi-Wakka test offers a simple and convenient alternative for estimating calf circumference without requiring specialized equipment. Findings from this study demonstrate a strong correlation between Yubi-Wakka test classifications and actual calf circumference measurements, supporting its effectiveness as a sarcopenia screening tool. Nevertheless, while the Yubi-Wakka test is a feasible and accessible method, direct calf circumference measurement remains the more precise approach (17).

The Yubi-Wakka test serves as an indirect measure of muscle mass through calf circumference, but it does not assess strength capacity or physical function -both of which are crucial elements in the diagnosis of sarcopenia based on established international criteria. Although the test is easy to use and suitable for wide application, it does not reflect functional decline, such as diminished grip strength or slower chair stand performance.

The simplicity and cost-effectiveness of the Yubi-Wakka test make it an appealing instrument for widespread use in community and clinical settings. Unlike advanced diagnostic modalities such as methods like DEXA and BIA, the Yubi-Wakka test requires no specialized equipment or technical expertise, making it particularly suited for use in resource-constrained environments. Furthermore, the self-administrable nature of the test enhances its feasibility for large-scale screening initiatives, potentially improving early detection rates and facilitating timely interventions.

The efficacy of the Yubi-Wakka test has been validated in previous studies using established diagnostic criteria for sarcopenia, including assessments based on BIA. For example, Lawongsa et al. (17) found that the test yielded sensitivity and specificity rates of 85.7% and 71.2% in males, and 87.5% and 80.8% in females, when compared with BIA-defined sarcopenia. These figures are comparable to those obtained using calf circumference, a widely accepted proxy for muscle mass

Table 3. Sarcopenia parameter changes

Parameter	Baseline (year 0)	Follow-up (year 2)
Handgrip strength (kg)	23.3±7.7	21.5±7.5
Calf circumference (cm)	36.4±3.7	35.2±3.5
ASMI (kg/m²)	6.6±1.1	6.4±1.0
5-time chair stand test (sec)	9.9±3.2	11.0±3.5
Prevalence of sarcopenia (%)	16.5%	22.0%

Values are shown as mean ± standard deviation
ASMI: Appendicular muscle mass index

estimation. Furthermore, the alignment between Yubi-Wakka test classifications and direct calf circumference measurements observed in this study reinforces the Yubi-Wakka test's reliability as a screening method for reduced muscle mass.

In terms of diagnostic accuracy, previous studies have compared the Yubi-Wakka test with other simple screening methods. In the study by Lawongsa et al. (17), the test's performance in terms of sensitivity and specificity was reported as 85.7% and 71.2% in males, and 87.5% and 80.8% in females, respectively, compared to calf circumference, which showed values of 85.7% and 81.8% in males, and 81.3% and 88.0% in females. Similarly, Ya-Huang et al. (22) compared calf circumference, SARC-F, and SARC-Calf, reporting that calf circumference had a sensitivity and specificity of 86.7% and 82.4% in males, and 85.5% and 63.3% in females. For SARC-F, sensitivity and specificity were 32.9% and 95.2% in males and 65.5% and 61.1% in females. SARC-calf showed values of 69.9% and 96.7% in males, and 83.6% and 65.6% in females. These findings emphasize that the Yubi-Wakka test demonstrates comparable or favorable diagnostic performance supporting its potential applicability as an initial screening instrument in various clinical and community settings.

In a study, the Yubi-Wakka test was confirmed as a reliable self-screening tool for detecting sarcopenia in Japanese community-dwelling older adults. The research, which involved 1,904 participants, demonstrated that individuals categorized as "smaller" had significantly elevated odds of sarcopenia and demonstrated a heightened risk of functional impairment and mortality (16). Similarly, a cross-sectional study, performed using 230 Thai older adults, revealed that the Yubi-Wakka test had favorable sensitivity and specificity for identifying those at risk of sarcopenia (17).

A novel aspect of this study is the exploration of the Yubi-Wakka test's longitudinal associations with new-onset sarcopenia. While previous research has primarily focused on cross-sectional analyses, this study provides valuable insights into the test's predictive validity over time. These findings align with the recent work of Tanaka et al. (16), which highlighted the significance of longitudinal assessments in comprehending the progression of sarcopenia and evaluating the effectiveness of preventive interventions. Furthermore, the inclusion of additional evidence from systematic reviews and meta-analyses highlights the global burden and significance of sarcopenia, as documented by Beaudart et al. (11) and Shafiee et al. (23). These studies underscore the critical need for effective screening tools to address the widespread prevalence of sarcopenia in aging populations.

Moreover, findings from the health, aging, and body composition study, as discussed by Goodpaster et al. (24), demonstrate the decline in skeletal muscle strength, mass, and quality as key contributors to functional decline in older adults. This aligns with the present study's results, highlighting the critical role of early detection and intervention. Additionally, the recommendations by Studenski et al. (25) and Rolland et al. (26) further support the integration of simple screening tools like the Yubi-Wakka test into broader sarcopenia management strategies to mitigate its adverse health impacts.

The early detection of sarcopenia through the Yubi-Wakka test offers a critical window for initiating preventive measures aimed at maintaining muscle mass and function. Recommended interventions include progressive resistance exercises, which have consistently been shown to enhance muscle strength, physical performance, and functional independence in older adults (27,28). Ensuring adequate protein intake-especially high-quality protein distributed evenly throughout the day-can help stimulate muscle protein synthesis and mitigate age-related muscle decline (29). Additional nutritional support, such as supplementation with key amino acids like leucine or β-hydroxy β-methylbutyrate, may further contribute to muscle preservation (30,31). Moreover, maintaining optimal vitamin D levels, managing comorbid conditions, and encouraging regular physical activity are essential components of a holistic approach (32). Integrating these strategies into clinical practice following positive Yubi-Wakka screening could improve patient outcomes and reduce the risk of disability among aging individuals.

Study Limitations

Despite its advantages, the Yubi-Wakka test has several limitations that warrant consideration. It provides only an indirect measure of muscle mass and may be influenced by factors such as subcutaneous fat and edema, potentially affecting its accuracy. While the test demonstrates moderate sensitivity and specificity for predicting sarcopenia, it should be used as a preliminary screening tool rather than a replacement for comprehensive diagnostic evaluations. Additionally, the applicability of our findings may be restricted, as the study population consisted exclusively of older Thai adults. Differences in body composition, habitual activities, and cultural practices across ethnic groups could influence the performance and interpretation of the Yubi-Wakka test. Therefore, it is important to exercise caution when applying these findings to non-Thai populations, and further validation studies in diverse populations are needed. Another limitation is the two-year follow-up period, which may not adequately reflect the long-term impacts of sarcopenia. Extended follow-up studies are necessary to gain deeper insight into its progression and health impacts over time. Moreover, this study did not assess key clinical outcomes such as fracture risk, hospitalization rates, long-term care requirements, or quality of life in individuals with sarcopenia. These factors are essential for understanding the broader clinical implications of the condition, and future research should aim to incorporate them.

Conclusion

In conclusion, the Yubi-Wakka test is a valuable self-screening tool for sarcopenia, with demonstrated utility in predicting both baseline and new-onset sarcopenia in older Thai adults. Its simplicity, affordability, and ease of use make it a promising option for widespread implementation in community and clinical settings. Future studies should explore the integration of the Yubi-Wakka test into broader sarcopenia management frameworks and evaluate its impact on health outcomes in diverse populations.

Ethics

Ethics Committee Approval: The study was approved by the Institutional Review Board of the Royal Thai Army Medical Department (approval number: IRBRTA1468/2565, date: 04.11.2022) and conducted in compliance with the ethical standards of the Declaration of Helsinki.

Informed Consent: Prior to participation, all individuals received clear explanations of the study's aims and procedures, and written informed consent was obtained.

Acknowledgements

We extend our sincere gratitude to the Bioscience Research Center at Phramongkutklao Hospital for their invaluable support in facilitating the handgrip strength assessments, 5-time chair stand tests, and BIA measurements. Our heartfelt thanks also go to the participants who generously contributed to this study and to the dedicated staff members for their significant contributions to the research.

Footnotes

Authorship Contributions

Concept: K.L., Design: K.L., S.T., K.G., P.S., Data Collection or Processing: K.L., J.T., P.H.O.T., S.T., Analysis or Interpretation: K.L., S.T., K.G., P.S., Literature Search: K.L., Writing: K.L., P.S.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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