Components of Sarcopenia and Frailty in Relation to Cognitive Impairment in Older Adults: An Ambispective Cohort Study from a Tertiary Hospital

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ABSTRACT

***Background**: Sarcopenia and frailty are common geriatric syndromes that may contribute to mild cognitive impairment (MCI). Evidence regarding the independent roles of individual sarcopenia components and frailty in MCI remains limited in low- and middle-income countries. This study evaluated the association between sarcopenia components, frailty, and MCI among older adults in Indonesia. **Methods**: An ambispective cohort study was conducted among adults aged ≥60 years attending the Geriatric Outpatient Clinic of Dr. Cipto Mangunkusumo National General Hospital, Jakarta. Sarcopenia components were assessed using SARC-Calf (low muscle mass indicator), handgrip strength, and the five-times sit-to-stand test. Frailty was evaluated using the FRAIL scale. Cognitive function was assessed using the Rapid Cognitive Screening. Multivariate log-binomial or Poisson regression with robust variance was used to estimate adjusted risk ratios (RRs) for MCI. **Results**: A total of 121 participants (median age 74 years; 68.6% female) were included, with an MCI prevalence of 21.5%. After adjustment for confounders, low muscle mass indicator (RR 2.206; 95% CI 1.045–4.652) and low muscle strength (RR 3.006; 95% CI 1.202–7.517) were independently associated with MCI. Low physical performance (RR 1.773; 95% CI 0.796–3.773) and frailty (RR 1.086; 95% CI 0.377–3.134) were not significantly associated with MCI. **Conclusion**: Low muscle mass indicators and reduced muscle strength were*

independently associated with MCI, supporting the integration of simple sarcopenia screening tools into routine geriatric cognitive assessment.

***Keywords**: sarcopenia, frailty, mild cognitive impairment, rapid cognitive screening.*

INTRODUCTION

The global ageing population is increasing rapidly, including in Indonesia, leading to a growing burden of geriatric syndromes such as sarcopenia, frailty, and cognitive impairment.[1] Growing evidence also suggests that these conditions may accelerate the onset of mild cognitive impairment (MCI), a transitional yet potentially reversible phase between normal cognition and dementia[2]. Early detection is therefore crucial to prevent progression toward dementia. Sarcopenia, characterized by reduced muscle mass, strength, and physical performance, has been linked to cognitive decline through shared biological pathways including chronic inflammation, mitochondrial dysfunction, vascular dysregulation, and reduced neurotrophic factors such as BDNF and IGF-1[3-4]. Frailty—a multidimensional state of decreased physiological reserve—has similarly been associated with poor cognitive outcomes[5].

Despite these associations, research on sarcopenia, frailty, and MCI among Indonesian older adults remains scarce. Cognitive screening in clinical practice frequently relies on the Abbreviated Mental Test (AMT), which has limited sensitivity in detecting early cognitive decline and is inadequate for identifying MCI[6,7]. Conversely, the Rapid Cognitive Screening (RCS) tool offers broader cognitive domain assessment and demonstrates better diagnostic performance for MCI[8].

Given these gaps, this study aimed to evaluate the relationship between sarcopenia components—low muscle mass indicator (SARC-Calf), low handgrip strength (HGS), and poor physical performance (FTSST)—as well as frailty, with the presence of MCI among older adults at Dr. Cipto Mangunkusumo National General Hospital (RSCM). Understanding these associations may support the development of simple, scalable screening strategies for early identification of MCI in geriatric settings.

METHODS

Study Design and Population

This ambispective cohort study was conducted at the Geriatric Outpatient Clinic of Dr. Cipto Mangunkusumo National General Hospital (RSCM), Jakarta, Indonesia. Older adults aged ≥60 years who attended the clinic in 2023 were screened at baseline and followed up in 2025. Individuals with preserved global cognition at baseline, defined as an Abbreviated Mental Test (AMT) score ≥8, were eligible for follow-up. Patients with Incomplete data on sarcopenia components or cognitive assessment at follow-up were excluded from the final analysis.

Ethics Statements

This study received approval from the Health Research Ethics Committee of the Faculty of Medicine, Universitas Indonesia/ Cipto Mangunkusumo Hospital, under certificate number KET-1198/UN2.F1/ETIK/ PPM.00.02/2025, issued on 29 August 2025. The permit for the research site was granted by the Human Resources, Education, and Research Department, under document number YR.02.01/D.IX.2.3/1406/2025, issued on 24 September 2025.

Data Collection

Baseline exposure data were obtained from a previously conducted cohort study in 2023, while cognitive outcomes were assessed prospectively during the current follow- up period. Baseline data collected in 2023 included sociodemographic characteristics (age, sex, education level, and monthly allowance), clinical characteristics (comorbidities, medication use, history of hospitalization, falls, and severe COVID-19), and comprehensive geriatric assessment parameters. These included functional status assessed by Activities of Daily Living (ADL), nutritional status using the Mini Nutritional Assessment (MNA), depressive symptoms using the Geriatric

Depression Scale (GDS), and physical activity using the Physical Activity Scale for the Elderly (PASE).

At follow-up in 2025, sarcopenia components, frailty status, and cognitive function were reassessed.

Assessment of Sarcopenia Components and Frailty

The low muscle mass indicator was assessed using the SARC-Calf questionnaire, which combines SARC-F items with calf circumference measurement[9]. Muscle strength was measured using handgrip strength (HGS) assessed by a handheld dynamometer and categorized as low according to established cut-off values for older adults. Physical performance was assessed using the five-times sit-to-stand test (FTSST), with completion time ≥12 seconds indicating low physical performance[10]. Frailty status was evaluated using the FRAIL scale and categorized as fit, prefrail, or frail. For analysis, prefrail and frail categories were combined.

Cognitive Assessment

Cognitive function was assessed using the Rapid Cognitive Screening (RCS) tool, which evaluates multiple cognitive domains, including memory, attention, language, visuospatial ability, and executive function. Participants were categorized as having normal cognition or mild cognitive impairment based on validated RCS cut-off scores[8].

Statistical Analysis

Descriptive statistics were used to summarize participant characteristics. Categorical variables were presented as frequencies and percentages, and continuous variables as medians with ranges. Bivariate analyses were performed to assess associations between sarcopenia components, frailty, potential confounders, and MCI.

Variables with $p < 0.25$ in bivariate analysis or those causing a ≥10% change in risk ratio (ΔRR) were considered potential confounders. Multivariate log-binomial regression or Poisson regression with robust variance was used to estimate adjusted risk ratios (RRs) and 95% confidence intervals (CIs) for the association between sarcopenia components, frailty, and MCI. Statistical significance was set at $p < 0.05$. All analyses were conducted using STATA version 16.0. Given the relatively small sample size, effect estimates were interpreted cautiously with emphasis on clinical plausibility.

RESULTS

Participant Characteristics

A total of 121 participants were included in the final analysis. The median age was 74 years, with the majority aged 70–79 years (62.0%) and predominantly female (68.6%) (**Table 1).**

Table 1. Baseline Characteristics of Subjects

Variables	N = 121
Age, n (%)	
60-69 y.o	25 (20.7)
70-79 y.o	75 (62.0)
≥80 y.o	21 (17.3)
Female, n (%)	83 (68.6)
Level of Education, n (%)	
≤ 9 years	17 (14.0)
>9 years	104 (86.0)
Monthly Allowance, n (%)	
< Rp 3.000.000, -	39 (32.2)
≥Rp 3.000.000, -	82 (67.8)
Married, n (%)	69 (57.0)
History of Smoking, n (%)	16 (13.2)
History of Alcohol (n, %)	3 (2.5)
History of Severe COVID-19, n (%)	15 (12.4)
History of Falls, n (%)	27 (22.3)
History of Hospitalization, n (%)	36 29.8)
Comorbidities, n (%)	
Hypertension	91 (75.2)
Diabetes Mellitus	57 (47.1)
Coronary Artery Disease	54 (44.6)
Cerebrovascular Disease	17 (14.0)
Dyslipidemia	56 (46.2)
Chronic Pulmonary Lung Disease	13 (10.7)
Chronic Kidney Disease	12 (9.9)
Malignancy	1 (0.8)
Obesity	55 (45.5)
Number of Medications (Median, Min-Max)	8 (2-16)
Polypharmacy, n (%)	106 (87.6)
ADL, n (%)	
Independent	85 (70.2)
Mild Dependent	36 (29.8)
GDS, n (%)	
Normal	110 (90.9)
Risk of Depression	11 (9.1)
AMT, n (%)	
Normal	120 (99.2)
Cognitive Impairment	1 (0.8)

RCS, n (%)	
Normal	97 (80.2)
Mild Cognitive Impairment	24 (19.8)
SARC-F, n (%)	
Normal	82 (67.8)
Low Muscle Mass Indicator	24 (19.8)
Handgrip Strength, n (%)	
Normal	74 (61.2)
Low Muscle Strength	47 (38.8)
FTSST , n (%)	
Normal	65 (53.7)
Low Physical Performance	56 (46.3)
FRAIL, n (%)	
Fit	40 (33.1)
Pre-Frail	68 (56.2)
Frail	13 (10.7)
MNA, n (%)	
Normal	76 (62.8)
At Risk of Malnutrition	39 (32.2)
Malnutrition	6 (5.0)
PASE, n (%)	
Normal	102 (84.3)
Limited	15 (12.4)
Sedentary	4 (3.3)

Chi-Square Test. ADL = Activities of Daily Living; AMT = Abbreviated Mental Test; RCS = Rapid Cognitive Screening; SARC-F = Strength, Assistance with walking, Rise from a chair, Climb stairs, and Falls; FTSST = Five-Times Sit-to-Stand Test; FRAIL = Fatigue, Resistance, Ambulation, Illnesses, and Loss of weight; MNA = Mini Nutritional Assessment; PASE = Physical Activity Scale for the Elderly; COVID-19 = Coronavirus Disease 2019.

Most participants had more than 9 years of formal education (86.0%) and reported a monthly allowance of at least IDR 3,000,000 (67.8%). Hypertension (75.2%), diabetes mellitus (47.1%), coronary artery disease (44.6%), and dyslipidemia (46.2%) were the most common comorbidities, and polypharmacy was present in 87.6% of participants. Most participants were functionally independent (70.2%), while 9.1% were at risk of depression, and 37.2% had either malnutrition or were at risk of malnutrition.

At follow-up, the prevalence of MCI assessed using the RCS was 21.5%. In contrast, cognitive impairment was detected in only 0.8% of participants using the AMT at baseline. Regarding sarcopenia-related parameters, 32.2% of participants had a low muscle mass indicator based on SARC-Calf, 38.8% had low handgrip strength, and 46.3% had low physical performance based on the five-times sit-to-stand test. More than half of the participants were classified as prefrail (56.2%), while 10.7% were frail.

Bivariate Analysis

In bivariate analyses, several clinical and geriatric variables were significantly associated with MCI (**Table 2**).

Table 2. Bivariate Analysis

	Cognitive Function			
Variable	**MCI (n=26)**	**Normal (n=95)**	**RR (95%CI)**	**p-value**
Age, n (%)				
60-69 y.o	5 (20.0)	20 (80.0)		
70-79 y.o	13 (17.3)	62 (82.7)	0.867 (0.343 – 2.189)	0.762
≥80 y.o	8 (38.1)	13 (61.9)	1.905 (0.733 – 4.945)	0.186
Level of Education, n (%)				
>9 years	8 (47.06)	9 (52.94)		
≤9 years	18 (17.31)	86 (82.69)	2,719 (1.311 – 5.241)	0.003
Monthly Allowance, n (%)				
≥3.000.000	14 (17.07)	68 (82.93)		
<3.000.000	12 (30.77)	27 (69.23)	1.802 (0.922 – 3.523)	0.085
History of Smoking, n(%)				
No	23 (21.90)	82 (78.10)		
Yes	3 (18.75)	13 (81.25)	0.856 (0.290 – 2.526)	0.778
History of Alcohol, n (%)				
No	25 (21.19)	93 (78.81)		
Yes	1 (33.33)	2 (66.67)	1.573 (0.306 – 8.092)	0.588
Komorbiditas Obesity, n (%)				
No	18 (27.27)	48 (72.73)		
Yes	8 (14.55)	47 (85.45)	0.533 (0.251 – 1.131)	0.101
Hypertension, n (%)				
No	5 (16.67)	25 (83.33)		
Yes	21 (23.08)	70 (76.92)	1.385 (0.572 – 3.351)	0.470

Diabetes, n (%)				
No	14 (21.88)	50 (78.13)		
Yes	12 (21.05)	45 (78.95)	0.962 (0.486 – 1.906)	0.912
CVD, n (%)				
No	19 (18.27)	85 (81.73)		
CAD				
No	13 (19.40)	54 (80.60)		
Yes	13 (24.07)	41 (75.93)	1.241 (0.629 – 2.449)	0.534
Dyslipidemia, n (%)				
No	13 (20.0)	80 (52.0)		
Yes	13 (23.2)	43 (76.8)	1.209 (0.507 – 2.882)	0.668
Physical Activity, n (%)				
Normal	20 (19.61)	82 (80.39)		
Limited/Sedentary	6 (31.58)	13 (68.42)	1.611 (0.746 – 3.477)	0.225
ADL				
Independent	14 (16.47)	71 (83.53)		
Mild Dependent	12 (33.33)	24 (66.67)	2.038 (1.040 – 3.936)	0.038
MNA				
Normal	8 (10.53)	68 (89.47)		
At risk/Malnutrition	18 (40.0)	27 (60.0)	3.800 (1.801 – 8.019)	<0.0001
History of Severe COVID- 19, n (%				
No	22 (20.75)	84 (79.25)		
Yes	4 (26.67)	11 (73,33)	1.284 (0.513 – 3.217)	0.593

Chi-Square test. CVD = Cerebrovascular disease; CAD = coronary artery disease; ADL = *Activities of Daily Living*; MNA = *Mini Nutritional Assessment;* GDS = *Geriatric Depression* Scale; COVID-19 = Coronavirus Disease 2019.

Lower educational attainment (≤9 years), presence of cerebrovascular disease, mild dependency in activities of daily living, risk of malnutrition or malnutrition, and depressive symptoms were all associated with a higher prevalence of MCI.

In the bivariate analysis of sarcopenia components, all three indicators demonstrated significant associations with MCI (**Table 3**). Participants with a low muscle mass indicator based on SARC-Calf had more than a threefold higher risk of MCI (RR 3.36, 95% CI 1.68–6.72; p = 0.001). Low handgrip strength showed the strongest association, with individuals nearly four times more likely to have MCI (RR 4.27, 95% CI 1.95–9.38; p < 0.0001). Low physical performance based on FTSST ≥12 seconds was also significantly associated with MCI (RR 2.19, 95% CI 1.06–4.53; p = 0.034). Frailty status demonstrated a borderline significant association, with prefrail or frail participants showing higher MCI prevalence (RR 2.72, 95% CI 1.00–7.35; p = 0.049).

Table 3. Bivariate Analysis of Sarcopenia Components and Frailty

Variable	Cognitive Impairment		RR (95%CI)	p- value
	MCI (n=26)	Normal (n=95)		
SARC-Calf, n (%)				
Low Muscle Mass Indicator	16 (41.03)	23 (58.97)	3.364 (1,684 – 6.721)	0.001
Handgrip Strength, n (%)				
Low Muscle Strength	19 (40.43)	28 (59.57)	4.273 (1.948 – 9.376)	<0.0001
FTSST, n (%)				
Low Physical Performance	17 (30.36)	39 (69.64)	2.192 (1.062 – 4.525)	0.034
Frailty, n (%)				
Pre-frail/Frail	22 (27.16)	59 (72.84)	2.716 (1.003 – 7.351)	0.049

After adjusting for potential confounders, including nutritional status, depressive symptoms, education level, cerebrovascular disease, functional status, socioeconomic status, obesity, age, and physical activity, two components remain significantly associated with MCI (**Table 4**). The adjusted risk ratio for the low muscle mass indicator was 2.206 (p = 0.038), and for low HGS was 3.006 (p = 0.019), indicating that deficits in muscle mass and strength independently increased the likelihood of MCI.

In contrast, low physical performance, assessed by the five-times sit-to-stand test, was not significantly associated with MCI after adjustment (adjusted RR = 1.773; 95% CI, 0.796–3.773; p = 0.166). Similarly, frailty status was not independently associated with MCI in the multivariate model (adjusted RR = 1.086; 95% CI, 0.377–3.134; p = 0.878).

Multicollinearity diagnostics using tolerance values, variance inflation factor (VIF), and condition index showed no evidence of significant collinearity among independent variables. All tolerance values were >0.1 (range: 0.481–0.946), all VIF values were <5 (range: 1.057–2.081), and the highest condition index was 6.682, well below the threshold of 30. These results indicate that all independent variables, including obesity and nutritional status, were suitable for inclusion in the multivariate regression models without risk of collinearity-related distortion.

DISCUSSION

In this ambispective cohort study of older adults attending a tertiary referral hospital in Indonesia, low muscle mass indicators and reduced muscle strength were independently associated with mild cognitive impairment (MCI), whereas physical performance and frailty were not.

Specific components of sarcopenia, particularly muscle mass and muscle strength, may play a more direct role in cognitive decline than broader functional or frailty constructs. These findings are consistent with earlier evidence showing strong interactions between sarcopenia-related physiology and cognitive decline. Sarcopenia is known to involve loss of muscle mass and strength, along with metabolic and endocrine changes that influence brain function[1]. Muscle tissue actively releases myokines, including BDNF, IGF-1, and irisin, that support neurogenesis, synaptic plasticity, and hippocampal function[2]. Reduced muscle mass and strength lead to diminished secretion of these neurotrophic factors, impaired neuroplasticity, and increased vulnerability to cognitive deterioration. Chronic low-grade inflammation, oxidative stress, and mitochondrial dysfunction—hallmarks of sarcopenia—also contribute to accelerated neurodegeneration[1,4].

The strong association observed between handgrip strength (HGS) and MCI aligns with multiple meta-analyses identifying muscle strength as one of the strongest predictors of cognitive impairment[11]. HGS reflects both peripheral neuromuscular performance and central motor pathway integrity, making it a robust biomarker of overall brain health. In the present study, HGS showed the highest risk ratio for MCI in both. bivariate and multivariate models, reinforcing its role as a sensitive indicator of early physiological decline that runs parallel to cognitive deterioration.[12]

The low muscle mass indicator (SARC-Calf) also remained significantly associated with MCI after adjustment. Calf circumference correlates with appendicular lean mass and nutritional

Table 4. Multivariate Analysis of Sarcopenia Components and Frailty

Variable	RR (95%CI)	p- value	Delta RR
SARC-Calf, n (%)			
Low Muscle Mass Indicator	2.206 (1.045 – 4.652)	0.038	3.4
Handgrip Strength, n (%)			
Low Muscle Strength	3.006 (1.202 – 7.517)	0.019	2.7
FTSST, n (%)			
Low Physical Performance	1.733 (0.796 – 3.773)	0.166	4.9
Frailty, n (%)			
Pre-frail/Frail	1.086 (0.377 – 3.134)	0.878	2.9

status, and previous studies in older adults have demonstrated that SARC-Calf provides better diagnostic performance for possible sarcopenia compared with SARC-F alone[7]. Reduced muscle mass may contribute to limited mobility, reduced physical activity, and impaired cerebral perfusion, all of which are known risk factors for cognitive decline. The combination of functional symptoms in SARC-F with calf circumference provides a multidimensional assessment that likely enhances sensitivity for detecting individuals at cognitive risk.

In contrast, physical performance assessed by the Five-Times Sit-to-Stand Test (FTSST) lost statistical significance after multivariate adjustment, suggesting that the association between gait-related or lower-extremity functional decline and cognition may be mediated by nutritional status, depression, functional dependence, and cerebrovascular disease rather than reflecting a direct causal effect.[13] Several longitudinal studies have reported inconsistent associations between lower-extremity performance and cognitive decline, particularly when confounders are included. Although impaired physical performance has been linked to deficits in executive function, visuomotor integration, and motor planning, these cognitive domains are also influenced by education, depressive symptoms, and comorbid cerebrovascular disease, all prevalent among the study population.[14,15]

Frailty was not independently associated with mild cognitive impairment in the fully adjusted model. This finding should be interpreted considering both cohort characteristics and the conceptual scope of the frailty instrument used. The predominance of prefrail individuals in the cohort likely limited variability in frailty severity, reducing the ability to detect an independent association. More importantly, the attenuation of the frailty–MCI relationship after multivariable adjustment likely reflects the physical focus of the FRAIL scale and its overlap with nutritional status, functional dependence, depressive symptoms, and comorbidity burden rather than the absence of a true biological relationship[6,17].

FRAIL is designed primarily as a physical frailty screening tool and does not explicitly capture cognitive reserve or executive functions, which are central to early cognitive decline. Prior studies have demonstrated that the association between frailty and cognitive impairment may be mediated or moderated by muscle strength, nutritional status, and comorbidity burden. In this analysis, more specific physiological markers, particularly muscle strength, muscle mass, and nutritional status, showed stronger and more direct associations with MCI. Taken together, these findings support the growing body of evidence suggesting that sarcopenia may represent a core biological pathway linking frailty to cognitive decline, and that global frailty constructs may lose independent explanatory power once these underlying components are accounted for.[16]

Nutritional status, depressive symptoms, and education level emerged as key confounding factors in the multivariate models. Malnutrition is known to increase systemic inflammation and reduce the availability of micronutrients essential for neurotransmitter synthesis and neuronal maintenance. Depression is strongly associated with reduced attention, memory, and motivation, and may both mimic and potentiate cognitive decline. Lower educational attainment reduces cognitive reserve, increasing vulnerability to clinical manifestation of neuropathology.[18] These factors significantly influenced effect estimates, highlighting their central roles in cognitive aging.

One of the key findings of this study is the marked discrepancy between cognitive screening tools. While the AMT failed to identify MCI in this cohort, the RCS detected MCI in more than 20% of participants. This divergence is clinically meaningful and suggests that AMT substantially under-detects early cognitive impairment in geriatric clinical settings. The AMT was originally designed to identify moderate-to-severe cognitive deficits and dementia, relying heavily on orientation and long-term memory.[8,19] Consequently, it lacks sensitivity for the subtle executive, attentional, and visuospatial deficits that characterize MCI. In contrast, RCS, despite its brevity, includes recall, visuospatial tasks, repetition, comprehension, and attention, with demonstrated diagnostic performance superior to Mini-Cog and AMT for detecting MCI.[8]

Our findings indicate that reliance on AMT alone may lead to systematic under- recognition of MCI, particularly in functionally independent older adults. This underdetection has important implications, as MCI represents a critical window for risk stratification, monitoring, and preventive interventions. The present study, therefore, provides empirical support for the use of RCS as a more sensitive screening instrument for early cognitive impairment in routine geriatric practice.

Clinical Implications

The findings of this study have implications that extend beyond tertiary care settings. Clinically, they highlight a critical limitation of widely used brief cognitive screening tools in identifying early cognitive impairment. The inability of AMT to detect MCI in this cohort indicates that reliance on AMT as a standalone screening instrument may lead to false reassurance, resulting in delayed recognition of cognitive vulnerability and missed opportunities for early intervention.

Simple assessments of sarcopenia components, such as SARC-Calf and handgrip strength measurement, are feasible and scalable tools that can be readily implemented in primary care and community-based settings. In Indonesia, these tools are particularly relevant for primary healthcare services, where access to advanced diagnostic modalities for muscle mass or cognitive assessment is limited.

Integrating sarcopenia screening into routine geriatric services at the primary care level may facilitate early identification of older adults at risk of cognitive impairment, enabling timely referral, nutritional and exercise interventions, and closer cognitive monitoring. At the population level, these findings support the incorporation of muscle strength and muscle mass screening into community-based geriatric screening programs, aligning with public health strategies aimed at preventing cognitive decline and reducing the burden of MCI in ageing societies.

Strengths and Limitations

This study has several strengths. First, the ambispective cohort design allowed temporal assessment of sarcopenia components and subsequent cognitive outcomes. Second, comprehensive geriatric assessment enabled adjustment for multiple relevant confounders, including nutritional status, depressive symptoms, functional status, and comorbidities. Third, the use of the Rapid Cognitive Screening tool, which assesses broader cognitive domains than commonly used brief instruments, improved sensitivity for detecting mild cognitive impairment. Finally, the evaluation of individual sarcopenia components provided insight into their differential associations with cognitive impairment.

Several limitations should also be acknowledged. Muscle mass was not directly measured using bioelectrical impedance analysis or dual-energy X-ray absorptiometry, which may limit diagnostic precision. The single-center design may restrict generalizability to other settings. Although attrition occurred during follow-up, participants lost to follow-up did not differ significantly in baseline sociodemographic, clinical, or geriatric characteristics compared with those retained, suggesting minimal risk of attrition bias. Residual confounding cannot be completely excluded despite multivariate adjustment.

CONCLUSION

In this ambispective cohort study, low muscle mass indicators and reduced muscle strength were independently associated with an increased risk of MCI among older adults, even after adjustment for nutritional, psychological, functional, and sociodemographic confounders. In contrast, low physical performance and frailty status were not independently associated with MCI.

These findings suggest that muscle mass and muscle strength represent more direct physiological contributors to early cognitive decline than broader functional or frailty constructs. Simple, low-cost assessments such as SARC-Calf and handgrip strength measurement may therefore serve as valuable screening tools to identify older adults at increased risk of MCI in routine geriatric and primary care settings.

We recommend that cognitive screening strategies in geriatric clinical practice move beyond tools primarily designed for dementia

detection. While AMT remains useful for identifying moderate-to-severe cognitive impairment, it should not be relied upon to screen for MCI.

RCS should be considered as a preferred screening instrument for early cognitive impairment in older adults, particularly in settings where time and resources are limited but early detection is essential. Future clinical protocols and geriatric assessment pathways should explicitly incorporate RCS or similarly multidomain-sensitive tools to reduce underdiagnosis of MCI.

CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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