Original Article

Prevalence of Sarcopenia and Its Association with Mental Health Status in Elderly Patients: A Comparative Cross-sectional Study

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Abstract

Background: Sarcopenia, characterized by loss of muscle mass and function, is a significant health concern in aging populations. While its physical consequences are well-documented, the relationship between sarcopenia and mental health remains understudied. This study aimed to investigate the prevalence of sarcopenia and its association with mental health status, including depression, cognitive function, anxiety, and loneliness, among elderly patients. **Methodology:** A comparative cross-sectional study was conducted on 407 participants aged ≥65. Sarcopenia was diagnosed using the modified Asian Working Group for Sarcopenia criteria. Mental health was assessed using validated scales: the 15-item Geriatric Depression Scale, the Mini-Mental State Examination, the 7-item Generalized Anxiety Disorder Scale, and the 3-item UCLA Loneliness Scale (UCLA-3). Logistic regression models were used to examine associations between sarcopenia and mental health outcomes. **Results:** The prevalence of sarcopenia was 49.9% (95% confidence interval [CI]: 45.0%–54.8%), with higher rates in older age groups and women. After adjusting for confounders, sarcopenia was significantly associated with depression (odds ratio [OR]: 2.28, 95% CI: 1.51–3.44, $P < 0.001$) and cognitive impairment (OR: 1.86, 95% CI: 1.17–2.96, $P = 0.009$). Associations with anxiety (OR: 1.49, 95% CI: 0.93–2.38, $P = 0.095$) and loneliness (OR: 1.52, 95% CI: 1.00–2.31, $P = 0.049$) were observed but did not reach statistical significance. **Conclusion:** Sarcopenia is highly prevalent among elderly patients and is independently associated with adverse mental health outcomes, particularly depression and cognitive impairment. These findings underscore the importance of integrated physical and mental health interventions in the care of older adults with sarcopenia.

Keywords: *Cognitive function, cross-sectional study, depression, elderly, mental health, sarcopenia*

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Introduction

Population aging is a global phenomenon, with the proportion of older adults expected to double by 2050.[1] This demographic shift brings with it an increased prevalence of age-related conditions, including sarcopenia, a progressive and generalized skeletal muscle disorder characterized by loss of muscle mass, strength, and function.[2] Sarcopenia has emerged as a major public health concern due to its association with adverse health outcomes, including falls, fractures, functional decline, and increased mortality.[3]

The prevalence of sarcopenia varies widely depending on the population studied and the diagnostic criteria used, ranging from 1% to 29% in community-dwelling older adults and 14% to 33% in long-term care populations.[4] This variability underscores the need for population-specific studies to accurately assess the burden of sarcopenia and its associated risk factors.

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While the physical consequences of sarcopenia are well-documented, growing evidence suggests that sarcopenia may also have significant implications for mental health in older adults.[5] The complex interplay between physical and mental health in aging populations is increasingly recognized, with bidirectional relationships observed between physical function and various mental health outcomes.[6]

Depression, a common mental health disorder in older adults, has been associated with decreased physical activity, poor nutrition, and increased inflammation, all of which are risk factors for sarcopenia.[7] Conversely, the loss of muscle mass and strength characteristic of sarcopenia may lead to reduced mobility, social isolation, and loss of independence, potentially contributing to the development or exacerbation of depressive symptoms.[8]

Cognitive function is another critical aspect of mental health that may be linked to sarcopenia. Recent studies have suggested a potential association between sarcopenia and cognitive decline, with shared pathophysiological mechanisms including chronic inflammation, oxidative stress, and vascular risk factors.[9] However, the nature and strength of this relationship remain unclear, particularly across different populations and settings.

Anxiety and loneliness, while less studied about sarcopenia, are important dimensions of mental health in older adults that may be influenced by or contribute to sarcopenic processes. The physical limitations imposed by sarcopenia could potentially exacerbate anxiety symptoms and increase feelings of social isolation.[10]

Despite the growing body of research in this field, there remains a paucity of comprehensive studies examining the relationship between sarcopenia and multiple dimensions of mental health simultaneously, particularly in the elderly. Understanding these associations is crucial for developing holistic interventions that address both the physical and mental health needs of older adults.

Therefore, this study aims to investigate the prevalence of sarcopenia and its association with mental health status, including depression, cognitive function, anxiety, and loneliness, among elderly patients in Gujarat. By elucidating these relationships, we hope to contribute to the development of more comprehensive and effective strategies for healthy aging, ultimately improving the quality of life for older adults.

Methodology

Study design and setting

This research employed a comparative cross-sectional study design. The study was conducted at a tertiary care center in Gujarat from June 2023 to June 2024. The study protocol was approved by the Institutional Ethics Committee of (Shri MP Shah Medical College and GG Government Hospital) (approval number: 36/01/2023, dated April 23, 2023), and all participants provided written informed consent before enrollment.

Participants

Inclusion criteria

1. Age ≥65 years
2. Ability to understand and communicate in vernacular language
3. Willingness to participate and provide informed consent.

Exclusion criteria

1. Severe cognitive impairment (Mini-Mental State Examination score [MMSE] <10)[11]
2. Acute illness or hospitalization within the past month
3. Terminal illness with life expectancy <6 months
4. Severe visual or hearing impairment that would interfere with assessment.

Sample size calculation

The sample size was calculated using G*Power 3.1 software (Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany). Based on previous studies, we estimated that 30% of nonsarcopenic elderly individuals would have depression. To detect a clinically meaningful difference of 20% in the prevalence of depression between sarcopenic and nonsarcopenic groups, with 80% power and a two-sided alpha of 0.05, a sample size of 186 participants per group was required. Accounting for a potential 10% dropout or incomplete data rate, we aimed to recruit 407 participants.[12,13]

Recruitment and sampling technique

Outpatient clinics

- Primary recruitment was conducted through the geriatric outpatient clinics at (Shri MP Shah Medical College and GG Government Hospital)
- Clinic staff was briefed on the study and provided with inclusion/exclusion criteria to identify potential participants
- Informational posters and brochures were displayed in waiting areas.

A stratified random sampling technique was employed to ensure representation across different age groups and genders:

Stratification

The target population was stratified into six groups based on age and gender:

a. Males 65–74 years
b. Females 65–74 years
c. Males 75–84 years

d. Females 75–84 years
e. Males ≥85 years
f. Females ≥85 years.

Sample size allocation

The total sample size of 407 was proportionally allocated to each stratum based on the population distribution of these groups in the list of geriatric outpatient department patients.

Random selection

- Participants were randomly selected within each stratum using a computer-generated random number sequence
- This random selection was applied to the pool of eligible individuals identified through the various recruitment methods.

Oversampling

- To account for potential nonresponse or ineligibility, we oversampled by 20% in each stratum
- This oversampling was particularly important for the oldest age group (≥85 years) due to potentially higher rates of exclusion based on health status.

Continuous monitoring

- The composition of the recruited sample was monitored throughout the recruitment process
- If certain strata were underrepresented, targeted recruitment efforts were intensified for those groups.

Replacement strategy

For individuals who were selected but found to be ineligible or unwilling to participate, replacement was done by randomly selecting another individual from the same stratum.

Data collection

Data were collected by trained research assistants who underwent standardized training to ensure consistency in measurements and assessments.

Demographic and clinical characteristics

Demographic information was collected through a structured questionnaire, including age, gender, education level, marital status, and living arrangements. Clinical characteristics, including medical history, current medications, smoking status, and alcohol consumption, were obtained through interviews and verified with medical records where available.

Anthropometric measurements

1. Height was measured to the nearest 0.1 cm using a wall-mounted stadiometer
2. Weight was measured to the nearest 0.1 kg using a calibrated digital scale
3. Body mass index (BMI) was calculated as weight (kg) divided by height squared (m^2).

Assessment of sarcopenia

To assess sarcopenia, we employed the modified Asian Working Group for Sarcopenia (AWGS-2) criteria. This comprehensive approach evaluated muscle strength, muscle mass, and physical performance. Muscle strength was measured using handgrip strength, with cutoff values of <28 kg for men and <18 kg for women indicating low strength. Physical performance was assessed using gait speed, with a cutoff of <1.0 m/s signifying low performance. For muscle mass evaluation, we utilized bioelectrical impedance analysis, with cutoff values of <7.0 kg/m^2 for men and <5.7 kg/m^2 for women indicating low muscle mass.[14-17]

Mental health assessments

Depression

- Assessed using the 15-item Geriatric Depression Scale (GDS-15)[18]
- Scores ≥5 indicated the presence of depressive symptoms.

Cognitive function

- Evaluated using the MMSE[11]
- Scores <24 indicated cognitive impairment.

Anxiety

- Measured using the 7-item Generalized Anxiety Disorder Scale (GAD-7)[19]
- Scores ≥10 indicated the presence of anxiety symptoms.

Loneliness

- Assessed using the 3-item UCLA Loneliness Scale (UCLA-3)[20]
- Scores ≥6 indicated loneliness.

Other assessments

Physical activity

- Evaluated using the International Physical Activity Questionnaire-Short Form[21]
- Categorized as low, moderate, or high based on weekly metabolic equivalent minutes.

Polypharmacy

Defined as the concurrent use of five or more medications.

Comorbidities

Presence of chronic conditions, including hypertension, diabetes, cardiovascular disease, and osteoarthritis, as reported by participants and verified through medical records where available.

Smoking status

Categorized as:

a. Never smoker: Participants who have never smoked or smoked fewer than 100 cigarettes in their lifetime

b. Former smoker: Participant who has smoked at least 100 cigarettes in their lifetime but has not smoked in the past 12 months
c. Current smoker: Participant who has smoked at least 100 cigarettes in their lifetime and continues to smoke either daily or occasionally.

Alcohol consumption

Categorized based on self-reported average daily alcohol intake:

a. None: No alcohol consumption
b. Moderate: Up to one drink per day for women and up to two drinks per day for men. One drink is defined as 12 fluid ounces of regular beer (5% alcohol), 5 fluid ounces of wine (12% alcohol), or 1.5 fluid ounces of 80-proof distilled spirits (40% alcohol)
c. Heavy: More than one drink per day for women and more than two drinks per day for men.

Statistical analysis

All statistical analyses were performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). The normality of continuous variables was assessed using the Shapiro–Wilk test and visual inspection of Q–Q plots. Descriptive statistics were calculated for all variables, with continuous data presented as mean ± standard deviation or median (interquartile range) as appropriate and categorical data as frequencies and percentages. Comparisons between sarcopenia and nonsarcopenia groups were conducted using independent *t*-tests or Mann–Whitney *U*-tests for continuous variables and Chi-square tests or Fisher's exact tests for categorical variables. The prevalence of sarcopenia was calculated as percentages with 95% confidence intervals (CIs), stratified by age group and gender. To examine the association between sarcopenia and mental health outcomes, logistic regression models were employed to calculate odds ratios (ORs) with 95% CIs. Both crude and adjusted ORs were calculated, with the latter adjusting for potential confounders including age, gender, BMI, education level, marital status, living arrangement, physical activity level, and number of comorbidities. Sensitivity analyses were performed using alternative definitions of sarcopenia (e.g., AWGS criteria) to assess the robustness of the findings. Missing data were analyzed using Little's Missing Completely at Random test, and multiple imputation was used if data were missing at random. For all analyses, a two-sided $P < 0.05$ was considered statistically significant.

Ethical considerations

The study was conducted by the Declaration of Helsinki and Good Clinical Practice guidelines. Participants were informed about the study's purpose, procedures, potential risks and benefits, and their right to withdraw at any time without consequence. All data were de-identified and stored securely to ensure confidentiality.

Power analysis

Post hoc power calculations were performed for all outcomes. With our sample size of 407, we had 90% power to detect an OR of 1.8 for depression and cognitive impairment at a significance level of 0.05. For anxiety and loneliness, our study had 80% power to detect ORs of 1.7 and 1.6, respectively. These calculations suggest that our study may have been underpowered to detect smaller effect sizes for anxiety and loneliness, which could explain the borderline significance of these associations.

Results

Of the 500 individuals initially approached, 93 declined to participate. Nonrespondents were similar in age and gender distribution to participants but were more likely to report mobility issues (35% vs. 28%). In addition, 25 individuals were excluded due to severe cognitive impairment (MMSE <10). These excluded individuals were older (mean age: 82.3 years) and more likely to be female (68%) compared to the study sample.

Table 1 presents a comprehensive comparison of demographic and clinical characteristics between the sarcopenia group ($n = 203$) and the nonsarcopenia group ($n = 204$). The data reveal several significant differences between the two groups. Participants with sarcopenia were generally older (mean age: 76.2 years vs. 73.5 years, $P < 0.001$) and had a lower BMI (22.8 kg/m² vs. 26.9 kg/m², $P < 0.001$) compared to those without sarcopenia. The gender distribution was slightly skewed toward females in the sarcopenia group (53.7% vs. 48.0%), although this difference was not statistically significant ($P = 0.312$).

Education levels differed significantly between the groups ($P = 0.047$), with a higher proportion of individuals with primary education or below in the sarcopenia group (33.0% vs. 25.5%). Living arrangements also showed significant variation ($P = 0.036$), with more sarcopenic individuals living alone (28.6% vs. 20.1%). Physical activity levels were markedly different ($P < 0.001$), with a higher proportion of sarcopenic individuals reporting low physical activity (48.3% vs. 30.4%).

While the prevalence of individual comorbidities did not differ significantly between groups, polypharmacy (use of ≥5 medications) was more common in the sarcopenia group (55.2% vs. 43.6%, $P = 0.019$). As expected, measures of muscle strength and function were significantly lower in the sarcopenia group, with

Table 1: Demographic and clinical characteristics of study participants

Characteristic	Sarcopenia group (*n*=203), *n* (%)	Nonsarcopenia group (*n*=204), *n* (%)	*P*
Age (years), mean±SD	76.2±6.8	73.5±6.1	<0.001*
Gender			
Male	94 (46.3)	106 (52.0)	0.312
Female	109 (53.7)	98 (48.0)	
BMI (kg/m^2), mean±SD	22.8±3.2	26.9±3.7	<0.001*
Education level			
Primary or below	67 (33.0)	52 (25.5)	0.047*
Secondary	98 (48.3)	101 (49.5)	
Tertiary or above	38 (18.7)	51 (25.0)	
Marital status			
Married	112 (55.2)	129 (63.2)	0.089
Single/divorced/widowed	91 (44.8)	75 (36.8)	
Living arrangement			
Alone	58 (28.6)	41 (20.1)	0.036*
With family	134 (66.0)	155 (76.0)	
Nursing home	11 (5.4)	8 (3.9)	
Smoking status			
Never	129 (63.5)	138 (67.6)	0.453
Former	52 (25.6)	48 (23.5)	
Current	22 (10.9)	18 (8.9)	
Alcohol consumption			
None	142 (70.0)	131 (64.2)	0.284
Moderate	51 (25.1)	61 (29.9)	
Heavy	10 (4.9)	12 (5.9)	
Physical activity level			
Low	98 (48.3)	62 (30.4)	<0.001*
Moderate	79 (38.9)	95 (46.6)	
High	26 (12.8)	47 (23.0)	
Comorbidities			
Hypertension	124 (61.1)	118 (57.8)	0.502
Diabetes	67 (33.0)	55 (27.0)	0.184
Cardiovascular disease	52 (25.6)	39 (19.1)	0.116
Osteoarthritis	81 (39.9)	65 (31.9)	0.089
Polypharmacy (≥5 medications)	112 (55.2)	89 (43.6)	0.019*
Handgrip strength (kg), mean±SD	18.3±5.1	24.7±6.3	<0.001*
Gait speed (m/s), mean±SD	0.72±0.18	0.94±0.22	<0.001*

*P<0.05 significant. SD: Standard deviation, BMI: Body mass index

lower mean handgrip strength (18.3 kg vs. 24.7 kg, $P < 0.001$) and slower gait speed (0.72 m/s vs. 0.94 m/s, $P < 0.001$).

Table 2 illustrates the prevalence of sarcopenia across different age groups and genders. Overall, the prevalence of sarcopenia in the study population was 49.9% (203/407). The data show a clear trend of increasing sarcopenia prevalence with age, particularly among women. In the 65–74 years of age group, the prevalence was similar between males (41.3%) and females (43.8%). However, in the 75–84 years of age group, the prevalence increased to 54.7% in males and 58.5% in females. The highest prevalence was observed in the ≥85 years group, with a notable gender disparity: 45.5% in males compared to 65.5% in females.

Across all age groups, females showed a higher overall prevalence of sarcopenia (52.7%) compared to males (47.0%). This gender difference was most pronounced in the oldest age group (≥85 years), suggesting that older women may be at particularly high risk for sarcopenia.

Table 3 compares various mental health measures between the sarcopenia and nonsarcopenia groups. Across all measured parameters, individuals with sarcopenia demonstrated poorer mental health outcomes. The mean GDS-15 score was significantly higher in the sarcopenia group (6.9 vs. 4.7, $P < 0.001$), with a much higher proportion meeting the criteria for depression (66.0% vs. 42.2%, $P < 0.001$).

Cognitive function, as measured by the MMSE, was also poorer in the sarcopenia group (mean

score 24.9 vs. 27.1, $P < 0.001$). The prevalence of cognitive impairment (MMSE < 24) was nearly twice as high in the sarcopenia group (36.0% vs. 20.1%, $P < 0.001$). Anxiety symptoms were more prevalent in the sarcopenia group, with 31.0% scoring ≥10 on the GAD-7 Scale compared to 21.1% in the nonsarcopenia group ($P = 0.022$). Loneliness, as assessed by the UCLA-3 Scale, was also more common in the sarcopenia group (43.8% vs. 31.9%, $P = 0.012$).

Table 4 presents the associations between sarcopenia and various mental health outcomes, expressed as ORs with 95% CIs. Both crude (unadjusted) and adjusted ORs are provided. The adjusted ORs account for potential confounding factors including age, gender, BMI, education level, marital status, living arrangement, physical activity level, and number of comorbidities.

Depression showed the strongest association with sarcopenia, with an adjusted OR of 2.28 (95% CI: 1.51–3.44, $P < 0.001$). This indicates that individuals with sarcopenia were more than twice as likely to have depression compared to those without sarcopenia, even after adjusting for other factors.

Table 2: Prevalence of sarcopenia by age group and gender

Age group (years)	Male (*n*=200), *n* (%)	Female (*n*=207), *n* (%)	Total (*n*=407), *n* (%)
65–74	38/92 (41.3)	42/96 (43.8)	80/188 (42.6)
75–84	41/75 (54.7)	48/82 (58.5)	89/157 (56.7)
≥85	15/33 (45.5)	19/29 (65.5)	34/62 (54.8)
Total	94/200 (47.0)	109/207 (52.7)	203/407 (49.9)

Cognitive impairment also showed a significant association with sarcopenia (adjusted OR: 1.86, 95% CI: 1.17–2.96, $P = 0.009$), suggesting that sarcopenic individuals had nearly twice the odds of cognitive impairment compared to nonsarcopenic individuals.

The association between sarcopenia and anxiety was not statistically significant after adjustment (OR: 1.49, 95% CI: 0.93–2.38, $P = 0.095$), although the trend suggested a possible relationship that might be clarified with a larger sample size.

Loneliness showed a borderline significant association with sarcopenia after adjustment (OR: 1.52, 95% CI: 1.00–2.31, $P = 0.049$), indicating that sarcopenic individuals had about 50% higher odds of experiencing loneliness compared to their nonsarcopenic counterparts.

Overall, these results suggest that sarcopenia is independently associated with several adverse mental health outcomes, particularly depression and cognitive impairment, even after accounting for various demographic and clinical factors. The findings underscore the importance of considering mental health in the comprehensive care of older adults with sarcopenia.

Discussion

This cross-sectional study investigated the prevalence of sarcopenia and its association with mental health status among elderly patients. Our findings reveal a high prevalence of sarcopenia (49.9%) in the study population, with significant associations between sarcopenia and various adverse mental health outcomes, particularly depression and cognitive impairment.

Table 3: Mental health status of study participants

Mental health measure	Sarcopenia group (*n*=203), *n* (%)	Nonsarcopenia group (*n*=204), *n* (%)	*P*
GDS-15 score, mean±SD	6.9±3.3	4.7±2.9	<0.001*
Depression (GDS-15≥5)	134 (66.0)	86 (42.2)	<0.001*
MMSE score, mean±SD	24.9±3.8	27.1±3.0	<0.001*
Cognitive impairment (MMSE <24)	73 (36.0)	41 (20.1)	<0.001*
Anxiety (GAD-7≥10)	63 (31.0)	43 (21.1)	0.022*
Loneliness (UCLA-3≥6)	89 (43.8)	65 (31.9)	0.012*

*P<0.05 significant. SD: Standard deviation, GDS-15: 15-item Geriatric Depression Scale, GAD-7: 7-item Generalized Anxiety Disorder Scale, UCLA-3: 3-item UCLA Loneliness Scale, MMSE: Mini-Mental State Examination

Table 4: Association between sarcopenia and mental health outcomes

Mental health outcome	Crude OR (95% CI)	*P*	Adjusted OR* (95% CI)	*P*
Depression (GDS-15≥5)	2.66 (1.80–3.93)	<0.001	2.28 (1.51–3.44)	<0.001*
Cognitive impairment (MMSE <24)	2.24 (1.44–3.48)	<0.001	1.86 (1.17–2.96)	0.009*
Anxiety (GAD-7≥10)	1.68 (1.08–2.62)	0.022	1.49 (0.93–2.38)	0.095
Loneliness (UCLA-3≥6)	1.67 (1.12–2.49)	0.012	1.52 (1.00–2.31)	0.049*

Adjusted for age, gender, BMI, education level, marital status, living arrangement, physical activity level, and number of comorbidities, *P<0.05-significant. BMI: Body mass index, OR: Odds ratio, CI: Confidence interval, GDS-15: 15-item Geriatric Depression Scale, GAD-7: 7-item Generalized Anxiety Disorder Scale, UCLA-3: 3-item UCLA Loneliness Scale, MMSE: Mini-Mental State Examination

The prevalence of sarcopenia in our study (49.9%) is consistent with recent literature, which reports varying prevalence rates in older adults. A systematic review and meta-analysis published in the *Journal of Cachexia, Sarcopenia and Muscle* (2020) reported a pooled prevalence of sarcopenia of 10% to 50% in older adults, highlighting the variability in prevalence rates depending on the population studied and diagnostic criteria used.[22] Another study published in the *Archives of Gerontology and Geriatrics* (2025) reported the overall prevalence of sarcopenia among community-dwelling older adults was 16.5 % (95 % CI: 14.7 %-18.4 %), which is similar to our findings.[23] However, a study in the *Journal of the American Medical Directors Association* (2018) reported a lower prevalence of 12.6% in older adults living in long-term care facilities, underscoring the impact of population characteristics on prevalence rates.[24] The variability in prevalence rates across studies emphasizes the need for standardized diagnostic criteria and highlights the importance of considering population-specific factors in sarcopenia research.

The observed increase in sarcopenia prevalence with age and the higher prevalence among women, especially in the oldest age group, corroborates previous findings. Similarly, a systematic review and meta-analysis published in the *Journal of Cachexia, Sarcopenia and Muscle* (2020) reported a higher pooled prevalence of sarcopenia in women compared to men.[22]

Our study demonstrates a strong association between sarcopenia and depression, with sarcopenic individuals having more than twice the odds of depression compared to nonsarcopenic individuals. This finding is consistent with previous research that has identified a link between sarcopenia and depression in older adults.[25,26] A study published in *Frontiers in Medicine* (2022) found that individuals with sarcopenia had a significantly higher risk of depression compared to those without sarcopenia.[27] Another study published in the *Clinical Interventions in Aging* (2018) found that sarcopenia was associated with increased symptoms of depression and anxiety in older adults.[28] The exact mechanisms underlying this association are unclear, but possible explanations include reduced mobility and functional decline associated with sarcopenia leading to increased risk of depression, inflammation disorders and chronic inflammation associated with sarcopenia contributing to depression, and shared underlying risk factors, such as physical inactivity, poor nutrition, and social isolation.

The significant association between sarcopenia and cognitive impairment observed in our study adds to the growing body of evidence linking these two conditions. This association is consistent with previous research that has identified a relationship between sarcopenia and cognitive decline in older adults.[29,30] A systematic review and meta-analysis published in the *Journal of the American Medical Directors Association* (2016) found that individuals with sarcopenia had a significantly higher risk of cognitive impairment and dementia compared to those without sarcopenia.[31] Another study published in the *Journal of Cachexia Sarcopenia Muscle* (2022) found that sarcopenia was associated with faster cognitive decline in older adults with mild cognitive impairment.[32]

Several mechanisms may underlie the observed associations between sarcopenia and mental health outcomes. Chronic low-grade inflammation, a hallmark of sarcopenia, has been implicated in the pathophysiology of depression and cognitive decline. Proinflammatory cytokines such as interleukin-6 and tumor necrosis factor-α, which are elevated in sarcopenia, can affect neurotransmitter metabolism and neural plasticity. In addition, sarcopenia-related reductions in physical activity may lead to decreased production of neurotrophic factors such as brain-derived neurotrophic factor, which play crucial roles in mood regulation and cognitive function. Hormonal changes associated with aging, such as declining levels of testosterone and estrogen, may contribute to both sarcopenia and mental health problems. Furthermore, the psychological impact of reduced physical capability and independence associated with sarcopenia may contribute to depressive symptoms and social isolation. Future research should aim to elucidate these mechanisms through longitudinal studies and investigation of relevant biomarkers.

While our study demonstrates strong associations between sarcopenia and mental health outcomes, it is important to consider the potential bidirectional nature of these relationships. For instance, depression may lead to reduced physical activity and poor nutrition, which are risk factors for sarcopenia. Conversely, the physical limitations imposed by sarcopenia may contribute to social isolation and loss of independence, potentially exacerbating depressive symptoms. Similarly, cognitive impairment may lead to decreased engagement in physical activities that maintain muscle mass, while sarcopenia-related mobility limitations might reduce cognitive stimulation. Future longitudinal studies are needed to elucidate these complexes, potentially bidirectional relationships.

Our study has several limitations that should be considered when interpreting the results. First, the cross-sectional design precludes drawing causal inferences about the relationships between sarcopenia

and mental health outcomes. Longitudinal studies are needed to establish temporal relationships and potential bidirectional effects. Second, while we adjusted for several potential confounders, residual confounding cannot be ruled out. Factors such as dietary habits, specific nutrient deficiencies, and genetic predisposition were not assessed and could influence both sarcopenia and mental health outcomes. Third, our use of self-reported measures for some variables, including physical activity and alcohol consumption, may be subject to recall bias. Finally, while our sample size was adequate for detecting associations with depression and cognitive impairment, it may have been underpowered to detect smaller effect sizes for anxiety and loneliness.

Clinical implications

Our findings have important clinical implications for the care of elderly patients. The high prevalence of sarcopenia and its significant associations with mental health outcomes, particularly depression and cognitive impairment, suggest that routine screening for sarcopenia should be considered in geriatric care. This could involve simple measures such as handgrip strength and gait speed assessments. For patients identified with sarcopenia, comprehensive mental health evaluations may be warranted. Conversely, elderly patients presenting with depression or cognitive impairment should be assessed for sarcopenia. Interventions targeting sarcopenia, such as resistance exercise programs and nutritional support, may have the potential to improve not only physical function but also mental health outcomes. Future research should focus on developing and evaluating integrated interventions that address both the physical and mental health needs of older adults with sarcopenia

Conclusion

Our study highlights the high prevalence of sarcopenia among elderly patients and its significant associations with adverse mental health outcomes, particularly depression and cognitive impairment. These findings emphasize the need for routine screening for sarcopenia in older adults and the implementation of integrated interventions addressing both physical and mental health. Future research should focus on longitudinal studies to establish causal relationships and on developing and evaluating multimodal interventions tailored to the needs of older adults with sarcopenia.

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Conflicts of interest

There are no conflicts of interest.

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