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CLINICAL RESEARCH

Comparative five-year mortality risk in older adults with sarcopenia and sarcopenic obesity: A retrospective cohort analysis

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Abstract

Background: Sarcopenia and sarcopenic obesity (SO) are increasingly prevalent among older adults and are associated with elevated mortality risk. However, the prognostic differences between these phenotypes remain unclear. This study aimed to compare five-year all-cause mortality between older adults with isolated sarcopenia and those with SO.

Methods: In this retrospective cohort study, we analyzed 730 community-dwelling individuals aged ≥60 years who attended a geriatrics outpatient clinic between 2018 and 2023. Participants were categorized as having sarcopenia, having SO, or controls based on EWGSOP2 criteria and BMI ≥ 30 kg/m². Comprehensive geriatric assessments—including evaluations of nutrition, cognition, function, and frailty—were performed at baseline. Mortality data were obtained from institutional records. Survival outcomes were assessed using Kaplan–Meier analysis and Cox proportional hazards models.

Results: Of the participants, 123 had sarcopenia and 174 had sarcopenic obesity (SO). Over a median follow-up of five years, both groups exhibited significantly higher mortality rates than controls. Individuals with isolated sarcopenia showed the lowest survival probability (log-rank $p < 0.001$). In multivariable Cox analysis, chronic kidney disease, lower BMI, and older age were independent predictors of mortality.

Conclusion: Both individuals with sarcopenia and those with SO are associated with increased five-year mortality in older adults. However, individuals with isolated sarcopenia have a higher risk than those with SO, suggesting that excess adiposity may partially mitigate the adverse effects of muscle loss.

KEYWORDS
aging, body composition, geriatric assessment, mortality, sarcopenia, sarcopenic obesity

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INTRODUCTION

Sarcopenia, defined as the progressive loss of skeletal muscle mass and strength, has emerged as a core geriatric syndrome with significant clinical implications. It is strongly associated with a range of adverse outcomes, including frailty, functional dependency, falls, fractures, and increased mortality risk.[1] Over the past decade, its recognition has grown not only as a physical disability contributor but also as a metabolic and prognostic determinant in aging populations.

In parallel, obesity—traditionally viewed as a midlife cardiometabolic burden—has become an increasingly relevant concern in older adults. Excess adiposity in late life is linked to hypertension, cardiovascular disease, insulin resistance, and malignancies.[2] Alarmingly, Turkey ranks among the countries with the highest adult obesity prevalence in Europe. According to national survey data, the prevalence of obesity among adults in Turkey exceeds 30%, with particularly high rates observed in older age groups, underscoring an urgent public health challenge.[3,4]

The co-occurrence of sarcopenia and obesity, known as sarcopenic obesity (SO), represents a complex body composition phenotype marked by both low muscle mass and excess fat tissue.[5] Despite its growing prevalence, SO has long suffered from a lack of standardized diagnostic criteria, which has hindered cross-study comparisons and evidence-based treatment strategies. In response to this gap, a joint consensus definition was issued in 2022 by the European Society for Clinical Nutrition and Metabolism (ESPEN) and the European Association for the Study of Obesity (EASO), describing SO as the presence of obesity in combination with reduced muscle mass, strength, or performance.[5]

Epidemiological studies estimate that SO affects more than 10% of the global older population, highlighting its clinical and societal relevance.[6] However, the phenomenon known as the "obesity paradox" adds complexity to clinical interpretations—suggesting that, in certain older individuals, excess body fat may confer unexpected survival advantages. Nonetheless, this relationship remains controversial, as study findings often differ depending on population characteristics, diagnostic methods, and obesity thresholds used—particularly when based solely on body mass index (BMI).[7–9]

Given the well-established link between sarcopenia and mortality and the uncertain prognostic role of obesity in advanced age, this study aimed to directly compare five-year all-cause mortality rates between older adults with isolated sarcopenia and those with sarcopenic obesity (SO). By analyzing these phenotypes within a single cohort, we sought to clarify the differential impact of muscle and fat composition on long-term survival in late life.

MATERIALS AND METHODS

Study population and setting

This retrospective cohort study examined individuals aged 60 years and older who visited the Geriatrics Outpatient Clinic between 2018 and 2023. Individuals were excluded if they had active malignancy, were unable to perform handgrip strength testing due to neurological or musculoskeletal conditions (such as peripheral neuropathy, advanced hand osteoarthritis, or severe dementia), or were unable to undergo bioelectrical impedance analysis because of implanted cardiac devices, orthopedic prostheses, or clinically significant peripheral edema. Patients were screened for eligibility prior to study inclusion; individuals who did not meet the inclusion criteria were not enrolled. Therefore, exact numbers of excluded individuals were not recorded. All participants provided written informed consent prior to study inclusion. The study protocol was approved by the institutional review board (Approval No: 2024/243).

Geriatric assessments and measurements

Demographic information was obtained via direct interviews. Body weight and height were measured by trained personnel using standardized equipment, and body mass index (BMI) was calculated as weight divided by height squared (kg/m^2). All individuals completed a thorough geriatric assessment encompassing examinations of functional status, dietary problems, mood, cognition, and frailty. Functional independence was evaluated with the Katz Index of Activities of Daily Living (ADL) and the Lawton Instrumental Activities of Daily Living (IADL) Scale. Scores of ≤6 on the Activities of Daily Living (ADL) and ≤8 on the Instrumental Activities of Daily Living (IADL) were considered indicative of ADL/IADL dependence.[10,11] Nutritional status was evaluated using the Mini Nutritional Assessment–Short Form (MNA-SF), which classifies scores below 8 as malnutrition, scores between 8 and 11 as malnutrition risk, and scores above 11 as indicating appropriate nutritional status.[12] Mood was assessed using the Geriatric Depression Scale (GDS), where a score of more than 14 suggests possible depressive symptoms.[13] The Mini-Mental State Examination (MMSE) was used to measure cognitive function; a score of less than 24 indicated cognitive impairment.[14] The FRAIL scale assessed frailty by dividing participants into three categories—frail (3–5 points), pre-frail (1–2 points), and robust (0 points).[15] The SARC-F is a simple five-item screening questionnaire used to identify individuals at risk of sarcopenia, assessing strength, assistance in

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walking, rising from a chair, climbing stairs, and falls.[16] Comorbidities were recorded based on medical history and electronic health records and included hypertension, diabetes mellitus, coronary artery disease, chronic kidney disease, and chronic obstructive pulmonary disease. Polypharmacy was defined as the regular use of five or more medications. Information on medication use was obtained from electronic medical records and confirmed during the geriatric outpatient clinic assessment. Waist circumference was measured at the midpoint between the lowest rib and the iliac crest using a non-elastic measuring tape with participants standing upright. Physical performance was evaluated using the 4-minute walking speed test and the Timed Up and Go (TUG) test. Walking speed was calculated as distance walked divided by time (m/s). The TUG test measured the time required to stand up from a chair, walk 3 m, turn, return, and sit down. All geriatric assessments were performed by a single trained geriatrician using standardized assessment protocols. Measurements were conducted using the same instruments and standardized procedures across participants. Regular calibration and periodic cross-checks were conducted to ensure consistency. All measurements, including demographic data collection, comprehensive geriatric assessment, handgrip strength (HGS), and bioelectrical impedance analysis (BIA), were performed during the same geriatric outpatient clinic visit.

Definition of sarcopenia

Sarcopenia was diagnosed according to the criteria established by the European Working Group on Sarcopenia in Older People (EWGSOP2), necessitating the coexistence of diminished muscular strength and reduced muscle mass.[1] Muscle strength was assessed by a digital handgrip dynamometer (Takei TKK 5401, Takei Scientific Instruments Co), with patients in a seated position and the elbow flexed at a 90-degree angle. Handgrip strength was measured three times for each hand with short rest intervals between attempts, and the highest value obtained from either hand was used for analysis, in accordance with EWGSOP2 recommendations. The Bodystat QuadScan 1500 BIA device and the Janssen et al. predictive equation were used to estimate skeletal muscle mass (SMM).[17] Bioelectrical impedance analysis was performed using the Bodystat QuadScan 1500 device under standardized conditions. Participants were assessed after a minimum of 4 h of fasting, with an empty bladder, and in the supine position. All metallic accessories were removed prior to measurement, and participants were instructed to avoid strenuous physical activity before assessment. Individuals with conditions that could interfere with BIA accuracy, such as implanted cardiac devices or clinically significant peripheral edema, were excluded. Skeletal muscle mass index (SMMI) was calculated by dividing skeletal muscle mass (SMM, kg), estimated by bioelectrical impedance analysis, by body mass index (BMI, kg/m^2). We opted to correct for BMI rather than height to avoid misclassification in obese individuals. The thresholds for diagnosing sarcopenia include handgrip strength values of <27 kg for males and <16 kg for females, as well as skeletal muscle mass index (SMMI) values of <1.049 kg/BMI for males and <0.823 kg/BMI for females.[18]

Definition of obesity and sarcopenic obesity

Obesity is defined as a body mass index (BMI) of 30 kg/m^2 or more, in accordance with World Health Organization (WHO) standards.[19] Sarcopenic obesity (SO) is characterized by the simultaneous presence of sarcopenia and obesity, with patients meeting the diagnostic criteria for both conditions.[5]

Mortality assessment

Mortality data were obtained from the Provincial Directorate of Health, Department of Public Health Services, following formal institutional permission. Vital status and dates of death were verified using official population-based records. Participants were followed for up to five years from the date of baseline assessment.

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics, version 25.0 (IBM Corp) and R version 4.4.1 (www.r-project.org). Categorical variables were presented as frequencies (n) and percentages (%), while continuous variables were expressed as mean ± standard deviation or median (25th–75th percentile) according to their distribution. Normality of continuous variables was assessed using the Kolmogorov–Smirnov and Shapiro–Wilk tests. For non-normally distributed variables, comparisons between two groups were performed using the Mann–Whitney *U* test, and comparisons among three groups were conducted using the Kruskal–Wallis test. When a significant difference was detected with the Kruskal–Wallis test, post hoc pairwise comparisons were performed using the Dunn–Bonferroni method. Categorical variables were compared using the Pearson

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chi-square test. Univariate Cox proportional hazards regression analysis was first performed to identify potential risk factors for mortality, and variables with a p value < 0.25 in the univariate analysis were considered candidates for inclusion in the multivariate Cox regression model. The multivariate model was then constructed to identify independent predictors of mortality. Hazard ratios (HRs) were reported with 95% confidence intervals (CIs), and a p value < 0.05 was considered statistically significant.

RESULTS

A total of 730 community-dwelling older adults were included in the analysis (median age: 69 years [IQR: 65–75]; 60.3% female). Based on EWGSOP2 and BMI-based criteria, 433 individuals were classified as controls (without sarcopenia or obesity), 123 as individuals with isolated sarcopenia, and 174 as individuals with sarcopenic obesity. The baseline demographic and clinical characteristics of the study groups are presented in Table 1. Significant differences were observed across groups in several key parameters, including age, BMI, body weight, waist circumference, body fat percentage, SMM, SMMI, and walking speed (all $p < 0.05$). The group with sarcopenic obesity exhibited the highest median BMI (34.8 kg/m²), waist circumference, and fat percentage, yet had significantly lower SMMI values than both the control group and the group with isolated sarcopenia. Participants with isolated sarcopenia constituted the oldest subgroup (median age: 74 years) and demonstrated markedly lower functional independence, as reflected by a higher prevalence of ADL and IADL dependence compared with controls ($p < 0.001$). Furthermore, cognitive impairment was more frequent among individuals with sarcopenia and those with sarcopenic obesity compared with controls ($p < 0.001$).

TABLE 1 Demographic and clinical characteristics of control, sarcopenia, and sarcopenic obesity groups.

Items	Overall ($n = 730$)	Control ($n = 433$)	Sarcopenia ($n = 123$)	Sarcopenic obese ($n = 174$)	P value
Age, (years)	69 (65–75)	68 (64–72.5)[a]	74 (68–80)[b]	70 (66–75)[c]	<0.001
BMI, (kg/m²)	31 (27.6–35.8)	31.2 (27.9–36)[a]	26.24 (24–28)[b]	34.8 (32–37.25)[c]	<0.001
Weight, (kg)	78 (69–88)	79 (71–91)[a]	65 (57.3–70)[b]	82 (75–90.15)[c]	<0.001
Height, (m)	1.57 (1.52–1.63)	1.58 (1.53–1.64)[a]	1.55 (1.50–1.63)[b]	1.54 (1.50–1.58)[c]	0.018
Grip strength, (kg)	20 (14–26)	22.7 (19.5–30)	13 (10–18.7)	13 (11–15)	0.218
Waist circumference, (cm)	105 (97–115)	106 (98–115)[a]	96.5 (90–102)[b]	111 (104–119)[c]	<0.001
Body fat, (%)	44.7 (36–49.7)	44 (34–49.5)[a]	40.9 (35.3–45.8)[b]	48.65 (43.95–51.92)[c]	<0.001
SMM, (kg)	19.87 (17.16–24.5)	20.52 (17.75–25.68)[a]	18.1 (15.37–21.53)[b]	19.29 (16.67–23.25)[c]	0.007
SMMI, (kg/BMI)	0.62 (0.53–0.81)	0.64 (0.54–0.87)[a]	0.70 (0.60–0.90)[a]	0.50 (0.47–0.64)[b]	<0.001
4-m walking speed, (m/s)	0.75 (0.50–0.97)	0.80 (0.57–1.00)[a]	0.62 (0.44–0.80)[b]	0.69 (0.49–0.88)[b]	0.023
Time Up and Go (s)	11 (9–14.8)	10 (8–13)	13 (10–16)	13 (10–17)	0.702
ADL—dependent, n (%)	418 (57.3)	305 (70.4)[a]	42 (34.1)[b]	71 (40.8)[a]	<0.001
IADL—dependent, n (%)	465 (63.7)	315 (72.7)[a]	62 (50.4)[b]	88 (50.6)[ab]	<0.001
Depression (GDS), n (%)	327 (44.8)	173 (40.0)	60 (48.8)	94 (54.0)	0.346
Cognitive impairment, n (%)	94 (12.9)	45 (10.4)[a]	21 (17.1)[b]	28 (16.1)[ac]	<0.001
MNA-SF—malnutrition, n (%)	54 (7.4)	21 (4.8)	23 (18.7)	10 (5.8)	0.232
SARC-F score	2 (1–4)	2 (1–4)	3 (1–5)	3 (2–5)	0.138
Frailty—frail, n (%)	173 (23.7)	80 (18.5)	41 (33.3)	52 (29.9)	0.735
Number of comorbidities	2 (0–3)	2 (1–3)[a]	1 (0–2)[b]	1 (0–3)[a]	0.010
Number of drugs used	3 (2–5)	3 (2–5)[a]	3 (1–6)[a]	4 (2–6)[b]	0.017

Note: a–c: Different superscript letters indicate statistically significant differences between groups ($p < 0.05$).

Abbreviations: ADL, Activities of Daily Living; BMI, Body Mass Index; GDS, Geriatric Depression Scale; IADL, Instrumental Activities of Daily Living; MNA-SF, Mini Nutritional Assessment–Short Form; SARC-F, A questionnaire to rapidly diagnose sarcopenia; SMM, Skeletal Muscle Mass; SMMI, Skeletal Muscle Mass Index.

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Although the group with sarcopenic obesity had the highest burden of comorbidities and polypharmacy (number of drugs used) ($p = 0.010$ and $p = 0.017$, respectively), no significant group differences were found regarding frailty status, depressive symptoms, or nutritional risk categories (all $p > 0.05$).

A comparative analysis of survivors ($n = 270$) and non-survivors ($n = 27$) over the five-year follow-up period is summarized in Table 2. Non-survivors were significantly older (median age: 78 vs. 72 years, $p = 0.002$), had lower BMI ($p = 0.014$), and demonstrated higher prevalence of chronic kidney disease (33.3% vs. 11.9%, $p = 0.002$) and cognitive impairment (33.3% vs. 14.8%, $p = 0.014$). In addition, frailty was significantly more common among non-survivors (55.6% vs. 28.9%, $p = 0.004$), as were sarcopenia

TABLE 2 Demographic and clinical characteristics of the patients according to survival.

Items	Survivor ($n = 270$)	Non-survivor ($n = 27$)	p-value
Age,* (years)	72 (67–76)	78 (72–82)	0.002
Age, n (%)			0.006
65–74	179 (66.3)	10 (37)	
75–84	73 (27)	12 (44.5)	
≥85	18 (6.7)	5 (18.5)	
Gender, n (%)			0.099
Female	200 (74.1)	16 (40.7)	
Male	70 (25.9)	11 (59.3)	
BMI,* (kg/m2)	31 (27.67–35.52)	27.6 (233–32.30)	0.014
Obesity, n (%)	163 (60.4)	11 (40.7)	0.048
Comorbidity, n (%)			
Hypertension	181 (67)	17 (63)	0.67
Diabetes mellitus	137 (50.7)	14 (51.9)	0.91
Congestive heart failure	20 (7.4)	3 (11.1)	0.49
Coronary artery disease	57 (21.1)	7 (25.9)	0.56
Chronic renal failure	32 (11.9)	9 (33.3)	0.002
Osteoporosis	52 (19.3)	2 (7.4)	0.13
Depression	49 (18.1)	7 (25.9)	0.32
Parkinson	6 (2.2)	2 (7.4)	0.11
Cognitive impairment	40 (14.8)	9 (33.3)	0.014
Frailty, Yes, n (%)	78 (28.9)	15 (55.6)	0.004
Sarcopenic obesity, n (%)	163 (60.4)	11 (40.7)	0.049
Sarcopenia, n (%)	107 (39.6)	16 (59.3)	0.049
4 m walking speed,* (m/s)	0.67 (0.48–0.82)	0.56 (0.44–0.73)	0.049
HGS,* (kg)	13 (10.95–15.18)	12.66 (10–20)	0.90
SMMI,* (kg/BMI)	0.60 (0.52–0.75)	0.64 (0.53–0.90)	0.07
ADL (dependent), n (%)	99 (36.7)	14 (51.9)	0.15
IADL (dependent), n (%)	133 (49.3)	17 (63)	0.27
MNA-SF, Malnutrition	27 (10)	6 (22.2)	0.04
SARC-F, Yes	125 (46.3)	18 (66.7)	0.017

Abbreviations: ADL, activities of daily living; IADL, instrumental activities of daily living scale; MNA-SF, mini nutritional assessment–Short Form; SARC-F, a simple questionnaire to rapidly diagnose sarcopenia; SMMI, skeletal muscle mass index.

*median (25p–75p)

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(59.3% vs. 39.6%, $p = 0.049$) and risk of sarcopenia according to the SARC-F questionnaire (66.7% vs. 46.3%, $p = 0.017$). Both individuals with isolated sarcopenia and those with sarcopenic obesity were significantly more common among non-survivors ($p = 0.049$ for both).

Kaplan–Meier survival analysis revealed a statistically significant difference in overall survival between the groups (log-rank $p = 0.000118$) (Figure 1). The control group had the highest five-year survival probability, followed by the group with sarcopenic obesity. The group with isolated sarcopenia exhibited the poorest survival outcomes, indicating that while individuals with sarcopenic obesity have worse prognosis than controls, isolated sarcopenia is associated with the greatest mortality risk.

In univariate Cox regression analysis, the presence of isolated sarcopenia (HR: 3.67, 95% CI: 1.94–6.94, $p < 0.001$), chronic kidney disease (HR: 3.45, 95% CI: 1.96–6.07, $p < 0.001$), lower BMI (HR: 0.92, 95% CI: 0.88–0.97, $p < 0.001$), older age (HR: 1.10, 95% CI: 1.06–1.14, $p < 0.001$), and male sex (HR: 2.59, 95% CI: 1.50–4.48, $p < 0.001$) were significantly associated with increased all-cause mortality. In the multivariable Cox regression model, independent predictors of mortality included chronic kidney disease (HR: 2.61, 95% CI: 1.46–4.66, $p < 0.001$), lower BMI (HR: 0.94, 95% CI: 0.89–0.99, $p = 0.015$), and older age (HR: 1.08, 95% CI: 1.04–1.12, $p < 0.001$) (Table 3).

DISCUSSION

This study demonstrates that both individuals with sarcopenia and individuals with sarcopenic obesity have increased five-year all-cause mortality among community-dwelling older adults, with the highest risk observed in individuals with isolated sarcopenia. These findings align with prior evidence identifying sarcopenia as a strong predictor of mortality in aging populations. Importantly, our results extend existing literature by showing that, although individuals with sarcopenic obesity have a higher mortality risk than non-sarcopenic controls, this risk appears less pronounced than in individuals with isolated sarcopenia.[20,21]

The greater mortality risk associated with sarcopenia may reflect reduced physiological reserve and impaired metabolic resilience. Skeletal muscle functions as an essential metabolic and endocrine organ, and its loss contributes to insulin resistance, systemic inflammation, and reduced stress tolerance.[22,23] These mechanisms likely explain the consistently observed association between sarcopenia and increased mortality in older adults.

In contrast, the comparatively lower mortality risk observed in individuals with sarcopenic obesity may partly relate to the so-called obesity paradox in older adults. Excess adiposity may provide metabolic reserves during periods of acute illness or catabolic stress, potentially attenuating mortality risk despite concomitant muscle loss.[24] Furthermore, BMI-based definitions

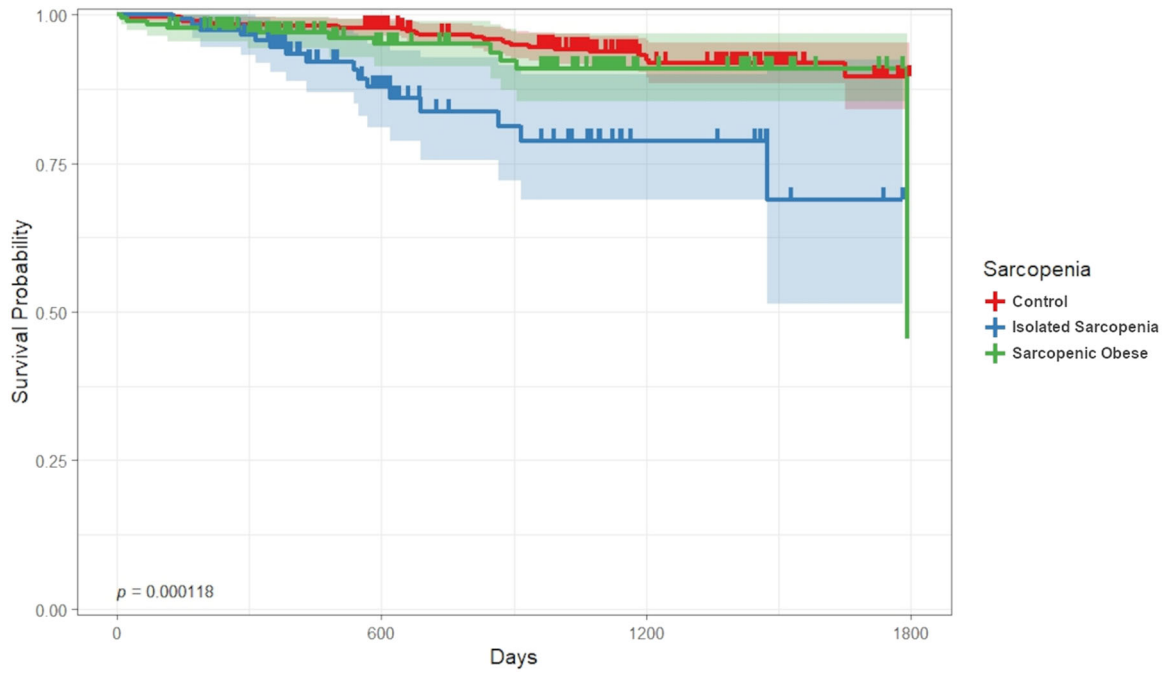

FIGURE 1 Kaplan–Meier survival curves showing five-year survival probability according to sarcopenia status (control, isolated sarcopenia, and sarcopenic obesity).

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TABLE 3 Risk factors affecting mortality (Cox regression analysis results).

Variables	Univariate HR (95% CI)	*p*	Multivariate HR (95% CI)	*p*
Sarcopenia				
Control	1.00	—	—	—
Isolated sarcopenic	3.67 (1.94–6.94)	<0.001	—	—
Sarcopenic obesity	1.50 (0.74–3.06)	0.263	—	—
Diabetes mellitus	1.03 (0.60–1.77)	0.924	—	—
Chronic renal failure	3.45 (1.96–6.07)	<0.001	2.61 (1.46–4.66)	<0.001
Hypertension	1.33 (0.77–2.29)	0.313	—	—
Coronary artery disease	1.36 (0.71–2.60)	0.352	—	—
Osteoporosis	1.43 (0.44–4.60)	0.553	—	—
MNA, Malnutrition	1.67 (0.95–2.94)	0.075	—	—
Frailty	2.19 (0.87–5.51)	0.096	—	—
Depression	1.16 (0.67–2.01)	0.597	—	—
Number of comorbidities	0.93 (0.77–1.12)	0.437	—	—
Number of drugs used	1.08 (0.98–1.19)	0.126	—	—
Hand grip strength	0.99 (0.97–1.02)	0.533	—	—
BMI	0.92 (0.88–0.97)	<0.001	0.94 (0.89–0.99)	0.015
Age	1.10 (1.06–1.14)	<0.001	1.08 (1.04–1.12)	<0.001
Sex, Male	2.59 (1.50–4.48)	<0.001	—	—

Abbreviations: CI, Confidence Interval; HR, Hazard Ratio; MNA, Mini Nutritional Assessment.

of obesity encompass heterogeneous phenotypes, including individuals with preserved functional status or relatively favorable metabolic profiles, which may dilute the observed association between sarcopenic obesity and mortality.[25]

Our findings are consistent with previous studies reporting higher mortality risk in individuals with isolated sarcopenia compared with those with sarcopenic obesity among community-dwelling older adults. In contrast to studies conducted in hospitalized populations, our outpatient-based cohort reflects baseline health status more accurately, allowing clearer evaluation of long-term prognostic implications. Differences from prior Turkish cohorts may be explained by methodological variations, including the use of BMI-adjusted skeletal muscle indices and the incorporation of comprehensive geriatric assessments.[26,27]

From a public health perspective, these results are particularly relevant given the high and rising prevalence of obesity among older adults in Turkey.[3,4] Early identification of sarcopenia, irrespective of obesity status, should be prioritized, as muscle loss appears to be a dominant determinant of long-term survival. Integrating muscle strength assessment and body composition analysis into routine geriatric practice may improve risk stratification and guide targeted interventions.[1]

This study's strengths include a well-characterized cohort, comprehensive geriatric assessment, and long-term follow-up. However, its observational design and reliance on bioelectrical impedance analysis warrant cautious interpretation. Further longitudinal studies using standardized definitions are needed to clarify transitions between sarcopenia phenotypes and their prognostic significance.

CONCLUSION

In this cohort of community-dwelling older adults, both individuals with sarcopenia and those with sarcopenic obesity were associated with increased five-year all-cause mortality. However, individuals with isolated sarcopenia exhibited the highest mortality risk, while those with sarcopenic obesity demonstrated comparatively better survival outcomes. These findings suggest that, although excess adiposity does not eliminate the

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adverse effects of muscle loss, it may partially mitigate its impact on long-term survival. Our results underscore the importance of early identification of impaired muscle health in older adults, regardless of obesity status. Incorporating routine assessments of muscle strength and body composition into comprehensive geriatric evaluation may improve risk stratification and support timely, targeted interventions aimed at preserving muscle function and improving long-term outcomes.

AUTHOR CONTRIBUTIONS

Ezgi Akandere Barlas: Conceptualization; study design; data collection; data curation; literature review; writing—original draft. **Sibel Akın:** Conceptualization; methodology; study design; writing—original draft. **Neslihan Doğan:** Data collection; statistical analysis; data analysis and interpretation. **Gülşah Güneş Şahin:** Statistical analysis. **Funda İpekten:** Statistical analysis. All authors contributed to the study conception and design. All authors read and approved the final manuscript.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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REFERENCES

1. Cruz-Jentoft AJ, Bahat G, Bauer J, et al. Sarcopenia: revised European consensus on definition and diagnosis. *Age Ageing*. 2019;48(1):16-31. doi:10.1093/ageing/afy169
2. Batsis JA, Zagaria AB. Addressing obesity in aging patients. *Med Clin North Am*. 2018;102(1):65-85. doi:10.1016/j.mcna.2017.08.007
3. World Health Organization *Obesity among adults, BMI >= 30, prevalence (age-standardized estimate) (%)*. World Health Organization. Accessed February 1, 2026. https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi-%3D-30-%28age-standardized-estimate%29-%28-%29
4. Turkish Statistical Institute *Health Statistics: Body Mass Index (BMI) Distribution by Age Group*. Turkish Statistical Institute. 2022. https://data.tuik.gov.tr
5. Donini LM, Busetto L, Bischoff SC, et al. Definition and diagnostic criteria for sarcopenic obesity: ESPEN and EASO consensus statement. *Obes Facts*. 2022;15(3):321-335. doi:10.1159/000521241
6. Gao Q, Mei F, Shang Y, et al. Global prevalence of sarcopenic obesity in older adults: a systematic review and meta-analysis. *Clin Nutr (Edinburgh, Scotland)*. 2021;40(7):4633-4641. doi:10.1016/j.clnu.2021.06.009
7. Kwon Y, Kim HJ, Park S, Park YG, Cho KH. Body mass index-related mortality in patients with type 2 diabetes and heterogeneity in obesity paradox studies: a dose-response meta-analysis. *PLoS ONE*. 2017;12(1):e0168247. doi:10.1371/journal.pone.0168247
8. Skinner JS, Abel WM, McCoy K, Wilkins CH. Exploring the "Obesity Paradox" as a correlate of cognitive and physical function in community-dwelling black and white older adults. *Ethn Dis*. 2017;27(4):387-394. doi:10.18865/ed.27.4.387
9. Yamazaki K, Suzuki E, Yorifuji T, et al. Is there an obesity paradox in the Japanese elderly population? A community-based cohort study of 13,280 men and women. *Geriatr Gerontol Int*. 2017;17(9):1257-1264. doi:10.1111/ggi.12851
10. Katz S, Akpom CA. 12. Index of ADL. *Med Care*. 1976;14(5):116-118. doi:10.1097/00005650-197605001-00018
11. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. *Gerontologist*. 1969;9(3 Part 1):179-186.
12. Guigoz Y, Vellas B, Garry PJ. Assessing the nutritional status of the elderly: the Mini Nutritional Assessment as part of the geriatric evaluation. *Nutr Res*. 1996;54(1 Pt 2):59-65. doi:10.1111/j.1753-4887.1996.tb03793.x
13. Yesavage JA, Brink TL, Rose TL, et al. Development and validation of a geriatric depression screening scale: a preliminary report. *J Psychiatr Res*. 1982;17(1):37-49. doi:10.1016/0022-3956(82)90033-4
14. Molloy DW, Alemayehu E, Roberts R. Reliability of a Standardized Mini-Mental State Examination compared with the traditional Mini-Mental State Examination. *Am J Psychiatry*. 1991;148(1):102-105. doi:10.1176/ajp.148.1.102
15. Morley JE, Malmstrom TK, Miller DK. A simple frailty questionnaire (FRAIL) predicts outcomes in middle aged African Americans. *J Nutr Health Aging*. 2012;16(7):601-608. doi:10.1007/s12603-012-0084-2
16. Malmstrom TK, Morley JE. SARC-F: a simple questionnaire to rapidly diagnose sarcopenia. *J Am Med Dir Assoc*. 2013;14(8):531-532. doi:10.1016/j.jamda.2013.05.018
17. Janssen I, Heymsfield SB, Baumgartner RN, Ross R. Estimation of skeletal muscle mass by bioelectrical impedance analysis. *J Appl Physiol*. 2000;89(2):465-471. doi:10.1152/jappl.2000.89.2.465
18. Bahat G, Tufan A, Kilic C, et al. Cut-off points for height, weight and body mass index adjusted bioimpedance analysis measurements of muscle mass with use of different threshold definitions. *Aging Male*. 2020;23(5):382-387. doi:10.1080/13685538.2018.1499081
19. World Health Organization *Obesity and overweight*. World Health Organization. Accessed February 1, 2026. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
20. Xu J, Wan CS, Ktoris K, Reijnierse EM, Maier AB. Sarcopenia is associated with mortality in adults: a systematic review and meta-analysis. *Gerontology*. 2022;68(4):361-376. doi:10.1159/000517099
21. Zhang X, Xie X, Dou Q, et al. Association of sarcopenic obesity with the risk of all-cause mortality among adults over a broad range of different settings: a updated meta-analysis. *BMC Geriatr*. 2019;19(1):183. doi:10.1186/s12877-019-1195-y
22. Severinsen MCK, Pedersen BK. Muscle–organ crosstalk: the emerging roles of myokines. *Endocr Rev*. 2020;41(4):594-609. doi:10.1210/endrev/bnaa016

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23. Iglesias P. Muscle in endocrinology: from skeletal muscle hormone regulation to myokine secretion and its implications in endocrine–metabolic diseases. *J Clin Med*. 2025;14(13): 4490. doi:10.3390/jcm14134490
24. Chapman IM Obesity Paradox during Aging. In: CV Mobbs, Hof PR, eds. *Interdisciplinary Topics in Gerontology and Geriatrics*. Vol 37. S. Karger AG; 2010:20-36. doi:10.1159/000319992
25. Bischoff SC, Boirie Y, Cederholm T, et al. Towards a multidisciplinary approach to understand and manage obesity and related diseases. *Clin Nutr*. 2017;36(4):917-938. doi:10.1016/j.clnu.2016.11.007
26. Campos GC, Lourenço RA, Molina MCB. Mortality, sarcopenic obesity, and sarcopenia: frailty in Brazilian older people study—FIBRA—RJ. *Rev Saude Publica*. 2021;55:75. doi:10.11606/s1518-8787.2021055002853
27. Atmis V, Yalcin A, Silay K, et al. The relationship between all-cause mortality sarcopenia and sarcopenic obesity among hospitalized older people. *Aging Clin Exp Res*. 2019;31(11): 1563-1572. doi:10.1007/s40520-019-01277-5

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