ORIGINAL RESEARCH

Bagcilar Med Bull 2026;11(3):404-413
DOI: 10.4274/BMB.galenos.2026.39206

Sarcopenia Risk Perception in Parkinson's Disease and Its Associations with Clinical Characteristics

Parkinson Hastalığında Sarkopeni Risk Algısı ve Klinik Özelliklerle İlişkisi

Hatice Betigül Meral[1], Abdülkadir Ermiş[2], Aygül Tantik Pak[2], Mehmet Yalman[2], Eren Toplutaş[3], Ece Akın[4], Sena Tolu[1]

[1]İstanbul Medipol University Faculty of Medicine, Department of Physical Medicine and Rehabilitation, İstanbul, Turkey
[2]University of Health Sciences Turkey, Gaziosmanpaşa Training and Research Hospital, Department of Neurology, İstanbul, Turkey
[3]İstanbul Medipol University Faculty of Medicine, Department of Neurology, İstanbul, Turkey
[4]İstanbul Medipol University Faculty of Medicine, İstanbul, Turkey

Abstract

Objective: This study aimed to evaluate sarcopenia risk perception in older adults with Parkinson's disease (PD) and to investigate its relationship with sarcopenia risk and clinical characteristics.

Method: This cross-sectional study included 52 older adults with PD and 52 age- and sex-matched healthy older adults. Demographic characteristics and clinical data, including disease duration, Hoehn and Yahr stage, and levodopa equivalent daily dose, were recorded. Sarcopenia risk was assessed using the mini sarcopenia risk assessment-7 (MSRA-7), whereas sarcopenia risk perception was evaluated using the Turkish version of the Sarcopenia Disease Risk Perception Scale (SDRPS-TR), which comprises the domains of perceived susceptibility and perceived severity. Correlations between variables were assessed using Spearman correlation analysis.

Results: Patients with PD had significantly lower MSRA-7 scores than healthy controls (30.19±7.19 vs. 33.65±5.98, p=0.028), and the prevalence of high sarcopenia risk was also significantly higher in this group (46.2% vs. 25.0%, p=0.041). However, no significant differences were observed between the groups regarding SDRPS-TR susceptibility, severity, or total scores (all p>0.05). Among patients with PD, age showed significant negative correlations with SDRPS-TR susceptibility, severity, and total scores, whereas educational level showed significant positive correlations with all SDRPS-TR domains (all p<0.05). In addition, living with family and participation in social activities were associated with higher SDRPS-TR susceptibility, severity, and total scores (all p<0.05).

Öz

Amaç: Bu çalışmanın amacı, Parkinson hastalığı (PH) olan yaşlı bireylerde sarkopeni risk algısını değerlendirmek ve bunun sarkopeni riski ve klinik özelliklerle ilişkisini araştırmaktır.

Yöntem: Bu kesitsel çalışmaya PH olan 52 yaşlı birey ile yaş ve cinsiyet açısından eşleştirilmiş 52 sağlıklı yaşlı birey dahil edildi. Hastalık süresi, Hoehn ve Yahr evresi ve levodopa eşdeğer günlük dozu dahil olmak üzere demografik özellikler ve klinik veriler kaydedildi. Sarkopeni riski mini sarkopeni risk değerlendirme ölçeği-7 (MSRA-7) ile, sarkopeni risk algısı ise algılanan duyarlılık ve algılanan ciddiyet alt boyutlarından oluşan sarkopeni hastalığı risk algısı ölçeği-Türkçe versiyonu (SDRPS-TR) kullanılarak değerlendirildi. Değişkenler arasındaki ilişkiler Spearman korelasyon analizi ile değerlendirildi.

Bulgular: PH'de MSRA-7 puanları sağlıklı kontrollere göre anlamlı olarak daha düşük bulundu (30,19±7,19'a karşı 33,65±5,98; p=0,028) ve bu grupta yüksek sarkopeni riski prevalansı da anlamlı olarak daha yüksekti (%46,2'ye karşı %25,0; p=0,041). Buna karşın SDRPS-TR duyarlılık, ciddiyet ve toplam puanları açısından gruplar arasında anlamlı farklılık saptanmadı (tüm p>0,05). PH grubunda, yaş ile SDRPS-TR duyarlılık, ciddiyet ve toplam puanları arasında anlamlı negatif; eğitim düzeyi ile tüm SDRPS-TR alanları arasında ise anlamlı pozitif ilişkiler bulundu (tümü için p<0,05). Ayrıca, ailesiyle yaşama ve sosyal aktivitelere katılım daha yüksek SDRPS-TR duyarlılık, ciddiyet ve toplam puanlarıyla ilişkiliydi (tümü için p<0,05).

Sonuç: PH olan yaşlı bireyler ile sağlıklı kontroller arasında sarkopeni risk algısı açısından anlamlı bir farklılık bulunmadı. İPH grubunda,

Address for Correspondence: Hatice Betigül Meral, İstanbul Medipol University Faculty of Medicine, Department of Physical Medicine and Rehabilitation, İstanbul, Turkey
E-mail: meralbetigul@gmail.com **ORCID:** orcid.org/0000-0002-7519-8184
Received: 15.07.2026 **Accepted:** 07.09.2026 **Publication Date:** 29.09.2026

Cite this article as: Meral HB, Ermiş A, Tantik Pak A, Yalman M, Toplutaş E, Akın E, et al. Sarcopenia risk perception in Parkinson's disease and its associations with clinical characteristics. Bagcilar Med Bull. 2026;11(3):404-413

Copyright© 2026 The Author(s). Published by Galenos Publishing House on behalf of Health Sciences University Turkey, İstanbul Bagcilar Training and Research Hospital. This is an open access article under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND) International License.

Abstract

Conclusion: Sarcopenia risk perception did not differ between older adults with PD and healthy controls. Among patients with PD, lower risk perception was associated with advanced age, whereas higher educational level, living with family, and participation in social activities were associated with higher risk perception. These findings highlight the importance of integrating patient education and awareness strategies into routine sarcopenia screening and management in patients with PD.

Keywords: Older adults, Parkinson's disease, risk perception, sarcopenia

Öz

ileri yaş daha düşük sarkopeni hastalığı risk algısıyla ilişkiliyken, daha yüksek eğitim düzeyi, ailesiyle yaşama ve sosyal aktivitelere katılım daha yüksek sarkopeni hastalığı risk algısıyla ilişkili bulundu. Bu bulgular, PH'de rutin sarkopeni tarama ve yönetim süreçlerine hasta eğitimi ve farkındalık stratejilerinin entegre edilmesinin önemini vurgulamaktadır.

Anahtar kelimeler: Parkinson hastalığı, risk algısı, sarkopeni, yaşlı bireyler

Introduction

Parkinson's disease (PD) is one of the most common neurodegenerative disorders worldwide after Alzheimer's disease and significantly impairs physical functioning and quality of life due to its progressive nature (1,2). The disease is characterized not only by motor manifestations such as bradykinesia, rigidity, and tremor, but also by a wide spectrum of non-motor symptoms including cognitive, autonomic, and sensory dysfunctions (3). In recent years, increasing evidence has demonstrated that PD is not limited to neurological involvement and may also exert substantial effects on the musculoskeletal system (4,5). Current evidence indicates that sarcopenia is more prevalent among individuals with PD compared with healthy older adults and may influence disease progression (6,7).

Sarcopenia is a progressive muscle disorder associated with aging and characterized by deterioration in muscle structure and physical performance (8). It has been recognized as an independent disease entity within the ICD-10-CM classification system and is considered a major geriatric syndrome. The updated diagnostic criteria proposed by the Asian Working Group for Sarcopenia recommend the combined assessment of muscle mass, muscle strength, and physical performance for the diagnosis of sarcopenia (9). Sarcopenia is associated with adverse clinical outcomes including increased fall risk, loss of functional independence, hospitalization, and mortality, particularly in older populations (10).

Recent studies in patients with PD have investigated body composition changes, physical performance, fall risk, non-motor symptoms, balance impairment, quality of life, and other clinical factors associated with sarcopenia (11-13). However, to the best of our knowledge, no previous study has specifically evaluated sarcopenia risk perception in patients with PD. Risk perception is an important cognitive process that influences health behaviors and engagement in preventive approaches (14). Therefore, assessing sarcopenia risk perception in patients with PD may contribute to early recognition and the development of preventive interventions.

The Turkish version of the Sarcopenia Disease Risk Perception Scale (SDRPS-TR), a disease-specific instrument designed to assess perceived susceptibility to and perceived severity of sarcopenia, was shown to be valid and reliable in the Turkish older adult population (15). The scale demonstrated high internal consistency and strong psychometric properties, supporting its use as a reliable tool for assessing sarcopenia awareness among older adults (15). Accordingly, the present study aimed to evaluate sarcopenia risk perception among older adults with PD using the SDRPS-TR and to investigate its association with sarcopenia risk status as well as clinical and demographic variables.

Materials and Methods

Study Participants

This cross-sectional study included patients with PD who were consecutively recruited from the outpatient clinics of the departments of physical medicine and rehabilitation and neurology. Patients with idiopathic PD fulfilled the Movement Disorder Society clinical diagnostic criteria (16). Age- and sex-matched healthy control participants were recruited from individuals undergoing routine health assessments at the same institution during the study period. The study protocol was approved by the Local Institutional Non-Interventional Clinical Research Ethics Committee of İstanbul Medipol University (decision no: 866, date: 14.05.2026) and all participants provided written informed consent before enrollment.

Eligible participants were ambulatory adults aged 65 years or older. Patients with PD were required to have mild-to-moderate disease severity (Hoehn and Yahr stage 1-3). General cognitive function was assessed in all participants using the mini-mental state examination (MMSE), and individuals with MMSE scores <24 were excluded (17).

For patients with PD, neurological disorders other than PD were excluded. For healthy controls, any neurological disorder was considered an exclusion criterion. A history of psychiatric disorders and severe medical conditions that could affect study participation or the interpretation of outcomes were exclusion criteria for both groups. These conditions included New York Heart Association class III-IV heart failure, dialysis-dependent end-stage renal disease, severe or very severe chronic obstructive pulmonary disease, severe osteoarthritis, and active malignancy. In addition, patients with secondary parkinsonism (e.g., drug-induced or trauma-related parkinsonism) were excluded.

Clinical Assessments

Demographic characteristics including age, gender, educational level, living status, and participation in social activities were recorded for all participants. Educational level was categorized into five groups: Illiterate (1), primary school (2), middle school (3), high school (4), and university (5). Clinical characteristics of patients with PD included disease duration and Hoehn and Yahr stage. Antiparkinsonian medication doses were recorded, and the Levodopa equivalent daily dose (LEDD) was calculated using the standardized conversion factors proposed by Tomlinson et al. (18). Comorbidities, including hypertension, diabetes mellitus, dyslipidemia, and coronary artery disease, were documented. Smoking status, history of alcohol consumption, history of falls during the previous year, and the number of medications used (polypharmacy defined as the concurrent use of >5 medications) were also recorded.

Sarcopenia Risk Assessment

Sarcopenia risk was assessed using the Turkish version of the mini sarcopenia risk assessment questionnaire-7 (MSRA-7). The MSRA questionnaire was originally developed by Rossi et al. (19) to screen for sarcopenia risk. The MSRA-7 consists of seven items evaluating age, recent hospitalization, physical activity level, dietary habits, weight loss, and mobility status. Total scores range from 0 to 40, with lower scores indicating a higher risk of sarcopenia. The Turkish version of the MSRA-7 has been shown to be a valid and reliable instrument for screening sarcopenia risk in older adults (20). In accordance with the original scoring system, a total score of ≤30 was considered indicative of increased sarcopenia risk.

Sarcopenia Disease Risk Perception Scale (SDRPS)

Sarcopenia risk perception was assessed using the SDRPS-TR. The original SDRPS was developed and validated by Zhang et al. (21) to evaluate individuals' perceptions regarding the risk of sarcopenia among older adults. The scale was subsequently translated, culturally adapted, and validated for use in the Turkish population, demonstrating excellent validity and reliability (15). The SDRPS-TR consists of 15 items organized into two subscales: perceived susceptibility (8 items) and perceived severity (7 items). Each item is scored on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate a greater perception of sarcopenia risk.

Ethics Statement

The study protocol was approved by the Local Institutional Non-Interventional Clinical Research Ethics Committee of İstanbul Medipol University (decision no: 866, date: 14.05.2026). The study was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants prior to enrollment.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics (version 26.0; IBM Corp., Armonk, NY, USA). Continuous variables were presented as mean ± standard deviation, and categorical variables as frequencies and percentages. The distribution of continuous variables was assessed using the Shapiro-Wilk test and visual inspection of histograms and Q-Q plots. For normally distributed variables, comparisons between groups were performed using the Student's t-test, whereas the Mann-Whitney U test was used for variables that were not normally distributed. Categorical variables were analyzed using the Pearson chi-square test or Fisher's exact test, as appropriate. The relationships between continuous variables that did not follow a normal distribution were analyzed using Spearman's rank correlation coefficient. All statistical tests were two-sided, and a p-value <0.05 was considered statistically significant.

Results

A total of 104 participants were included in the study, comprising 52 patients with PD and 52 age- and sex-

matched healthy controls. The demographic and clinical characteristics of the study population are presented in Table 1.

There were no significant differences between the PD and control groups regarding age, sex distribution, body mass index (BMI), education level, hypertension, type 2 diabetes, dyslipidemia, coronary artery disease, polypharmacy, current smoking, alcohol use, living status, or social activities (all p>0.05). However, a significantly higher proportion of patients with PD had experienced a fall during the previous year compared with controls (p=0.009). Among patients with PD, the mean disease duration was 7.97±5.61 years, the mean LEDD was 631.35±356.19 mg/day, and Hoehn and Yahr stage 2.5 was the most common disease stage.

As shown in Table 2, patients with PD had significantly lower MSRA-7 scores than healthy controls (30.19±7.19 vs. 33.65±5.98, p=0.028). In addition, the prevalence of high sarcopenia risk (MSRA-7 ≤30) was significantly higher in the PD group than in the control group (46.2% vs. 25.0%,

Table 1. Demographic and clinical characteristics of the study population

	Parkinson's disease (n=52)	Controls (n=52)	p-value
Age (years)	74.00±6.80	72.31±6.16	0.195
Gender n (%)			
Female	25 (48.1)	26 (50.0)	1.000
Male	27 (51.9)	26 (50.0)	
BMI (kg/m²)	26.21±4.18	25.52±3.70	0.513
Education level, n (%)			
Illiterate	10 (19.2)	9 (17.3)	0.506
Primary school	13 (25.0)	8 (15.4)	
Middle school	5 (9.6)	9 (17.3)	
High school	8 (15.4)	12 (23.1)	
University	16 (30.8)	14 (26.9)	
Hypertension, n (%)	21 (40.4)	29 (55.8)	0.169
Type 2 diabetes, n (%)	7 (13.5)	12 (23.1)	0.310
Dyslipidemia, n (%)	15 (28.8)	13 (25.0)	0.825
Coronary artery disease, n (%)	2 (3.8)	3 (5.8)	1.000
Polypharmacy (>5 drugs), n (%)	21 (40.4)	19 (36.5)	0.840
Current smoking, n (%)	3 (5.8)	9 (17.3)	0.125
Alcohol use, n (%)	1 (1.9)	2 (3.8)	1.000
Fell last year, n (%)	21 (40.4)	8 (15.4)	**0.009**
Living status, n (%)			
Family	39 (75.0)	37 (71.2)	0.825
Alone	13 (25.0)	15 (28.8)	
Social activities, n (%)			
Yes	22 (42.3)	30 (57.7)	0.170
No	30 (57.7)	22 (42.3)	
Disease duration (years)	7.97±5.61	—	—
Hoehn and Yahr stage n (%)		—	—
Stage 1	1 (1.9)	—	
Stage 1.5	2 (3.8)	—	
Stage 2	8 (15.4)	—	
Stage 2.5	26 (50.0)	—	
Stage 3	15 (28.8)	—	
LEDD (mg/day)	631.35±356.19	—	—

BMI: Body mass index, LEDD: Levodopa equivalent daily dose, n: Number, %: Percentage. Continuous variables are presented as mean ± standard deviation and categorical variables as n (%)

Table 2. Comparison of sarcopenia risk and sarcopenia disease risk perception

	Parkinson's disease (n=52)	Controls (n=52)	p-value
MSRA-7 score	30.19±7.19	33.65±5.98	**0.028**
MSRA-7 ≤30, n (%)	24 (46.2)	13 (25.0)	**0.041**
SDRPS-TR susceptibility score	30.50±3.89	29.63±3.91	0.346
SDRPS-TR severity score	26.92±3.36	26.15±3.82	0.340
SDRPS-TR total score	57.42±7.11	55.79±7.55	0.287

MSRA-7: Mini sarcopenia risk assessment-7, SDRPS-TR: Sarcopenia disease risk perception scale-Turkish version, n: Number, %: Percentage. Continuous variables are presented as mean ± standard deviation and categorical variables as n (%)

p=0.041). No significant differences were observed between the groups regarding SDRPS-TR susceptibility, severity, or total scores (all p>0.05).

Patients with PD were further compared according to MSRA-7-defined sarcopenia risk (Table 3). Patients at high sarcopenia risk were significantly older than those at low risk (p=0.027). They also reported a significantly higher frequency of falls during the previous year (p=0.006) and were more likely to live alone (p=0.025). No significant differences were observed between the groups regarding sex, BMI, education level, disease duration, Hoehn and Yahr stage, LEDD, hypertension, type 2 diabetes mellitus, dyslipidemia, coronary artery disease, polypharmacy, current smoking, alcohol use, social activities, or SDRPS-TR susceptibility, severity, and total scores (all p>0.05).

The correlations between clinical variables and SDRPS-TR scores are presented in Table 4. Age showed significant negative correlations with the SDRPS-TR susceptibility (r=-0.366, p=0.008), severity (r=-0.405, p=0.003), and total scores (r=-0.398, p=0.003). Education level showed significant positive correlations with the SDRPS-TR susceptibility (r=0.312, p=0.024), severity (r=0.346, p=0.012), and total scores (r=0.352, p=0.011). No significant correlations were observed between SDRPS-TR scores and BMI, disease duration, Hoehn and Yahr stage, LEDD, or MSRA-7 score (all p>0.05).

As shown in Table 5, participants living with their families had significantly higher SDRPS-TR susceptibility (p=0.001), severity (p=0.002), and total (p=0.001) scores than those living alone. Similarly, participants who reported engaging in social activities had significantly higher SDRPS-TR susceptibility (p=0.010), severity (p=0.006), and total (p=0.006) scores than those without social activities.

Discussion

The present study evaluated sarcopenia risk and SDRPS in patients with PD. Compared with healthy controls, patients with PD had significantly lower MSRA-7 scores and a higher prevalence of high sarcopenia risk. However, SDRPS did not differ significantly between the two groups. Among patients with PD, high sarcopenia risk was associated with older age, a history of falls, and living alone. In addition, increasing age was associated with lower sarcopenia risk perception, whereas higher educational level was positively correlated with SDRPS-TR scores. Moreover, participants living with their families and those engaging in social activities had significantly higher SDRPS-TR scores.

Sarcopenia is a muscle disease characterized by the progressive loss of muscle strength, muscle mass, and physical performance and is associated with an increased risk of falls, disability, hospitalization, and mortality (22,23). Growing evidence suggests that sarcopenia is highly prevalent in patients with PD and contributes to poorer functional outcomes and disease progression (24,25). Although the underlying mechanisms have not been fully elucidated, physical inactivity, malnutrition, chronic inflammation, mitochondrial dysfunction, oxidative stress, and neuromuscular dysfunction have been proposed as potential mechanisms contributing to the development of sarcopenia in patients with PD (25). Consistent with these findings, patients with PD in the present study had significantly lower MSRA-7 scores than healthy controls. High sarcopenia risk was identified in 46.2% of patients with PD compared with 25.0% of healthy controls, representing a statistically significant difference. The prevalence of sarcopenia in the general older population has been reported to range from approximately 6% to 22% and increases substantially with advancing age (26,27). In contrast, the reported prevalence of sarcopenia in patients with PD varies considerably according to the diagnostic criteria and assessment methods used, ranging from approximately 17% to 58% (5,28,29).

Within the PD group, patients at high sarcopenia risk were significantly older, had a higher prevalence of falls during the previous year, and were more likely to live alone than

Table 3. Comparison of patients with Parkinson's disease according to sarcopenia risk (MSRA-7)

	MSRA-7 ≤30 (n=24)	MSRA-7 >30 (n=28)	p-value
Age (years)	76.42±7.21	71.93±5.78	**0.027**
Gender, n (%)			
Female	11 (45.8)	14 (50.0)	0.983
Male	13 (54.2)	14 (50.0)	
BMI (kg/m²)	26.56±3.66	25.91±4.62	0.532
Education level, n (%)			
Illiterate	8 (33.3)	2 (7.1)	0.073
Primary school	4 (16.7)	9 (32.1)	
Middle school	1 (4.2)	4 (14.3)	
High school	5 (20.8)	3 (10.7)	
University	6 (25.0)	10 (35.7)	
Disease duration (years)	7.64±4.96	8.26±6.19	0.826
Hoehn and Yahr stage, n (%)			
Stage 1	0 (0.0)	1 (3.6)	0.867
Stage 1.5	1 (4.2)	1 (3.6)	
Stage 2	3 (12.5)	5 (17.9)	
Stage 2.5	13 (54.2)	13 (46.4)	
Stage 3	7 (29.2)	8 (28.6)	
LEDD (mg/day)	693.75±366.56	577.86±344.62	0.263
Hypertension, n (%)	8 (33.3)	13 (46.4)	0.499
Type 2 diabetes mellitus, n (%)	3 (12.5)	4 (14.3)	1.000
Dyslipidemia, n (%)	6 (25.0)	9 (32.1)	0.795
Coronary artery disease, n (%)	0 (0.0)	2 (7.1)	0.493
Polypharmacy (>5 medications), n (%)	11 (45.8)	10 (35.7)	0.64
Current smoking, n (%)	2 (8.3)	1 (3.6)	0.590
Alcohol use, n (%)	0 (0.0)	1 (3.6)	1.000
Fell last year, n (%)	15 (62.5)	6 (21.4)	**0.006**
Living status, n (%)			
Family	14 (58.3)	25 (89.3)	**0.025**
Alone	10 (41.7)	3 (10.7)	
Social activities, n (%)			
Yes	7 (29.2)	15 (53.6)	0.135
No	17 (70.8)	13 (46.4)	
SDRPS-TR susceptibility score	29.88±4.62	31.04±3.13	0.471
SDRPS-TR severity score	26.29±3.62	27.46±3.08	0.356
SDRPS-TR total score	56.17±8.17	58.50±6.00	0.368

BMI: Body mass index, LEDD: Levodopa equivalent daily dose, MSRA-7: Mini sarcopenia risk assessment-7, SDRPS-TR: Sarcopenia disease risk perception scale-Turkish version, n: Number, %: Percentage. Continuous variables are presented as mean ± standard deviation and categorical variables as n (%)

those at low risk. Advanced age is recognized as one of the strongest risk factors for sarcopenia because aging is accompanied by progressive declines in muscle mass, muscle strength, neuromuscular function, and regenerative capacity (30). A bidirectional relationship between sarcopenia and falls can be considered. Reduced muscle strength and impaired physical performance increase the risk of falls, whereas falls may further exacerbate physical inactivity, functional decline, and subsequent muscle loss, thereby accelerating the progression of sarcopenia (31). Regarding the association between living alone and sarcopenia, individuals living alone are more likely to experience social isolation, which may contribute to the development of sarcopenia through behavioral and

Table 4. Correlations between clinical variables and sarcopenia disease risk perception in Parkinson's disease (n=52)

	SDRPS-TR susceptibility		SDRPS-TR severity		SDRPS-TR total	
	r	p	r	p	r	p
Age (years)	-0.366	**0.008**	-0.405	**0.003**	-0.398	**0.003**
BMI (kg/m^2)	-0.186	0.186	-0.142	0.315	-0.153	0.279
Disease duration (years)	0.169	0.232	0.192	0.172	0.182	0.198
Education level	0.312	**0.024**	0.346	**0.012**	0.352	**0.011**
Hoehn and Yahr stage	0.008	0.954	-0.041	0.775	-0.028	0.844
LEDD (mg/day)	0.237	0.091	0.266	0.056	0.260	0.063
MSRA-7 score	-0.014	0.921	-0.003	0.981	0.001	0.997

BMI: Body mass index, LEDD: Levodopa equivalent daily dose, MSRA-7: Mini sarcopenia risk assessment-7, SDRPS-TR: Sarcopenia disease risk perception scale-Turkish version, r: Spearman's correlation coefficient

biological mechanisms, including reduced physical activity, inadequate nutritional intake, chronic inflammation, neuroendocrine dysregulation, and oxidative stress (32).

An important finding of the present study was that, despite the significantly higher risk of sarcopenia among patients with PD, perceived susceptibility, perceived severity, and total SDRPS scores did not differ significantly between patients with PD and healthy controls. This finding suggests that the increased risk of sarcopenia in PD is not accompanied by a parallel increase in disease awareness or perceived susceptibility and severity. Given that risk perception is an important determinant of health-related behaviors, insufficient awareness of sarcopenia may represent a barrier to the adoption of preventive strategies, including regular exercise, adequate protein intake, and early screening (14). In addition, increasing age was associated with lower sarcopenia risk perception, whereas higher educational level, living with family, and participation in social activities were associated with higher SDRPS-TR scores.

Studies evaluating SDRPS remain scarce. Amin et al. (33) investigated the relationships among fall efficacy, sarcopenia risk perception, and health behaviors in community-dwelling older adults and found that greater fall efficacy was associated with lower sarcopenia risk perception, with health behaviors partially mediating this association. The authors interpreted these findings in accordance with Bandura's self-efficacy theory, suggesting that individuals who perceive greater control over a given situation tend to perceive health threats as less severe. In another study, Guo et al. (34) assessed sarcopenia awareness among community-dwelling older adults and reported that only 17.8% of participants had previously heard of sarcopenia. They further demonstrated that older age, lower educational level, living alone or with children, and lack of participation in social activities were associated with lower levels of sarcopenia knowledge. Similarly, Sun et al. (35) conducted a cross-sectional survey to evaluate knowledge, attitudes, and practices regarding sarcopenia among adults with type 2 diabetes. They reported that participants had limited knowledge despite generally favorable attitudes and moderate practice behaviors related to sarcopenia. Furthermore, higher knowledge levels were positively associated with more favorable attitudes and better health-related practices, suggesting that belonging to a high-risk population alone does not necessarily translate into greater awareness of sarcopenia. These findings are largely consistent with our results and support the concept that sarcopenia awareness and disease risk perception are influenced not only by objective clinical risk but also by educational, social, and behavioral factors. Therefore, improving awareness of sarcopenia through patient education, routine screening, and individualized counseling should be considered an integral component of the clinical management of patients with PD, particularly those at increased risk of sarcopenia, to facilitate the adoption of preventive health behaviors and promote early identification and management of the condition.

Study Limitations

This study has several limitations. First, its cross-sectional design precludes any inference of causal relationships between sarcopenia risk, sarcopenia risk perception, and the associated clinical or sociodemographic factors. Second, the study was conducted at a single center with a relatively small sample size, which may limit the generalizability of the findings. Third, sarcopenia risk was assessed using the MSRA-7 questionnaire rather than a diagnostic evaluation based on established consensus criteria, such as the European Working Group on Sarcopenia in Older People 2 recommendations; therefore, the results reflect sarcopenia

Table 5. Comparison of SDRPS-TR scores according to categorical variables in Parkinson's disease (n=52)

	SDRPS-TR susceptibility		SDRPS-TR severity		SDRPS-TR total	
	Mean ± SD	**p**	**Mean ± SD**	**p**	**Mean ± SD**	**p**
Gender						
Male	30.37±3.31	0.919	26.85±3.17	0.890	57.22±6.26	0.971
Female	30.64±4.51		27.00±3.62		57.64±8.06	
Hypertension						
Yes	30.71±4.60	0.858	27.14±3.58	1.000	57.86±8.11	0.985
No	30.35±3.41		26.77±3.25		57.13±6.47	
Type 2 diabetes mellitus						
Yes	29.00±3.06	0.246	25.43±2.70	0.186	54.43±5.71	0.202
No	30.73±3.99		27.16±3.42		57.89±7.25	
Dyslipidemia						
Yes	30.00±5.17	0.976	26.53±3.93	0.879	56.53±9.01	0.879
No	30.70±3.31		27.08±3.15		57.78±6.29	
Coronary artery disease						
Yes	29.50±2.12	0.615	25.50±2.12	0.416	55.00±4.24	0.535
No	30.54±3.95		26.98±3.40		57.52±7.21	
Polypharmacy (>5 medications)						
Yes	30.57±2.87	0.948	26.81±2.58	0.851	57.38±5.43	0.881
No	30.45±4.50		27.00±3.84		57.45±8.14	
Current smoking						
Yes	31.00±2.65	0.843	27.33±1.53	0.828	58.33±4.16	0.829
No	30.47±3.97		26.90±3.45		57.37±7.28	
Alcohol use[†]						
Yes	30.00	—	27.00	—	57.00	—
No	30.51±3.93		26.92±3.39		57.43±7.18	
Fell last year						
Yes	29.62±4.92	0.302	26.05±3.89	0.209	55.67±8.75	0.243
No	31.10±2.95		27.52±2.86		58.61±5.60	
Living status						
Family	31.64±2.96	**0.001**	27.85±2.79	**0.002**	59.49±5.57	**0.001**
Alone	27.08±4.44		24.15±3.51		51.23±7.83	
Social activities						
Yes	32.32±3.43	**0.010**	28.55±3.16	**0.006**	60.86±6.32	**0.006**
No	29.17±3.71		25.73±3.03		54.90±6.67	

SDRPS-TR: Sarcopenia disease risk perception scale-Turkish version, SD: Standard deviation, [†]: Statistical comparison was not performed because only one participant reported alcohol use

risk rather than confirmed sarcopenia. Finally, although the SDRPS-TR provides valuable information regarding individuals' perceptions of sarcopenia, it is a self-reported instrument and may be subject to recall and response bias.

Conclusion

In conclusion, sarcopenia is an increasingly important clinical condition with a high prevalence among patients with PD. However, our findings indicate that the increased risk of sarcopenia in patients with PD is not accompanied by a higher level of sarcopenia risk perception. These findings highlight the need for strategies aimed at improving awareness of sarcopenia. Therefore, integrating routine sarcopenia screening with patient education and awareness-promoting interventions may facilitate preventive health behaviors and contribute to the early identification and management of sarcopenia in patients with PD.

Ethics

Ethics Committee Approval: The study protocol was approved by the Local Institutional Non-Interventional Clinical Research Ethics Committee of İstanbul Medipol University (decision no: 866, date: 14.05.2026).

Informed Consent: All participants provided written informed consent before enrollment.

Footnotes

Authorship Contributions

Surgical and Medical Practices: H.B.M., A.T.P., M.Y., E.T., E.A., S.T., Concept: H.B.M., A.E., A.T.P., M.Y., E.T., E.A., S.T., Design: H.B.M., A.E., A.T.P., M.Y., E.T., E.A., S.T., Data Collection or Processing: H.B.M., E.T., S.T., Analysis or Interpretation: H.B.M., A.E., A.T.P., M.Y., E.T., E.A., S.T., Literature Search: H.B.M., A.E., A.T.P., M.Y., E.T., S.T., Writing: H.B.M., A.E., A.T.P., M.Y., E.T., E.A., S.T.

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

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

References

1. Costa HN, Esteves AR, Empadinhas N, Cardoso SM. Parkinson's disease: a multisystem disorder. Neurosci Bull. 2023;39(1):113-124.
2. GBD 2016 Parkinson's Disease Collaborators. Global, regional, and national burden of Parkinson's disease, 1990-2016: a systematic analysis for the global burden of disease study 2016. Lancet Neurol. 2018;17(11):939-953.
3. Leite Silva ABR, Gonçalves de Oliveira RW, Diógenes GP, de Castro Aguiar MF, Sallem CC, Lima MPP, et al. Premotor, nonmotor and motor symptoms of Parkinson's disease: a new clinical state of the art. Ageing Res Rev. 2023;84:101834.
4. Yazar T, Yazar HO, Zayimoğlu E, Çankaya S. Incidence of sarcopenia and dynapenia according to stage in patients with idiopathic Parkinson's disease. Neurol Sci. 2018;39(8):1415-1421.
5. Peball M, Mahlknecht P, Werkmann M, Marini K, Murr F, Herzmann H, et al. Prevalence and associated factors of sarcopenia and frailty in Parkinson's disease: a cross-sectional study. Gerontology. 2019;65(3):216-228.
6. Vetrano DL, Pisciotta MS, Laudisio A, Lo Monaco MR, Onder G, Brandi V, et al. Sarcopenia in Parkinson disease: comparison of different criteria and association with disease severity. J Am Med Dir Assoc. 2018;19(6):523-527.
7. Cai Y, Feng F, Wei Q, Jiang Z, Ou R, Shang H. Sarcopenia in patients with Parkinson's disease: a systematic review and meta-analysis. Front Neurol. 2021;12:598035.
8. Marzetti E, Calvani R, Tosato M, Cesari M, Di Bari M, Cherubini A, et al. Sarcopenia: an overview. Aging Clin Exp Res. 2017;29(1):11-17.
9. Chen LK, Woo J, Assantachai P, Auyeung TW, Chou MY, Iijima K, et al. Asian Working Group for Sarcopenia: 2019 consensus update on sarcopenia diagnosis and treatment. J Am Med Dir Assoc. 2020;21(3):300-307.e2.
10. Sobestiansky S, Michaelsson K, Cederholm T. Sarcopenia prevalence and associations with mortality and hospitalisation by various sarcopenia definitions in 85-89 year old community-dwelling men: a report from the ULSAM study. BMC Geriatr. 2019;19(1):318.
11. Kamaci Sener D, Deniz O, Gemci E, Gonullu S, Kamisli S. The association between probable sarcopenia, non-motor symptoms, and fall-related outcomes in Parkinson's disease. Sci Rep. 2026;16(1):5650.
12. Gomes de Luna JR, Lima DP, Gomes VC, Lopes FKM, Brito de Almeida S, Barroso PLS, et al. Sarcopenia, body composition, physical performance, and clinical features in Parkinson's disease: a cross-sectional comparative study. Front Endocrinol (Lausanne). 2026;17:1793254.
13. Almeida SB, Lima DP, Luna JRG, Viana Júnior AB, Roriz-Filho JS, Alencar ÁP, et al. Physical performance and clinical correlates of sarcopenia in Parkinson disease: a cross-sectional study. Arq Neuropsiquiatr. 2026;84(2):1-11.
14. Ferrer R, Klein WM. Risk perceptions and health behavior. Curr Opin Psychol. 2015;5:85-89.
15. Meral HB, Tolu S, Noyan Z. Validation and cross-cultural adaptation of the Sarcopenia Disease Risk Perception Scale among Turkish older adults. Turk J Phys Med Rehabil. 2026;72(2):197-206.
16. Postuma RB, Berg D, Stern M, Poewe W, Olanow CW, Oertel W, et al. MDS clinical diagnostic criteria for Parkinson's disease. Mov Disord. 2015;30(12):1591-1601.
17. Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res. 1975;12(3):189-198.
18. Tomlinson CL, Stowe R, Patel S, Rick C, Gray R, Clarke CE. Systematic review of levodopa dose equivalency reporting in Parkinson's disease. Mov Disord. 2010;25(15):2649-2653.
19. Rossi AP, Micciolo R, Rubele S, Fantin F, Caliari C, Zoico E, et al. Assessing the risk of sarcopenia in the elderly: the mini sarcopenia risk assessment (MSRA) questionnaire. J Nutr Health Aging. 2017;21(6):743-749.
20. Yilmaz O, Kilic C, Seker N, Şentürk Durmuş N, Kucukdagli P, Ozulu Turkmen B, et al. Assessing the applicability of the mini sarcopenia risk assessment questionnaire in Turkish older adult population: a validation study. Acta Clin Belg. 2026;81(2):84-94.
21. Zhang W, Sun Z, Wang J, Wu Y. Development and validation of the sarcopenia disease risk perception scale for older adults. BMC Geriatr. 2024;24(1):876.
22. Park WT, Shon OJ, Kim GB. Multidisciplinary approach to sarcopenia: a narrative review. J Yeungnam Med Sci. 2023;40(4):352-363.
23. Sayer AA, Cruz-Jentoft A. Sarcopenia definition, diagnosis and treatment: consensus is growing. Age Ageing. 2022;51(10):afac220.
24. Morimoto R, Kitagawa K, Todo K, Iijima M. Clinical analysis of sarcopenia prevalence and its influencing factors in patients with Parkinson's disease. Front Aging Neurosci. 2025;17:1718723.
25. Gui M, Lv L, Hu S, Qin L, Wang C. Sarcopenia in Parkinson's disease: from pathogenesis to interventions. Metabolism. 2025;169:156272.

26. Bianchi L, Abete P, Bellelli G, Bo M, Cherubini A, Corica F, et al. Prevalence and clinical correlates of sarcopenia, identified according to the EWGSOP definition and diagnostic algorithm, in hospitalized older people: the GLISTEN study. J Gerontol A Biol Sci Med Sci. 2017;72(11):1575-1581.

27. Morley JE, Anker SD, von Haehling S. Prevalence, incidence, and clinical impact of sarcopenia: facts, numbers, and epidemiology-update 2014. J Cachexia Sarcopenia Muscle. 2014;5(4):253-259.

28. Tan AH, Hew YC, Lim SY, Ramli NM, Kamaruzzaman SB, Tan MP, et al. Altered body composition, sarcopenia, frailty, and their clinico-biological correlates, in Parkinson's disease. Parkinsonism Relat Disord. 2018;56:58-64.

29. Ozer FF, Akın S, Gultekin M, Zararsız GE. Sarcopenia, dynapenia, and body composition in Parkinson's disease: are they good predictors of disability? A case-control study. Neurol Sci. 2020;41(2):313-320.

30. Araújo LP, Figueiredo Godoy AC, Fortes Frota F, Barbalho Lamas C, Quesada K, Rucco Penteado Detregiachi C, et al. Sarcopenia in the aging process: pathophysiological mechanisms, clinical implications, and emerging therapeutic approaches. Int J Mol Sci. 2025;26(24):12147.

31. Yeung SSY, Reijnierse EM, Pham VK, Trappenburg MC, Lim WK, Meskers CGM, et al. Sarcopenia and its association with falls and fractures in older adults: a systematic review and meta-analysis. J Cachexia Sarcopenia Muscle. 2019;10(3):485-500.

32. Yang J, Huang J, Yang X, Li S, Wu X, Ma X. The association of living alone and social isolation with sarcopenia: a systematic review and meta-analysis. Ageing Res Rev. 2023;91:102043.

33. Amin SM, Alkubati SA, Hra M, Zoromba MA, Abdallah HMM, Ghoniem NGE, et al. Perceiving the invisible: the mediating role of health behaviour in the link between fall efficacy and sarcopenia risk perception among community-dwelling older adults. Geriatr Nurs. 2026;71:104082.

34. Guo W, Wang T, Dai H, Wang Y, Zhou Z, Wang Y, et al. The knowledge level and influencing factors of sarcopenia among Chinese community-dwelling older adults. PLoS One. 2025;20(10):e0333557.

35. Sun X, Liu W, Han S, Wang M, Liu Z, Jiang W, et al. Knowledge, attitudes, and practices about sarcopenia in adults with type 2 diabetes: a cross-sectional survey. J Diabetes Res. 2026;2026(1):e3057863.