İstanbul Med J 2024; 25(3): 219-22
DOI: 10.4274/imj.galenos.2024.29559

Association Between Quality of Life and Sarcopenia Components in Older Adults

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ABSTRACT

Introduction: Sarcopenia is a serious cause of mortality and morbidity. Expressing that the quality of life of older adults may be a sign of sarcopenia. The purpose of this study was to explore the association between the Euro-Quality of Life Visual Analog Scale (EQ-VAS) and sarcopenia components in older adults.

Methods: Patients aged over 60 years who visited geriatric outpatients between October 2016 and August 2021 were included in the study. The overall quality of life was evaluated using the EQ-VAS. Handgrip strength (HGS), Chair Stand Test (CST), skeletal muscle mass (SMM), usual gait speed (UGS), and timed up-go test were measured to assess sarcopenia components.

Results: A total of 545 patients were included in the study. The median EQ-VAS score was 70 (10-100). Age, UGS, and HGS were found to be statistically significant determinants of the EQ-VAS ($p=0.014$, $p=0.005$, $p<0.001$) after adjusting for gender, diabetes, body mass index, SMM, and CST.

Conclusion: Our study suggests that age, UGS, and HGS are associated with self-reported quality of life in older adults. The results highlight the importance of assessing the quality of life of older adults in clinical practice to improve sarcopenia.

Keywords: Quality of life, older adults, sarcopenia

Introduction

The life expectancy of the human population is increasing, leading to a greater prevalence of comorbid conditions in the older adult age group (1). Sarcopenia is a health problem that is commonly associated with other diseases (falls, fractures, disability and even ending of life) in older adults (2).

The Euro-Quality of Life-5D (EQ-5D3L) is a two-part scale based on the assessment of EQ-5D and the EQ-Visual Analog Scale (EQ-VAS) (3). The EQ-VAS is a visual scale based on which participants can express their health status, functionality, and general perception of life (3,4).

A few studies to date have reported an association between sarcopenia and quality of life (5,6). Components of the sarcopenia test, on the other hand, may be impractical due to the large scale of patients and the limited scale of physicians with the ability to take such measurements, the patient's general condition disorder, and balance-vision-hearing problems. In diagnosing sarcopenia in these unsuitable conditions, can a self-reported quality of life score be used as an indicator of sarcopenia? For these reasons, the current study investigated the relationship between sarcopenia components and EQ-VAS in geriatric outpatients.

Methods

Included in this retrospective cross-sectional designed study were participants over the years of 60 who applied to geriatric outpatients between October 2016 and August 2021. Upon admission to the geriatric outpatients, the patients underwent a comprehensive geriatric evaluation by trained personnel, taking as long as the prevailing conditions permitted, although some patients were extracted from our study due to the unsuitability of their general condition (cognitive problems, hand osteoarthritis, depression, stroke, neuropathy, pacemaker), the absence of trained personnel who were able to perform the tests, time restraints, refusal to give consent, and an inability to evaluate the data with a comprehensive geriatric evaluation. The Strengthening the Reporting of Observational Studies in Epidemiology guidelines were followed in this study (7). Ethics committee consent for the study was obtained from the İstanbul University, İstanbul Faculty of Medicine Ethics Committee (approval number: 09, date: 13.05.2022).

The medical histories of the participants were enrolled retrospectively based on participant file data, and their overall quality of life was evaluated using the EQ-VAS, a VAS in which a score of 0 demonstrated

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Cite this article as: Bozkurt ME, Erdoğan T, Bahat G, Karan MA. Association Between Quality of Life and Sarcopenia Components in Older Adults. İstanbul Med J. 2024; 25(3): 219-22

Received: 03.05.2024
Accepted: 04.06.2024

the worst health condition and 100 demonstrated the best health condition (3).

The patients' physical activity levels were determined based on their self-reported engagement in physical activity, with the options: never, sometimes, 1-2 days a week, or every day. Height measurements were performed using a stadiometer, while weights and skeletal muscle mass (SMM) were obtained using a bioelectrical impedance device, all in accordance with standard procedures. Body mass index (BMI) was calculated by dividing weight by height^2 (8).

Handgrip strength (HGS) was evaluated for the assessment of sarcopenia. Patients who did not meet the HGS extracted criteria were evaluated using a hand-held dynamometer as follows: while seated in an appropriate position, the patients were instructed to squeeze the hand dynamometer as hard as feasible for 2-3 seconds. The measurements were repeated three times for both hands, and the highest recorded value was obtained (2).

Probable sarcopenia was evaluated based on low HGS. Diagnoses of probable sarcopenia were made using the regional cut-off values recommended by the European Working Group on Sarcopenia in Older People (EWGSOP-2) (<35 kg and <20 kg in males and females, respectively) (2,9).

The Chair Stand Test (CST) was used to assess low muscle strength. For the CST measurements, the patients were asked to stand up five times from a sitting position without using their upper extremities, and the time taken was recorded. Usual gait speed (UGS) and timed up go test (TUG) were used to evaluate physical performance. For the UGS, older adults were asked to walk 4 meters (m) at normal speed. A cut-off value of ≤0.8 m/s was defined for a low walking speed (2). In the TUG, patients were asked to get up from their chair, walk 3 meters, and sit down again, and the duration of the activity was recorded. A cut-off of >=20 s was defined for impaired TUG (2).

Statistical Analysis

SPSS for Windows (Version 15.0. SPSS Inc. (Chicago, IL, USA) was used for statistical analysis. Descriptive statistics of our study results were presented as numbers (percentages) or means + standard deviations or medians (minimum-maximum). The anormal distribution of numerical variables between the two independent groups were made using a Mann-Whitney U test. The associations among the numerical variables were evaluated by a Spearman correlation if the analysis the parametric test condition was not met. The determining determinants were analyzed by regression analysis. The statistical alpha significance level was admitted as $p<0.05$.

Results

A total of 1,070 older participants aged over 60 years were initially evaluated, and 525 patients were subsequently excluded from the study because they did not meet the criteria. The final model size covered 545 patients, with a median age of 73 (60-93) years. Of the total, n=375 (68.8%) were female and n=178 (32.7%) were diabetic. The median EQ-VAS score was 70 (10-100). The baseline data of the study population are presented in Table 1.

EQ-VAS was positively correlated with UGS, HGS, SMM, and daily physical activity and negatively correlated with age, TUG, BMI, CST, number of drugs, and number of diseases (p=0.034 for age; p=0.033 for BMI; p=0.015 for SMM, p<0.001 for other comparisons) (Table 2).

The EQ-VAS scale score measurements were significantly lower among the female participants than among the male participants and in the groups with impaired UGS, impaired TUG, and probable sarcopenia (gender p=0.012, p<0.001 for other comparisons).

Table 1. Baseline characteristics of the study population

Age median (min.-max.)	73 (60-93)
Gender n (%)	
Male	170 (31.2%)
Female	375 (68.8%)
Diabetes n (%)	178 (32.7%)
EQ5D-VAS median (min.-max.)	70 (10-100)
TUG (s) mean ± SD (min.-max.)	9.1 (5-36)
UGS (m/s) median (min.-max.)	0.95 (0.21-1.60)
Impaired UGS n (%)	141 (25.9%)
Impaired TUG n (%)	30 (5.5%)
HGS (kg) median (min.-max.)	24 (6-52)
BMI (kg/m^2) median (min.-max.)	29.7 (15.9-58.8)
SMM median (min.-max.)	24.2 (16-40.5)
Probable sarcopenia (35/20 kg) n (%)	194 (35.6%)
CST (s) median (min.-max.)	11.1 (5,6-66)
Number of medication medians (min.-max.)	2 (0-17)
Number of diseases median (min.-max.)	3 (0-10)
Daily physical activity status (%)	
Never	66 (12.1%)
Sometimes	11 (2.0%)
1-2 times per week	188 (34.5%)
Every day	280 (51.4%)

Data are presented as mean + standard deviation, median (interquartile range), or number (percentage) as applicable. EQ-VAS: Euro Quality of Life Visual Analog Scale, TUG: Timed-up-and-go test, UGS: User's gait speed, HGS: Handgrip strength, BMI: Body mass index, SMM: Skeletal muscle mass, CST: Chair stand test, SD: Standard deviation, min.: Minimum, max.: Maximum

Table 2. Correlation between EQ5-VAS with related factors

EQ5-VAS		
	r	**p**
Age	-0.433	**0.034***
TUG (s)	-0.257	**<0.001***
UGS (m/s)	0.265	**<0.001***
HGS (kg)	0.254	**<0.001***
BMI (kg/m^2)	-0.091	**0.033***
SMM	0.104	**0.015***
CST (s)	-0.216	**<0.001***
Number of medications	-0.211	**<0.001***
Number of diseases	-0.218	**<0.001***
Daily physical activity status	0.258	**<0.001***

*Significant p-values. EQ-VAS: Euro Quality of Life Visual Analog Scale, TUG: Timed-up-and-go test, UGS: Usual gait speed, HGS: Handgrip Strength, BMI: Body mass index, SMM: Skeletal muscle mass, CST: Chair stand test

There were no statistically significant differences in the EQ-VAS measurements between patients with and without diabetes (p=0.872) (Table 3).

All factors including age, sex, diabetes, HGS, BMI, SMM, CST, and UGS were subjected to linear regression analysis to determine their effects on EQ-VAS; age (p=0.014), UGS (p=0.005), and HGS (p<0.001) were determined to be statistically significant (Table 4).

Discussion

In our study examining the relationship between the EQ-VAS scores and the results of the sarcopenia components of 525 older adults living in the community, the factors associated with the EQ-VAS, which is a component of the general quality of life, were age, UGS, and HGS. In addition, the EQ-VAS scores were significantly lower in female members of the groups with impaired UGS, impaired TUG, and probable sarcopenia.

Table 3. Association between diabetes, sex, probable sarcopenia, and impaired physical performance based on the EQ5D-VAS in univariate analyses

EQ5D-VAS			
	Mean ± SD	**Median (min.-max.)**	**p**
Gender			
Male	67.8±20.0	70 (10-100)	0.012*
Female	63.5±20.0	60 (10-100)	
Diabetes			
(-)	65.1±19.7	70 (10-100)	0.872
(+)	64.2±20.8	70 (10-100)	
Impaired UGS			
(-)	66.8±19.5	70 (10-100)	<0.001*
(+)	59.0±20.6	60 (10-100)	
Impaired TUG			
(-)	65.7±19.7	70 (10-100)	<0.001*
(+)	50.3±20.9	50 (10-90)	
Probable sarcopenia (35/20 kg)			
(-)	67.6±18.9	70 (10-100)	<0.001*
(+)	59.7±21.1	60 (10-100)	

*Significant p-values. EQ-VAS: Euro Quality of Life Visual Analog Scale, TUG: Timed-up-and-go test, UGS: Usual gait speed, SD: Standard deviation, min.: Minimum, max.: Maximum

Table 4. Regression of the EQ5D-VAS demographics data's of study population and sarcopenia related measures

Dependent variable: EQ5D-VAS			
	B	**Beta**	**p**
Age	0.382	0.130	0.014*
Gender	4.857	0.114	0.160
Diabetes	0.272	0.006	0.881
UGS (m/sn)	14.938	0.167	0.005*
HGS (kg)	0.606	0.247	<0.001*
BMI (kg/m^2)	-0.166	-0.048	0.432
SMM	-0.069	-0.015	0.858
CST (sn)	-0.152	-0.043	0.403

Adjusted R squared value: 0.074. *Significant p-values. EQ-VAS: Euro Quality of Life Visual Analog Scale, TUG: Timed-up-and-go test, UGS: Usual gait speed, HGS: Handgrip strength, BMI: Body mass index, SMM: Skeletal muscle mass, CST: Chair stand test

Many studies have investigated the relationship between UGS and EQ-VAS (6,10-14).

Trombetti et al. (6) conducted a prospective study on 48 older adults, 22 of whom had limited mobility, for 3 years and reported a correlation between decreased UGS and deterioration in general quality of life in both groups of older adults. Similarly, Guralnik et al. (10) examined over 5,000 respondents aged 71 years and over residing in three communities and identified a relationship between low UGS and individual perceptions of general health problems. In a prospective study of 422 participants by Oh et al. (15) examining the effect of lower extremity function and quality of life in older adults, a correlation was found between UGS and the EQ5D index. Perera et al. (11) also reported a relationship between UGS and movement-related aspects of quality of life in a prospective intervention study involving 100 people with limited mobility, 100 who had recovered from a subacute stroke, and 492 community-dwelling older adults. Andersson et al. (13) conducted a study of 360 participants aged over 85 years to explore the relationship between general quality of life and instrumental activities of daily living and found that a low self-reported general quality of life was associated with mobility restriction. In the present study, a significant relationship was identified between UGS and the EO-VAS. This is the first study to report this relationship among older adults in Turkey.

We also investigated the relationship between HGS and SMM based on the EQ-VAS scores in the present study. HGS was found to be related to self-reported general quality of life, whereas SMM had no significant effect. Although our results are compatible with the EWGSOP-2 diagnostic criteria and with studies conducted in other regions reported in the literature, ours is one of the first studies to be conducted in Turkey (2,16,17). The EWGSOP 2 has recently identified muscle strength as more important than muscle mass for the evaluation of sarcopenia, and the fact that HGS and UGS were found to be related in the results of the study supports this (2,18,19).

Lærum-Onsager et al. (5) examined 107 individuals aged 70 years and over with a history of hospitalization and 328 older adults who had not been hospitalized and found that those who were overweight had a lower perception of their general quality of life. Similarly, Goins et al. (20) investigated the relationship between obesity and health-related quality of life in adults aged 65 years and over and reported that older adults with obesity have a lower health-related quality of life. Kim et al. (21) also reported a relationship between obesity and low quality of life in their study, which included 6,057 participants.

You et al. (22) conducted a study on 10,257 community-dwelling individuals over the age of 60 years and found that being underweight was associated with a low general quality of life in both male and female older adults. They further reported that overweight women were more likely to have a low EQ-5D index, whereas overweight men were less likely to have a low EQ-VAS (22).

In the present study, the EQ5D-VAS component was found to be unassociated with BMI, which contrasts with the findings reported in

the literature. The reason for this difference may be ethnic differences or the use of only the EQ5D-VAS.

Furthermore, the EQ-VAS score component of the EQ-5D3L was found to be low in older adults in the present study, which is consistent with the findings of some studies in the literature reporting a tendency for EQ-VAS scores to be low in older adults (7,13).

Study Limitations

One of the strengths of our study is its status as the first to investigate the relationship between sarcopenia components and self-reported quality of life in a large community sample of older adults in Turkey. Additionally, our study is strengthened by the use of regression analysis to correct for HGS and UGS values in the diagnosis of sarcopenia.

The limitations of our study include its retrospective design, lack of follow-up data, and possible underestimation of the EQ-VAS component, which is common in the literature.

Conclusion

The results of the present study may be useful for healthcare professionals engaged in the provision of care to the rapidly aging population. Because our society is aging rapidly, the EQ-VAS, which is a simple self-reported assessment tool, can help in cases where UGS and HGS, which are essential components of sarcopenia in older adults, cannot be applied. Further prospective studies are needed to identify any improvement in quality of life after the implementation of the necessary interventions and thus to establish a definitive association between EQ-VAS and UGS.

Ethics Committee Approval: Ethics committee consent for the study was obtained from the İstanbul University, İstanbul Faculty of Medicine Ethics Committee (approval number: 09, date: 13.05.2022).

Informed Consent: Retrospective study.

Authorship Contributions: Surgical and Medical Practices - M.E.B., T.E.; Concept - M.E.B.; Design - M.E.B., M.A.K.; Data Collection or Processing - T.E.; Analysis or Interpretation - M.E.B.; Literature Search - M.E.B., T.E., G.B., M.A.K.; Writing - M.E.B., T.E., G.B., M.A.K.

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

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

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