RESEARCH PAPER

Influence of Demographic, Clinical Variable and Fatigue Severity on Quality of Life, Among Elderly Population with Sarcopenia

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ABSTRACT

Background: Sarcopenia is the loss of muscle mass and function associated with aging, that has a huge impact on an elderly person's ability to live independently. There is a lot of information about the physical signs of muscle loss and loss of function, but lacunae exists on how subjective symptoms like fatigue and clinical factors affect a person's quality of life. Our aim was to assess the influence of clinical variables, fatigue levels and demographic characteristics on the quality of life among elderly population with sarcopenia.

Methods: A cross-sectional study was performed with 201 elderly individuals, averaging 64.5 years of age. Sarcopenia was screened using the SARC-F questionnaire and subsequently assessed through clinical evaluations, including hand grip strength (HGS), calf girth and chair stand test (CST). The Fatigue Severity Scale (FSS) was used to measure fatigue, and the SarQoL questionnaire for assessing quality of life. Multiple linear regression analysis was conducted to investigate the factors that correlate independently with quality of life,.

Results: 53.5% of the people who took part in the study were men, and 46.4% were women. Male participants exhibited markedly elevated SarQoL scores (59.9 ± 24.8) in contrast to females (49.0 ± 25.3). Multiple linear regression analysis revealed three variables as significant predictors of SarQoL: fatigue severity (beta = −0.484, $p < 0.001$), comorbidities (beta = −2.118, $p = 0.037$), and performance on the chair stand test (beta = −0.182, $p = 0.045$). Fatigue was the most important factor that predicted a lower quality of life.

Conclusion: Quality of life in sarcopenic elderly individuals' assesed using sarcopenia specific questionnaire has demonstrated to be strongly related with subjective fatigue and lower-limb functional capacity than muscle strength alone. These results indicate that clinical management of sarcopenia should encompass fatigue management and functional mobility training to enhance overall well-being rather than strengthening alone.

Keywords: *Sarcopenia, Quality of Life, Fatigue, Elderly, SarQoL, Physical Performance.*

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INTRODUCTION:

Sarcopenia is a geriatric disorder characterised by a gradual decline in skeletal muscle mass, strength, and physical function[1]. It is a major public health issue that affects about 10% to 15% of people above 65 years[2]. Sarcopenia speeds up the normal process of muscle loss as one gets older. This leads to a noticeable decline in physical health, more frailty, and a higher risk of falls, fractures, and disability[3]. It generally starts to emerge in individuals around the age of 50 and becomes increasingly prominent with advancing age. It may also manifest in younger persons due to causes such as inactivity, malnutrition, chronic sickness, or other medical disorders.

Fatigue is an overwhelming, severe and persistent sensation of exhaustion that diminishes an individual's capacity to engage in everyday activities, including successful employment and routine family and social responsibilities[4]. Fatigue is one of the most severe symptoms of sarcopenia. Fatigue is a complex, multifaceted phenomenon may manifest in physical, cognitive and emotional forms[5]. In the realm of sarcopenia, fatigue can profoundly affect an individual's

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quality of life, hindering the ability to execute everyday activities and sustain independence[6]. Sarcopenia correlates with elevated levels of fatigue[7-9]. Sarcopenic individuals exhibited elevated fatigue levels and worse physical function relative to non-sarcopenic people[4].

Research has consistently demonstrated that sarcopenic patients' exhibit diminished physical function and mobility, challenges in executing daily tasks, and reduced muscle strength, resulting in frailty and disability, as well as a decline in quality of life, which encompasses diminished enjoyment of social activities, anxiety, depression, and cognitive impairment. They may encounter less social interaction and isolation, leading to decreased independence and heightened healthcare expenses.

Sarcopenia has been associated with mental health disorders, including anxiety, depression, and cognitive decline. These disorders diminish an individual's quality of life and complicate the management of sarcopenia. Sarcopenic individuals may encounter diminished social involvement and isolation, adversely affecting their mental and physical health. Sarcopenia correlates with elevated healthcare expenditures owing to the necessity for support in everyday activities, hospital admissions, and additional healthcare services.

Sarcopenia significantly influences the quality of life of those affected, impairing physical function, mobility, mental health, social involvement, and healthcare expenses[1]. Addressing sarcopenia through early identification, prevention, and therapy is crucial for enhancing the quality of life for the affected persons. Most existing research has examined the impact of fatigue on sarcopenia and the effect of sarcopenia on quality of life independently.

Our objective was to examine the impact of fatigue-related impairment on the quality of life in older individuals with sarcopenia and association of independent sarcopenia measures with fatigue severity.

METHODOLOGY:

The study received ethical clearance from the Institutional Ethical Committee (IEC-NI/25/09/108/168) and was registered in the government trial registry with number CTRI/2025/12/099796. A total of 201 community-dwelling older adults aged 60 years or older were enrolled in this cross-sectional study from a tertiary care hospital. Participants were included if they were able to understand Tamil or English as well as verbal instruction, participants with underlying medical problems and undergone recent surgeries (<6 years) were excluded. Each participant was required to sign an informed consent before data collection. Demographic data was collected which included age, gender, socioeconomic status, comorbidities, height and weight.

Based on the AWGS algorithm, SARC-F questionnaire for sarcopenia screening, calf circumference for muscle mass, hand grip strength for muscle strength as well as physical performance (Chair stand test) were performed[10].

The SARC-F questionnaire uses a series of questions to check the patient's ability to perform specific tasks such as lifting and carrying, walking, transferring, climbing stairs and number of falls the patient sustained in the past. Scores are rated from 0 to 2. 0 for no difficulty, 1 for some difficulty, and 2 for major difficulty in completing the task. A total score of 4 or higher suggests possible sarcopenia[17].

Calf circumference was measured in standing position using a non-elastic tape at the maximum circumference of both the calves. Cut off values for calf circumference <34 cm and <33 cm were utilised for male and female respectively, for diagnosing possible sarcopenia[15].

Handgrip strength was assessed using a Jamar hand-held dynamometer to determine the strength of the upper limb. The participants were asked to grip the dynamometer with the dominant hand as strong as possible positioned in sitting with the elbow at 90° flexion, wrist and forearm in a neutral position. They were given three trials with a 1-min rest interval and the best of three was considered. The hand grip strength cut-off points were <28 kg and <18 kg for male and female respectively for diagnosing possible sarcopenia[15].

The physical performance was measured using the chair stand test. The time taken to complete 5 raises from a chair was recorded. A completion time of greater than 12 seconds indicates sarcopenia[16].

The Fatigue severity scale assessed self-reported fatigue in the participants. This scale consists of 9-item relating to disturbances in physical function, work and social activities due to fatigue. The scale has a minimum score of 0 and a maximum of 63. Based on this, participants were classified as having mild or severe fatigue, where a score >36 denotes severe fatigue[18].

Quality of life was assessed using a specific self-administrated health-related quality of life questionnaire for sarcopenia, which has been recently developed. This questionnaire is composed of 55 items translated into 22 questions and organized into seven domains of quality of life: Physical and Mental Health, Locomotion, Body Composition, Functionality, Activities of daily living, Leisure activities and Fears. SarQoL is available for clinical and research purposes from the website www.sarqol.org at free of cost. The questionnaire is scored out of 100 points and the greater the score better the quality of life[11].

DATA COLLECTION:

Data collection was carried out among community-dwelling elderly individuals aged 60 years and above after obtaining informed consent. Demographic data including age, gender, socioeconomic status, comorbidities, height, and weight were recorded. Sarcopenia was assessed using the SARC-F questionnaire along with clinical measures such as hand grip strength, calf circumference, and chair stand test. Fatigue severity was evaluated using the Fatigue Severity Scale (FSS), while quality of life was assessed using the SarQoL questionnaire. All

measurements were conducted following standardized procedures to ensure consistency and reliability.

STATISTICAL ANALYSIS:

The Statistical Analysis was done with Statistical Package for Social Sciences (SPSS) version 17.0 using both Descriptive Statistics and Inferential Statistics. For continuous variables, means and standard deviations were used; for categorical variables, frequencies and percentages were used. The multiple linear regression analyses were performed to determine the predictors of the quality of life (SarQoL) with independent variables of hand grip strength, calf circumference, Body Mass Index (BMI), presence of comorbidities, performance on the chair stand test (CST), and severity of fatigue. Prior to performing the analysis, assumptions of the model were tested. A p-value of less than 0.05 was considered significant for statistical analysis.

RESULTS:

A total of 201 elderly were screened for eligibility, and 84 were found eligible for inclusion. The mean age of the included participants was around 64 years, with the majority (55.9%) falling in the 60-70 year old age group. The gender distribution among the 84 included participants was fairly even, with 53.5% being male (n=45) and 46.4% being female (n=39).

In the comparison of fatigue levels by fatigue severity scale, mild fatigue was reported by 63% of the study sample, while 36.9% reported severe fatigue. Males had significantly greater hand grip strength (a measure of physical performance) than females. Males also had greater calf circumference than females, indicating greater muscle mass. (Refer table 1)

Table 1: Demographic details

S.NO	VARIABLES		N (%)	Mean(SD)
1.	Age (years)	50-60	22(26.1%)	56.4(4.37)
		60-70	47(55.9%)	64.5(2.18)
		70-83	15(17.8%)	74.6(3.64)
2.	Gender	Male	45(53.5%)	
		Female	39(46.4%)	
3.	Body Mass Index (kg/m^2)	20-25	34(40.4%)	22.5(1.46)
		25-30	33(39.2%)	27.3(1.49)
		Greater than 30	9(10.7%)	35.0(3.24)
4.	Fatigue Severity Scale (points)	Mild fatigue	53(63.0%)	16.7(8.11)
		Severe fatigue	31(36.9%)	44.4(7.37)
5.	Chair Stand Test (sec)	Male	45(53.5%)	16.8(10.8)
		Female	39(46.4%)	17.1(5.96)
6.	Hand Grip Strength (kg)	Male	45(53.5%)	26.0(12.7)
		Female	39(46.4%)	16.5(8.18)
7.	Calf Circumference (cm)	Male	45(53.5%)	35.0(3.59)
		Female	39(46.4%)	33.0(4.65)
8.	SarQoL (points)	Male	45(53.5%)	59.9(24.8)
		Female	39(46.4%)	49.0(25.3)
9.	SarcF (points)	Male	45(53.5%)	3.82(2.8)
		Female	39(46.4%)	4.48(2.79)
10.	Comorbidities	1	35(41.6%)	
		2 - 3	15(17.8%)	
		Nil	34(40.4%)	

Notes: Values are expressed as number (percentage) or mean (standard deviation), as appropriate.

Multiple linear regression analysis was performed to identify factors influencing sarcopenia quality of life scores. BMI, comorbidities, chair stand test, hand grip strength, calf circumference, and fatigue severity scale were entered into the regression analysis. Comorbidities, fatigue severity scale and chair stand test performance emerged as significant predictors of SarQoL. The presence of comorbidities was significantly associated with lower SarQoL scores ($B = -4.54$, $\beta = -0.190$, $p = 0.037$; 95% CI: −18.65 to −0.58), indicating a negative impact of comorbid conditions on quality of life. (Refer table 2)

Among all the factors fatigue severity was strongly associated with SarQoL, with greater fatigue significantly predicting lower quality of life ($B = -0.145$, $\beta = -0.484$, $p < 0.001$; 95% CI: −1.05 to −0.47). A significant relationship between SarQoL and Chair Stand Test performance ($B = -0.249$, $\beta = -0.182$, $p = 0.045$; 95% CI: −1.00 to −0.00) was observed, indicating that lower quality of life score using SarQoL was associated with poor functional performance.

Table 2: Factors influencing SarQoL

Model	Unstandardized coefficients		Standardized coefficients	t	p-Value	95.0% Confidence Interval for B	
	B	Std Error	Beta			Lower bound	Upper bound
	Constant	5.95	0	15.09	5.55	77.9	101.6
	Comorbidities	4.541	-0.190	-2.118	0.037	-18.65	-0.58
	Fatigue Severity Scale	0.145	-0.484	-5.283	0.000	-1.05	-0.47
	Chair Stand Test	0.249	-0.182	-2.029	0.045	-1.00	-0.00

Note: The data are displayed as t values, p values, 95% confidence intervals (CI), standardized coefficients (β), standard error (SE), and unstandardized regression coefficients (B). The SarQoL score was used as the dependent variable in a multiple linear regression analysis. The model included comorbidities, the Fatigue Severity Scale and the results of the Chair Stand Test as independent variables. Statistical significance was defined as a $p < 0.05$.

DISCUSSION:

This study provides important evidence for the complex nature of sarcopenia and how it affects the quality of life of older adults. The three factors identified that would impact an individual's quality of life with sarcopenia, beyond simple muscle loss, are fatigue levels, functional ability of the lower extremities and comorbidities present in the individual with sarcopenia. The Fatigue Severity Scale (beta = −0.484, $p < 0.001$), as shown in our regression analysis, was the strongest predictor of SarQoL. Therefore, as an individual's perception of fatigue increases their perceived quality of life dramatically declines consistently[13]. When an individual is experiencing symptoms related to sarcopenia, fatigue is not just a physical tiredness method but also indicates an ongoing lack of energy and can limit social activity and have negative consequences on an individual's psychological health. Our results verify that fatigue is a strong mediator between muscle loss and disability for older adults. Additionally, fatigue has a greater impact on an individual's perception of their overall health than does advanced clinical evaluation using objective measurements of physical functioning.

The Chair Stand Test was an important predictor in this study (beta = −0.182, $p = 0.045$) while hand grip strength did not have statistical significance in the final model, demonstrating a shift in geriatric care from solely isolating strength metrics to also monitoring functional performance. The ability to rise from a chair is necessary for independent living due to the need for strength as well as balance and coordination. These findings support the principles of EWGSOP2 which state that physical performance is one of the most reliable predictors of "severe" sarcopenia1. Moreover, Beaudart et al. found that "Physical Activity" and "Independence," two domains very closely associated with lower-limb functional capacity, were the most affected in people with sarcopenia[10].

Analysis of demographics has shown a large difference between male and females when it comes to quality of life (QOL). Women have a mean SarQoL score of 49.0 compared to men who have an average score of 59.9. Many studies have examined these differences among older people; however, women are known to have more restrictions on their physical ability attributable to the limitations in physical conditions as a result of altered hormones and low muscle mass as they get older[14]. The presence of other diseases (Beta = -0.2118, $p = 0.037$) has also been associated with lower quality of life scores. In our analysis, more than 40% of study participants have been identified as having at least one comorbid condition; therefore, sarcopenia rarely occur isolated. Hence overall quality of life is based on several factors that may work together to increase the frailty status, such as losing muscle, impaired physical functioning along with chronic diseases (e.g., diabetes and hypertension) [15].

The regression outcomes suggest that strategies solely aimed at augmenting muscle mass may be insufficient to improve quality of life instead, a more thorough approach that focuses on managing fatigue and lower-body resistance training to improve functional mobility. By focusing on the "vicious cycle" between tiredness and not being active, healthcare providers may be able to help older adults with sarcopenia become more independent and improved mental health.

LIMITATIONS:

The study offers valuable insights into the factors influencing quality of life among elderly individuals with sarcopenia, howbeit there are certain limitations. First, as the study was a cross-sectional design, this prevents the establishment of a definite causal relationship between fatigue, and SarQoL; it remains unclear if fatigue leads to sarcopenia or if sarcopenia primarily drives the fatigue. Second, the data was collected from a specific sample size, which may limit the generalizability of the findings to the broader elderly population or different ethnic groups with varying lifestyle habits. Third, the assessment of comorbidities was based on the number of conditions rather than the severity or specific type of illness, which might influence quality of life differently (e.g., a cardiac condition versus a metabolic one). Lastly, the study relied on self-reported measures for fatigue and quality of life, which are subject to recall bias or the psychological state of the participant at the time of the interview. Future longitudinal studies are needed to track how the

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progression of sarcopenia over time impacts these variables.

CONCLUSIONS

The conclusion of this research indicate that there are many factors that affect the quality of life of seniors with sarcopenia and physical measurements alone is not sufficient. Regression analysis shows that the fatigue severity, functional performance (determined by the Chair Stand Test) and other health problems are the most reliable predictors for SarQoL. The other symptoms with which we classify patients, whether patient-reported or objectively measured parameters have significant impact on their quality of life. The perceived level of energy and psychological well-being of a patient is as important as the objective measures of muscle strength.

The findings of this study indicate that there is a need to change the way of managing individuals who have sarcopenia from a clinical perspective. Rather than only looking at muscle strength, the management of sarcopenia should be with an expanded focus on the management of fatigue and increased training for mobility. By focusing on improving lower-limb power and addressing the combined impact of chronic conditions, healthcare providers may be better able to maintain independence and promote overall well-being in the ageing population.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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