Original Research

Profile of Elderly with Sarcopenia at the Medical Rehabilitation Outpatient Department in Dr. Soetomo General Academic Hospital

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Abstract

Background: The elderly group is the age group that is most susceptible to geriatric syndromes, one of which is sarcopenia. Sarcopenia is a syndrome characterized by a progressive and overall decrease in muscle mass and skeletal muscle strength with an increased risk of disability, decreased quality of life, and death.
Aims: Currently, research on sarcopenia profiles, particularly in Indonesia, is still limited. This research data is expected to help determine policies to improve the quality of services in the health sector.
Material and Methods: This descriptive, cross-sectional study involved elderly patients (≥60 years) who visited the Medical Rehabilitation Clinic of RSUD Dr. Soetomo. The SARC-F questionnaire, assessing strength, walking assistance, rising from a chair, stair climbing, and falls, was administered. A score of 4 or higher indicated a high risk of sarcopenia. Patients meeting the inclusion criteria were selected via total sampling. Statistical analysis was performed using Fisher's exact test, with a significance level of $p<0.05$.
Results: From the 25 elderly patients, 56% were found to be at high risk for sarcopenia (SARC-F score ≥4). Significant associations were found between sarcopenia risk and body height ($p=0.048$), physical activity ($p=0.007$), and mood status ($p=0.049$). No significant associations were observed with age, sex, or BMI. Hypertension, diabetes mellitus, and heart disease were the most common comorbidities.
Conclusion: The study highlights a moderate prevalence of sarcopenia among elderly patients at the clinic, with body height, physical activity and mood status emerging as key factors influencing sarcopenia risk. These findings underscore the importance of targeted interventions to enhance physical activity and address mood-related issues in the elderly population to mitigate sarcopenia risk. Further research is recommended to explore the role of body fat percentage and other factors in sarcopenia development.

Keywords: *Elderly, Geriatric Assessment, Muscle, Risk Factors, Sarcopenia.*

INTRODUCTION

Aging will always be accompanied by a decline in physical performance and decreasing body capabilities, leading to undesired events such as falls, fractures, disabilities, etc.[1] This is supported by previous study indicating that human muscle mass decreases by 3—8% each decade, with a higher decline observed after the age of 60.[2] The reduction in muscle mass will be followed by an increase in fat mass and significant changes in body composition, often associated with insulin resistance leading to type 2 diabetes in the elderly.[2] After the decline in fat mass, there will also be a reduction in bone density and an increase in joint stiffness. These factors have implications for several diseases such as type 2 diabetes, heart disease, obesity, and osteoporosis.

Sarcopenia, a muscle syndrome associated with aging, involves the loss of muscle mass, low strength, and/or reduced physical performance. Various factors contribute, including environmental influences, diseases, inflammation, abnormal mitochondria, neuromuscular junction loss, reduced satellite cells, hormonal changes, physical inactivity, and nutritional issues. The primary cause is aging, but lifestyle, hormones, and inflammation also pose risks. The SARC-F questionnaire, assessing strength, walking assistance, rising from a chair, stair climbing, and falls, is a screening tool. A score of four or more indicates sarcopenia risk. If risk is identified, physical examinations (e.g., SPPB, gait speed) and tests (DXA, BIA, handgrip strength) can confirm sarcopenia, following AWGS guidelines that link decreased handgrip strength or gait speed to muscle mass measurements for diagnosis.[3-6] Global sarcopenia prevalence is 5–13% for individuals aged 60–70 and 11–50% for those above 80. In the Asian region, gender-specific rates range from 9.6–22.1% for males and 7.7–21.8% for females. Limited studies in Indonesia show a prevalence of 9.1% in West Java (AWGS criteria) and

40.6% in Taiwan. At Dr. Cipto Mangunkusumo National General Hospital, 8% had low handgrip strength, and 2.8% had limited mobility. In Surabaya, at Geriatric Clinic of Dr. Soetomo Hospital, sarcopenia prevalence among the elderly is 41.8% (13.9% in males, 27.9% in females).[7-11]

Previous research indicates a sarcopenia prevalence of 41.8% among the elderly in Surabaya, but specific data for sarcopenia in Dr. Soetomo Hospital's Medical Rehabilitation Clinic is lacking. The absence of sarcopenia diagnoses in this clinic, coupled with differences in definitions between medical rehabilitation and geriatrics, suggests a potential variation in sarcopenia prevalence. To address this gap, the researchers aim to explore the profile of sarcopenia in elderly patients at the Medical Rehabilitation Clinic, Dr. Soetomo Hospital from November 2022 to January 2023, aiming to determine prevalence and characteristics during this specified period.[11]

MATERIAL AND METHODS

This study was a descriptive study with a cross-sectional method and data collection was done using the SARC-F questionnaire given to elderly patients in the Medical Rehabilitation Clinic of Dr. Soetomo Hospital during the period from November 2022 to January 2023. The sample in this study consisted of elderly patients in the Medical Rehabilitation Clinic of Dr. Soetomo Hospital during the period from November 2022 to January 2023 who met the inclusion criteria and were willing to participate in the study by filling out an informed consent form. The sampling method used was total sampling, which adhered to the sample acceptance criteria. Inclusion criteria included elderly patients (age $\geq$ 60 years) clinically diagnosed with sarcopenia, proficient in the Indonesian language, able to read and write well, and capable of understanding and completing the questionnaire. Sarcopenia was defined based on the Asian Working Group for Sarcopenia

(AWGS) 2019 diagnostic algorithm. The process involves:

1) Case finding: Initial identification based on clinical conditions such as functional decline, chronic diseases, or specific indicators like low calf circumference or high SARC-F scores.

2) Diagnosis

a. Muscle Strength: Measured by handgrip strength, with thresholds for males and females.

b. Physical Performance: Assessed through tests like the 6-meter walk or chair stand tests.

c. Muscle Mass: Determined via methods like Dual-energy X-ray Absorptiometry (DXA) or Bioelectrical Impedance Analysis (BIA).

3) Classification

a. Sarcopenia: Diagnosed when both low muscle mass and either low muscle strength or physical performance are present

b. Severe sarcopenia: Defined as low muscle mass, low muscle strength, and low physical performance together.

Samples were excluded if they met any of the following criteria: incomplete medical record data or cognitive impairment that prevented patients from adequately completing the questionnaire. The variables in this study included: 1) gender, 2) age, 3) weight, 4) height, 5) body mass index (BMI), 6) other diseases, 7) physical activity based on METS, 8) mood, and 9) sarcopenia risk based on SARC-F.

Primary data for this study were collected via questionnaires administered to elderly patients at Dr. Soetomo Hospital's Medical Rehabilitation Clinic from November 2022 to January 2023. The process involved distributing the questionnaire and informed consent form, and eligible patients who agreed to participate filled out the forms. Statistical analysis was conducted usinng Fisher's exact test with significance being determined if $p<0.05$. Data processing utilized SPSS ver. 29.0, including editing and coding stages. Ethical clearance was obtained from the Ethics Committee for Research at Dr. Soetomo Hospital, Surabaya.

RESULT

Table 1. Characteristics of elderly patients.

Variables	N	%
Elderly age group		
Young elderly (60—69 year)	20	80%
Middle elderly (70—79 year)	4	16%
Old elderly (≥80 year)	1	4%
Sex		
Male	8	32%
Female	17	68%
Body Height		
<150 cm	2	8%
150—170 cm	21	84%
>170 cm	2	8%
BMI		
Severely underweight (<17.0)	1	4%
Underweight (17.0—18.4)	0	0%
Normoweight (18.5—25.0)	12	48%
Overweight (25.1—27.-0)	5	20%
Obese (>27.0)	7	28%
Physical activity (METS)		
Light	17	68%
Moderate	8	32%
Heavy	0	0%
Comorbidity		
Diabetes mellitus	9	36%
Hypertension	16	64%
Heart disease	7	28%
Neurological disorder	5	20%
Others	9	36%
Mood		
Depressed	1	4%
Sad	3	12%
Normal	8	32%
Happy	9	36%
Euphoric	4	16%

From Table 1, elderly individuals were most frequently undergoing treatment at the Medical Rehabilitation Clinic of RSUD Dr. Soetomo belong to the classification of the young elderly group (60—69 years), with 20 individuals (80%) out of 25 seeking treatment from November 2022 to January 2023. Elderly patients were mostly females, accounting for 17 individuals (68%), while males only constitute 8 individuals (32%). The majority of elderly patients were 150-170 cm (84%) in height with normal BMI range being the most commonly identified (48%).

Based on the distribution of comorbidities among elderly patients in the Medical Rehabilitation Clinic of RSUD Dr. Soetomo, the most frequently encountered diseases are hypertension (64%), diabetes mellitus (36%), heart disease (28%), and nervous system disorders (20%). Additionally, there are a few elderly patients diagnosed with kidney failure, breast cancer, vertigo, stroke, glaucoma, rheumatism, spinal postural abnormalities, and gastric diseases.

Most elderly patients at the clinic engage only in light physical activities in their daily routines, such as walking at a slow pace, cooking, and other light household chores.

Specifically, 17 (68%) elderly patients perform only light physical activities daily out of a total of 25. The remaining 8 (32%) elderly patients engage in moderate physical activities daily, such as brisk walking, light exercise, and sweeping the yard. There are

no elderly patients at the Medical Rehabilitation Clinic of RSUD Dr. Soetomo engaging in heavy physical activities in their daily lives, such as jogging, carrying heavy groceries up the stairs, participating in strenuous fitness classes, etc.

The majority of elderly patients at the Medical Rehabilitation Clinic of RSUD Dr. Soetomo feel happy about their mood, with 9 (36%) elderly patients out of a total of 25 expressing happiness. This is followed by 8 (32%) elderly patients feeling normal about their mood, 4 (16%) feeling euphoric, 3 (12%) feeling sad, and 1 (4%) feeling depressed.

Following the administration of the SARC-F questionnaire to elderly patients at the Medical Rehabilitation Clinic of RSUD Dr. Soetomo, the results are summarized in Table 2.

Table 2. The distribution of SARC-F questionnaire among elderly patients.

SARC-F Score		Frequency (%)	Total (%)
Low risk sarcopenia (<4)	0	3 (12%)	11 (44%)
	1	2 (8%)	
	2	3 (12%)	
	3	3(12%)	
Moderate risk sarcopenia (≥4)	4	4 (16%)	14 (56%)
	5	5 (20%)	
	6	3 (12%)	
	7	0 (0%)	
	8	2 (8%)	

The most common SARC-F score observed was 5, with 5 patients (20%) obtaining this score. According to the SARC-F criteria, a score below 4 indicates a low risk of sarcopenia, while a score of 4 or higher suggests a high risk. Notably, 14 patients (56%) scored ≥4, placing them at a high risk of sarcopenia, whereas the remaining 11 patients (44%) were classified as low risk due to their scores being below 4. These findings highlight the prevalence of sarcopenia risk within this patient population.

Based on the statistical analysis, we identified that elderly patient's body height, physical activity (METS), and mood status were associated with SARC-F classification of sarcopenia risk (p=0.048, p=0.007, and p=0.049; respectively). However, no significant association was observed across age groups, sexes, and BMI.

DISCUSSION

In this study, we identified that the majority (56%) of elderly patients presented with a moderate risk of sarcopenia (Table 2). The study uses a 60-year-old cutoff age for

the elderly, according to Indonesia's Ministry of Health regulations. SARC-F was utilized to measure the risk of sarcopenia, with a score of 4 or higher indicating a high risk. The study finds that body height, physical activity (METS), and mood status were significant factors for the risk of sarcopenia, however the risk did not affect with elderly age categories, sexes, or BMI (Table 3).

Table 3. Association between elderly patient characteristics with SARC-F sarcopenia risk

Variables	SARC-F, N (%)		p-value
	Low Risk	Moderate Risk	
Elderly age group			
Young elderly (60—69 year)	10 (50%)	10 (50%)	0.435
Middle elderly (70—79 year)	1 (25%)	3 (75%)	
Old elderly (≥80 year)	0	1 (100%)	
Sex			
Male	4 (50%)	4 (50%)	0.678
Female	7 (41%)	10 (59%)	
Body Height			
<150 cm	2 (100%)	0	**0.048**
150—170 cm	7 (33%)	14 (67%)	
>170 cm	2 (100%)	0	
BMI			
Severely underweight (<17.0)	0	1 (100%)	0.454
Underweight (17.0—18.4)	0	0	
Normoweight (18.5—25.0)	6 (50%)	6 (50%)	
Overweight (25.1—27.-0)	1 (20%)	4 (80%)	
Obese (>27.0)	4 (57%)	3 (43%)	
Physical activity (METS)			
Light	4 (23%)	13 (77%)	**0.007**
Moderate	7 (88%)	1 (12%)	
Heavy	0	0	
Mood			
Depressed	3 (75%)	1 (25%)	**0.049**
Sad	2 (22%)	7 (78%)	
Normal	6 (75%)	2 (25%)	
Happy	0	3 (100%)	
Euphoric	0	1 (100%)	

Based on the Table 3 below, young elderly group (60-69 years) has a lower occurence of sarcopenia than the middle-aged and elderly groups (70 years and above).[12-14] The number of female elderly patients (68%) is higher than the number of male elderly patients (32%) at the Medical Rehabilitation Clinic of RSUD Dr. Soetomo. This aligns with the statement from the Indonesian Central Statistics Agency that the life expectancy of females in East Java is consistently higher than that of males each year. In Table 3, patient data at the Medical Rehabilitation Clinic of RSUD Dr. Soetomo is presented. The table reveals that the percentage of female elderly patients with SARC-F scores ≥ 4 (58.82%) is higher than female elderly patients with SARC-F scores < 4 (41.18%). In contrast, male elderly patients have an equal ratio of those with SARC-F scores ≥ 4 and those with SARC-F scores < 4, both at 50%. However, the changes were non-significant, indicating that females are not at an increased risk state of developing sarcopenia compared to males. In contrast, a study in rural East China concluded that females are significantly

more vulnerable to sarcopenia than males.[15]

This study finds BMI alone may not prevent sarcopenia in elderly patients. Researchers studied the link between BMI and sarcopenia in elderly patients. While previous research suggests higher BMI protects against sarcopenia, this study's findings were inconclusive. Notably, the normal BMI group had an equal split of patients with and without sarcopenia, while overweight and obese groups had a higher proportion with sarcopenia. This discrepancy may be due to the presence of obese patients with sarcopenia and the lack of body fat measurements in the study. The researchers recommend further research on body fat percentage and BMI to clarify their roles in sarcopenia risk.[16]

Data on comorbidities among elderly patients at the Medical Rehabilitation Clinic of RSUD Dr. Soetomo reveals a high prevalence of sarcopenia, often coexisting with various diseases. Common ailments include hypertension, diabetes mellitus, heart disease, and nervous system disorders. Among 16 elderly patients with hypertension, an equal percentage ratio is observed between those with SARC-F scores <4 and ≥4 (both 50%). For other diseases, elderly patients with SARC-F scores ≥4 predominate, except for spinal postural abnormalities. This aligns with previous research linking sarcopenia to conditions like metabolic disorders, cancer, cardiovascular diseases, nephrology, and geriatric diseases. Sarcopenia frequently coexists with cardiovascular diseases, tumors, COPD, endocrine diseases, and rheumatic diseases. The data from RSUD Dr. Soetomo's clinic supports this, with almost all diseases showing a dominance of elderly patients with SARC-F scores ≥4, indicating a high risk of sarcopenia.[17-19]

In this study, physical activity is a measured research variable and a recognized risk factor for sarcopenia. It is assessed at the Medical Rehabilitation Clinic of RSUD Dr. Soetomo by categorizing daily activities (light, moderate, vigorous) based on estimated METS. Physical activity has proven benefits in preventing health disorders, including sarcopenia, acting as a protective factor. We identified significant differences of SARC-F scores among elderly

patients that underwent either light or moderate activity. The distribution of SARC-F revealed that 77% of those with scores ≥ 4 were engaging in light physical activities, while among patients with scores <4, 88% were engaging in moderate physical activities. This underscores the crucial role of daily physical activity in reducing the risk of sarcopenia, serving as motivation for the elderly to enhance their activity levels.[20]

In this study, mood is measured as a variable and a potential risk factor for sarcopenia among elderly patients at the Medical Rehabilitation Clinic of RSUD Dr. Soetomo. Mood is assessed by inquiring about current feelings, ranging from depressed to euphoric. Despite showing significant association, the distribution of SARC-F scores based on mood in this study shows inconsistent results. Elderly patients with sad and very sad moods predominantly have SARC-F scores ≥ 4, while those with normal and very happy moods are mostly associated with scores < 4. The happy mood is dominated by patients with scores ≥ 4. This may be influenced by factors like spiritual beliefs and family support, as patients believe that maintaining happiness contributes to stress reduction and faster recovery. However, ambiguity arises, as it's possible that some patients in an unhappy mood try to perceive themselves as happy, or they may be in denial. Further research using more valid measurement tools is necessary to objectively explore the correlation between mood and sarcopenia in elderly patients at RSUD Dr. Soetomo's Medical Rehabilitation Clinic.[21]

This study is expected to contribute to the advancement of medical science by providing data on sarcopenia and the elderly. It is beneficial for the Medical Rehabilitation Clinic of RSUD Dr. Soetomo to enhance its services and management for patients, beneficial for researchers to train in the field when dealing with patients, and beneficial for the research subjects to gain a better understanding of their health conditions, especially regarding sarcopenia and factors that can exacerbate it.

CONCLUSION

In conclusion, the present study reveals that the majority of elderly patients had moderate risk of developing sarcopenia

based on the SARC-F score (56%). Body height, physical activity based on METS, and mood status were significantly associated factors for sarcopenia among elderly patients at the clinic during the period from November 2022 to January 2023.

DISCLOSURES

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Conflict of interest

The authors declare no conflict of interest.

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None.

Author Contribution

Designed the study and drafted the manuscript: FN. Collected data and performed background literature review: FN. Performed statistical analysis: FN. Supervised results and discussion: RSD, HF and NN. All authors reviewed and approved the final version of the manuscript.

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