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DEPENDENCY IN OLDER PEOPLE WITH SARCOPENIA

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ABSTRACT
The risks of sarcopenia tends to increase as the age increase and also low physical activity, dependency in activity of daily living, and obesity may lead to decrease in skeletal muscle mass that impact to muscle strength and decreasing physical performance. This study aimed to determine the association between physical activity, activity of daily living, and obesity in older people. Determining the association of physical activity, activity of daily living, and obesity with sarcopenia among older people in West Jakarta. This was an analytical descriptive study with cross-sectional design of 207 subjects aged > 70 years in West Jakarta. The variable were assessed by using a guidelines from Asian Working Group of Sarcopenia (AWGS), cut-off points from World Health Organization (WHO) and Barthel Index for assessment of sarcopenia, physical activity and activity of daily living, and also using cut-off points from World Health Organization (WHO) for assessment of obesity. Multivariate logistic regression was used to analyze the association between sociodemographic factors, physical activity, activity of daily living, and obesity on sarcopenia. Based on sociodemographic characteristics, the respondents were mostly woman (71.5%) with more than 70 years (58%), had more than 12 years of education (74.4%). The analysis showed that activity of daily living has a meaningful relationship with sarcopenia (p= 0.021; OR= 3.595; 95% CI= 1.208 – 10.696). Furthermore, sex was also found as a risk factor for sarcopenia (p= 0.002; OR= 5.484; 95% CI= 1.899 – 15.836). This study showed that activity of daily living played a significant role in the incidence of sarcopenia in older people. In addition, older men are known to have higher risk of developing sarcopenia.

Keywords: activity of daily living; obesity; older people; physical activity; sarcopenia

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INTRODUCTION

Aging is a process of change that occurs in the biological, physiological, environmental, psychological, behavioral, and social fields.1 Currently, Indonesia is starting to enter a period of aging population. The number of people aged 60 years or older in Indonesia has reached 25.7 million people or around 9.6 percent of the population.2 In old age, physical activity is very important in maintaining various aspects of health, such as brain health, bone and muscle health, and weight-related health.3 In addition to physical activity, daily activities can also experience changes due to decreased body function in the elderly.4 If the elderly have difficulty carrying out daily activities, then the elderly can be classified as a disability group because they are unable to carry out activities independently.5 During the aging process, body fat will experience a natural increase and there is a decrease in the redistribution of fat from the peripheral and subcutaneous to the central location that triggers obesity.6

Physical activity, activities of daily living, and obesity have an important role in the incidence of saropenia. In several previous studies, sarcopenia was widely studied using a 24-hour diet. Therefore, the researchers wanted to use 24-hour physical activity measurements to determine the incidence rate of saropenia among the elderly in West Jakarta.7,8

METHOD

This study uses a cross-latitude analytical descriptive method. The data used in this study is primary data. This research was conducted at PUSAKA Jelambar and Kebon Jeruk, West Jakarta in August – October 2022. The respondents of this study were elderly people in PUSAKA Jelambar and Kebon Jeruk, West Jakarta who met the inclusion criteria, namely age > 60 years old and has signed inform consent. The minimum sample needed in this study is 93 people. The dependent variable in this study was sarcopenia, while the independent variables were physical activity, daily life activities, and obesity. Sarcopenia is measured using Bio-Impedance Analysis (BIA), Electronic Hand Dynamometerand Timed get-up-and-go test. Respoden can be declared to have saropenia, if the muscle mass is <7.0 kg/m2 in men and <5.7 kg/m2 in women, the grip strength is <28 kg in men and <18 kg in women, and the physical performance is >12 seconds. In addition, physical activity and activities of daily living are measured using questionnaires, while obesity is known by measuring BMI using Stature meters.9

RESULT

Table 1.
The Relationship of Elderly Demographic Characteristics, Physical Activity, Activities of Daily Living, and Obesity to Sarcopenia

Variable	Sarkopenia [n (%)]		*p*	OR	95% CI	
	Already	No			Lower	Upper
Age						
< 70 years	4 (4,6)	83 (95,4)	0,085	0,365	0,116	1,150
≥ 70 years	14 (11,7)	106 (88,3)				
Gender						
Man	11 (18,6)	48 (81,4)	0,001	4,616	1,694	12,581
Woman	7 (4,7)	141 (95,3)				
Education						
< 12 years	5 (9,4)	48 (90,6)	0,825	1,130	0,383	3,334
≥ 12 years	13 (8,4)	141 (91,6)				
Physical Activity						
Light physical activity	16 (10,1)	143 (89,9)	0,255	2,573	0,570	11,615
Moderate-vigorous physical activity	2 (4,2)	46 (95,8)				
Activities of Daily Living						
Self-sufficient	6 (5,0)	114 (95,0)	0,027	3,040	1,094	8,451
Dependency	12 (13,8)	75 (86,2)				
Obesity						
Not obese	4 (4,0)	96 (96,0)	0,026	0,277	0,088	0,872
Obesity	14 (13,1)	93 (86,9)				

This study was attended by 207 respondents where the majority of respondents were aged >70 years old (58%) and female (71.5%). The length of education was dominated by respondents with an education level of >12 years (74.4%). Of all the respondents, 76.8% of the respondents did light physical activity, 58% of the respondents were independent in daily life activities, 51.7% of the respondents were obese, and 91.3% of the respondents were sarcopenia. Based on gender characteristics, male respondents were known to have more saropenia as evidenced by the results of meaningful analysis (*p= 0,001)* [TABLE 1]. In addition, on [TABLE 1] A meaningful relationship between dependence in daily life and

saropenia (*p= 0.027). At* [TABLE 1] It was also found that there was a meaningful relationship between obesity and sarcopenia (*p= 0.026). However, the variables of age, education, and physical activity had no statistically significant relationship to sarcopenia* [TABLE 1]. Based on the results of the analysis on [TABLE 2], it was found that respondents with dependence in daily life activities and male sex were factors that greatly influenced the incidence of saropenia with each value *p= 0,021; OR= 3,595; 95% CI= 1,208 – 10,696 dan p= 0,002; OR= 5,484; 95% CI= 1,899 – 15,836.*

Table 2.
Multivariate Analysis of Factors Affecting Sarcopenia

	Sarcopenia			
	p	OR	95% CI	
			lower	*upper*
Physical Activity	0,147	3,206	0,664	15,477
Activities of Daily Living	0,021	3,595	1,208	10,696
Obesity	0,052	0,308	0,094	1,011
Age	0,338	0,545	0,157	1,889
Gender	0,002	5,484	1,899	15,836
Education	0,318	1,885	0,543	6,544

DISCUSSION

This study showed that age has a meaningless relationship with sarcopenia (p= 0.338; OR= 0.545; 95% CI= 0.157 – 1.889). The results of this study are different from the research of Handajani et al.10 where there is a meaningful relationship between age and sarcopenia (p= 0.01) with the criteria of age of respondents > 70 years. In addition, there is also research conducted by Huschtscha et al.11 where there is a relationship between age and sarcopenia (p < 0.05), this data was obtained by dividing the age category into 50-59 years and > 60 years. Thus, it can be concluded that the results of the age relationship test with sarcopenia can have different results according to the characteristics and evenness of the respondent population. In this study, sex had a meaningful relationship with sarcopenia (p= 0.002; OR= 5,484; 95% CI= 1,899 – 15,836). This is in accordance with research according to Du et al..12 where the prevalence of sarcopenia in men and women in China is dominated by men as much as 19.2%, while in women it is 8.6%. This happens because muscle mass in men is more often experienced a decrease in function and muscle structure than in women.

In addition, in this study, education has a meaningless relationship with saropenia (p= 0.318; OR= 1,885; 95% CI= 0.543 – 6.544). This is different from the research according to Ko et al..13 which states that sarcopenia has a meaningless relationship with education (p= 0.827) where respondents with an education level < 9 years had a higher incidence of saropenia. Meanwhile, there is also research that is in line with the researcher conducted by Handajani et al.10 where there are as many as 71.6% of the elderly with an education level > 9 years of which 16.8% of them suffer from saropenia. However, in this study, no meaningful relationship was found between education level and sarcopenia. However, a meaningful relationship can be found between the level of education < 9 years and muscle strength (p < 0.001; OR= 3.16; 95% CI= 1.91-5.23) and muscle mass (p= 0.001; OR= 6.26; 95% CI= 2.15-18.25). In this study, physical activity had a meaningless relationship with sarcopenia (p= 0,147; OR= 3,206; 95% CI= 0,664 – 15,477). Prayuni et al.14 stated that physical activity had an insignificant relationship with known saropenia with the value (p > 0.05). This can happen because physical activity has an important role in the anabolic metabolic process for muscle protein synthesis which serves to prevent the occurrence of saropenia. The results of this study are in line with what has been done by the researcher because the method of measuring

saropenia carried out in this study is the same as the researcher and the criteria of the respondents used are also almost similar, namely respondents with age > 60 years old and predominantly female.

In addition, according to Kitamura et al.15 Saropenia has a meaningful relationship with light physical activity characterized by values (p= 0.002). This study states that a decrease in muscle mass can occur due to a decrease in physical activity carried out by the elderly. The results of this study can be different from the researcher because the physical activity in this study is measured with an accelerometer. Meanwhile, the researcher used a 24 Hour Activity Recall questionnaire. In this study, activities of daily living have a meaningful relationship with sarcopenia (p= 0,021; OR= 3,595; 95% CI= 1,208 – 10,696). Sousa et al.16 stated that activities of daily living have a meaningful relationship with sarcopenia which is characterized by values (p < 0.001). This can occur due to the presence of aging factors that cause quantitative and qualitative changes in muscle structure and function. This is in line with what has been researched by researchers, where saropenia is a skeletal muscle disorder with loss of skeletal muscle mass, strength, and muscle function so that it can cause disability and fall events in the elderly.17

In addition, according to Kamo et al.18 activities of daily living do not have a meaningful relationship with sarcopenia which is characterized by values (p= 0.28). This is influenced by the difference in muscle mass measurement, where measurements are made by Near-infrared spectroscopy (NIRS) to measure muscle mass with optical density at two wavelengths. In this study, obesity had a meaningless relationship with sarcopenia (p= 0,052; OR= 0,308; 95% CI= 0,094 – 1,011). Menurut Swan et al.19 Obesity has a meaningful association with sarcopenia (p= 0.01; OR= 0.74; CI= 0.58 – 0.93). This can happen due to the use of the European Working Group On Sarcopenia (EWGSOP) and related to the socio-economic level. In addition, research by Silalahi et al.20 states that obesity has a meaningful relationship with saropenia (p= 0,015; OR=0,309; 95% CI=0,120 – 0,796). This can happen due to the use of BMI which is indicated through weight and height without considering body fat composition. Differences in the results of this data analysis can occur due to differences in the number of respondents and other variables studied.

CONCLUSION

The prevalence of the elderly who experience saropenia in PUSAKA Jelambar and Kebon Jeruk, West Jakarta is 8.7%. There is a meaningful relationship between sex and activities of daily living with sarcopenia. However, there was no meaningful relationship between age, education level, physical activity, and obesity and sarcopenia.

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