

PHYSICAL ACTIVITY LEVELS AMONG OLDER SARCOOPENIC PATIENTS: A CROSS-SECTIONAL STUDY

Nguyen Ngoc Tam^{1,2}, Do Lan Chinh¹, Tran Viet Luc^{1,2}

1. Hanoi Medical University

2. National Geriatric Hospital

DOI: 10.47122/VJDE.2023.64.9

SUMMARY

Aims: The aims of the study were to evaluate the physical activity levels among older sarcopenic patients. **Method:** A cross-sectional study was conducted among sarcopenic patients aged ≥ 60 in Hanoi, Vietnam, from March 2022 to October 2022. Sarcopenia was defined by the criteria proposed by the Asian Working Group for Sarcopenia (AWGS 2019). Physical activity levels (low, moderate and high) were assessed by using the IPAQ-SF instrument. **Results:** Among 295 sarcopenic patients, the mean age was 75.7 ± 8.2 , 78% female. Patients with low physical activity levels accounted for 61.4% (mean: 187.03 ± 198.6 MET minutes a week). In multivariate logistic regression, severe sarcopenia (adjusted OR 1.94, 95%CI: 1.05 – 3.57) was associated with higher odd ratio for having low physical activity level. **Conclusion:** The rate of low physical activity levels in older sarcopenic patients was high. Further studies are needed to examine the effect of physical exercise in this population.

Correspondence: Nguyen Ngoc Tam,
Submission date:August 2023
Revised date: 12th August 2023
Acceptance date: 30th September 2023
Email: Ngoctam@hmu.edu.vn
Tel: +84 979 221 905

INTRODUCTION

Sarcopenia has defined as loss of lean muscle mass and/or poor muscle strength

and/or performance¹. Sarcopenia prevalence estimates range from 9.9% to 40.4 %, based on the definition used². Falling, fractures, disability, hospitalization or the need for long-term care, poor quality of life, and even mortality are health-related adverse of sarcopenia, putting a strain on an aging population^{1,3,4}. There are many causes of sarcopenia, including genetics, small body size, and a reduced number of anabolic hormones⁵. People with sarcopenia are one of the most causes of functional decline and loss of independence⁶. Physical activity (PA) is a common problem affecting people with sarcopenia.

World Health Organization (WHO) has defined physical activity as any bodily movement produced by skeletal muscles that require energy expenditure and produces overall health benefits. Physical inactivity or a lower level of physical activity is a part of the underlying mechanisms of sarcopenia⁷. Szu-Ying Lee (2018) has demonstrated that PA is an effective protective strategy for sarcopenia but maintenance of muscle strength appeared to depend on the continuous implementation of certain types of PA.

Vietnam is also the country with the fastest aging population. The proportion of elderly people (more than 60 years old) in 2038 will account for over 20% by 2049 will account for about 25%. The prevalence of sarcopenia in Vietnamese patients attending geriatric clinics was high and lower physical activity was significantly associated with sarcopenia⁸.

An earlier understanding of the level of physical activity in older sarcopenic patients is important in the treatment and prevention of the disease. Thus, this study was conducted to assess the prevalence of physical activity levels in older sarcopenic patients

METHODS

Study design

The study was a cross-sectional study

Study subject, sampling, and sample size

❖ Study subject

- Inclusion Criteria: (1) Patients 60 years and older; (2) Have the physical and cognitive abilities to do a face-to-face interview; (3) Diagnostic criteria for Sarcopenia: according to Asia Working Group on Sarcopenia – AWGS 2019⁹

- Exclusion criteria: (1) Patients or families refused to participate in the study; (2) Severe loss of vision, hearing, or communicative ability; (3) Acute and malignant diseases (advanced cancers, end-stage chronic diseases, acute myocardial infarction, stroke, acute COPD); (4) Patient can not perform physical exam in the study

❖ Sample size

This is a cross-sectional study. The sample size was calculated based on the formula for estimating a ratio:

$$n = Z_{(1-\alpha)}^2 \cdot \frac{p \cdot (1-p)}{d^2} / Fp.1-pd^2$$

n: the smallest sample to study have significance

$Z_{(1-\alpha)} = 1.96$ with 95% confidence intervals
 $p = 0.212$ the rate of low physical activity levels of research in Taiwan in 2021¹⁰

$d = 0.05$ is the expected error

From the formula, the estimated sample size $n = 257$ older patients.

Study setting

The research was conducted at the National Geriatric hospital from March, 2022 to October, 2022.

Variables

Information collected through medical records for inpatient patients, interviews and examinations based on early research projects. Interviewers and research support members include 02 uniformly trained in interviews with questions, measuring body indicators, and performing a physical exam

❖ *Sarcopenia* was diagnosed by using the standard of the Asian Working Group for Sarcopenia (AWGS 2019):

Criterion 1: Low muscle mass: Muscle mass (kg): Each patient was assessed total body fat mass using a bioelectrical impedance analysis (BIA). Low muscle mass $< 7.0 \text{ kg/m}^2$ (male) and $< 5.7 \text{ kg/m}^2$ (female)

Criterion 2: Low hand grip strength (HGS): The hydraulic hand (HGS, kg) is evaluated using a Jamar TM (Hydraulic Hand Dynamometer 5030 JI, USA). 2 trials were performed, and the better of two trials was used for scoring purpose. Low HGS $< 28 \text{ kg}$ (male) and $< 18 \text{ kg}$ (female)

Criterion 3: Low physical performance: Each patient was checked for gait speed by performing a 6-meter walk. Low physical performance $< 1.0 \text{ m/s}$

Evaluation: Sarcopenia: (1) + (2) or (1) + (3); Severe sarcopenia: (1) + (2) + (3)

Physical activity levels assessment

Performing: International physical activity questionnaire (IPAQ) short form was used to measure the PA levels. The specific types of activity that are assessed are walking, moderate-intensity activities, and vigorous-intensity activities. The computation of the total score for the short form requires the summation of the duration (in minutes) and frequency (days).

Walking MET-minutes/week = $3.3 \cdot$
 walking minutes * walking days

Moderate MET-minutes/week = 4.0 * moderate-intensity activity minutes * moderate days

Vigorous MET-minutes/week = 8.0 * vigorous-intensity activity minutes * vigorous-intensity days

Total physical activity MET-minutes/week = sum of Walking + Moderate + Vigorous MET-minutes/week scores

Evaluation: Low level: < 600 MET-minutes/week; Moderate to High levels: ≥ 600 MET-minutes/week

Data processing and data analysis:

The process of data coding, entry into REDCap, and analysis were done by using Statistical Package for Social Science (SPSS) software (version 20). Descriptive statistics were adopted to examine characteristic data: frequency, percentage, and mean. Inferential statistics was done to perform comparisons between groups: Chi-square, Multivariable

regression. Statistical significance was accepted at the 95% confidence level ($p < 0.05$).

Ethical consideration: Study subjects explained clearly the purpose of the study, and the questionnaires were given only when subjects agreed to participate. The right to withdraw at any time was explained clearly to the participants. Study tool was not involved sensitive or intimate problems, and did not affect the subject's emotions.

RESULTS

A total of 295 patients were recruited in the study. The age of the sample ranged from 60 to 97, mean 75.7 ± 8.2 years old. The majority of participants lived with family (92.9 %, $n=274$) and 7.1% lived alone or with others. The proportion of outpatients was 62.7% ($n=185$) and 37.3% ($n=110$) inpatients.

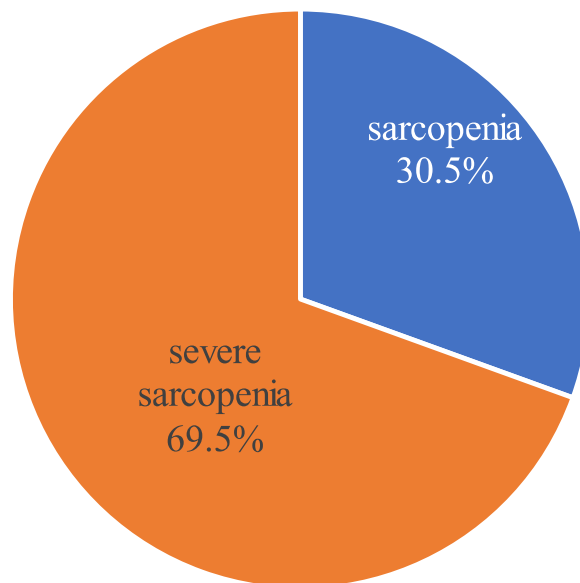


Figure 1. Stage of sarcopenia among all participants (N=295)

According to AWGS criteria, 69.5% ($n=205$) were diagnosed as severe sarcopenia and 30.5% ($n=90$) sarcopenia.

Table1. The characteristics of sarcopenia

Variables	Total (n=295)	Male (n=65)	Female (n=230)
Hand grip strength (kg)	15.53±5.45	19.71± 6.28	14.35±4.55
Bioelectrical impedance analysis (BIA): muscle mass (kg)	5.19±0.72	5.98±0.61	4.96±0.57
Physical performance: walking speed (m/s)	0.6±0.26	0.61±0.27	0.63±0.26

The mean of physical performance was 0.6 (SD=0.26) m/s in all participants and there was not different between male and female. Hand grip strength and muscle mass in male were higher than female

Physical activity levels in older Sarcopenic patients

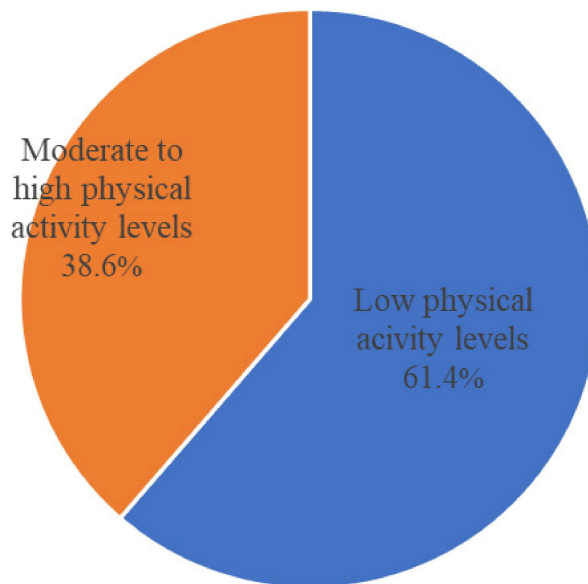


Figure 2. The physical activity levels in older sarcopenic patients (N=295)

The older sarcopenia patients who were low physical activity levels accounted for 61.4% (n=181), and 38.6% (n=114) were identified as at moderate to high physical activity levels. Our study reported that total physical activity levels of low PA levels has a mean of 187.03 (SD=198.6) MET minutes/week and moderate to high PA levels have a mean of 1355 (SD=879) MET minutes/week.

Association between stage of sarcopenia and physical activity levels

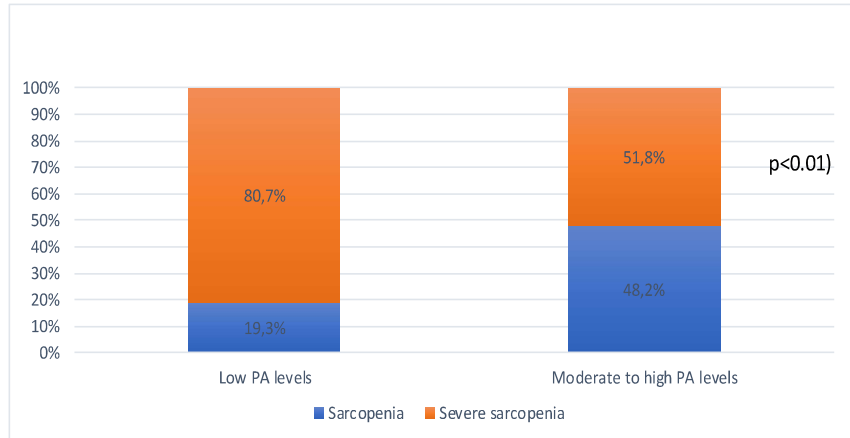


Figure 3. The rate of stages of sarcopenia according to physical activities levels

There was a statistically significant difference between the stage of sarcopenia according to physical activity levels ($p<0.001$). The rate of severe sarcopenia in low PA levels was 80.7% ($n=146$) higher than in moderate to high PA levels 48.2% ($n=55$). The rate of sarcopenia in low PA levels and moderate to high PA levels were 19.3% and 48.2%, respectively.

Table 2. Association between sarcopenia and physical activity levels

	Univariate		Multivariate	
Severe Sarcopenia	3.89 (2.31-6.55)	<math><0.001</math>	1.94 (1.05-3.57)	0.034

After adjusted for age, gender, living status and recruited resources, severe sarcopenia (adjusted OR : 1.94 , 95%CI : 1.05-3.57) was associated with higher odds ratio for low PA levels in older patients ($p=0.034$).

DISCUSSION

Among 295 participants, based on the IPAQ-SF tool, the older sarcopenia patients who were low physical activity levels accounted for 61.4% ($n=181$). The results of previous study were noted that, among 376 older patients with sarcopenia, the rate of low physical activity level 78.5%. This study has prevalence of low physical activity levels higher than our study , it could be explained by different from sample sizes.

In similar research by Yun-Chen Ko in Taiwan (2021), 138 participants were diagnosed with sarcopenia according to the AWGS. The prevalence of low physical activity was 45.3%

($n=48$), and moderate to high physical activity was 54.7% ($n=90$)¹⁰. In Thai Lan, the research showed that total physical activity was on average 945.66 (SD=1869.45) MET-minutes/week in sarcopenia participants. In another research in Kashiwa city, Chiba prefecture, Japan, they found 5.1% sarcopenia ($n=60$). The mean of total physical activity MET-minutes/week was 102.9 (SD=257.1)¹¹. It is highly different from our study because the proportion of sarcopenia patients in their study accounted for a smaller number than in our study. Both of these studies used the GPAQ tool to measure physical activity levels.

The previous studies showed PA was a key factor in the prevention of sarcopenia¹². Sarcopenia can be effectively treated with physical activity. The majority of studies on exercise interventions for older persons showed that the participants had successful outcomes, but it appeared that maintaining muscle strength

required ongoing participation in particular physical activities. Relationship between sarcopenia and physical activity in older people in 2017 by author Michal Steffl et al. The meta-analysis indicated that PA reduces the odds of acquiring sarcopenia in later life (odds ratio [OR] =0.45; 95% CI 0.37–0.55). The results confirmed the beneficial influence of PA in general on the prevention of sarcopenia ¹³.

CONCLUSION

The rate of low physical activity levels in older sarcopenic patients was high. Stage of sarcopenia and PA levels were significant associated. Further studies are needed to examine the effect of physical exercise in this population.

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