ORIGINAL ARTICLE

Attitude and Understanding of Sarcopenia among Clinical-year Medical Students in a Tertiary Care Hospital in Thailand

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Objective: Although sarcopenia is highly prevalent and associated with many adverse outcomes, prior studies have shown that healthcare professionals still need to be more aware of and knowledgeable about this condition. The present study aimed to determine the attitudes and levels of understanding regarding sarcopenia among clinical-year medical students who will become physicians and explore the correlation between positive attitudes and knowledge of sarcopenia among participants.

Materials and Methods: A cross-sectional study using an electronic Thai questionnaire, which addressed various aspects of sarcopenia, to evaluate attitudes and knowledge among participants. A five-point Likert scale assessed attitudes toward sarcopenia; binary "yes" or "no" responses tested knowledge about it. Participants were clinical-year medical students (4th to 6th year). Descriptive statistics analyzed demographic data, while Spearman rank correlation assessed the relationship between positive attitudes and overall knowledge scores on sarcopenia.

Results: Of the 852 individuals, 202 (24%) completed questionnaires. Approximately 80% were familiar with the term but were uncertain about its diagnostic criteria and clinical significance. The median score for knowledge about sarcopenia was 21 out of 30 (70%). Participants excelled in understanding its definition and importance (70%), causes (75%), and management (70%) but performed in diagnosis, scoring only 50%. A marginal correlation existed between positive attitude and scores on sarcopenia knowledge of 0.2 (95% CI 0.1 to 0.3, $p<0.05$).

Conclusion: A majority of participants had positive attitude toward sarcopenia, and possessed good sarcopenia knowledge in most aspects, except for diagnosis. The positive attitude regarding sarcopenia showed a low correlation with sarcopenia knowledge. Strategies should be implemented to enhance their confidence in diagnosing and managing sarcopenia, which may increase the correlation between a positive attitude and their knowledge.

Keywords: Aging; Disability; Frailty; Sarcopenia

Received 20 December 2024 | Revised 29 May 2025 | Accepted 30 May 2025

J Med Assoc Thai 2025;108(Suppl.2):S37-43

Website: http://www.jmatonline.com

Sarcopenia is a geriatric syndrome characterized by a generalized and progressive loss of muscle mass and strength, which results in limited muscle function[1]. The prevalence of sarcopenia differs among studies depending on the definition criteria; however, the meta-analysis evaluated the pool prevalence of sarcopenia, which was 10% to 16% worldwide[2-4]. The prevalence of sarcopenia in critically ill patients or those with cancer could be as high as 68% to 80%[2,5-9]. Sarcopenia is very important in the health care system because it is related to adverse outcomes among older adults, such as hospitalizations[2,10,11], functional decline[12,13], and mortality[12,14-16].

Some risk factors associated with sarcopenia, such as age and gender[17-19], cannot be modified; however, many risk factors can be prevented and treated. Those risk factors include obesity, malnutrition, physical activity, sleep quality, and underlying diseases[17,20-22]. Moreover, giving multimodal interventions can improve sarcopenia[23,24]. Therefore, healthcare providers' early recognition, prevention, and treatment of sarcopenia may decrease or prevent adverse outcomes. Still, a study found that this condition in patients with comorbidities is often not recognized[25].

Several studies evaluated attitudes, knowledge, and awareness of sarcopenia among healthcare professionals[26-29].

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How to cite this article:

Limpawattana P, Manjavong M, Tanlawan P, Saengwijit N, Ojongpien K. Attitude and Understanding of Sarcopenia among Clinical-year Medical Students in a Tertiary Care Hospital in Thailand. J Med Assoc Thai 2025;108(Suppl.2):S37-43.

DOI: 10.35755/jmedassocthai.2025.S02.S37-S43

A prior research study conducted in the UK with physician participants revealed that they had limited awareness of sarcopenia, and only 6% utilized a diagnostic algorithm for their patients[29]. Two previous studies concluded that nurses have positive attitudes but limited knowledge and awareness about this syndrome[26,27]. Another study revealed that orthopedic professionals had lower knowledge and practice of sarcopenia than those from the geriatric department[28]. For medical students who will be physicians in the future, a study that evaluates their perspective and knowledge about sarcopenia is still being determined. Suppose the authors knew the level of sarcopenia knowledge among them, in that case, we might conduct strategies for medical students to increase their confidence in diagnosis and treatment in the future. Therefore, the primary aim of the present study was to determine the attitudes and levels of expertise of medical students regarding sarcopenia. The secondary objective was to explore the correlation between positive attitudes and knowledge of sarcopenia among participants.

Materials and Methods

The present study was a cross-sectional study encompassed clinical-year medical students (typically corresponding to the 4th to 6th years in the Thai medical education system) from the Faculty of Medicine, Khon Kaen University, Thailand, over the period extending from November 2022 to October 2024. Students who failed to submit the electronic questionnaires were systematically excluded from participation. The study received approval from the Institutional Review Board of Khon Kaen University (HE651502). The project was deemed exempted from further review by the Ethics Committee as it involved survey methodologies. Then, the requirement for informed consent was formally waived.

The electronic Thai questionnaire used in the present study was developed by Khuankaew K et al.[26] according to the guideline established by the Asian Working Group for Sarcopenia's 2019 consensus update concerning the diagnosis and treatment of sarcopenia (AWGS2019)[30]. The questionnaires covered different areas of sarcopenia, including its definition, significance, causes, diagnostic criteria, management strategies and prevention. They were comprised of 2 main sections: 1) the collection of demographic information, and 2) an evaluation of attitudes towards sarcopenia (which included 9 items) and general knowledge regarding sarcopenia (which consisted of 30 items, further categorized into 10 items related to definition and significance, 4 items concerning causes, 8 items emphasizing diagnosis, and 8 items focused on management strategies and prevention). A five-point Likert scale was used for the assessment of attitudes about sarcopenia. To assess positive attitude towards sarcopenia, individuals who strongly agree or agree with statements such as “I have heard about sarcopenia”, “I know about how to diagnose sarcopenia” and “every hospitalized patient who is expected to stay over a week should have a physical therapy consultation” would score one point. Any differing responses would result in a score of zero. In contrast, individuals who strongly agree or agree with negative statements like “In clinical practice, prevention of common medical diseases with severe complications such as diabetes mellitus and hypertension is more important than prevention of sarcopenia”, “Sarcopenia lies beyond the realm of my expertise, as it lacks any association with my patients”, or “The patient without muscle atrophy is likely to have normal muscle mass” would receive a score of zero. Other responses would score one point.

Binary responses of “yes” or “no” were required for the knowledge assessment components associated with sarcopenia. The scale-content validity index (S-CVI) of this tool was 0.94, and the internal consistency using Cronbach’s alpha for the definition and significance, causes, diagnostic criteria, and management strategies & prevention was 0.80, 0.83, 0.87, and 0.83, respectively. Comprehensive details regarding the development of the questionnaires were described in other sources[26].

The electronic questionnaires were distributed to all medical students in their clinical years at the Faculty of Medicine, Khon Kaen University, Thailand. Participants were encouraged to provide their responses to the questions based on their individual judgment. Students were free to decline participation without facing any consequences. Confidentiality of the response was rigorously maintained, and no forms of incentive was offered to the participants. Then, the completed surveys were submitted back to the researchers.

Descriptive statistics were used to analyze the demographic information, which were presented as percentages, means, and standard deviations. If the data failed to conform to a normal distribution, medians and inter-quartile ranges were used as alternatives. In cases where data were normally distributed, Pearson’s correlation coefficient would have been applied; however, due to the non-normal distribution, the Spearman rank correlation was used to evaluate the relationship between positive attitudes and total scores on knowledge pertaining to sarcopenia. The identification of statistically significant differences was predicated on a p-value threshold of less than 0.05. Data analysis was conducted using STATA version 10.0 (StataCorp, College Station, TX, USA).

Results

A total of 202 completed electronic questionnaires were submitted by the participants, resulting in a response

rate of 24% (202 out of 852 individuals). The demographic characteristics of the respondents were presented in Table 1.

Attitude regarding sarcopenia among clinical-year medical students

Attitude on selected issue on sarcopenia among clinical-year-medical student was demonstrated in Table 2. A significant proportion of the participants (approximately 80%) exhibited familiarity with the term "sarcopenia"; however, they expressed uncertainty regarding its diagnostic criteria and the clinical significance of sarcopenia. Nevertheless, an impressive 70% of them agreed or strongly agreed that every hospitalized patient anticipated to remain for a duration exceeding one week should receive a consultation for physical therapy.

Table 1. Characteristics of studied population

Variables	n=202	
Age (years); med (IQR)	23	(22 to 23)
Female; n (%)	105	(52)
Year of medical student; n (%)		
4th year	64	(31.7)
5th year	74	(36.6)
6th year	64	(31.7)
Place of clinical year		
Srinagarind Hospital	173	(85.6)
Khon Kaen Hospital	15	(7.4)
Udon Thani Hospital	7	(3.5)
Mahasarakham Hospital	7	(3.5)

n=numbers of participants; med=median; IQR=inter-quartile

General knowledge on sarcopenia among clinical-year medical students

The median total scores on knowledge about sarcopenia was 21 out of 30 (70%, IQR 56.7 to 76.7). The subjects performed favorably in the domains of definition and significance (70%, IQR 60 to 80), causes (75%, IQR 74 to 100), as well as management strategies and preventive measures (70%, IQR 62.5 to 75.0); however, their performance was notably inferior in the area of diagnosis (50%, IQR 25 to 75), as Table 3.

Correlation of positive attitude and scores on sarcopenia knowledge

There existed a marginal correlation between positive attitude and scores on sarcopenia knowledge, as indicated by a Spearman rank correlation coefficient of 0.2 (95% confidence interval 0.1 to 0.3, $p<0.05$). A graphical representation of this correlation was illustrated in Figure 1.

Discussion

The results of the present study could be summarized as follows: 1) A high percentage of participants who responded to the questionnaire had a positive attitude toward sarcopenia, 2) They had good sarcopenia knowledge, as they could reach 70% of the total score, 3) Positive attitude regarding sarcopenia showed low correlation with sarcopenia knowledge.

From the perspective of sarcopenia, the majority of medical students were familiar (62.4% intensely familiar and 19.3% familiar) with this syndrome. These results contradicted the prior study, which reported that less than 20% of U.S. internists and family physicians expressed that

Table 2. Attitude on selected issue on sarcopenia among clinical-year-medical student

Statement	Level of agreement (n=202)				
	Strongly agree, n (%)	Agree, n (%)	Neutral, n (%)	Disagree, n (%)	Strongly disagree, n (%)
I have heard about "sarcopenia" before.	126 (62.4%)	39 (19.3%)	20 (9.9%)	10 (4.9%)	7 (3.5%)
I know how to diagnose sarcopenia.	9 (25.7%)	16 (27.2%)	70 (34.7%)	55 (7.9%)	52 (4.5%)
In clinical practice, prevention of common medical diseases with severe complication such as diabetes mellitus, hypertension is more important than prevention of sarcopenia.	40 (19.8%)	47 (23.3%)	54 (26.7%)	41 (20.3%)	20 (9.9%)
Sarcopenia lies beyond the realm of my expertise, as it lacks any association with my patients.	19 (9.4%)	15 (7.4%)	26 (12.9%)	73 (36.1%)	69 (34.2%)
Sarcopenia is like cachexia or starvation.	12 (5.9%)	21 (10.5%)	39 (19.3%)	54 (26.7%)	76 (37.6%)
The patient without muscle atrophy is likely to have normal muscle mass.	14 (6.9%)	33 (16.3%)	49 (24.3%)	63 (31.2%)	43 (21.3%)
The patient with normal muscle power is likely to have normal muscle mass.	37 (18.3%)	64 (31.7%)	44 (21.8%)	32 (15.8%)	25 (12.4%)
Every hospitalized patient who is expected to stay over a week should have physical therapy consultation.	66 (32.7%)	73 (36.1%)	38 (18.8%)	23 (11.4%)	2 (1.0%)
The treatment of sarcopenia necessitates a complex approach, requiring the expertise and involvement of specialized healthcare professionals.	9 (4.5%)	38 (18.8%)	70 (34.6%)	60 (29.7%)	25 (12.4%)

Table 3. Total score on sarcopenia knowledge

Topics	No. of correct answers; median (IQR)	No. of items	(%); median (IQR)
A. Definition and importance	7 (6 to 8)	10	70 (60 to 80)
B. Causes	3 (3 to 4)	4	75 (74 to 100)
C. Diagnosis	4 (2 to 6)	8	50 (25 to 75)
D. Management strategies & prevention	6 (5 to 6)	8	75 (62.5 to 75.0)
Total score	21 (17 to 23)	30	70 (56.7 to 76.7)

IQR=interquartile range

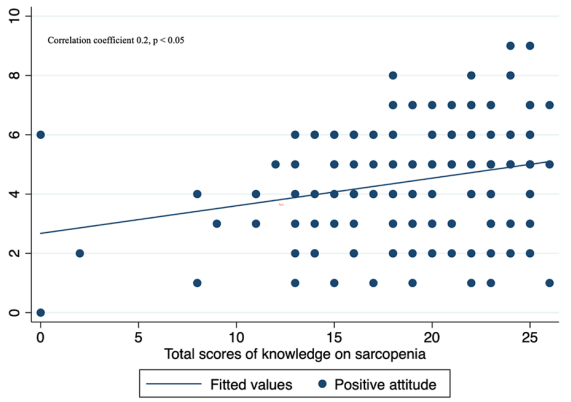

Figure 1. Scatter plot of the correlation between positive attitude and scores on sarcopenia Knowledge.

they strongly knew the terminology of sarcopenia[31]. This difference may be explained by the concept of sarcopenia, which has been extensively known for around 5 to 10 years. Although the European Working Group on Sarcopenia in Older People (EWGSOP) and the Asian Working Group for Sarcopenia (AWGS) released their initial consensus and diagnostic criteria in 2010[32] and 2014[33], respectively, these criteria gained wider recognition following the publication of their updated versions in 2018[34] and 2019[30]. This knowledge may have recently been implemented in the curricula for medical students and residents. Therefore, healthcare personnel who graduated before this period might have varying degrees of awareness of sarcopenia. However, physicians who work in the sarcopenia field showed different results[31]. In a previous survey study from the US, 70% of the geriatrician participants reported being very familiar with the term sarcopenia. Additionally, the results may vary depending on the country or region. An online survey conducted by the Asian Working Group for Sarcopenia revealed that over 90% of respondents, who are healthcare professionals in Asia, are familiar with the term "sarcopenia" and understand its definition[35].

While many participants were familiar with the term, only a smaller percentage (53%) knew how to diagnose the syndrome accurately. However, the questionnaire did not include questions to determine the reasons participants lacked knowledge about the diagnostic criteria for sarcopenia. The following reasons may explain these: limitations in the medical curriculum regarding the teaching of diagnostic criteria, and the complexity of diagnostic criteria for sarcopenia. Some items (muscle mass and muscle strength) have different cut-points between genders, and items (muscle mass and physical performance) have several ways to measure, each having its own cut-point. Additionally, several working groups have established diagnostic criteria with slightly different cut-off points. Medical students may not recall the exact number of each cut point without consulting the diagnostic guidelines. This hypothesis is supported by the results of the sarcopenia knowledge score (Table 3), which showed that medical students chose 50% of the correct items.

About 40 percent of participants agreed that preventing medical comorbidities is more critical than preventing sarcopenia. This attitude may be because most patients who come to hospitals typically present with principal diagnoses, such as medical or surgical conditions. Therefore, medical students may tend to focus more on those conditions that brought their patients to the hospital, rather than on sarcopenia, which is a common risk factor and sequelae of those comorbidities. Focusing on this trend can encourage medical educators to take a more integrated approach in teaching about the health issues faced by older adults. These results are consistent with the review of six studies conducted in Australia, the Netherlands, and Brazil to examine healthcare personnel's awareness of sarcopenia[36], and they concluded that the healthcare professionals had a low awareness of sarcopenia. Another study, conducted in Seoul in 2022, examined the perspective of primary physicians in the community regarding sarcopenia[37]. The results from the prior study[37] showed that only 16.9% of doctors believed that their patients had sarcopenia, and 23.8% knew the diagnostic criteria for it.

Participants demonstrated a good understanding of sarcopenia, achieving an optimized score of at least 70% on most of each item score and the total score. However, they only attained 50% of the points for diagnostic items. These results were similar to the previous studies[38,39]. One study conducted in Australia and New Zealand found

that 90% of healthcare professionals could accurately identify interventions for treating sarcopenia, yet only 2% provided the correct cut-off point for handgrip strength used in diagnosing sarcopenia[38]. Another study from the Netherlands revealed that around 20% of healthcare personnel correctly knew how to diagnose sarcopenia[39].

The current study showed a very weak correlation between positive attitude and scores on sarcopenia knowledge. These results were similar to the two prior studies from China and Thailand, which examined the attitude and expertise of sarcopenia among nurses[26,27]. The study from China found that nurses had limited knowledge about sarcopenia; however, their attitude towards sarcopenia was positive[27]. Similar to a study conducted among nurses in Thailand, there was a low correlation between attitudes and knowledge regarding sarcopenia[26].

According to the results, medical school curriculum makers should consider emphasizing sarcopenia recognition and knowledge (primarily diagnostic criteria) while giving medical students a chance to interact with real patients who have sarcopenia. These approaches may enhance medical students' confidence in diagnosing and managing sarcopenia and may increase the correlation between a positive attitude and their knowledge.

The present study is the first to evaluate medical students' attitudes and knowledge regarding sarcopenia; however, it has several limitations: 1) The results were based on a total analysis of participants without conducting a subgroup analysis based on their years of training. 2) Since the participants were enrolled in a single university in Northeastern Thailand, the findings may not apply to medical students at other universities. Therefore, future multicenter studies should be conducted. 3) The results indicated a weak correlation between knowledge and attitude, but the factors contributing to this discordance have not been explored. Further research should focus on this issue. 4) Due to the low response rate in the present study, there may be a potential for non-response bias in the results, which may limit the generalizability of the data. Further studies with higher response rates should be conducted to compare the results of the current study.

What is already known on this topic?

Sarcopenia has a high prevalence in elderly patients. However, the attitude and level of knowledge on sarcopenia of clinic-year medical students have not been evaluated.

What this study adds?

Medical students demonstrated a positive attitude toward sarcopenia and showed good overall knowledge about the condition; however, their understanding of the diagnostic criteria needs improvement. The correlation between a positive attitude regarding sarcopenia and sarcopenia knowledge was found to be low. Adding this topic to the medical curriculum and giving them a chance to encounter real patients may improve their understanding.

Acknowledgements

The authors would like to thank the Department of Internal Medicine, Faculty of Medicine, Khon Kaen University for publication support.

Conflicts of interest

The authors declare no conflict of interest.

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