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Urban Public Knowledge towards Sarcopenia: Health Education Needs Assessment

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Abstract: Introduction: Sarcopenia is increasingly recognized as a health problem among older persons and is one of the major determinant factors in frailty. Studies revealed sarcopenia is prevalent in Malaysia and it have detrimental impact on the quality of life of older people. Sarcopenia can be prevented with adequate knowledge and practices on controlling the risk factors. This study aimed to assess the urban public's knowledge on sarcopenia. **Methods:** A cross-sectional online survey was conducted among urban population in one of the states in Malaysia. Data was collected from October to December 2020. **Results**: A total of Two hundred and two publics participated in the study. The present study revealed that only 14 (6.9%) of the participants were found to possess good knowledge about sarcopenia with mean age was 49.0 years (SD = ±12.65. Analysis of variance indicated statistically significant differences at the < 0.05 significance level for age group, gender, educational level and smoking habit. **Conclusion:** The findings highlight the lack of sarcopenia knowledge among the urban public. This study indicated urban public are not well-informed about sarcopenia and lack of health promotion strategies to address this alarming public health problem. The study findings have identified the health education needs and will contribute to the development and implementation of an evidence-based health promotion programme serve as data for health promotion programme towards sarcopenia and its prevention.

Keywords: Health education; needs assessment; Sarcopenia; Knowledge; Urban Public

1. Introduction

Sarcopenia is a major global public health challenge, defined as a progressive and generalised skeletal muscle disorder. The disease that involves the accelerated loss of skeletal muscle mass and functional impairment with loss of strength; often associated with severe

negative adverse health outcomes including increased likelihood of falls, functional decline, frailty, loss of autonomy and mortality[1–5]. Sarcopenia is a term derived from the Greek phrase poverty of flesh and first described in the 1980s as an age-related decline in lean body mass affecting mobility, nutritional status and independence[6]. Primarily sarcopenia is a disease of the elderly; however, development may associate with conditions that are not exclusively seen in older persons[7] but also has shown to begin in younger age[8]. Sarcopenia is a muscle disease (muscle failure) rooted in adverse muscle changes that accrue across a lifetime; it is common among adults of older age but can also occur earlier in life[1]. While sarcopenia in older people is primarily associated with frailty, sarcopenia in younger people is associated with metabolic syndrome[9].

Sarcopenia a geriatric disease is one of the leading health issues in older adults and a significant public health concern. It is defined as the age-related loss of muscle mass, strength and function[10,11]. After the age of 30, 3 to 8% of muscle mass loss occurs with each passing decade. The decline worsens after age 60 years depending on several factors, including diet and physical activity is associated with a high risk of mobility-disability, decreased quality of life, increased burden of treatment and caregiving, and increased mortality[12,13].

Sarcopenia is becoming a significant public health issue at both patient and societal levels, especially in countries with a growing proportion of older adults[13]. This geriatric disease is typically associated with major unfavourable health consequences such as an increased chance of falling high prevalence in Malaysia, older people are defined as those aged 60 years and above. Malaysia's total population of older people was 3.63 million, representing 11.1% of the total population[14]. By 2030, Malaysia is projected to become an aged nation with older people constituting more than 15% of the population[14].

Therefore, there is a need for this study, which aimed to assess knowledge of sarcopenia and its associated factors among the general public in Kuala Lumpur, Malaysia. A study involved 388 older people which conducted in Kuala Lumpur reported prevalence of sarcopenia was 89% in men and 40.3% in women with an overall prevalence of 59.8%[15]. Another study recruited 426 older people identified 50.5% (based on skeletal muscle index method) and 32.2% (based on European Working Group on Sarcopenia in Older People method) older adults in Malaysia suffered from sarcopenia[16]. Previous studies indicated alarming sarcopenia prevalence rate in the country. With increasing of the ageing population, the incidence of sarcopenia is expected to rise dramatically.

Today, the incapacitating effects of sarcopenia are widely recognised. It is imperative to prevent the onset or slow down the progression of sarcopenia by raising public awareness

of sarcopenia. Knowledge plays a vital role during the course of a disease, especially in its early detection and prevention. Therefore, it is essential to impart knowledge about sarcopenia prevention to public through health education programme. Needs assessment is the primary stage in developing an evidence-based health education programme. Hence, this study aimed to assess the knowledge of sarcopenia among the urban public population in one of the states in Malaysia.

2. Materials and Methods

2.1 Materials

2.1.1 Study design

A cross-sectional online survey was conducted among urban population in one of the states of Malaysia.

2.2 Methods

2.2.1 Data collection procedure

The study was conducted from October 2020 to December 2020. Sample size was determined by using Daniel and Cross's (2018) formula with a ± 5% margin of error and a confidence level of 95%, the required sample size was 220. The study was conducted online via Google Form. The recruitment of participants was made through the researchers' network with colleagues and friends via emails and social media. The message contained a brief introduction of the study and a statement to disseminate the Google survey link were provided to the contacts. Inclusive criteria were public who were Malaysian and aged 18 years and above.

2.2.2 Instrument

The questionnaire was adapted with the author's permission (17). Cronbach Alpha coefficient for the instrument was 0.05. Face validity was carried out by five allied health professionals to ensure the appropriateness and clarity of the questionnaire. The questionnaire consisted of socio-demographics, general health condition and knowledge about sarcopenia. The socio-demographics questions included age, gender, ethnicity and level of education. General health condition questions were smoking habit, use of walking aid, difficulty in walking 100 metres, history of fall for the last 12 months, self-reported injury when fell, self-reported balance problems and if participants need any helps in performing activities of daily living (ADL). The 16-item of knowledge about sarcopenia was dichotomous questions with "True" and "False" responses. A correct answer was assigned 1 point, while an incorrect response was assigned 0 point. The total knowledge score ranged

from 0 to 16, with a higher score indicating better knowledge about sarcopenia and vice versa. The total marks obtained were converted into a percentage score using the following formula: (actual score x 100)/total number of questions. The level of knowledge was interpreted based on the percentage marks obtained and classified in three categories: poor (<50%), fair (≥50% to <80%) and good (≥80%).

2.2.3 Statistical analysis

Data were analysed using Statistical Package for Social Science (version 27, SPSS Inc., Chicago, USA). Baseline characteristics of the study participants were reported as means and standard deviation for continuous variables, whereas numbers and percentages for categorical variables. Independent t-test or Mann Whitney test or One-way ANOVA test was used to assess the continuous variables after checking the normality test. Pearson's or Spearman correlation coefficient was used to assess the relationship between socio-demographics and general health condition variables with knowledge scores. Significant level was set at 0.05.

2.2.4 Ethical approval

Ethical clearance for the study was obtained from the Research Ethics Committee of Sunway University Malaysia (SUREC 2020/086). Brief information about study objectives, inclusive and exclusive criteria, duration of the survey, contact details of researchers as well as privacy and confidentiality were included in the cover page of survey which generated by Goggle Form. Public who clicks the 'Continue' button indicates their consent to participate in the survey and would be directed to complete the self-administered questionnaire.

3. Results

A total of 202 public urban residents participated in this study. The socio-demographics and general health condition data of the participants and their association with knowledge score as presented in **Table 1**. The mean age of participants was 49.0 years (SD = ±12.65). About three quarters of the participants were female (74.8%, *n*=151) and half of them were Chinese (59.4%, *n*=120). Majority of the participants received tertiary education with 41.6% (*n*=84) and 44.6% (*n*=90) for diploma and degree respectively. Majority of the participants were in good health condition with 92.1% (*n*=186) of them ambulate without use of walking aid and have no difficulty in walking 100 metres. About 95.5% (*n*=193) of the participants have no history of fall in the last 12-month and 98% (*n*=198) claimed that they have no balance problems. Majority of the participants (89.6%, *n*=181) were not depend on others for activities daily living.

The highest mean knowledge scores were observed for participants aged more than 60 (M=8.78, SD=2.04) and the youngest age-group which was below 40 had the lowest mean knowledge scores (M=7.51, SD=1.72). The female participants (M=8.00, SD=2.12) showed slightly higher mean knowledge score compared to male participants (M=7.00, SD=2.00). The participants who received diploma (M=9.06, SD= 1.70) and degree (M=7.57, SD=2.47) education demonstrated better mean knowledge scores. Higher knowledge level was observed in participants who claimed not smoking (M=8.00, SD=2.12). Analysis of variance indicated statistically significant differences at the < 0.05 significance level for age group, gender, educational level and smoking habit.

Table 1. Mean total scores of knowledges of sarcopenia according to Socio-demographics and general health condition of participants (*n*=202)

Variables	**Mean ± SD**	**n (%)**	**Knowledge score**	
			Mean ± SD Median (IQR)[a]	***p* value**
Age (years)	49.03 ± 12.65			
Age group				
31 – 40		53 (26.2)	7.51 ± 1.72	
41 – 50		51 (25.2)	7.71 ± 2.41	0.011*
51 – 60		44 (21.8)	8.25 ± 2.34	
61 - 70		54 (26.7)	8.78 ± 2.04	
Gender				
Male		51 (25.2)	7.00 (2.00) [a]	0.026*
Female		151(74.8)	8.00 (2.12) [a]	
Ethnicity				
Malay		55 (27.2)	8.20 ± 2.53	
Chinese		120(59.4)	8.04 ± 1.97	0.837
Indian		21(10.4)	7.71 ± 2.33	
Others		6(3.0)	8.33 ± 2.58	
Highest education level				
Lower		3 (1.5)	7.00 ± 0.00	
Secondary		25(12.4)	6.60 ± 0.65	< 0.001*
Diploma		84(41.6)	9.06 ± 1.70	
Degree		90(44.6)	7.57 ± 2.47	
Current smoking status				0.023*
No		184(91.1)	8.00 (2.12) [a]	
Yes		18(8.9)	6.00 (2.19) [a]	
Use of walking aid				0.148
No		186(92.1)	8.00 (2.13) [a]	
Yes		16(7.9)	6.00 (2.72) [a]	
Difficulty in walking 100 m				0.069
No		186 (92.1)	8.00 (2.00) [a]	
Yes		16 (7.9)	6.00 (5.00) [a]	
History of fall in the last 12 months				0.339
No		193 (95.5)	8.00 (3.00) [a]	
Yes		9 (4.5)	8.00 (7.00) [a]	
Did you suffer any injury when you fell				0.605
No		189 (93.6)	8.00 (3.00) [a]	
Yes		13 (6.4)	7.00 (6.00) [a]	
Self- reported balance problems				0.148
No		198 (98.0)	8.09 ± 2.18	
Yes		4 (2.0)	6.50 ± 1.29	
Activities of Daily Living (ADL) dependent				0.146
No		181 (89.6)	8.00 ± 2.17	
Yes		21 (10.4)	8.71 ± 2.15	

* $p < 0.05$ level

Publics' knowledge levels on sarcopenia are presented in **Table 2.** More than half (69.8%, *n*=141) of the public view sarcopenia is a disease of muscles while 53.5% (*n*=108) believe sarcopenia is a condition characterized by loss of skeletal muscle mass. Less than half (36.1%, *n*=73) of the public responded that sarcopenia is primarily a disease of the elderly while 86 (42.6%) were cognizant that symptoms of sarcopenia include weakness and loss of stamina. More than half (69.8%, *n*=141) of the public view age is one risk factor most associated with sarcopenia while 34.2% (*n*=69) opined that sarcopenia could lead to frailty and physical disability. More than half (56.9%, *n*=115) of the public considered sarcopenia as age-related. Slightly more than three-quarter (87.6%, *n*=177) of the public said that after the age of 30, the muscle mass begins to decline gradually. Less than half (41.6%, *n*=84) of the public indicated an increase in fat mass replaces muscle mass in older people. More than a quarter (36.6%, *n*=74) of the public opined decline of muscle mass are more pronounced in women than male. Slightly more than a quarter (28.2%, *n*=57) of public responded that strength training is a treatment to combat sarcopenia. In comparison, less than half (44.6%, *n*=90) of the public thought that resistance training is a treatment for sarcopenia. The results showed that less than half (44.6%, *n*=90) of public opined that nutrition-related parameter associated with sarcopenia is vitamin D, while 54.5% (*n*=110) agreed that nutritional supplements could improve muscle function. Less than of public in this present study recognised that assessment of muscle strength involves the use of handgrip strength (47%, *n*=95).

Table 2. Public response to sarcopenia knowledge (*n*=202)

No	Questions	Correct response *n* (%)	Wrong response *n* (%)
1	Sarcopenia is a disease of muscle.	141 (69.8)	61 (30.2)
2	Sarcopenia is a condition characterized by loss of skeletal muscle mass.	108 (53.5)	94 (46.5)
3	Sarcopenia is primarily a disease of the elderly.	73 (36.1)	129 (63.9)
4	Symptoms of sarcopenia can include weakness and loss of stamina.	86 (42.6)	116 (57.4)
5	Age is one risk factor most associated with sarcopenia.	141 (69.8)	61 (30.2)
6	Sarcopenia can lead to frailty and physical disability.	69 (34.2)	133 (65.8)
7	Sarcopenia can be considered age-related.	115 (56.9)	87 (43.1)
8	Muscle mass peaks at age of 30 years and begin to decline	177 (87.6)	25 (12.4)
9	Increased fat mass replaces muscle mass in older people.	84 (41.6)	118 (58.4)

No	Questions	Correct response *n* (%)	Wrong response *n* (%)
10	Decline of muscle mass are more pronounced in women than men.	74 (36.6)	128 (63.4)
11	Strength training is a treatment for sarcopenia.	57 (28.2)	145 (71.8)
12	Resistance training is a treatment for sarcopenia.	90 (44.6)	112 (55.4)
13	Nutrition-related parameter associated with sarcopenia is vitamin D.	90 (44.6)	112 (55.4)
14	Sarcopenia is most common in individuals who had increased risk of malnutrition.	118 (58.4)	84 (41.6)
15	Nutritional supplements can improve muscle function.	110 (54.5)	92 (45.5)
16	Assessment of muscle strength involves the use of handgrip strength.	95 (47.0)	107 (53.0)

As presented in **Table 3**, this study reported a small percentage of the urban public (6.9%, *n*=14) had good knowledge of sarcopenia. The same number of participants fall into the category of fair (46.5%, *n*=94) and poor (46.5%, *n*=94) knowledge level.

Table 3: Knowledge level among public (*n*=202)

Knowledge level	*n* (%)
Poor	94 (46.5)
Fair	94 (46.5)
Good	14 (6.9)

However, further study is needed to make sense as presented in **Figure 1**, finding as well as the lack of any significant association between knowledge scores and other variables, self-reported balance problems, ADL dependence. The present findings revealed that the overall knowledge of sarcopenia in the general population of Malaysia was low. From these results, we may surmise that health education plays a pivotal role in enhancing the public's knowledge of sarcopenia and informing them of their healthcare choices, such as emphasising the aetiology, characteristics, and consequences of sarcopenia.

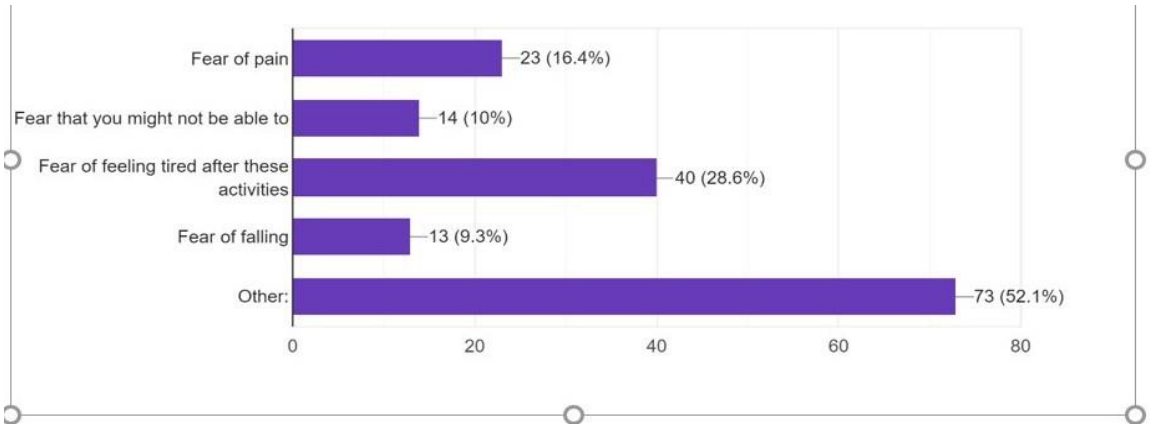

Figure 1. Knowledge level adherence self-report balance problem.

4. Discussion

To our knowledge, this is the first study to establish knowledge about sarcopenia among the urban public populations in Malaysia. The present study found that the urban public demonstrated fair to poor knowledge about sarcopenia. Our study reported on knowledge of sarcopenia and associated socio-demographic factors among the general public of Kuala Lumpur, Malaysia.

Consistent with other studies, knowledge of sarcopenia among the general public were low even in a developed country like Australia[17]. Data from a longitudinal study in Australia and New Zealand have examined the knowledge among health care professional have shown that knowledge of sarcopenia is also limited among health care professionals[18] and in Netherland[19]. The possible explanation could be sarcopenia is an unfamiliar term and recently recognised as a disease, and has not yet received frequent public notice[20]. While this knowledge gap is daunting, the information from this study could illuminate multiple potential opportunities to improve general knowledge on sarcopenia among the public to prevent and even reverse sarcopenia in the long term, while increasing lifespan and quality of life among the Malaysian community.

An explanation the participants viewed sarcopenia as a geriatric disease and a natural component of the aging process. Sarcopenia, defined by a progressive loss of muscle mass and muscle function with advancing age, is associated with several health consequences, such as a higher risk of functional decline, hospitalization, falls, fractures and death[13]. The present findings found that the public considered sarcopenia as age-related and muscle mass begins to decline after the sprite age of thirty gradually. They opined sarcopenia is a disease of the elderly leading to frailty and physical disability.

Our study showed that although most participants understood sarcopenia as a muscle disease and age as a risk factor, they did not recognise symptoms or risk factors for it, such as malnutrition and vitamin D deficiency. The nutrition-related parameter associated with sarcopenia is vitamin D. Nutritional supplements can improve muscle function. The responses showed the general public still have inadequate knowledge in sarcopenia. These findings demand the need to inform the general public that although ageing uniquely influences many changes in physiological body functions, the good news is, sarcopenia is avoidable and even, to some degree, reversible. Studies show that there are various ways to prevent sarcopenia – it can be reversed, and muscle loss decreased[21,22].

Evidence suggesting a lack of dissemination of knowledge to the public and insufficient promotion of sarcopenia awareness and care among healthcare profession. The general public needs to be educated about various prevention methods such as a healthy diet, adequate nutrition and reasonable exercise. Studies have reported a causal association between malnutrition, vitamin D deficiency and an increased risk of sarcopenia in older people. However, the exact reason is not very well understood[21,23]. The present study highlights the need to educate the public and keep them informed that these approaches could improve conditions of sarcopenia, which consequently increases lifespan and improves the quality of life.

Sarcopenia, as previously mentioned, is a major public health concern and a natural part of the ageing process. Hormone levels are particularly important for men and women. Testosterone concentrations decline as age increases, suggesting that low plasma testosterone levels can cause or accelerate muscle- and age-related diseases, as sarcopenia[24]. Although the causes of sarcopenia are not entirely understood, it has been postulated that menopausal transition and loss of estrogen contributes to sarcopenia[25]. The present study showed that slightly less than half of the public opined decline of muscle mass is more pronounced in women than men. Previous studies have reported that resistance training can help the neuromuscular system and hormones. It also can improve older adults' ability to convert protein to energy in as little as two weeks.

From these results, we may surmise that health education plays a pivotal role in enhancing the public’s knowledge of sarcopenia and informing them of their healthcare choices. Older adults undergoing age-related decrements in muscle health can benefit substantially from resistance exercise training, a potent stimulus for whole muscle and myofiber hypertrophy, neuromuscular performance gains, and improved functional mobility[22]. Regular resistance exercise is known to increase the sizes and cross-sectional areas of muscle fibres, especially fast-twitch fibres (types IIa and IIx) rather than slow-twitch

fibres (type I)[26]. Previous studies have shown that resistance exercise training represents the most widely recognized strategy to combat sarcopenia[22] and grip strength is the measure of choice for the assessment of overall muscle strength[13]. The present study revealed the current public's knowledge in this aspect and emphasizes knowledge gaps that require future attention as exercise can improve muscle health at multiple layers. In clinical settings and for the diagnosis of sarcopenia and frailty, grip strength is the measure of choice for the assessment of overall muscle strength, as it is a surrogate for lower extremity muscle strength and as it is easier to measure[13].

However, the current study has limitations that need to be considered. There was a significant difference reported between age group. The average knowledge score of older age-group was better than the average knowledge score of younger age-group. Furthermore, the mean knowledge scores were increased parallel to advancing age. The possible explanation could be when it comes to health, older people seem to have higher health consciousness and awareness[27] and greater sense of responsibility and concern for their health[28]. Although sarcopenia is a common health issue and is primarily a disease of the elderly, its development is not limited to only older adults[29]. This study highlights the need for public education on sarcopenia awareness and measures to the younger generation.

However, further study is needed to make sense of this finding, as well as the lack of any significant association between knowledge scores and other variables, including ethnicity. In this study, we found that gender showed a significant difference in the knowledge score. A higher median knowledge score was found in female than male; a result which is in line with a Finnish population-based survey on gender differences in health information whereby female seem to be more aware of health information[30]. This present study revealed a difference in gender-related knowledge would likely affect sarcopenia status. It thus may account for a considerable part of the still enduring life expectancy gap between Malaysian men and women as well. Another possible explanation of these findings could be the disparities that female represents the majority, and hence, more research is needed before these complex gender-related circumstances are fully understood.

Our findings demonstrated that higher levels of education had a gradient of knowledge impact on the general public. These results suggest that, concerning higher levels of education, the general public were more likely to act upon sarcopenia prevention. Education has been shown to increase knowledge and raise awareness; and encourage people to improve their lifestyle[31–33].

The public had limited knowledge regarding sarcopenia and therefore, often do not recognise its harmful sequelae. One of the probable reasons for the deficit of knowledge

could be primarily social media on sarcopenia information was not propagated enough. Salient information that sarcopenia is avoidable and even, to some degree, reversible need to be made aware among the general public. The findings of this study would serve as evidence-based for health promotion planning and in facilitating sarcopenia prevention initiatives. Raising sarcopenia knowledge among the general public is useful for sarcopenia prevention and its associated comorbidities.

5. Strengths

This study has several strengths. First, it is one of the studies in Asia to address sarcopenia knowledge among the general Malaysian population in Asia, which comprised of a multi-ethnic population of adults living in a defined geographical area in Malaysia and sample that include participants that range in age from 31 to 70 years.

6. Limitations

There were several limitations to our study. Sampling for the survey was conducted via a convenience sample through the networks of the researchers and disseminated through different social media platforms such as Whatsapp, WeChats, etc. As a result, there is a possibility of bias as underprivileged populations may not have been able to participate in the study. Additionally, when compared to current population statistics in Malaysia (Department of Statistics Malaysia, 2019), the sample of the survey was over-representative of women, people below the age of 50, Chinese and from one urban metropolitan state in Malaysia. Therefore, there are limitations to the representativeness of the findings. Inclusive sampling methods are warranted to improve the representativeness and generalizability of the results.

7. Conclusion

In conclusion, our study revealed that the Malaysian general public's knowledge of sarcopenia was poor to moderate and associated with age and education status. The primary findings of this study revealed that urban public have inadequate knowledge level on sarcopenia. The participants in this study are represent urban public who are well educated and easy access to healthcare information. Unfortunately, their knowledge towards sarcopenia were fair to poor. The study findings have identified the health education needs and could contribute to the development and implementation of an evidence-based health promotion programme. A multidimensional approach for health promotion on sarcopenia is imperative to increase the awareness among public.

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