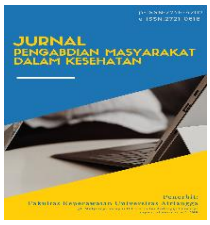

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THE URGENCY TO IDENTIFY LOW MUSCLE MASS AMONG ELDERLY: COMMUNITY SERVICE IN NURSING HOME

Farapti Farapti, Chusnul Fadilla, Amelliya Nur Heriyana, Afifah Nurma Sari, and Sri Adiningsih

Department of Nutrition, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

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CONTACT
Farapti Farapti
farapti@fkm.unair.ac.id
Department of Nutrition, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

ABSTRACT

Introduction: Decreased muscle mass in the elderly often occurs due to the aging process. Identification of muscle mass needs to be done to optimize the health status of the elderly. So, this article will identify muscle mass in the elderly.

Methods: Community service was carried out to 54 elderly people in a nursing home. For the elderly, health checks are carried out including body composition measurements, especially muscle mass, as well as nutrition education and counseling. The inclusion criteria for the elderly who take part in the activity include (1) healthy and able to stand; (2) fully aware; (3) not bed rest; (4) able to communicate and cooperative. The data presented include age, length of stay, body mass index, and body composition, namely muscle mass.

Results: About three-quarters of the elderly are women and have lived in a nursing home for approximately 3 years. The average nutritional status of the elderly is normal (21.6 ± 4.5 kg/m2). As many as 96.3% of the elderly have a low muscle mass index and 53.7% of the elderly have a high fat mass. The muscle mass of older men was higher than that of women (26.2 ± 2.8 vs 21.9 ± 1.9).

Conclusion: Almost all the elderly has low muscle mass due to the physiological aging process and decreased activity of the elderly in using muscles. . Elderly women were observed to have lower muscle mass index than that of men. Identification of muscle mass strength is also needed to find out more about sarcopenia in the elderly.

KEYWORDS

elderly; muscle mass; nursing home

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1. INTRODUCTION

Elderly is a condition when a person has entered the age of ≥60 years (Ministry of Health, 2014). The group is more detailed categorized into early-old age at the age of 65 - 74 years, middle-aged (middle-old) between 75 - 84 years and the elderly (oldest-old) at the age of ≥85 years (Lee et al., 2018). The elderly population is expected to continue to increase from about 524 million in 2010 to nearly 1.5 billion by 2050 with the highest increase occurring in developing countries including Indonesia (World Health Organization, 2011). The increase in the elderly population is directly proportional to the increase in Life Expectancy (AHH) in Indonesia. Based on data released by the Central Statistics Agency (BPS), AHH Indonesia increased from 71.20 years in 2018 to 71.34 years in 2019 (Central Bureau of Statistics, 2020).

It is known that the elderly group tends to experience very rapid body changes when compared

to other age groups (Halaweh et al., 2018). Changes that occur in the elderly can include various things, including physical, psychological, and social changes that tend to decrease (Singh et al., 2014). Changes in the physical elderly will be related to the onset of diseases and other health problems that can be caused by aging factors and accompanying diseases that have been suffered before entering old age (Fatmawati & Imron, 2017; Favora-Moreira et al., 2016). One of the common problems that occur in the elderly is changes in body composition that cause a decrease in bone mass, an increase in body fat and a decrease in muscle mass and strength (Ilich et al., 2014).

Muscle mass and muscle strength in the elderly tend to decrease with age (JafariNasabian et al., 2017). In muscle mass, there will be a decrease of about 1-2% after a person enters the age of 50 years while muscle strength also decreases by about 12-15% per year after entering that age (Papa et al., 2017; Quittan, 2016). A longitudinal study conducted on Caucasian men over the age of 70 years showed that in fat-free mass there was a decrease of about 0.5-0.8% per year (Kemmler et al., 2019). In line with this, other studies show that a decrease also occurs in the muscle mass of the thighs of both men and women aged 70 years (Cameron et al., 2020).

Aging that causes decreased muscle mass and strength will accelerate the occurrence of weakness (frailty) in mobility and aggravate other chronic health problems (Izquierdo et al., 2020; Merchant et al., 2021). Mobility limitations during the ageing period are associated with the incidence of sarcopenia, one of which is characterized by a decrease in muscle strength and function (Billot et al., 2020; Marzetti et al., 2017). Impaired mobility skills and also other health problems that occur in the elderly will have an impact on the decline in the quality of life of the elderly (Vitriana et al., 2016). According to the World Health Organization (WHO) mentions that there are four main domains that need to be considered, including environmental aspects, social relations, psychological health, and physical health (Indrayani & Ronoatmodjo, 2018).

The Government has regulated the welfare of the elderly in Government Regulation No. 43 (2004) and Regulation of the Minister of Social Affairs No. 5 (2018) on National Standards of Social Rehabilitation of Elderly. The regulation was made as a government effort in ensuring the welfare of the elderly, especially for the elderly who are disadvantaged and displaced who are then given facilities in the form of nursing home. Therefore, regular and periodic checks need to be done in nursing home as an effort to maintain and ensure the quality of life of the elderly remains guaranteed. Community service programs conducted have the goal to perform examinations on the muscle mass of the elderly as one of the domains of physical health that naturally tend to decrease with age.

2. MATERIAL AND METHODS

Community service activities with elderly goals at UPTD Griya Werdha Surabaya are carried out through a series of activities with the general aim of improving nutritional status and optimal health status in the elderly. A series of activities in the form of balanced nutrition counseling, health checks including body composition measurements, and nutritional counseling in the elderly. Measurements of body composition that include muscle mass and fat mass are performed using the Bioelectrical Impedance Analysis (BIA Karada Scan HBF375) tool by a trained nutritionist. Respondents were selected by purposive sampling from all elderly residing in the nursing home. After screening 150 participants, we got 54 subjects who met the study criteria. Some inclusion criteria, including: (1) healthy and able to stand; (2) fully aware; (3) not bedrest; (4) able to communicate and cooperative.

This community service activity is carried out during the pandemic (2020-2021), therefore restrictions on the number of elderly (keep distance)

and strict health protocol must be implemented by all committees and elderly participants. Muscle mass measurement activities are carried out gradually or several days by dividing the number of elderlies who participate so as not to cluster. Starting with nutrition extension activities by Dr. Sri Adiningsih, dr., MS., MCN, with the theme "Balanced nutrition in the elderly to stay healthy and productive" with online methods and 2nd speaker, Farapti, dr., M.Gizi, with the theme "application of low-sugar fat salt diet on the daily menu of the elderly" with offline methods. For online method, the material is explained and delivered through zoom media. The elderly are gathered in one large room which is set up with an Liquid Cyrstal Display projector to seeing to the information given by the speaker

The next days, a health examination was carried out in the form of blood pressure tests, body composition measurements, disease history interviews and was equipped with nutritional counseling by nutrition lecturers and a team of nutritionists, namely alumni and students of Bachelor of Nutrition, Faculty of Public Health, Universitas Airlangga. Counseling for the elderly is carried out briefly after knowing their individual body composition. The number restriction and time limit of elderly that examined every day cause all activities took a long time due to we must applied strict health protocol. The entire community service event took place over a period of ± 3 month with various schedules that have been agreed.

This community service has received permission from the Surabaya nursing home and approval by the head of UPTD Griya Wreda Surabaya. Data on subjects' characteristics such as age, length of stay, and body mass index are presented in the mean ± SD. The results of body composition examination data are presented in the form of frequency and percentage distribution. Muscle mass index is categorized as low when the value of < 7 in men and <5.7 in women. For high category fat mass when the measurement results showed a value of ≥ 35% for women and ≥ 25% for men, while if fat showed a value of ≤ 24% for women and ≤ 13% for men is relatively low.

3. RESULTS

Nutrition education for the elderly focuses on the important things they should know about nutrition. As an evaluation, the elderly was given the opportunity to ask questions if they were unclear and the elderly who could answer the questions were given door prizes. The elderly seemed to be actively asking questions, especially regarding what foods related with their health. Although one of the presenters provides online education, it does not make it difficult for the elderly to hear or understand what the speaker is talking about. This is reinforced during nutrition counseling, they can explain in general the results of the education they have received.

Distribution of elderly characteristics at health examinations held at UPTD Griya Werdha Surabaya is fully presented in table 1. The majority of elderly people are female (75.9%) with the average length of stay in the nursing home is almost 3 years. A total of 54 elderly people has normal nutritional status when viewed through body mass index (21.6 ± 4.5 kg/m2).

Documentation of body composition data collection can be seen in figure 1 (a, b, c). The results of muscle mass examination showed that only 3.7% of the elderly had a normal muscle mass index and the rest were relatively low (Table 2). Elderly women have a higher percentage of low muscle mass than men (97.6% vs. 92.3%). In addition to muscle mass, fat mass can also be identified that more than 50% of the elderly have a fat mass that is classified as high and normal fat is only owned by a small percentage of the elderly (13%). Even so, the majority of the elderly have visceral fat that is still relatively normal (79.6%). Subcutaneous fat in the elderly looks about the same percentage between high and normal categories. In contrast to the buildup of visceral fat that is more

Table 1. Subject characteristics

Variable	Total (n) / Mean ± SD	%
Age (years)	71 ± 8.2	
Long stay (month)	21.6 ± 17.2	
Body weight (kg)	51.1 ± 12.2	
Body Mass Index (kg/m^2)	21.6 ± 4.5	
Gender		
Man	13	24.1
Woman	41	75.9

Table 2. Classification of subject body composition

Category	Total (n=54) %	Man (n=13) %	Woman (n=41) %
Muscle Mass Index			
Low	96.3	92.3	97.6
Normal	3.7	7.7	2.4
Body Fat			
Low	33.3	30.8	34.2
Normal	13	7.7	14.6
High	53.7	61.5	51.2

Table 3. Percentage of muscle mass composition in some parts of the body

Characteristic	Total (n=54) Mean ± SD	Man (n=13) Mean ± SD	Woman (n=41) Mean ± SD
Muscle Mass			
Whole (%)	23.0 ± 2.8	26.2 ± 2.8	21.9 ± 1.9
Arms (%)	18.2 ± 4.85	22.7 ± 7.4	16.7 ± 2.45
Legs (%)	28.3 ± 6.2	36.1 ± 4.9	25.8 ± 4.2
Trunk (%)	33.7 ± 7.5	37.6 ± 10.2	32.5 ± 6.05

(a) (b)

Figure 1. Body composition data collection using Bioelectrical Impedance Analysis

experienced by men, excess subcutaneous fat is not experienced by any elderly men.

Table 3 describes the body composition of the elderly after being measured using Bioelectrical Impedance Analysis (BIA Karada Scan HBF375) and obtained measurements in several categories of muscle mass and fat. Overall, the muscle mass of elderly men is higher than the opposite sex. The lowest average percentage of muscle mass was in the elderly arm (18.2 ± 4.85), while the highest in the body (33.7 ± 7.5).

4. DISCUSSION

The existence of nutrition education and counseling is expected to increase knowledge and healthy lifestyle habits in the elderly even though they are in nursing homes. A Comprehensive Geriatric Assessment (CGA) study on Nutrition Status stated that intervention in the form of nutritional counseling, even without nutritional supplements, could improve the nutritional status of the elderly (Nykänen et al., 2014). A randomized controlled trial study on follow-

up home visits in the elderly by registered dietitians also had a positive effect on the functional and nutritional status of the elderly. It can be seen that the counseling and monitoring provided can improve the compliance of the elderly so that the resulting output is also optimal (Beck et al., 2012). Despite the different backgrounds, a study in Korea stated that the existence of nutrition education and supported programs had a positive impact on the dietary habits, nutritional knowledge and nutritional status of the elderly living alone (Ahn et al., 2018). This shows that the intervention is beneficial for the elderly and even those who live alone, especially if it is applied to the elderly in nursing homes whose activities and dietary habits are more well-organized. Of course, in this case it is related to improving the nutritional status of the elderly related to muscle mass.

The elderly population in Griya Werdha is mostly female. Various conditions can be the cause of the elderly being in a nursing home. Usually, the elderly live in a home because there are no children or families who can help care for, especially elderly women (Demirkıran et al., 2013). This of course can affect the quality of life of the individual. In a social institution in the United States, the average elderly woman is older and more in need of assistance in carrying out daily activities (Moore et al., 2012). On average, the elderly have lived in nursing home for almost 3 years. It was reported that the depression rate of the elderly in nursing home was higher than the elderly who lived in their own homes (Demirkıran et al., 2013; Moore et al., 2012). Although individuals living in nursing home are entirely one age group, the elderly, but the pace of care can vary by individual based on their age, gender, and health conditions, especially for the long term. (Moore et al., 2014).

Based on body mass index, the average nutritional status of the elderly is relatively normal. Abnormal nutritional status is directly proportional to undesirable conditions. Such as underweight with mortality rates, as well as overweight / obesity with the incidence of non-communicable diseases (Veronese et al., 2015). However, having a normal nutritional status does not mean the elderly are fully healthy because the identification of muscle and fat is still very necessary to know the real condition and the effects that can be caused. (Spahillari et al., 2016). Even now, not only muscle mass but muscle strength is also an important indicator for the elderly against the presence of inflammation in the body that can increase the risk of indications of physiological disorders of the body (Tuttle et al., 2020).

The results showed that almost all elderly people in nursing home have low muscle mass. A previous study also explained that more than 50% of seniors in a nursing home have abnormalities of muscle mass, such as atrophy and sarcopenia (Kimyagarov et al., 2012). Epidemiological data show that the elderly have a decrease in arm and leg muscle mass. This certainly affects the mobility of the elderly in their daily lives. (Visser, 2021). Decreased muscle mass and strength is related to the physiological aging process. The condition with the right diagnosis can be called sarcopenia and can interfere with the mobility of the elderly. Decreased muscle mass accompanied by increased fat is often called obesity sarcopenia (Cruz-Jentoft & Sayer, 2019). The condition of sarcopenia in the elderly in the nursing home and coupled with malnutrition is one of the risk factors for death that must be considered (Kimyagarov et al., 2012; Saka et al., 2016).

In percentage terms, muscle mass is lower in women, but the elderly men are only a small percentage who have relatively normal muscle mass. A study related to Asian elderly muscle mass also showed that elderly women, especially over the age of 50 years, have a lower muscle mass index (Hamaguchi et al., 2016). Physiologically, male muscle mass is higher and vice versa in women, although both will decrease with age. In contrast to some previous studies that explained that elderly men in nursing home tend to have a higher

prevalence of sarcopenia (Kimyagarov et al., 2012; Landi et al., 2012; Papadopoulou et al., 2020). This is likely due to the determining factors of sarcopenia not only muscle mass but also muscle strength. According to Kimyagarov et al. (2012), elderly men in nursing home are higher in abnormalities even though it is not related to mortality.

5. CONCLUSION

Almost all elderly people in social care have a low muscle mass index. This is related to the physiological aging process and muscle ability that is used less often than during productive age, which tends to decrease muscle mass. Elderly men have higher muscle mass than women, while fat mass is higher in women. As we know it is physiologically normal throughout the ages, although muscle mass in both genders tends to be low in old age. The lowest muscle mass is in the arms, both men and women. This is very influential on the possibility of sarcopenia events and decreased mobility of the elderly. More identification is needed regarding the strength of elderly muscle mass.

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