

Body Composition in Elderly People in Telagah Village

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Abstract: The elderly population is expected to nearly double in decades. The elderly is associated with increased malnutrition, decreased muscle and bone mass, decreased water volume in the body, and increased body fat mass. This research aims to determine the body composition of the elderly in Telagah Village to improve their degree of health. This study used a cross-sectional design and sampling method using total sampling conducted in conjunction with counselling. The inclusion criteria for research subjects are ≥ 60 years old and willing to participate in research. Researchers directly measured participants to obtain the necessary data in the form of age, sex, height, weight, body mass index, body fat percentage, total body fluid percentage, visceral fat, and bone mass. The collected data is presented in the form of frequency and percentage. The total participants in this study were 30 people, the majority of whom were women (80%), age range 60-69 years (76.67%), and had nutritional status in the form of obesity (66.7%). The average height and weight of the participants were 152.85 ± 8.41 cm and 62.75 ± 14.02 kg. From body composition data, the majority of participants had a high percentage of body fat (46.7%), low bone mass (93.3%), normal visceral fat (86.7%), and normohydration (56.7%). The majority of nutritional status in the elderly in the study was obese with body composition that had a high percentage of body fat, low bone mass, normal visceral fat, and normohydration.

Keywords: Body composition, elderly, nutritional status

INTRODUCTION

The elderly are a group of individuals who are over 60 years old.¹ In 2020, the number of elderly people worldwide exceeded the number of children under 5 years old.¹ Between 2015-2050, it is estimated that the number of elderly population will increase from 12%-22%.² In Indonesia, the elderly population reached 29.3 million people in 2021 and by 2045 it is estimated that almost one-fifth of

Indonesia's population will be elderly.¹ The increase in the estimated number of elderly population is certainly a challenge for health and social services to prepare for these challenges.

In the elderly, the ageing process occurs which is irreversible.³ This ageing process involves various organs of the body such as the nervous system, digestion, kidneys, cardiovascular, respiratory, and so on.⁴ The involvement of these organ systems

will result in a physiological decline in the body and facilitate the occurrence of a disease.⁴ These disorders will also tend to make the elderly more susceptible to malnutrition.⁴

Along with ageing, there are changes in body composition in the elderly.⁵ The elderly generally experiences a decrease in muscle and bone mass, a decrease in water volume in the body, and an increase in body fat mass which will result in a decrease in daily energy needs.⁵ The impact of this is that calorie intake also decreases and is often accompanied by a decrease in protein and micronutrient intake.⁵ Therefore, malnutrition is often associated with undernutrition or overnutrition.⁵

Globally, about 13-78% of the elderly are malnourished.³ A meta-analysis study conducted by Cereda et al (2016) analyzed the number of malnourished elderly in various healthcare settings and found that 3.1% and 29.4% of the elderly in community and rehabilitation services were malnourished respectively.⁶ Multi-centre research in 10 cities in Indonesia found that 2.14% of the elderly were classified as malnourished and 56.7% of the elderly were at risk of malnutrition.⁷

Malnutrition in the elderly will cause an increase in mortality and morbidity due to acute and chronic diseases.⁸ In addition, malnutrition can also lead to longer stays, increased hospital admissions, and decreased quality of life.⁸ Therefore, it is necessary to know early the nutritional status of the elderly to prevent the impact of this malnutrition.

The purpose of this study was to determine the picture of nutritional status and body composition in the elderly in Telagah Village, Sei Bingei District, Langkat Regency, North Sumatra. The

selection of Telagah Village is because there has never been a study to determine the nutritional status of the elderly in Telagah Village and based on data from the Central Statistics Agency 2021, Sei Bingei District in Telagah Village does not yet have health facilities.⁹ In addition, this study was conducted in conjunction with counselling on nutritional intake in the elderly.

METHODS

This study used a cross-sectional design to obtain data on the body composition and nutritional status of the elderly in Telagah Village, Sei Bingei District, Langkat Regency, North Sumatra. This cross-sectional research design was carried out by taking measurements only once at a time.¹⁰ This study was conducted in September 2022. The data in this study is primary data, namely researchers directly measure participants to obtain the necessary data, namely in the form of age, sex, height, weight, body mass index (BMI), body fat percentage, total body fluid percentage or % total body water (%TBW), visceral fat, and bone mass. This research has received approval from the Ethics Commission with No 900/KEPK/USU/2022.

In this study, the inclusion criteria for research subjects were aged ≥ 60 years and willing to participate in the research. The ages in this study were grouped into three, namely young elderly aged 60-69 years, middle-aged 70-79 years, and elderly aged ≥ 80 years, this refers to data from the Central Statistics Agency/Badan Pusat Statistik (BPS).¹¹

In this study, sampling was carried out using total sampling. This research was conducted in conjunction with counselling for the elderly with the topic "Education on the Importance of Nutritional Intake in the

Elderly in Telagah Village, Langkat, North Sumatra" so that the samples taken came from all participants in counselling who met the inclusion criteria.

Height and weight measurements use body scales that can measure these two variables at once. BMI measurement aims to determine nutritional status by calculating:

$$\text{BMI} = (\text{BW}/(\text{BH})^2)^{12}$$

Information: BMI = Body mass index; BW = Body Weight (kg); TB: Body Height (m)¹²

The results of these calculations will be adjusted using WHO – Asia Pacific criteria.¹² If BMI < 18,5 kg/m², then included in *underweight*, BMI 18,5-22,9 kg/m² Included in normal, BMI 23-24,9 kg/m² Included in Overweight, dan BMI ≥ 25 kg/m² Included in obesity.¹² Body composition was measured using the Bio Impedance Analysis (BIA; Tanita BC-541-N) to find out the values of other variables. The percentage of total body fluid (%TBW) is categorized into three, namely dehydration (%TBW < 45%), normohydration (%TBW 45-49%), and overhydration (%TBW > 49%).¹³ Other body compositions obtained are grouped according to their criteria based on the official website of the body composition measurement tool, namely <https://tanita.eu/understanding-your-measurements>

All results that have been obtained are then compiled in a descriptive form using the help of a software statistical package for the social sciences (SPSS 25).

RESULTS

A total of 30 elderly participants successfully collected data in this study. Table 1 provides an overview of the demographic data of participants in this

study. In this study, most of the participants were female (80%), age range 60-69 years or young elderly (76.67%). In terms of nutritional status, most (66.7%) participants were obese. The average height and weight of the participants were 152.85 ± 8.41 cm and 62.75 ± 14.02 kg (Table 1).

Table 1. Distribution of sex, age, nutritional status, height, weight

Characteristic	n=30
Gender, n(%)	
• Man	6 (20)
• Woman	24 (80)
Age (year), n(%)	
• 60-69	23 (76,67)
• 70-79	7 (23,33)
Nutritional status, n(%)	
• Underweight	1 (3,3)
• Normal	3 (10,0)
• Overweight	6 (20,0)
• Obesitas	20 (66,7)
Body Height (cm)	152,85 ± 8,41
Body Weight (kg)	62,75 ± 14,02

Based on the results of the body composition examination Table 2, The majority of participants had a high percentage of body fat (46.7%), low bone mass (93.3%), normohydration (56.7%) and normal visceral fat (86.7%).

Table 2. Percentage distribution of body fat, bone mass, visceral fat and total body fluid in participants

Characteristic	n=30
Body fat percentage, n(%)	
• Low	4 (13,3)
• Normal	5 (16,7)
• Height	14 (46,7)
• Very Hight	7 (23,3)
Bone mass, n(%)	
• Low	28 (93,3)
• Normal	2 (6,7)
Lemak visceral, n(%)	
• Normal	26 (86,7)
• Tinggi	4 (13,3)
Total body fluid percentage, n(%)	
• Dehydration	5 (16,7)
• Normohydration	17 (56,7)
• Overhydration	8 (26,7)

DISCUSSION

In this study, most of the elderly were female and had an age range of 60-69 years. This can happen because, in the North Sumatra region, the majority of the elderly population is aged 60-69 years (67.1%) and female (54%) of the total elderly population, based on BPS North Sumatra 2021 data.¹¹ Several conjectures explain the elderly population is generally dominated by women.

Earlier immunosenescence (age-related immune dysfunction) occurs in the male group, triggering an inflammatory response earlier than in women.¹⁴ Hormones are also thought to have a role in explaining this process, namely the hormone oestrogen has a role in slowing the process of atherosclerosis and increasing the immune response, this is different from testosterone which tends to slow down the immune response.¹⁴ In addition, the mortality rate of the disease is higher in men than in women.¹⁴

In terms of nutritional status, it was found that the majority of the elderly were obese. The prevalence of obesity in the elderly from various countries is reported to vary such as in Iran (21.4%)¹⁵, the United States (35%)¹⁶, Taiwan (22.8%)¹⁷, and Malaysia (30.2%).¹⁸ In Indonesia itself, based on the 2018 Basic Health Research (RISKESDAS) report, it was found that 19.3% and 11.9% of the elderly aged 60-64 years and over 64 years were obese.¹⁹ Based on body fat percentage this study found most elderly have a high body fat percentage. Based on research by Macek et al. (2020) on 4799 participants aged (43-64 years), both BMI and body fat increased with age in both men and women.²⁰ It is estimated that body fat begins to increase slowly at the age of 20-25 years until reaching the age of 65 years.²¹

The causes of malnutrition in the elderly can be abbreviated to *meals on wheels*, namely *medication*, emotional problems (emotional/psychological problems), anorexia nervosa and alcohol, paranoid old age, swallowing disorders, oral factors, no money, wandering and other behaviours associated with dementia, hyperthyroidism/hypothyroidism, gastrointestinal problems, eating problems, low-cholesterol and low-salt diets, and social problems.⁵

The reason for the increase in body fat is still pro-con and con that a combination of increased energy intake and decreased mobility is the cause of the condition²⁰, But other literature states that a decrease in energy *expenditure* plays an important role in increasing body fat and not energy intake.¹⁶ When after the age of 20, the *resting metabolic rate* will decrease by 2-3% per decade due to the loss of fat-free mass.¹⁶ This combination of decreased *resting metabolic rate*, physical activity and increased sedentary lifestyle is estimated to cause a loss of half of total energy *expenditure*.¹⁶

Another finding in this study is that the majority of the elderly have low bone mass and normal *visceral* fat. About 43.1%-62.7% of the elderly experience a decrease in bone mass.^{22,23} The difference in the percentage of elderly who experienced a decrease in bone mass in this study with other studies lies in the size of the sample as well as tools and classification criteria that differ between studies. This decrease in bone mass is caused by many factors, such as vitamin D and calcium deficiency, increased parathyroid hormone (triggers increased osteoclast activity), decreased levels of steroid sex hormones (e.g., oestrogen that inhibits osteoclast cell

activity and increased osteoprotegerin production), fat accumulation in the bone marrow that inhibits osteoblast work through the release of fatty acids and adipokine that are toxic.²⁴ Other factors are also thought to play a role in bone mass loss, namely dysregulation of the hormone's leptin and serotonin, malnutrition, comorbidity, and low physical activity.²⁴

In this study, it was found that about 16.7% of the elderly were dehydrated. In the United States, dehydration is reported in 17-28% of the elderly.²⁵ As ageing occurs, plasma volume may decrease by up to 21% relative to body weight.²⁶ These consequences can cause an increase or acute loss of fluids and cause the elderly to tend to be susceptible to mild dehydration or fluid overload.²⁶ This will also result in a shift in the concentration of solutes in the body such as electrolytes.²⁶

A limitation of this study is the small sample size making it difficult to generalize to larger populations. In addition, the population of this study was only carried out in one location so there is a possibility in terms of ethnicity and lifestyle uniform and this may also be the cause of differences in the findings of this study with other studies on body composition in the elderly.

CONCLUSION

The majority of nutritional status in the elderly in Telaga Village is obesity with a body composition that has a high % *body* fat, low bone mass, normal visceral fat and normohydration.

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