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The Correlation between Body Mass Index, Protein Intake, and Quality of Life in Elderly

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ABSTRACT

Background: The elderly is an age group that is susceptible to nutritional problems, especially protein intake which tends to be less intake, so it affects the body mass index. Both of these problems directly or indirectly will also affect the quality of life of the elderly. This study aimed to determine the correlation between body mass index, protein intake and quality of life in the elderly.

Methods: In a cross-sectional design, a sample of 165 elderlies aged≥60 years were enrolled and randomized from three community health centers of Karanganyar Regency. The body mass index (BMI), height, weight, protein intake data were obtained through interviews using 24-hour recall form. The quality of life data was prepared through interviews using the WQOOL-BREF questionnaire.

Results: There was a significant correlation between protein intake and quality of life; however, there was no correlation between body mass index and the quality of life.

Conclusion: Protein intake was shown to have a significant relationship with quality of life in the elderly.

Introduction

Indonesia is facing significant growth in the elderly population. According to the prediction in 2020, there will be an explosion on the number of the elderly population from 11% to 34%. In 2020, the elderly population aged over 60 years is projected to reach 28,8 million. Maintaining the independence of quality of life and health is very important for this population (1, 2). Body mass index (BMI) is an indicator to determine nutritional status in the elderly. BMI also indirectly affects the quality of life in the elderly, especially in the domain of physical health. As the elderly tends to have a low BMI or exceed the recommended limit, it will affect their daily activities. Elderly people tend to have a low BMI, because their nutritional needs are not fully met due to the changes in physiological function (3, 4).

Nutrition plays an essential role in health and function, especially in the elderly. Improper nutrition can contribute to the improvement of malnutrition, sarcopenia, and obesity. As life expectancy increases, it is important to consider optimal nutritional recommendations that will provide good

results on the health, quality of life of the elderly and physical independence in the elderly too (1). Several studies have identified protein as the main nutrient for the older adults. Protein intake greater than the amount that is recommended can improve muscle health and muscle function, prevent sarcopenia, malnutrition and help to maintain energy balance, weight management and cardiovascular function (1).

In malnutrition that is a lack of energy, protein or micronutrients can affect the function and clinical outcome. Malnutrition has a negative effect on the health status of the elderly and is common in elderly due to reduced activity, impaired mal-absorption, a decrease in the sense of smell, decreased sense of taste and financial problems (5). The results showed 20% of the total elderly subjects experienced a protein intake deficit, while in elderly with a BMI<18.5 kg/m^2 was 17.2% (6, 7). Low protein intake and BMI in short and long term will have a negative effect, especially on the quality of life of the elderly (8, 9). This can increase morbidity and mortality in the elderly. So this research was conducted on the relationship between BMI, protein intake and quality of life in the elderly group.

Materials and Methods

This cross-sectional study was conducted on 165 elderly subjects. The purposive random sampling method was used from March to June 2019. The sample was all elderly aged ≥60 years who were randomized from three community health centers in the Karanganyar Regency. Karanganyar Regency has 21 community health centers, but the population of study met the criteria of three community health centers. Inclusion criteria were elderly men and women of all ethnic groups, not smoking, not consuming alcohol, having an elderly health book, actively conducting health checks at community health centers, living with family and having a population identity card. Whereas, exclusion criteria were blood pressure ≥140/90 mmHg and living in the elderly care community.

This study was approved by the Sebelas Maret University Health Research Ethics Commission (No.52/KEPK/2019).

In retrieving weight data, this study used a digital scale with the accuracy of 0.1 kg. Because some elderly cannot stand perfectly, we used two methods of height measurement, namely by microtoise to measure height and seca or measuring tape and non-elastic seca to measure knee height with a precision of 0.1 cm to determine BMI in elderly, For the measurement of knee height, it was converted to height using a calculation based on Chumlea et al., 1988 (10). Protein intake was obtained through interviews using the 24-hour recall form that was conducted twice, Quality of life was obtained through interview using the WHOQOL-BREF questionnaire (2005) covering four domains (physical health, psychological, social relations, and environment) with a total of 26 questions.

Inclusion criteria were not to smoke, not to consume alcohol, and having an elderly Integrated Health Post book. BMI data and quality of life were processed using Microsoft Excel 2010 device, protein intake by using the 2007 Nutrisurvey device to determine the macro- and micro-nutrient intake in the elderly. After all data have been collected, the data were analyzed using SPSS software (version 21, Chicago, IL, USA). For the analysis of correlation, Pearson Product Moment test was used if the data were normally distributed (P<0.05). However, if the data were not normally distributed, the Spearman Rank test was used.

Results

A total of 165 elderly subjects participated in this study including 150 females and 15 males. The average age of the elderly population was 65 and age 80 years was the oldest age being found among women. Anthropometric characteristics and intakes were presented in Table 1. The analysis results showed no significant relationship between body mass index variables and quality of life in

Table 1: Distribution of variables			
Variable	**Min**	**Max**	**Mean±SD**
Age (y)	53	60	65.80±8.304
Weight (kg)	31.10	88.00	50.59±10.55
Height (cm)	140.11	169.87	154.84±6.08
BMI (kg/m^2)	13.08	35.24	21.03±3.86
Energy intake (g)	294	1934.85	8.891±289.44
Protein intake (g)	35.75	86.00	32.51±8.88
Fat intake (g)	1.10	92.40	37.73±18.28
Carbohydrate intake (g)	36.30	252.60	1.103±35.76
Quality of life	3.90	72.80	63.39±12.72

BMI: Body Mass Index

the elderly (n=165, r=0.03, P=0.70). The coefficient correlation showed that the positive value means of the two variables were in the same direction. So the analysis used Spearman rank analysis.

Meanwhile, protein intake and quality of life in the elderly population showed a significant correlation (n=165, P=0.023, r=0.17). The correlation coefficient between the two variables was positive (unidirectional). The coefficient correlation between the two variables tended to be stronger because it approached the number one. Therefore, Pearson product moment was used as both variables were normally distributed.

Discussion

BMI is an indicator of health status. Weight and height are determinants of BMI and nutritional status. Weight loss in elderly usually tends to decrease due to reduction of the muscle mass. Other studies have shown that BMI can indirectly affect the quality of life of the elderly (10-12). There is no significant relationship in our study. However, the correlation coefficient is positive that means the pattern of this correlation is unidirectional but the correlation coefficient is weak. The results of this study are in line with previous research that proved that less and more elderly weight is associated with increased mortality (13). The elderly who have underweight will have a lower quality of life scores compared to elderly people who have more bodyweight (11, 12).

The elderly who had a BMI<18.5 kg/m^2 were 26.1%. Whereas those who had a BMI of ≥27 kg/m^2 were only 6.7%. Based on the results of the data, elderly who had a low BMI were more than the elderly who have a high BMI. One factor affecting low BMI was underweight elderly (14). Underweight is a more important contributor than more weight for quality of life in the elderly. This shows that body weight especially in the elderly needs to get attention to control their health status (15).

Malnutrition is a deficiency, excess or imbalance of one's energy and/or nutrition intake (16). Malnutrition that occurs in the elderly is due to inadequate food intake, illness, decrease of psychosocial and economic limitations. All of these are not only increasing susceptibility to the disease but also can reduce the quality of life in the elderly and increase health care costs (17). A study in Indonesia, West Java showed that the prevalence of malnutrition was higher in rural adults when compared to urban adults aged ≥60 years (58 rural participants: 52% at risk of malnutrition and 16% of malnutrition; 54 urban participants: 35% at risk of malnutrition and 2% of malnutrition as defined by the Mini Nutritional Assessment (MNA) (18).

In addition, a recent survey showed that residents of Yogyakarta those living in rural areas compared with urban areas consumed far less protein per day (55 vs. 66 g) at risk of malnutrition and food insecurity which has a larger (9 vs. 1 village). The recommended protein intake in the elderly was 60-65 g/day in males and 55-57 g/day in females (19). An increasing protein intake above the recommended threshold (30-35% of total calorie intake) ADMR has been suggested (19).

Factors that can contribute to the increased protein intake in the elderly are socioeconomic, family support, health service support and knowledge related to nutrition in the elderly. Meanwhile, the average protein intake in the elderly showed that it has not reached the recommended nutritional adequacy rate yet that tended to be deficit. However, some elderly were able to achieve the recommended targets. In Indonesia, limited research results showed that the reduction in energy and protein intake is caused by economic factors and limited food supply, especially in rural areas (19).

Optimal protein intake in the elderly directly or indirectly will affect physical health. Physical health in the elderly becomes one of the domains of quality of life in the elderly so that it will affect the quality of life in this group. Protein intake is important for the elderly because in the they have a loss of muscle mass, muscle strength and muscle function that occurs progressively. This has become one of the threats of increasing morbidity and mortality both directly and indirectly, through the secondary development of cardiovascular diseases, diabetes, obesity and malnutrition (20-23).

The needed proteins are essential amino acids as the constituents of the formation of proteins, which the body cannot produce by itself (1). It is important to pay attention to recommendations for optimal nutritional needs that will have a positive impact on health, quality of life and physical independence in the elderly (23). Several researchers have identified protein as the main nutrient for the elderly. The goal of increasing protein intake is to improve muscle health, help maintain energy balance, weight management, and cardiovascular function. It also includes improving muscle function, preventing the onset of chronic diseases and improving quality of life in the elderly (21, 23, 24). The limitation of the research was that it did not separate the elderly who had less and more nutritional status so that it can affect the quality of life score.

Conclusion

Research confirms that there is a significant

relationship between protein intake and quality of life in the elderly. In the future, it is expected that the elderly will maintain their daily protein intake to maintain physical condition and a better quality of life. In addition, the elderly are also expected to remain actively participating in health activities in the community health centers.

Acknowledgment

Conflict of Interest

None declared.

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