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The relationship between macronutrient intake and nutritional status of the elderly at Tresna Werdha Sabai Nan Aluih Sicincin social institution

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ABSTRACT

The aging process results in physiological and psychological changes in old age thereby increasing the risk of nutritional problems. Macronutrient intake is one of the factors that affect nutritional status. This study aims to determine the relationship between macronutrient intake and the nutritional status of the elderly at Tresna Werdha Sabai Nan Aluih Sicincin Social Institution. This research is a correlative analytic research with cross sectional design. The sample of this research were 38 people. Data were analyzed using the Pearson correlation test. The results of this study showed that the average carbohydrate intake was 164.62 grams, the average protein intake was 35.44 grams and the average fat intake was 33.40 grams. As many as 55.3% of the elderly are at risk of malnutrition. The average body mass index is 21.28 kg/m2. There is a relationship between carbohydrate intake and body mass index (r=0.33, p=0.03) and there is no relationship between protein intake and body mass index (r=0.25, p=0.12) and there is no relationship between fat intake with body mass index (r=0.08, p=0.62). So that it can be concluded, the average intake of carbohydrates, protein and fat for the elderly at the Tresna Werdha Sabai Nan Aluih Sicincin Social Institution is less than the daily nutritional adequacy rate. There is a relationship between carbohydrate intake and body mass index and there is no relationship between protein and fat intake and body mass index.

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INTRODUCTION

The elderly population has increased in line with improvements in nutritional status, economy and education (Bhuyan, Sahoo, & Suar, 2020; Suhrcke et al, 2008). According to data from the World Health Organization (WHO) the number of people aged 60 years and over will continue to increase. Data for 2019 shows that the population aged 60 and over is 1 billion. This number will continue to increase to 1.4 billion in 2030 and 2.1 billion in 2050. (World Health Organization, 2022)

The number of elderly people in Indonesia has increased by 9.92%. Of these, there are 1.01% more elderly women than male elderly. Several provinces in Indonesia have the highest number of elderly such as DI Yogyakarta (14.71 percent), Central Java (13.81 percent), East Java (13.38 percent), Bali (11.58 percent) North Sulawesi (11.51 percent) and West Sumatra (10.07 percent). (Central Bureau of Statistics, 2021)

The elderly experience various physical changes, such as gray hair, wrinkles on the skin, decreased appetite due to changes in diet that cause malnutrition, reduced function of the sense of taste and reduced or lost teeth. This condition makes the elderly vulnerable to various nutritional problems (Ellawati, Wahyuni, & Sapang, 2021; Pranata & Daeli, 2021).

Nutritional problems in the elderly can be caused by various factors. One of the factors that contribute to the nutritional problems of the elderly is food intake. Adequate intake of macronutrients such as carbohydrates, protein and fat will result in the elderly achieving optimal nutritional status. In addition, the elderly need intake of macronutrients to maintain the body's organs to function properly (Ellawati et al., 2021).

The results of Sjahriani's research, 2018 at the Tresna Werdha Social Institution, Lampung, show that there is a relationship between carbohydrate and protein intake and the nutritional status of the elderly. In addition, Sulistiawati's research, 2022 also shows a relationship between macronutrient intake and the nutritional status of the elderly (Sjahriani & Yulianti, 2018; Sulistiawati, Dewi, Septiani, Studi, & Nutrition, 2022).

RESEARCH METHOD

This research is a correlative analytic research with cross sectional design. The research was carried out at the Tresna Werdha Social Institution (PSTW) Sabai Nan Aluih Sicincin from May to July 2022. The sample in this study was 38 people with inclusion criteria for elderly patients at PSTW Sabai Nan Aluih Sicincin, able to communicate and willing to be a sample. Exclusion criteria were the elderly who were unable to answer questions in the interview. Samples were taken by simple random sampling. Macronutrient intake was assessed by interviewing the Semi Quantitative Food Frequency Questionnaire (SQ-FFQ). The nutritional status of the elderly is assessed by measuring knee height and body weight, then knee height is converted to body height using the Clumlea formula. The risk of malnutrition in the elderly was measured using a Mini Nutritional Assessment (MNA) questionnaire. Data were analyzed using SPSS 16.

RESULTS AND DISCUSSIONS

The research results can be seen in the table below:

Table 1. Frequency distribution of elderly demographic characteristics at PSTW Sabai Nan Aluih Sicincin

Gender	n	%
Woman	14	36.8%
Man	24	63.2%
Total	38	100%

In table 1 it can be seen that the majority of respondents were male as many as 24 people (63.2%).

Table 2. Gender Frequency Distribution of the Elderly at PSTW Sabai Nan Aluih Sicincin

Age	N	%
60-74	22	57.9%
75-90	15	39.5%
>90	1	2.6%
Total	38	100%

Based on table 2, it was found that the most age was 60-74 years, namely 22 people (57.9%).

Table 3. Frequency Distribution of Elderly Nutritional Status based on the Mini Nutritional Assessment Questionnaire (MNA)

Nutritional status	n	%
Normal	13	34.2%
Malnutrition risk	21	55.3%
Malnutrition	4	10.5%
Total	38	100%

Based on table 3, it was obtained that the nutritional status of the elderly based on the MNA questionnaire was the most at risk of malnutrition, namely 21 people (55.3%).

Table 4. Average Body Mass Index for the Elderly

Variable	Average	At a minimum	Maximum
BMI	21,28	14.50	29.00

Based on table 4, the average BMI of the elderly at PSTW Sabai Nan Aluih is 21.28 kg/m ^{2}.

Table 5. Average Macronutrient Intake of Elderly PSTW Sabai Nan Aluih Sicincin

Variable	Average (grams)	At a minimum	Maximum
Carbohydrate intake	164,62	81.80	287.08
Protein Intake	35,44	20.00	77,51
Fat Intake	33,40	15.00	49.50

Based on table 5, it was found that the average carbohydrate intake for the elderly at PSTW Sabai Nan Aluih was 164.62 grams. The average protein intake is 35.44 grams and the average fat intake is 33.40 grams per day.

Table 6. Relationship between macronutrient intake and body mass index in the elderly at PSTW Sabai Nan Aluih Sicincin

Variable		p.s	r
BMI	Carbohydrate intake	0.038	0.33
	Protein Intake	0.120	0.25
	Fat Intake	0.62	0.08

Based on table 6 it is known that there is a relationship between carbohydrate intake and the body mass index of the elderly in PSTW Sabai Nan Aluih Sicincin (r value = 0.33, p = 0.03). There is no relationship between protein intake and body mass index in the elderly (r = 0.25, p = 0.12). There is no relationship between fat intake and body mass index in the elderly (r = 0.08, p = 0.62).

Discussion

The most gender in this study was male, namely 63.2%. These results are in accordance with the research of Tessa, et al at the Tresna Werdha Natar Lampung Social Services UPTD in 2018 which obtained a male sex result of 52.7%. The 2019 Ngadiran study in Cimahi also found that the most male gender was 53.2% (Ngadiran, 2019; Sjahriani & Yulianti, 2018). The large number of male elderly respondents corresponds to the number of elderly who are in PSTW Sabai Nan Aluih Sicincin which is dominated by elderly men. The highest number of elderly people in PSTW Sabai Nan Aluih Sicincin is in the range of 60-74 years, namely 57.9%. This result is in line with Sulistiawati's research, 2022 which found that 68% of the elderly were aged over 60 years.

The results of this study indicate that 55.3% of the elderly at PSTW Sabai Nan Aluih Sicincin are at risk of experiencing malnutrition. This result is in line with the results of Akbar's research, 2020 as many as 52.6% of the elderly in Banua Baru Village are at risk of malnutrition (K, Hamsah,

& M, 2020). The elderly are vulnerable to malnutrition because of various physiological changes in their bodies. The aging process causes the elderly to experience changes in taste which results in a decrease in appetite. Besides that, decreased body metabolism and decreased digestive tract function also have a role in the risk of malnutrition in the elderly (Ellawati et al., 2021; K et al., 2020). Elderly who are at risk of malnutrition should be given nutritional intervention from the start so they don't fall into a state of malnutrition.

The average body mass index of the elderly in this study was 21.28 kg/m2. These results indicate that the elderly at PSTW Sabai Nan Aluih Sicincin have a normal body mass index (Supariasa, Fajar, & Bakri, 2001). These results are in line with Junitasari's research, MH, 2021 at PSTW Bengkulu. Body mass index is one of the indicators most often used to monitor nutritional status. Nutritional status is the end result of a balance between food intake and the body's nutritional needs. Good nutritional status in the elderly will improve health status (Junitasari, Wahyu, & Suryani, 2021).

The average carbohydrate intake in this study was 164.62 grams per day. These results indicate that the average carbohydrate intake is less than the recommended daily allowance. These results are in line with Sulistiawati's research, 2022 where 84% of the elderly have less carbohydrate intake. Carbohydrates are the main source of energy for the body. Monosaccharides, especially glucose, are the main source of energy for cells. The elderly need 45-65% carbohydrates from the total daily calorie needs. The cause of this lack of carbohydrate intake is related to reduced appetite and taste in the elderly. Lack of carbohydrate intake can result in a lack of energy reserves which can affect nutritional status (Junitasari et al., 2021; Astrup, Larsen, & Harper, 2004).

The average protein intake in this study was 35.44 grams per day. The average daily protein intake in this study was in the less category. These results are in line with Junitasari's research, 2021 with the result that 54% of respondents lacked protein intake. Protein intake plays a role in the aging process. Protein plays a role in stimulating muscle protein synthesis which will have an impact on increasing muscle mass thereby increasing muscle strength and function. Increasing strength, function and muscle mass has an impact on improving health in the elderly. Elderly who consume less protein in the long term will result in loss of muscle mass resulting in functional limitations in the elderly (Junitasari et al., 2021; Stepaniak et al., 2022).

The average fat intake in this study was 33.40 grams per day. These results indicate that the average fat intake is in the less category (Ministry of Health RI, 2019). Fat is a source of reserve energy for the body. Fat plays a role in carrying fat-soluble vitamins A, D, E and K. In addition, fat also plays a role in protecting organs in the body. The elderly need fat intake of around 20-35% of the total daily calorie requirement with a composition of less than 7% is saturated fat (Vannice & Rasmussen, 2014). More recommended fat intake is unsaturated fat intake. The low intake of fat in the elderly is related to the understanding that in old age fat intake must be limited (Junitasari et al., 2021; Sulistiawati et al., 2022).

This study found a relationship between carbohydrate intake and the nutritional status of the elderly at PSTW Sabai Nan Aluih Sicincin with a value of r = 0.3 and a value of p = 0.03. These results are in line with the research of Sjahriani, 2018. Intake of less carbohydrates will result in the elderly being at risk of experiencing malnutrition when compared to the elderly with sufficient carbohydrate intake. Nutritional status can be influenced by many factors such as education level, physical activity and food intake. Carbohydrates consumed will be stored by the body in the form of glycogen (Sjahriani & Yulianti, 2018).

The results of this study found that there was no relationship between protein intake and body mass index with a value of r = 0.23, p = 0.12. These results are in line with previous research (Sulistiawati et al., 2022). This condition is caused by an imbalance in nutrient intake in the elderly, such as low protein intake. Lack of protein will result in a decrease in muscle mass and the immune system. Inadequate protein intake coupled with an increase in body mass index will result in an increased risk of sarcopenia and obesity in the elderly (Morris et al., 2020).

The results of this study found no relationship between fat intake and body mass index in the elderly at PSTW Sabai Nan Aluih Sicincin with a value of r = 0.08 and a value of p = 0.62. These results are in line with Sjahriani's research, 2018. These results are different from Sulistiawati's research, 2022. Fat is the largest contributor of energy per gram compared to carbohydrates and protein (Aubertin-Leheudre & Adlercreutz, H2009). The absence of a relationship between fat intake and body mass index may be due to other factors such as hormones and physical activity (Fariadi, Vianingsih, Rahayu, & Werdhasari, 2020; Slattery, et al, 2003).

CONCLUSION

Based on the results of the study, it can be concluded that most of the elderly are male. The largest age range is 60-74 years. The average nutritional status of the elderly based on body mass index is in the normal category, but at risk of malnutrition based on the MNA questionnaire. There is a relationship between carbohydrate intake and the nutritional status of the elderly at PSTW Sabai Nan Aluih Sicincin, but there is no relationship between protein and fat intake and nutritional status.

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