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# Fulfillment of Elderly Nutrition Based on Daily Protein, Carbohydrate, Fat, and Calcium Needs

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**Abstract** The fulfillment of nutritional needs in the elderly generally decreases, several factors contribute to a decrease in food intake and nutritional fulfillment in older adults, including sensory changes, illness, use of drugs, and psychological factors such as depression. The purpose of this study was to identify a description of the nutritional fulfillment of the elderly based on daily protein, carbohydrate, fat, and calcium requirements. This research method is a quantitative study with a cross-sectional design. The population is the elderly in the village of Pagongan, with a sampling technique using accidental sampling and collecting data using questionnaires and interviews. The data obtained were analyzed univariately. The results obtained were that 66.7% of the respondents were female, 75% did not work, 83.3% consumed less protein, 79.2% consumed less fat, 79.2% consumed fewer carbohydrates, and 66.7% consumed less calcium. Fulfillment of elderly nutrition based on protein, fat, carbohydrate, and calcium needs is lacking. It is necessary to provide health education related to elderly nutrition to the family/companion.

**Keywords:** elderly, nutrition, protein, fat, carbohydrate, and calcium

## 1. Introduction

WHO targets 2020 to 2030 as the decade of healthy old age. By 2020 the number of older people (over 60 years) will exceed the number of children under five years old, and globally the number of older people will increase from 1 billion in 2019 to 1.4 billion in 2030 (an increase of about 34%). By 2050, the proportion of older people is estimated to be one in five.[1]

in 2017 the number of older people in Indonesia reached 23.66 million people (9.03%). The elderly population is predicted to increase by 27.08 million in 2020, 33.69 million in 2025, 40.95 million in 2030, and 48.19 million in 2035.[2] In Central Java alone, the number of older people in 2020 is 12.15%. This number has increased when compared to 2010, which was 10.34%.[3]

The aging process is a process of gradual loss of the ability of tissues to repair themselves or replace themselves and maintain their standard structure and function. The decline in the function of the body's organs can impact the decrease in body resistance so that the fulfillment of nutrition in the elderly needs to be maintained. [4]

Fulfillment of nutritional needs in the elderly generally decreases. Several factors contribute to a decrease in food intake and nutritional fulfillment in older adults, including sensory changes, illness, drug use, and psychological factors such as depression.[5] This study was conducted to identify a description of the nutritional fulfillment of the elderly based on the needs of protein, carbohydrates, fat, and calcium.

## 2. Methods

This study is a quantitative study with a cross-sectional design. The population in this study were the elderly who were in Pagongan Village. The sampling technique uses accidental sampling. The data in this study are primary data, including gender, occupation, protein requirement, fat requirement, carbohydrate requirement, and calcium requirement. Data were collected using questionnaires and interviews. The data obtained in this study were analyzed using univariate analysis.

### 3. Results and Discussion

This study was conducted to describe the nutritional fulfillment of the elderly based on the needs of carbohydrates, fats, proteins, and calcium. The research results obtained are as follows:

**Table 1.** Characteristics of respondents

Variable	F	%
<b>Gender</b>		
1. Male	8	33.3%
2. Female	16	66.7%
<b>Work</b>		
1. Work	6	25%
2. Not work	18	75%

The majority of respondents in this study were elderly females, with 66.7%, and the majority did not work as much as 75%. While the description of the fulfillment of elderly nutrition based on the fulfillment of carbohydrate, fat, protein, and calcium needs can be seen in Table 2 below:

**Table 2.** Overview of Fulfilling the Nutritional Needs of the Elderly

Variable	F	%
<b>Protein</b>		
1. Less	20	83.3%
2. As needed	0	0%
3. More	4	16.7%
<b>Fat</b>		
1. Less	19	79.2%
2. As needed	0	0%
3. More	5	20.8%
<b>Carbohydrate</b>		
1. Less	19	79.2%
2. As needed	0	0%
3. More	5	20.8%
<b>Calcium</b>		
1. Less	16	66.7%
2. As needed	0	0%
3. More	8	33.3%

The study results showed that most of the elderly lack protein needs as much as 83.3%. The same finding was also found in the elderly in Korea, where protein intake in the elderly was also found to be less.[6] Good protein intake in the elderly can reduce muscle mass loss associated with increasing age. Lack of protein intake in the elderly can cause a negative balance of protein levels that impact skeletal muscle atrophy, impaired muscle growth, functional decline, and decreased muscle response to protein intake (anabolic).[7]

In the study, it was stated that lower protein consumption at breakfast and higher at lunch impacted the weakness of the elderly. In addition, the amount of total and animal protein consumed was associated with reduced lean mass, whereas the elderly who consumed higher protein would lose fat mass. % less than the elderly, who only consume small amounts of protein.[8]

To overcome anabolic resistance to low protein intake, the elderly are advised to consume 25 to 30 grams of protein at each meal. This is done to stimulate postprandial muscle protein synthesis in the elderly properly.[9]

Dietary protein intake in the elderly in the Netherlands was found to be between 10-12 grams at breakfast, 15-23 grams at lunch, and 24-31 at dinner. 60% protein is obtained from animal protein and 40% from



vegetable protein.[10] In this study, older people eat more food at breakfast, commonly known as ponggol or fried rice overnight, so that protein intake at breakfast is also the least when compared to lunch or dinner. Fat is a source of energy, and fatty acids are essential components of cell membranes and precursors for many molecules in the body. Several studies have shown that an imbalance in dietary fat intake has been associated with chronic disease in recent decades. A high intake of saturated fat is known to increase circulating LDL cholesterol concentrations and increase the risk of cardiovascular disease. [11]

The recommended intake of foods containing fat for adults is 20-35% of the total energy intake. Some foods such as full-fat dairy, red and processed meat solid fats should be limited to <10%, while trans fats such as biscuits/cakes and chips should be avoided at <1%. Foods recommended vegetable oil, soft margarine, nuts, and fish oil are recommended. [12]

This study indicates that most fat consumption in the elderly is still lacking as much as 79.2%. The fat obtained by the elderly in this study was mainly obtained from fried foods such as tempeh or fried tofu consumed as a side dish at meals. Intake of small amounts of fat impacts lowering cholesterol, albumin, and pre-albumin, but these decreases are associated with possible impaired liver function and inflammation. It is known that fatty acids have a role in interaction with various food components and microbes that function as anti-inflammatory.[13]

The results of this study also showed that the fulfillment of carbohydrates in the elderly was 79.2% less, this finding was in line with the findings presented by Ter Borg et al. (2015), which stated that carbohydrate intake in the elderly was below the AMDR threshold, but it was not clear what type of carbohydrate was consumed.[5] The same finding was also found in France, where the elderly at risk of malnutrition consumed food, especially staple foods, only twice a day. The physiological reasons are the presence of disease, the senses of taste and smell have decreased function.[14]

Carbohydrates are organic compounds consisting of carbon, hydrogen, and oxygen. Carbohydrates act as signaling molecules, energy sources, and structural components. Carbohydrates themselves are associated with chronic metabolic disease. Glucose is a carbohydrate that acts as the primary energy source. Consuming too much glucose can accelerate the aging of human cells.[15] In one day, carbohydrate requirements in the elderly are recommended as much as 45-65% or about 130 grams per meal.[16]

Calcium is an essential nutrient needed to maintain a healthy human body. Calcium is an abundant mineral in the body, and 99% is found in teeth and bones. Adequate calcium intake may reduce the risk of fractures, osteoporosis, and diabetes in some populations. Low calcium intake can result from lactose intolerance.[17] The results of this study indicate that 66.7% of respondents have a low calcium intake. Decreased calcium intake occurs in all elderly and impacts bone mass loss and a decrease in the mechanical load of the bone skeleton. In the US, the elderly aged 65 years consume 600 mg in men and 480 mg in women. Calcium intake in the elderly is much lower than in young people. The impact of this decrease in calcium also reduces nutrient absorption.[18]

Research in Australia stated that older women and men who had given calcium <600 mg and 700 mg showed a reduction in the risk of falls and fractures after 3-5 months of administration because it can slow bone loss and microstructural deterioration. Giving calcium is also considered effective for treating the elderly at high risk of osteoporosis.[19]

The majority of the elderly in this study lack the fulfillment of this study's protein, carbohydrate, calcium, and fat needs. Factors of tooth strength and masticatory function have a role in meeting the nutritional needs of the elderly. The mechanical and chemical processes of digestion begin in the mouth with mastication. The strength of the mouth muscles in chewing, and the structure of the food play an important role in ensuring that food is swallowed safely. In addition, chewing also helps release sensory signals in recognizing taste. In the elderly, there is a change in the oral cavity, a decrease in bite strength, mandibular reflexes, a decrease in oro-sensory receptors, and a decrease in saliva secretion. Besides that, the motor activity of the tongue and masticatory muscles also decreases. These changes impact decreasing the number of nutrients consumed by the elderly.[20]

Other studies also mention that the elderly have a lack of ability to meet the nutritional needs of their bodies, this is due to several etiopathogenic factors that can lead to a reduction or utilization of nutritional intake,



1 progressive loss of organ function with dependence on food and 1 psychological problems related to economic isolation or economic isolation—social conditions, such as poverty or loneliness. Changes in the aging gut also impact the disintegration of food mechanisms, gastrointestinal motor function, food transit, intestinal wall function, and chemical processes of food digestion.[21]

#### 4. Conclusion

2 The majority of the respondents' gender in this study were women and did not work. Fulfillment of elderly nutrition based on protein, fat, carbohydrate, and calcium needs is lacking. It is necessary to provide health education related to elderly nutrition to the family/companion.

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#### Limitation

The sample in this study was too small due to time constraints. The data taken is also cross-sectional, so that the nutritional fulfillment is assessed only at the time of the study.

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