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Nutritional Status of Elderly in Urban and Rural North Sumatera, Indonesia

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Abstract*— One measure of the progress of a nation is the expectancy of inhabitants, especially for the elderly. One of the primary efforts made for the elderly to achieve the quality of life and to remain reasonable is by eating nutritious and diverse foods as well as maintaining nutritional status in a balance condition. The fulfillment of nutritional needs can help in the process of adapting or adjusting to the changes they experienced and can maintain the continuity of body cell changes so that they can prolong life. Generally, support and attention from family members are needed by the elderly, especially in their food consumption. This research applied a qualitative method with a cross-sectional design. This research was conducted in Titi Kuning Village (representing urban areas) and in Ranto Baek Village (representing rural areas). Sampling was carried out using inclusion criteria with the criteria, not dementia, not lying sick, and being able to stretch both hands. Total sampling used in this study, 108 people from the village of Ranto Baek, and 438 people from Titi Kuning village became the sample of this research. As a result of the frequency distribution of urban and rural elder's knowledge about nutritional needs, most urban participants have good knowledge; totally, 251 participants (57.3%) and rural participants have sufficient knowledge, a total of 44 participants (40.7%). The results of the frequency distribution of the urban and rural elderly on eating patterns indicated that both urban and rural participants have a good eating pattern total 282 (64.4%) for urban participants and 85 (77%) for rural participants. In addition, frequency distribution results of the nutritional status of urban and rural elders show that many urban participants have good nutritional status, i.e., 213 (48.6%) and rural participants have heavy weight-loss nutritional status as many as 61 participants (58%). This study found that the knowledge, eating pattern, and nutritional status of participants in the city all were good, whereas the knowledge of the participants in the village was sufficient; the nutritional status was a heavyweight loss, yet the eating pattern was good. The difference between rural and urban communities is due to the influence of participants' insight, the neighborhood, the mass media, and the information available. The results of this study can be a reference for the initial material to conduct further research related to the regulation of balanced nutrition for the elderly.

***Keywords*— nutritional status; elderly; rural communities; urban and rural.**

I. INTRODUCTION

The behavior of balanced nutrition is a significant prevention effort affecting non-communicable diseases in older adults. Mostly all countries experience an increase in the number of older adults because of demographic transmission. Demographic transmission is a process of population change where the birth rate has decreased dramatically, while life expectancy has increased. The success of health development in Indonesia has an impact on the decline of birth rates, morbidity, and mortality and an increase in life expectancy. One consequence, since 2010, there has been an increase in the number of elders. The increase in the number of older people in Indonesia is one sign that development in this country must be proud of. However, the consequences are not simple. Various kinds of challenges due to population aging have touched various aspects of life, and it involves a humanitarian development program that can protect the lives of Indonesian older adults.

Based on the 2016 national survey data, the number of older adults in Indonesia reaches 22.4 million people or 8.69 percent of the population. This number can be potential if the older adults are in productive and independent conditions, on the other hand, they can contribute to the various problem once it is not handled immediately and continuously, one of which is related to nutritional problems. Judging from the economic aspect, the elderly population is generally seen as more of a burden than a potential resource for development. Older people are considered as unproductive citizens, and their lives need to be supported

by younger generations. For older adults who are still entering the workforce, their productivity is considered to have decreased, so that commonly their income is lower than that received by the young population. However, not all of those in the elderly age group have low quality and productivity. From a social point of view, the elderly population is a separate social group. In Western countries, for example, older people occupy social strata below young people. The involvement in economic resources, influence in decision making, and the extent of social relations decline sharply in old age. However, in traditional communities in Asia in general, including Indonesia, the elderly population occupies a high social class, which must be respected by younger people.

One measure of the progress of a nation is the life expectancy of inhabitants. Indonesia, at present, has an increased life expectancy of the population along with improvements in the quality of life and general health services. One of the first efforts made to achieve the quality of life to remain good is by consuming nutritious and diverse foods and maintaining nutritional status in a stable condition. For the older adults, the fulfillment of nutritional needs that are given well can help in the process of adapting or adjusting to the changes they experience for maintaining the continuity of body cell changes so that they can prolong life.

Nutritional problems are problems that may occur in the elderly who are closely related to food intake and body metabolism and the factors that influence it [1]. There is a correlation between factors that influence nutritional needs with elderly nutritional status, including physical activity, depression, and mental condition, treatment, illness, and biological decline with elderly nutritional status. All growth processes require nutrients contained in food. Adequacy of healthy food is very important for the elderly. People who are 70 years old, their nutritional needs are the same as when they were 50 years old, but their appetite tends to continue to decline.

Therefore the consumption of foods full of nutrients must continue. Food selection is a multidimensional behavior, influenced by various factors, including psychological parameters. The provision of food eaten is the procurement of materials from the process of choosing and food processing. Efforts to achieve excellent or optimal community nutritional status begins with an adequate food supply. The provision of sufficient food is obtained through domestic food production through agricultural efforts in producing staple foods, side dishes, vegetables, and fruits. Factors that affect the physical condition and endurance of the elderly are the patterns of life that he lived from the age of a toddler.

The main problem of food consumption for the elderly is related to poor food providing for the elderly. Unhealthy patterns of life have an impact on the decline in the body's resistance; a common problem experienced is vulnerability to various diseases. [2] Assessing the nutritional status of elderly patients is an integral component of a comprehensive geriatric assessment. Anthropometric measurements, body composition estimates, and questionnaires such as the Mini Nutritional Assessment, Malnutrition Screening Tools, Nutritional Risk Index, and Prognosis Inflammatory Nutrition Index are useful methods for assessing nutritional status in the elderly. In general, most of the majority live with their family members, support, and attention from family members are needed by the elderly, especially in their food consumption. The food consumed by the elderly is often the same as the food for other younger family members. Should food for the elderly be considered because it will affect their nutritional status and health, for example, equal eating portions, easy-digested food texture, rich in fiber, low in salt and fat regarding the decline of the digestive system in the elderly. They also often complain of constipation because they rarely consume fruits. The fulfillment of balanced nutrition in the elderly certainly can determine his health condition in the future. Nutritional status is a state of the body that reflects what we eat every day. Nutritional status is said to be good if our diet is balanced. That is, the intake, frequency, and type of food consumed must be following the body's needs. In the elderly, there is a decrease in body function and organs, so that it makes the elderly need more time to digest food than in other adults. For this reason, attention is needed to the diet menu for the elderly so that the nutritional status of the elderly is well maintained. Assessment of nutritional status can be carried out by means of bio comics, where bio-comic is an examination of laboratory-tested specimens carried out on various body tissues. The body tissues used include blood, urine, faces, and other tissues, for instance, the liver and muscles. This method is used for a warning that there may be more severe malnutrition. The good nutritional status will affect the quality of life of the elderly themselves. Good health can also improve the quality of life.

According to WHO, the quality of life is the individual's perception of the life that a person lives with the cultural context and the individual's values live, including aspects of physical health, psychological state, level of independence, social relations, personal beliefs and their relationship with the environment. [10] Nutritional status is related to the quality of life of the physical and environmental health domains, while health status is related to the quality of life in the domain of physical health and social relations. Balanced nutrition behavior in the elderly, namely the age categorized as World Health Organization (WHO) starting from the age of 60 years, is essential because age increases cause the function of various organs and tissues to decline, especially the digestive system.

The objectives of good nutrition achievement on the older adults are making them fulfill the nutritional, physical, spiritual, social, and psychological requirements adequately, solving the problems of old age, protecting them from the wrong treatment, and implementing the activities that are meaningful for the elders. The nutritional needs appropriately given can help in the process of adapting or adjusting to the changes that happened and sustain the turn of the cells of the body so that it can extend life. Nutritional needs in the elderly need to be adequately fulfilled for the continuation of the process of cell turnover in the body and overcoming the aging process. The basic calorie requirement due to basic calorie physical activity is the calories needed to do body activities in a resting state. Balanced menu requirements for the elderly, include:

- Varied nutrient content and food ingredients consisting of substances power, builder, and regulator

- High fiber
- High calcium
- High iron
- Limited use of salt
- High protein, preferably from fresh and easily digestible food ingredients
- No alcohol contents
- Easily chewed or soft food texture.

Based on above-balanced menu requirements, families need to know, not only the elderly themselves. In fulfilling the nutritional status of the elderly, family play an active role and help to meet the nutritional needs of the elderly. Nutritional problems that occur in the elderly are:

1) Excessive Nutrition: The habit of eating a lot when young causes excessive weight, especially in the elderly, because calorie use is reduced due to lack of activity.

2) Reduced Nutrition: Socioeconomic factors and diseases suffered often cause reduced nutrition. If calorie consumption is lower than necessary, it will cause weight loss from ordinary.

3) Vitamin deficiency: If the elderly consumes fewer fruits and vegetables, it can cause decreased appetite, blurred vision, lethargy, dry skin, weakness, and lack of enthusiasm.

II. Materials and Method

This research applied a descriptive qualitative method with a cross-sectional design. This research was conducted at Titi Kuning Village (representing urban areas or big city) and in Ranto Baek Village (representing rural areas or district area). The population of this study was all ≥60-years-old elderly living at Ranto Baek as many as 607 people and at Titi Kuning Village were 932 people. Sampling was carried out using total sampling by using inclusion criteria with criteria, not dementia, not lying sick, and being able to stretch both hands. One hundred eight older adults from Ranto Baek Village and 438 older adults from Titi Kuning village became the sample of the population. Data collection consists of primary data and secondary data. The primary data in this study include as follows:

- The participants' characteristics
- The elderly's knowledge about food consumption
- The elderly's attitudes about food consumption obtained through interviewees using questionnaires
- The type, frequency and texture of food obtained through interviews using the form of an elderly food frequency
- Nutritional status is obtained using the Anthropometry method that measures weight (weight scale) and measures the length of the front (2-meter-long ruler).

The secondary data in this study were the general overview of the region and the community of Ranto Baek and Titi Kuning.

III. Result and Discussion

This part displays the data of this research. Table 1 informs the results of demographic data that the majority age is elderly, around 60-74 years old, a total of 372 urban participants (85.32%), and 62 rural participants (57.40%). The average gender is female, totally 325 urban participants (74.20%) and 70 rural participants (64.81%). Then, the majority religion of urban participants is Islam, a total of 372 urban participants (84.93%) and 108 urban participants (100%). Most urban and rural participants are Mandailing, totally 240 urban participants (54.79%) and 92 rural participants (85.18%). The average education level was elementary school, totally 217 urban participants (49.54%) and 86 rural participants (79.62%).

TABLE I
CHARACTERISTIC OF RESPONDENT

	Urban n = 438	**%**	**Rural n = 108**	**%**
Age				
Elderly 60-74	372	85,32	62	57,40
Old 75-90	65	14,85	45	41,66
Very Old >90	1	0,22	1	0,92
Gender				
Man	123	28,08	38	35,18
Woman	325	74,20	70	64,81
Religion				
Islam	372	84,93		
Catholic	20	4,56	108	100
Protestant	14	3,19		
Buddha	32	7,30		
Ethnic				
Mandailing	240	54,79	92	85,18
Java	119	27,16	16	14,81
Batak Toba	24	5,47		
Batak Karo	16	3,65		
Chinese	32	7,30		
Nias	6	1,36		
Aceh	1	0,22		
Education				
Elementary School	217	49,54	86	79,62
Junior School	137	31,27	22	20,37
High School	84	19,17		

Frequency distribution results of the knowledge of the urban elderly about nutritional needs tell that most of them have good knowledge about nutritional status. Participants responded true answers are over 70 percent of the total 30 statements. Thus, there were 57.3% of participants with good category, 21% of participants with enough category (give true answers over 50 percent of the total 30 statements). There were 21.7 % of participants with less category or give a correct answer of less than 50 percent of the total 30 statements, as shown in figure 1.

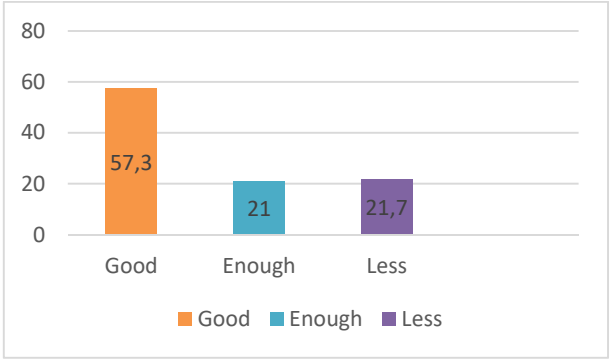

Fig. 1 Knowledge of the Urban Elderly

Frequency distribution results of the knowledge of rural elderly about nutritional needs present that most of them have enough knowledge about nutritional status. There were 41 % of participants with enough category, 40 % of participants with a good category. Interestingly, there were 19 % of participants with less and good categories, respectively, as presented in figure 2.

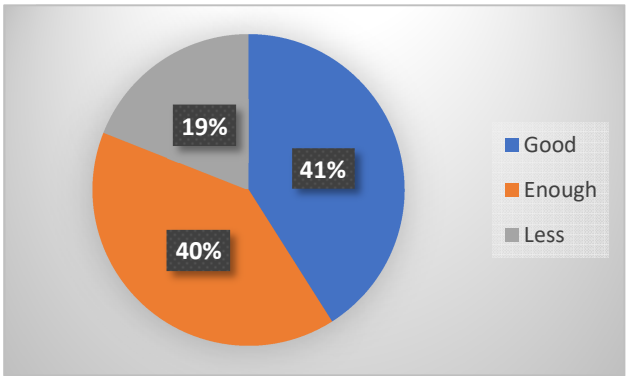

Fig. 2 Knowledge of the Rural Elderly

A frequency distribution shows the results of the diet or eating pattern of the urban elderly. Most participants had a proper diet or consuming 5 or more food ingredients recommended for the elderly every day. There were 64.4% of participants with good category. There were 21.3 of participants with enough category or consuming more than 3 of food ingredients recommended for the elderly every day. There were 14.3% with less category or consuming less than 3 of food ingredients recommended for the elderly every day, as shown in figure 3.

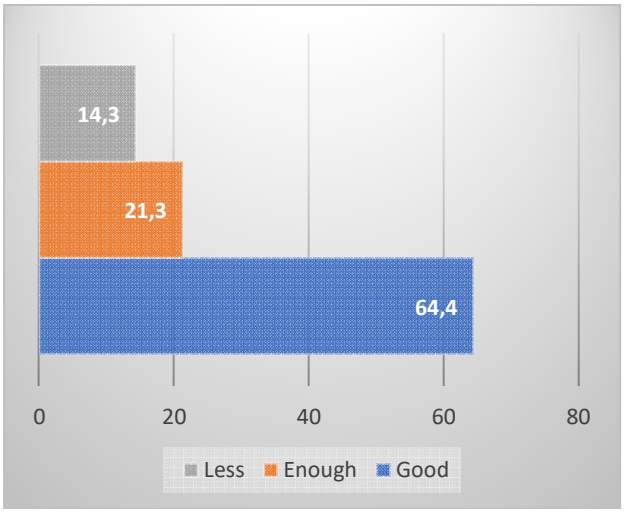

Fig. 3 Eating Pattern of Urban Elderly

Figure 4 below presents the frequency distribution results of the eating pattern of the rural elderly diet. Most rural participants also has a good diet or consuming five or more food ingredients recommended for the elderly every day. There were 77% of participants with good category, 21.2 % participants with enough category or consuming more than 3 of food ingredients recommended for the elderly every day. Also, there were 1.8 % of participants with less category or consuming less than 3 of food ingredients recommended for the elderly every day, as shown in figure 4.

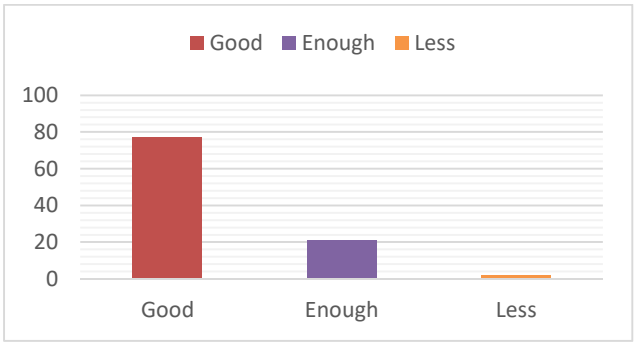

Fig. 4 Eating pattern of Rural Elderly

Figure 5 below shows the frequency distribution results of the nutritional status of urban elderly. The majority of urban participants have good nutritional status or BMI >18,5-25,0. It made 48.6% of participants with good category, 28.2% of participants with enough or mild weight loss category or BMI 17,0-18,5. Finally, there were 23.2% of participants heavy weight loss category or less nutrition, BMI < 17,0, as shown in figure 5.

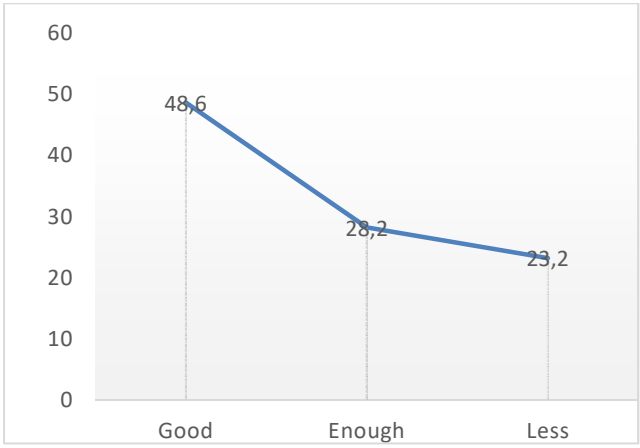

Fig. 5 Nutritional Status of Urban Elderly

In addition, Figure 6 below indicates the frequency distribution results of the nutritional status of the rural elderly. This study presents that most rural participants have heavy weight loss nutritional or less nutrition. There were totally 58% of participants, 23.3 % of participants with mild weight loss category or enough, and 18.7% with good category, as shown in figure 6.

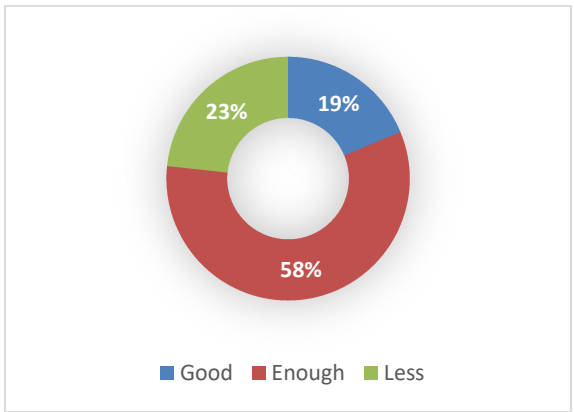

Fig. 6 Nutritional Status of Rural Elderly

A. *Knowledge about Nutritional Needs of the Urban and Rural Elderly*

In this study, most of both urban and rural participants have good knowledge, a total of 251 urban participants (57.3%), and 44 rural participants (40.7%). The level of knowledge is divided into six categories; they are knowing, understanding, applying, analyzing, synthesizing, and evaluating. However, this research only focused on the first three levels of the categories, i.e., knowing, understanding, and applying. Knowing is regarding how to remember something that has been learned before. Understanding refers to recalling a specific issue that has been studied or stimulated previously. Applying is defined as the ability of someone to use something studied in a real situation. Analyzing refers to an ability to describe material or objects in components, but it is still in an organizational structure and still has a relationship with others. Synthesizing shows an ability to put or connect parts in a new overall form. In other words, synthesizing is the ability to form new formulations from existing formulations. Lastly, is evaluating. Evaluating relates to the ability to justify against material or object of these assessments based on a criterion which is determined by itself or using existing criteria.

A person's knowledge is obtained from sensing results, which are then influenced by external factors, for example, education, age, mass media, and the environment. In this study, the majority of urban participants mostly have a good knowledge due to the majority of urban participants aged 64-74 years old in which participants have had much experience of life and have resided in urban areas so that the information and means of mass media are easier to get. Whereas in the rural area, most participants have sufficient knowledge due to the average level of education of participants, namely elementary schools, where the level of education is one of the factors that can affect the quality and quantity of food consumption. With a higher level of education, it is expected that knowledge and information about nutrition will also be more numerous due to the environmental factors to obtain the latest information.

A good knowledge level will affect the quality of life. Knowledge can be obtained through available information or mass media, including health education [3]. Health education about balanced nutrition, especially calcium and vitamin D, in preventing osteoporosis in the elderly, need to be given to the community adequately. In urban and rural communities, there are different ways of taking attitudes and habits in solving a problem. Urban and rural areas have differences in terms of socialization, income levels, technological advances, and cultural values that influence the level of knowledge of people living in rural and urban areas [4]. The effectiveness of nutrition education based on HBM (Health Belief Model) is referred to as the perception of a healthy diet, beliefs, and behavior among older women. In the elderly, health promotion related to nutrition is adjusted to their ability to understand health promotion given, especially in rural communities where they are more familiar with this thing.

B. *Diets or Eating Pattern of the Urban and Rural Elderly*

The result of the study shows that both urban and rural elderly have a proper diet or good eating pattern, a total of 282 participants (64.4%) for urban elderly, and 85 participants (77%) for rural elderly. The diet itself influences the health of the elderly very much. In the elderly, the occurrence of decreased appetite is caused by decreased organ function. In urban participants, the elderly diet is proper; they have good knowledge of it. Better knowledge will undoubtedly affect their daily life. In the study, most participants are women as women usually have a habit of cooking at home for food and family intake such as vegetables, fish, fruit. Therefore, a well-maintained diet can be performed. In rural participants, it is obtained that they have an average level for diet as the rural people have a habit of eating regularly. [5]. The existence of high motivation about fulfilling balanced nutrition will influence the efforts to meet balanced nutritional needs.

Elderly who have good diet means that they have done five or more things that are recommended in meeting the nutritional needs of the elderly, namely: Food sources of carbohydrate sources, such as oatmeal (oatmeal), whole wheat bread, brown rice, and mashed rice, Food sources of protein, such as low-fat milk, fish, soy, and tofu, Food ingredients that are healthy sources of fat, such as nuts (peanuts/peanut butter), soybean oil, and corn oil, Green or orange vegetables such as spinach, kale, carrots, broccoli, pumpkin, chayote, and tomatoes, fresh fruits such as papaya, banana, orange, apple, and watermelon. As much as possible, choose fresh food and avoid all types of processed foods that use preservatives.

Motivation can encourage someone to achieve goals in life. With the motivation of the elderly regarding the fulfillment of balanced nutrition, there will be an effort in the fulfillment of balanced nutrition. In the elderly, dietary settings related to diet selection are needed, especially in the elderly, to prevent osteoporosis. [6] Prevention of osteoporosis involves achieving peak bone mass and optimal nutrition throughout life. Regulating the elderly's eating portion is also important so that the elderly do not lack certain nutrients. There are six Some nutrients that are often not consumed by the elderly are vitamin B6, vitamin B12, folic acid, vitamin C, and calcium.

Many nutrients, vitamins, minerals, and bioactive compounds in the diet promote bone health. Although individual nutrition is an integral part of bone health, healthy lifestyle choices include balanced food consumption, optimal weight maintenance, regular exercise, falling prevention, and avoiding modifiable risk factors (smoking and excessive alcohol consumption) all promote bone mass healthy. Reduced nutrient intake as an energy source for the elderly is influenced by the diet of the elderly themselves, namely the amount of food intake, meal schedule and the type of food eaten as well as reduced digestibility, absorption, and distribution of nutrients in the body of the elderly.

The better diet for the elderly is to eat well the intake of nutrients that enter the elderly body [7]. In elderly patients with diabetes are more likely to have chronic coexistence conditions such as hypertension, dyslipidemia, and cardiovascular disease which can affect their nutritional needs. For this reason, elderly people who have diabetes mellitus need to manage their diet because they have problems changing their appetite, food palatability, dietary

restrictions, loneliness, and depression that can affect the type and quantity of food consumed by the elderly. Many elderly people experience with high blood pressure, heart disease, high cholesterol, and diabetes. These diseases can be controlled or even prevented by maintaining a healthy diet and regular exercise. In elderly election nutrition, a balanced diet should pay attention to certain things because the elderly's organ function has decreased. Adequacy of energy is obtained by the elderly from daily food intake following their physical and activity conditions. This is related to the diet. Therefore, they need to pay attention to the selection of diet menu, so the food will be more comfortable to be chewed and easy to be digested. If the elderly keeps on a balanced diet, the nutritional status will also be good.

C. Nutritional Status of the Urban and Rural Elderly

In this study, the majority of urban participants have good nutritional status, a total of 213 participants (48.6%), but rural participants have less nutritional status as many as 61 participants (58%). Nutritional status is a condition of human nutrition as a manifestation of food consumption and the use of nutrients by the body. Nutritional status is related to a person's level of knowledge regarding food nutrition. Good nutritional status indicates that a person has a healthy lifestyle. Changes in nutritional status in the elderly are caused by changes in the environment and health conditions. Urban participants have good nutritional status due to the knowledge possessed by most participants, both the facilities and infrastructure in urban areas.

Thus, the ability of the elderly to meet nutritional needs are fulfilled. On the other hand, rural participants have less nutritional status due to the knowledge of participants related to nutrition is sufficient. Their nutritional needs are so lacking that they quickly get sick because their appetite is not good. [8] Consuming balanced nutrition can reduce the risk of osteoporosis, especially for older people who do not have coffee drinking habits are advised to provide more information to the public regarding balanced nutrition to improve the health status of the community. [9]. Emphasizing the importance of consuming balanced nutrition, especially to get vitamin D so that bone health is maintained and its nutritional status is good.

In the elderly, a Geriatric Nutritional Risk Index (GNRI) calculation is a new prognostic indicator for complications and mortality related to nutritional status among the elderly [10]. GNRI has a close relationship with exercise tolerance and can be a nutritional rating scale that is useful for elderly patients. This structured screening tool can identify nutrition-related problems that guarantee evidence-based interventions to measure nutritional status assessments [11]. The main challenges of clinical nutrition nowadays, are keeping the elderly person in optimal nutritional status as well as in the determination of the optimal and faster timing for intervention [12]. Nutritional status should be periodically screened in the institutionalized elderly to prevent malnutrition.

Also, it was noted that adequate energy and nutrients intake of the elderly played a crucial role in maintaining nutritional status and preventing malnutrition within residential homes. Nutritional status and health of the elderly are generally influenced by lifestyle, especially diet, physical activity, and stress. In setting a good nutritional status, the family plays an important role in this matter, because usually, families prepare diet menu in their homes [13]. The results showed that the elderly with good knowledge of nutritional status is 12.5%, elderly with a normal nutritional status of 56.2%, and those who had a fat nutritional status of 31.3%. Apart from that, the family in the category of having enough elderly people with normal nutritional status is equal to 45.8%, elderly underweight nutritional status of 16.7%, and fat nutritional status of 37.5%. The factors that can affect nutritional status are a bad environment that can affect a person's mental and physical condition so that nutritional status will be bad too. Then food intake is the most important factor in the nutritional status of the elderly. The food eaten must be varied so that all nutrients can be fulfilled. The disease occurs along with the increasing age of the immune system in the elderly. The decline of the immune system causes the elderly to suffer from a disease.

Furthermore, physical activity is closely related to body weight. Adequate nutrition is critical to support health status [14]. Inadequate nutrition could have an adverse effect on life. Physical activity causes less accumulation of nutrients in the body so that it increases the risk of obesity. The last mental condition, in the elderly, often show symptoms of depression, and it arises due to an illness suffered by the elderly. Psychological factors such as anxiety have a large contribution in determining food intake and the nutritional status of the elderly [15]. There is a significant relationship between the level of anxiety with nutritional status and food intake in the elderly and between food intake and the nutritional status of the elderly.

The anxiety condition in the elderly that occurs can be caused by socioeconomic differences (entering retirement), decreasing income, post power syndrome, role conflict, and feeling lacking or no longer needed. Health conditions have begun to decline and often experience physical disturbances, and illness has begun to emerge. Changes in the social environment, isolated conditions, loneliness, and reduced activity make the elderly experience frustration and lack of enthusiasm. As a result, appetite is disrupted and can ultimately lead to weight loss. Besides, less social interaction can cause loneliness so that it can affect appetite, food intake, body weight, and overall well-being.

IV. CONCLUSION

This study found that the knowledge, diet, and nutritional status of participants in the urban were good, while in rural areas, the participants have sufficient knowledge and a good diet, yet they lack nutritional status. The difference between rural and urban communities is due to the influence of the participants' insight, the neighborhood, the mass media, and the information available. In urban communities, it is easy to access the latest information and easily obtainable compared to rural communities.

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