

# The Relationship between Nutritional Status and the Incidence of Hypertension in the Elderly at the Working Area of the Lubuk Pinang Health Center, North Bengkulu

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# The Relationship between Nutritional Status and the Incidence of Hypertension in the Elderly at the Working Area of the Lubuk Pinang Health Center, North Bengkulu

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**Abstract:** Hypertension may occur primarily or is idiopathic. Where the causative factor cannot be identified or can occur secondarily as a result of a particular disease. This study aims to determine the relationship between nutritional status and the incidence of hypertension in the Elderly Work Area of the Lubuk Pinang Health Center, Muko-Muko Regency, North Bengkulu. The type of research used is analytical observational research with a cross-sectional approach. The affordable population in this study was the elderly who were registered for treatment at the Lubuk Pinang Health Center, Muko-Muko Regency, North Bengkulu, with 36 samples using the total sampling technique. Univariate data analysis is presented in frequency and percentage distribution and bivariate analysis using the spearman correlation test and data processing using the computerized IBM SPSS program version 24.0. The results of this study show that the highest age was 60-70 years, namely 28 people (77.8%), and the most gender was female, namely 31 people (86.1%). The most nutritional status was overweight, 15 people each (41.7%), the most hypertension was stage II, namely 25 people (69.4%), and there was a relationship between nutritional status and the incidence of hypertension in the Elderly Work Area of the Lubuk Pinang Health Center, Muko-Muko Regency, North Bengkulu ( $p=0.031$ ). This research concludes that the highest age is 60-70 years. The most gender is female, the most nutritional status is overweight, the most hypertension is stage II, and there is a relationship between nutritional status and the incidence of hypertension in the Elderly Work Area of the Lubuk Pinang Health Center, Muko-Muko Regency, North Bengkulu.

**Keywords:** Hypertension; Nutritional Stage; Sample characteristic

## Introduction

Health and nutrition are human rights and are factors that largely determine the quality of human resources. As healthcare rates progress and births decline, the number of older people is also increasing. Currently, the number of elderly (advanced age) in Indonesia is estimated to be around 24 million people, and Indonesia is ranked fourth most elderly population below China, India, and the USA. The number of elderly people is increasing every year. In 2015, the percentage

of the elderly population in the world reached 12.3%, 11.6% in Asia, and 8.1% in Indonesia. This percentage is expected to increase in 2025 to 14.9% in the world, 15% in Asia, and 11.1% in Indonesia. Old age can be said to be the golden age because not everyone can reach that age. Increasing age is also accompanied by a decrease in function, metabolism, and body composition. These changes cause the need for nutrients and the amount of food intake to increase. The decrease in the immune system of the elderly causes the elderly to be susceptible to disease and causes their quality of life of the elderly to

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be low (Haynes, 2020). Nutritional problems and diseases can be influenced by the food consumed by the elderly (Kaur et al., 2019), which is related to the problem of deficiency and overnutrition. According to the WHO (World Health Organization), the elderly are residents who are 60 years of age or older.

Globally in 2013, the ratio of the population over the age of 60 was 11.7% of the total world population and it is expected that the number will continue to increase with an increase in Life Expectancy (UHH). Changes in nutritional needs and intake must be anticipated by providing proper nutrition so that it does not cause nutritional problems or worsen the physical condition of the elderly (Maillot et al., 2017). Many studies have been conducted that most nutritional problems in the elderly are overnutrition problems or obesity which will eventually spur degenerative diseases and malnutrition problems (Norman et al., 2021). Malnutrition conditions can occur because the symptoms that appear are almost invisible until the elderly fall into the category of nutrition bad. Research reveals that the elderly living in rural areas, both men and women, are thin and almost all nutrients consumed do not reach the Nutritional Adequacy Rate (NAR). In contrast, other studies have shown that the condition of the elderly in the city leads to more nutritional status which can further increase the risk of degenerative diseases (Shuremu et al., 2023).

Hypertension is the number one disease that affects the elderly, hypertension itself is a blood pressure that exceeds 140 mmHg, while the normal blood pressure of adults averages 120/80 mmHg. When systolic blood pressure equals or exceeds 140 mmHg, the risk of coronary heart disease, stroke, and kidney disorders will increase. According to WHO, in 2018, there were 1 billion people in the world suffering from hypertension, and an estimated 7.5 million deaths, or about 12.8% of all total deaths, were caused by hypertension (Singh et al., 2017). Of these patients, only less than 20% seek control of hypertension, Hypertension can occur primarily or is idiopathic.

The causative factor cannot be identified or can occur secondary due to a particular disease. However, hypertension is the leading cause of stroke, heart disease, and kidney failure. Primary hypertension occurs in 90 - 95% of cases and increases over time. The high prevalence of hypertension is due to an unhealthy lifestyle, such as lack of exercise / physical activity, smoking habits, and consuming foods high in fat. (Cherfan et al., 2020). According to (Aronow, 2017), the factor that influences hypertension and the development of increased hypertension is obesity. Approximately 46% of patients with Body Mass Index (BMI) 27 have high hypertension.

According to WHO data, about 972 million (26.4%) people worldwide suffer from hypertension, which is

likely to increase to 29.2% by 2025. Of the 972 million people with hypertension, 333 million are in developed countries, and 639 million are in developing countries, including Indonesia (Chowdhury et al., 2008). Nationally, the results (Mbouemboue & Ngoufack, 2019) showed that the prevalence of the population with high blood pressure is 34.11%, the majority of high blood pressure in women is 36.85% higher than that of men, which is 31.43%, the prevalence in urban areas is slightly higher by 34.4% compared to in rural areas, namely 33.7% the prevalence is increasing as the patient ages. The prevalence of hypertension was found in the measurement results at the age of  $\geq 18$  trillion according to the province, confident that in Bengkulu, the results were obtained at 28.14%, while in Indonesia, the results were found to be 34.14%.

The program carried out by Puskesmas staff is to do prolanis gymnastics once a week and educational activities about chronic diseases such as Hypertension and Diabetes Mellitus type 2 every week. This program was done so that the elderly who participate in the membership of Prolanis can prevent or control the diseases they have suffered. Prolanis activities target all health workers with chronic conditions, especially DM type II and hypertension. Prolanis activities are more aimed at patients with type II DM and Hypertension because the disease can be treated at the primary level and is carried out to prevent complications. Advanced health care for each participant. The analysis data has been recapitulated at the end of each month to find out how the patient's medical history (Herdiani, 2019). Based on this background, researchers are interested in analyzing the nutritional status of hypertension in the elderly prolanis working area of the Lubuk Pinang Health Center, Muko-muko Regency, North Bengkulu.

## Method

This research was conducted on  $\geq 60$  years old who had a history of or suffered from Hypertension who came a member of Prolanis at the Posyandu Lansia Working Area of the Lubuk Pinang Health Center, Muko-muko district, North Bengkulu in April-May 2021. This type of research is observational research using a cross-sectional design with secondary data on blood pressure and Body Mass Index (BMI) from elderly prolanis data at the time of first diagnosis of Hypertension. The target population in this study was 40 elderly prolanis patients who came for medicine to the Lubuk Pinang Health Center, Muko-Muko North Bengkulu district. The sample used in this study was 36 elderly patients registered as members of the Lubuk Pinang Health Center Prolanis who met the inclusion and extension criteria.

The data in this study were described using the statistical SPSS application method with an analysis univariate approach to determine the frequency distribution of body level, body weight, and blood pressure. A bivariate analysis was performed to determine the relationship between nutritional status and hypertension. research scheme:

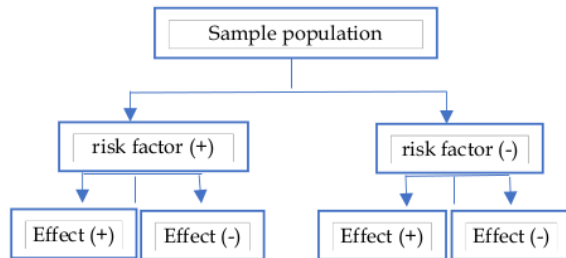


Figure 1. observational analytic research scheme

**Result and Discussion**

Based on research that has been conducted on participants of hypertension elderly prolanis in the Lubuk Pinang Puskesmas Working Area, in 36 respondents, the study obtained the following research results:

*Sample characteristics*

Distribution of respondents' characteristics by age and gender (Table 1).

Table 1. Frequency distribution of respondents' characteristics by age and gender

Characteristics	F	%
Age (years)		
60-70	28	77.8
71-80	6	16.7
>80	2	5.6
Gender		
Male	5	13.9
Female	31	86.1
	36	100

Based on Table 1 obtained that out of 36 respondents, the most age was 60-70 years which is 28 people (77.8%) and the most gender is female which is 31 people (86.1%).

*Nutritional Stage*

Distribution of Nutritional Status Frequency in Elderly Prolanis Puskesmas Working Area Lubuk Pinang (Table 2). Table 2 showed that out of 36 respondents, the most nutritional status was overweight, namely 15 people (41.7%).

Table 2. Distribution of Nutritional Status Frequency

Nutritional Stage	F	%
Underweight	4	11.1
Normoweight	13	36.1
Overweight	15	41.7
Obesity	4	11.1
	36	100

*Hypertension*

Distribution of hypertension frequency in elderly prolanis working area Lubuk Pinang Health Center (Table 2).

Table 3. Distribution of hypertension frequency

Hypertension Status	F	%
Pre-hypertension	1	2.8
Hypertension stage-1	10	27.8
Hypertension stage-2	25	69.4
	36	100

Table 3 shows that out of 36 respondents, the most hypertension was stage II, namely 25 people (69.4%). Table 4 showed that out of 36 respondents, the most nutritional stage was overweight, namely 15 people (41.7%), with the most hypertension in stage II, 11 people (30.6%). The results of the statistical test (Spearman correlation) obtained a value of  $p = 0.031$  ( $p < 0.05$ ), so it can be concluded that there is a relationship between nutritional status and the incidence of hypertension in the Elderly Prolanis Working Area of the Lubuk Pinang Health Center, Muko-Muko Regency, North Bengkulu.

The results showed that based on the age of 36 respondents, the most were 60-70 years, namely 28 people (77.8%) in the Elderly Prolanis Working Area of the Lubuk Pinang Health Center, Muko-muko Regency, North Bengkulu. This study shows that the age of the elderly who follow Prolanis is mainly the elderly. In line with research (Yunanto et al., 2020) older people with hypertension in the work area of the Pakusari Jember Health Center, most patients aged 60-74 years, namely (56.2%). in the elderly who followed and did not follow Prolanis obtained the most elderly age was 65-70 years, namely (60.3%). This difference can be caused by categorizing the age of the elderly using different theoretical references and also other research locations so that various categories are obtained (Weiss & Zhang, 2020). They are following the theory that age is one of the risk factors for irreversible hypertension. The more you get older, the greater the risk of hypertension. This is caused by changes in the structure of blood vessels, such as the narrowing of the lumen, as well as the walls of blood vessels becoming stiff and their elasticity reduced, thereby increasing hypertension (Abineno & Malinti, 2022). Based on the gender of the elderly who follow prolanis, the most are women, namely 31 people (86.1%)



in the Prolanis Elderly Working Area of the Lubuk Pinang Health Center, Muko-muko Regency, North Bengkulu. In line with previous research conducted by Ahmad that Prolanis hypertension patients at the Surakarta City Health Center were the most followed by women, namely (85.7%) and obtained the gender of the most Prolanis hypertension patients was women, namely (73.3%).

Gender is one of the risk factors for hypertension that cannot be changed. In this case, men tend to suffer more from hypertension than women. Because the male sex has a lifestyle that tends to increase hypertension more than women. Meanwhile, women will have a higher risk of hypertension when they enter menopause.

The average woman has an increased risk of high blood pressure (Wenger et al., 2018). It happens because women experience a period of menopause and a decrease in the endocrine system, such as estrogen and progesterone. Women who have not undergone menopause are protected by the hormone estrogen, which plays a role in increasing levels of High-Density Lipoprotein (HDL), which is a means of transporting cholesterol from arteries and tissues to the liver to be recycled so that the arteries become clean. Low HDL cholesterol levels and high LDL cholesterol (Low-Density Lipoprotein) will affect the process of atherosclerosis (Borén et al., 2020).

**Table 4.** Relationship of nutritional stage and incidence of hypertension in elderly Prolanis region the work of Puskesmas Lubuk Pinang

Nutritional stage	Hypertension						N	p-value
	Pre-hypertension		Hypertension stage-1		Hypertension stage-2			
	F	%	F	%	F	%		
Underweight	0	0	0	0	4	11	4	0.031
Normoweight	1	2.8	1	2.8	11	30.6	13	
Overweight	0	0	7	19.4	8	22.2	15	
Obesity	0	0	2	5.6	2	5.6	4	
	1	2.8	10	27.8	25	69.4	36	100

Research by (Santosa et al., 2020) showed that 33 female respondents experienced hypertension more than men, namely 33 people (66%), while male respondents 17 people (34%) (Putra et al., 2021). For women who enter the menopause period, their blood pressure tends to increase, and this is due to the influence of estrogen hormones that protect the cardiovascular system decreases. While men suffer more from hypertension at the age of fewer than 60 years due to lifestyle influences (Everett & Zajacova, 2015). Women follow Prolanis, more than men. There is because, in addition, women and men have different responses to facing problems. Men are more likely to not care about health, while women are more concerned about their health, and women are more found doing their health checks (Cheong et al., 2020).

Distribution of Nutritional Stages Frequency in Prolanis Elderly in the Lubuk Pinang Puskesmas Working Area, Muko-Muko Regency, North Bengkulu shows that the most nutritional status value is overweight, namely 15 people (41.7%) in the Elderly Prolanis Working Area of the Lubuk Pinang Health Center, Muko-Muko regency, North Bengkulu. It shows that overweight nutritional stages are caused by a lack of physical activity at home and an unbalanced diet. In the line where the elderly with the most nutritional status were obese degree I (29.7%) and also obtained a small part, namely (37%), the elderly prolanis had an overweight nutritional stage, the most nutritional status

of the elderly was normal (43.3%) and that the nutritional status of hypertension participants who followed the prolanis with the most nutritional status was normal, namely (66.7%). More nutrition in the elderly occurs because the elderly experience changes in body composition, which results in loss of muscle mass and an increase in body fat, besides that the elderly also experience a decrease in physical activity that causes a buildup of body fat (Ng et al., 2017).

Prevalence of Hypertension in the Elderly Prolanis Working Area of the Lubuk Pinang Health Center, from the results of the study obtained from 36 respondents, the most hypertension degree is stage II, namely 25 people (69.4%) in the Elderly Prolanis Working Area of the Lubuk Pinang Health Center, Muko-Muko, North Bengkulu. it is inseparable from the long time the elderly have experienced hypertension because hypertension increases with age. Unlike the previous study conducted obtained that elderly patients who follow prolanis with gymnastics activities, the most degree of hypertension is Stage 1 (70%) (Syamson et al., 2020). Hypertension occurs due to the degeneration of the circulatory system, starting with atherosclerosis, a disturbance in the anatomical structure of peripheral blood vessels that continues with the stiffness of blood vessels/arteries. Vascular stiffness is accompanied by narrowing and possible enlargement of plaque that inhibits peripheral circulatory disorders. The stiffness and dullness of the blood flow cause the heart load to

increase in weight which is eventually compensated by an increase in the pumping effort of the heart, which will impact increasing blood pressure in the circulatory system. Hypertension is also one of the degenerative diseases. Generally, blood pressure increases slowly with age, and its prevalence is that of most men (Laurent & Boutouyrie, 2020).

The elderly participated in the most prolans in stage II as it is known that many factors, such as long-suffering, influence hypertension. Prolonged hypertension  $\geq 1$  year has a 3,623 times risk of causing poor quality of life in prolans respondents. **The Relationship between Nutritional Status and the Incidence of Hypertension in the Elderly Prolans Working Area of the Lubuk Pinang Health Center, Muko-Muko Regency, North Bengkulu**

The results showed that the most nutritional status was overweight, namely 15 people (41.7%), with the most hypertension in stage II, 11 people (30.6%). The results of the statistical test (spearman correlation) obtained a value of  $p = 0.031$  ( $p < 0.05$ ), so it can be concluded that there is a relationship between nutritional status and the incidence of hypertension in the Elderly Prolans Working Area of the Lubuk Pinang Health Center, Muko-Muko Regency, North Bengkulu in 2018. Of 36 respondents, 4 had underweight nutritional status and a stage II hypertension history. Where this could occur because the patient had been suffering from hypertension for a long time or because of other comorbidities that require taking long-term medications where the drug if taken in the long term, can disrupt organ function such as digestion which will interfere with the absorption of food which causes the patient to experience weight loss (Livovsky et al., 2020).  $P$ -value = 0.007 was obtained, which means a meaningful relationship exists between the respondent's body mass index and the blood pressure of dm type 2 patients who are members of the Prolans Puskesmas Alai Kota Padang ( $p < 0.05$ ). Obtained there is a relationship between BMI with systolic and diastolic blood pressure, although with a low correlation coefficient. The relative risk of suffering from hypertension in obese people is 5 times higher compared to people whose weight is normal, besides the Body Mass Index (BMI) is directly correlated with blood pressure, especially systolic blood pressure. Many studies have proven that there is a relationship between nutritional status and the incidence of hypertension in the elderly and it is suspected that weight gain plays an important role in the mechanism of the onset of hypertension in the elderly, nutrition is more closely related to the craze for consuming foods that contain high fat. Nutrition further increases the risk of hypertension due to several reasons. The greater the body mass, the more blood is needed to supply oxygen

and food to the body's tissues. This means that the volume of blood circulating through the blood vessels increases putting more pressure on the walls of the arteries, which will cause an increase in blood pressure. In addition, being overweight also increases the frequency of heart rate. When hypertension occurs in a person can be caused by the sympathetic system and the renin system angiotensin. The activity of the sympathetic nerves is to regulate the function of nerves and hormones, so it can increase heart rate, narrow blood vessels, and increase water and salt retention (Sata et al., 2018). In the renin-angiotensin system, renin triggers the production of aldosterone, which will affect the kidneys to retain water and sodium, while angiotensin will shrink the diameter of blood vessels so that blood pressure will rise.

## 1 Conclusion

Based on the results of research on the relationship between nutritional status and the incidence of hypertension in the Elderly Prolans Working Area of the Lubuk Pinang Health Center, Muko-Muko Regency, North Bengkulu, in 2018, it can conclude that the highest age is 60-70 years and the most gender is female. Furthermore, the most nutritional status is overweight, while the most hypertension is stage II. The statistical analysis results show a relationship between nutritional status and the incidence of hypertension in the Elderly Prolans Working Area of the Lubuk Pinang Health Center, Muko-Muko Regency, North Bengkulu, in 2018. ( $p=0.031$ ).

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# The Relationship between Nutritional Status and the Incidence of Hypertension in the Elderly at the Working Area of the Lubuk Pinang Health Center, North Bengkulu

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