



The Risk Factors of Hypertension Among the Elderly in the Working Area of Sikumana Primary Health Care Center

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Abstract

Introduction: The elderly are prone to hypertension. This study aimed to analyze the risk factors of diet and physical activity for hypertension in the elderly in the working area of Sikumana Primary Health care center in 2022.

Method: This analytical observation study was conducted in a case control design. The subjects were 100 elderlies (50 cases and 50 controls). Simple random sampling was used to choose the subjects. Data collection was done by interviews using structured questionnaires. Data analysis was done through Chi Square test and Odd Ratios.

Results: The results showed that the elderly who has an unhealthy diet were at 4.45 times more likely to have hypertension (OR= 4.45, 95% CI: 1.68-11.81; p=0.004). The elderly who had lacked of physical activity were at 5.52 times more likely to have hypertension (OR=5.5, 95% CI: 1.86-16.34; p=0.002).

Conclusion: The risk factors for hypertension among the elderly in the working area of Sikumana Primary health care center were unhealthy diet and lack of physical activity. It is suggested that primary health care center should promote healthy food, salt and fat reduction in the diet and increase physical activities through posyandu (integrated health post), especially for elderly.

Keywords: Physical activity, hypertension, elderly, unhealthy diet

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Introduction

Hypertension is a condition in which systolic blood pressure increase to above or equal to 140 mmHg or diastolic blood pressure is above or equal to 90 mmHg.¹ Hypertension is also called the silent killer because its existence is not realized by sufferers as there is no typical symptom or complaint as the warning and hypertension is the leading cause of death worldwide.² Hypertension is an increase in blood pressure on the walls of arteries. In this case, the intended blood vessels are blood

vessels that carry blood from the heart, then pump the blood to all body tissues and organs of the human body to circulate blood through blood vessels. As a result of the hypertension, the heart will work stronger. This causes problems, namely blood flow disruption, blood vessel damage, which can lead to degenerative diseases until death.³

Risk factors for hypertension are divided into two groups, the risk factors that cannot be changed or controlled, such as age, sex, and heredity, and the risk factors that can be changed or controlled, such as

smoking, unhealthy diet, salt intake, saturated fat intake, alcohol consumption, obesity, lack of physical activity, stress and estrogen use. Hypertension is now a major problem, not only in Indonesia but in the world because hypertension is one of the entrances or risk factors for other diseases such as heart, kidney failure, diabetes and stroke.²

According to World Health Organization (WHO), the increase in hypertension is influenced by four main risk factors, namely unhealthy diet, lack of physical activity, tobacco use, and alcohol use that is harmful to health. Weak control of the risk factors can affect the increase in number of cases every year.⁵ The prevalence of hypertension in Indonesia was found from 2018 Riskesdas, which showing that the prevalence of high blood pressure was 34.11%. The prevalence of high blood pressure in women was higher (36.85%) than the prevalence of high blood pressure in men (31.34%). The hypertension prevalence in urban areas was higher (34.43%) than in rural areas (33.72%).⁵

Based on the results of 2018 Riskesdas data from East Nusa Tenggara (NTT) Province, the hypertension prevalence based on diagnosis 7.2%, taking medication 4% and the measurement results was 27.7% in the population aged >18 years in NTT Province, with the estimated results of 183,152 cases (26.5%). In 2019 the hypertension increased to the estimated results of 189,781 cases. The hypertension prevalence in Kupang City in 2018 according to diagnosis was 8.0%, taking medication 8.31% and measurement results in residents aged >18 years in Kupang City was 25.61%, with the estimated results of 2,282 cases.⁶

Puskesmas Sikumana had the highest prevalence of hypertension in Kupang City in 2021, with 1,995 cases.⁷ Based on initial observations of the incidence of hypertension obtained from UPTD Puskesmas Sikumana Kupang City, hypertension is included in the 10 highest diseases in the last 6 (six) years. In 2016 there were 1,700 cases, in 2017 were 1,971 cases, in 2018 were 5,449 cases, but

decreased in 2019 into 866 cases and in 2020 there was 1,634 cases and in 2021 increased to 1,995 cases. Based on the age distribution of hypertension, the most cases was in Puskesmas Sikumana (342 cases or 32%).⁸

The elderly is the age group that had the most cases of hypertension. This happens because the elderly often experience setbacks in physical, mental and social condition. Physical deterioration in the elderly made them vulnerable to diseases, especially degenerative diseases, one of which is hypertension.⁹ The emergence of degenerative problems and non-communicable diseases, namely hypertension, diabetes and mental health disorders such as depression, dementia, anxiety disorders, and difficulty sleeping will influence the health status of the elderly. Hypertension in the elderly is closely related to dietary factors and physical activity. Most of the elderly in the study area consumed excessive salt and their physical incompetence resulted in lack of physical activity. As a result, the heart has to work harder and blood pressure rises which causes hypertension.¹⁰ If the hypertension is not managed properly, more severe diseases such as damage to the blood vessels of the heart, kidneys and brain will result in stroke or heart attack.⁵

Unhealthy diet and lack of physical activity are the risk factors of hypertension. In general, the elderly had unhealthy diet, such as high in salt and fat. Sodium in salt make water retention so that the amount of blood volume increases, as a result there is an increase in blood pressure because the heart works stronger to pump the blood and result in hypertension. The physical activities such as climbing stairs, gardening and cleaning the house are the examples to improve the ability of the heart, lungs, and muscles of the body.¹¹

The results of previous studies showed that there was a relationship between diets such as consumption of high-sodium and fatty foods with the prevalence of hypertension in the elderly in the working area of the Molibagu Health Center, Bolaang Mongondow Regency.¹² Salty and fatty food

intake cause hypertension as the amount of sodium and cholesterol accumulates in the blood, thus triggering hypertension. This research is supported by the research of Rihiantoro and Widodo (2017) at the Tulang Bawang I primary health care center which showed that the individuals who consumed unhealthy diet had 4.31 times greater risks than the ones who consumed healthy diet. The ones who had light physical activity had 2.26 times greater risk of hypertension than those who had moderate or heavy physical activity. It can be concluded that there was a relationship between diet and physical activity with the risk of hypertension.¹³

Based on the pre survey on 7 elderlies with hypertension who visited Sikumana Health Center, it was found that 4 of them had the habit of consuming excessive salt, fatty foods such as meat, offal and coconut milk. They were also rarely doing exercise and had low physical activities. The other 3 elderlies also rarely did physical activity and exercise. They also had not been able to reduce consumption of salty and fatty foods, even though they were suffering from hypertension. This specific issue of food consumption and physical inactivity in the working area of Sikumana primary health care center inspired the researchers to study the risk factors of hypertension among the elderly in the Sikumana Health Center working area.

Method

Types and Design of Research

This analytical observation study used a case control study design. The cases were the elderly who suffered from hypertension, while the controls were the elderly who did not suffer from hypertension. The study was conducted in the working area of Sikumana primary health care center. The research was conducted in December 2022. The risk factors studied were diet and physical activity.

Diet were measured through Food Frequency Questionnaires (FFQ). The

groups of food sources included sources of carbohydrates, fats and sodium. The number of consumption was scored 50 if the subjects consumed >3x/day, 25 if the subjects consumed 1x/day, 10 if the subjects consumed 3-6x/week, 5 if the subjects consumed 2x/month and 0 if the subjects never consumed these food groups. The scores then were added up as a whole and averaged. The diet category was categorized as unhealthy if the average score was 15-50 and was categorized as healthy if the average score was 0-14.¹⁴

The physical activity questionnaire was adopted from Iftya's study in 2019.¹⁵ The physical activity measurement were done using Physical Activities Scale for Elderly (PASE) questionnaire. PASE questionnaire consists of three kinds of activities: leisure, household and voluntarily activities. The score used was 0 for never, 1 for rarely, 2 for sometimes and 3 for often. The scores of each item were added to produce the final score then averaged. Then, the scores from the subjects were categorized as lack of physical activity if the scores were 0-31 and good if the scores were 32-63.¹⁶ Blood pressure measured using a sphygmomanometer by the health workers at the primary health care center. Hypertension was defined by systolic blood pressure of 140 mmHg or above and diastolic blood pressure of 90 mmHg or above.²

Sampling methods and calculations

The sampling technique in this study was a probability sampling: simple random sampling method. The matching was done in age and sex variables, by selecting the control subjects with the same characteristics as the cases. The subjects of the study was a portion of the population taken and will be considered to be representative of the entire population.¹⁷ The magnitude of the sample in the study can be determined by calculating it using the formula Lemeshow (1997). Determination of sample size using the following formula:

$$n = \frac{\{Z_{1-\alpha/2} \sqrt{2P_2(1-P_2)} + Z_{1-\beta} \sqrt{P_1(1-P_1) + P_2(1-P_2)}\}^2}{(P_1 - P_2)^2}$$

Description:
 N = Sample size
 Z (1- α) = Standard normal spread value, with a confidence level of 95% = 1.96
 Z (1- β) = Standard normal spread value, power of test 80% = 0.84
 P1 = Proportion of exposure to the case group (0.58)
 P2 = Proportion of exposure to the control group (0.41)
 Based on the formula, the number of samples obtained is:

$$n = \frac{\{1.96 \sqrt{2 \times 0.41(1-0.41)} + 0.84 \sqrt{0.58(1-0.58) + 0.41(1-0.41)}\}^2}{(0.58 - 0.41)^2}$$

$$n = \frac{1.394}{0.028} = 49.7 = 50$$

Figure 1. The Sample size formula

The minimal sample size was 50 in each group, case and control groups, with a ratio of 1:1. The overall subjects in this study was 100 elderlies.

The inclusion criteria of this study were:

1. Elderly aged 60-70 years
2. Residing in the working area of Sikumana primary health care center
3. Willing to be the subjects of this study.

The exclusion criteria of this study are:

1. Unclear address
2. Cannot be found after three visits.

Data Analysis

The univariate analysis aimed to describe the frequency distribution of each variable, which were the categorical

variables. Bivariate analysis was used to find the risk factors of hypertension from the diet and physical activities. The Chi square tests were used to find the risk factors of hypertension. This study used Odd Ratios to find the risk factors of hypertension among the elderly in the working area of the Sikumana primary health care center.

Results

Table 1 shows that among the subjects, 53% were females, mostly at the age of 60-65 (62%) and most of the had high school education (38%). Most of the subjects were the retirement as the civil servant/ police/ army (35%). Most of the subjects consumed unhealthy diet (72%) and lack of physical activity (76%).

Table 1. Characteristics of the subjects

No	Variable	Total	Percentage (%)
1	Gender		
	Female	53	53%
	Male	47	47%
	Total	100	100%
2	Age		
	60-65 (years)	62	62%
	66-69 (years)	38	38%
	Total	100	100%
3	Education		
	No School	4	4%
	Primary school	17	17%
	Junior High School	7	7%
	High School	38	38%

Table 1. (Continued) Characteristics of the subjects

	College	34	34%
	Total	100	100%
4	Work		
	Retired Civil Servants/police/ army	35	35%
	Housewives	22	22%
	Self employed	18	18%
	Farmer	18	18%
	Craftsman	2	2%
	Odd Jobs (Scavengers And Grass Pulling Out)	5	5%
	Total	100	100%
5	Diet		
	Unhealthy	72	72%
	Healthy	28	28%
	Total	100	100%
6	Physical Activity		
	Lack	76	76%
	Enough	24	24%
	Total	100	100%

Table 2 shows that the percentage of the subjects who consumed unhealthy diet was higher among the cases (59.7%), than the control group (25.0%). The results of the Chi Square test showed a p value of 0.004.

The Odd Ratio for hypertension was 4.45 among the subjects who consumed unhealthy diet compared to the subjects who consumed healthy diet, with 95% of CI of 1.68-11.81.

Table 2. The crosstabulation between diet and hypertension

Diet	Hypertension				p	95%CI	OR
	Case		Control				
	n	%	n	%			
Unhealthy	43	59.7%	7	25.0%	0.004	1.68-11.81	4.45
Healthy	29	40.3%	21	75.0%			
Total	72	100%	28	100%			

Table 3 shows that the percentage of the elderly who did less physical activity was more in the case group (59.2%), than the control group (20.8%). The results of the Chi Square test showed a p value of p = 0.002.

The Odd Ratio for hypertension was 5.52 among the subjects who had lack of physical activities compared to the subjects who had enough physical activities, with 95% of CI of 1.86-16.34

Table 3. The crosstabulation between physical activity and hypertension

Physical Activity	Hypertension				P	95%C	OR
	Case		Control				
	N	%	N	%			
Lack	45	59.2%	5	20.8%	0,002	1.86-16.	5.52
Enough	31	40.8%	19	79.2%			
Total	76	100%	24	100%			

Discussion

The results of this study showed that the elderly whose diet is unhealthy were having 4.45 times greater chance to have

hypertension compared to the elderly who consumed the healthy diet. In this study, 32 % of the subjects were the retirement of civil servants / TNI / POLRI. Thus, they had good

income or economy so that they were able to provide a preferred food according to the taste they liked, without paying attention to the content that can cause health disruptions. This was in accordance with Fitriani's opinion (2020) which stated that with good income, they could choose the food that suit their tastes.¹¹ At the elderly (mostly aged 60-65 years), they also experienced a decrease function in their taste buds. Sensitivity to taste will decrease, especially in sweet and salty tastes so that the elderly used flavoring and high salt in the food consumed to prevent from bland taste. This also in accordance with the opinion of Subkhi (2016) which stated that the consumption of unhealthy food influenced by the physiological state of the elderly that the diminishing the taste sense, which made them used more flavorings such as salt or soy sauce excessively.¹⁸

The reserchers also found that many of the elderlies in Sikumana Primary health care center often consume salted fish and anchovies (94%) because they are cheap and easy to get, high-fat foods (90%), instant noodles (80%), eggs (80%) and all of them used high salt and other flavoring. Consuming high fat can increase the narrowing of blood vessels associated with an increase in blood pressure.¹⁸ The habit of consuming saturated fats that can be found in butter, biscuits, meat and cheese can increase cholesterol levels in the blood, which causing clogged of blood circulation. Sodium contained in salt can hold water retention thereby increasing blood volume resulting harder work of heart so that blood pressure increases and causes hypertension. Saturated fat makes cholesterol levels in the blood rise and can cause plaque on the walls of blood vessels that will make the heart work hard to pump blood throughout the body so that it can cause hypertension.¹⁹

The results of this study are in line with the research conducted by Mouliza and Sarumpaet (2014). The unhealthy food consumed were the foods that were high in salt, fat and rice, bread, biscuits and preserved foods with a percentage of 56.92% and the percentage of subjects who had the healthy food was lower (43.1%). The results of the Chi Square test on the

relationship between diet and hypertension incidence in the elderly in Paya Bujuk Village.²⁰ This study was also reinforced by the results of another study conducted by Andriyani (2020), which showed that the elderly who had the habit of eating salty foods had a higher hypertensive status with a percentage of 62.2% and the subjects who did not have the habit of eating salty foods was only 37.8%. The results of the stusy showed a significant relationship between the habit of eating salty foods and hypertension status in the elderly at RSU Tangerang Selatan.²¹

The results of this study showed that the elderly who had lack of physical activity were having 5.52 times greater chance to have hypertension compared to the elderly who had enough physical activities. The results of this study showed that the subjects had lack of physical activity such as walking, making crafts, dressing up, washing clothes, cleaning the environment, cleaning the bathroom, cleaning the trash can, and caring for others that can cause an increase in blood pressure. Factors that affect physical activity in the elderly are gender and age. Among the subjects who had lack of physical activity was 59.2%. It was also found that most of the elderly were female 53%. Most of the females were housewives who tend to have less physical activity. Most of them just stayed at home without exercise. In accordance with Fitriani's opinion (2020) which stated that those who did not do physical activity were mostly housewives and tended to do less physical activity by staying at home.¹¹ The age of the elderly were 60-65 years (62%), which mean that they were in the middle elderly group so that health and body functions began to decline as a result of limitations in the physical activity. This was in accordance with Amaliyah's opinion (2021) which stated that the elderly at the age of 60-74 years had limited daily activities due to a decrease in physiological factors.²²

Based on the findings of this study, the activities of the subjects were watching TV and rarely walking. In addition, weekly elderly gymnastics, which originally held have been eliminated since the Covid-19 pandemic, causing them had a lack of physical activity. The results of this study

were in line with the research conducted by Herdiani et al (2021). Based on the results of the study conducted, it was found that the percentage of the subjects whose physical activity was high in the case group (65.6%) compared to the sufficient physical activity with a percentage (8.7%) Researchers said that the majority of the elderly of 70 years old and above only did light activities and did not spent time for resting and watching TV. The results of the study showed a relationship between physical activity and the prevalence of hypertension in the elderly at the Klampis Ngasem Health Center, Surabaya City.²³ Another study conducted by Tating Nuraeni (2017) found that the percentage of respondents tended to be high in the group of cases whose physical activity was less (69.7%). This is influenced by the age of the elderly so that they experience a decrease in activity due to fear of falling and injury. The results of the statistical test have a relationship between physical activity and the incidence of hypertension in the elderly.²⁴

Physical activity is very important for blood pressure control in the elderly because it can help in preventing and lower high blood pressure. The lighter the heart works, the less pressure on the arteries so that the blood pressure drops. Physical

activity carried out regularly by the elderly can improve heart and blood vessel health and reduce the risk of hypertension in the elderly.²⁵ Seniors who like to exercise regularly such as participating in

gymnastics, morning walks, cleaning the house and sweeping can lower blood pressure. The more regular exercise, the greater the need for oxygen-containing blood because the heart meets by increasing blood flow (Amaliyah, 2021).

Conclusion

This study found that the risk factors of hypertension among the elderly in the working area of Sikumana primary health care center were unhealthy diet and lack of physical activities. There is a relationship between physical activity and the prevalence of hypertension in the elderly in the work area of the Sikumana primary health care

center. It is suggested for the Sikumana primary health care center to engage promotive and preventive activities in hypertension prevention through increasing routine exercise activities every week and walking activities for 10,000 steps per day, conducting a promotion of healthy eating by consuming nutritious foods rich in fiber, low in fat and salt, especially for the elderly. These activities can be promoted in posyandu (integrated health post) for elderly. Further research on more specific dietary factors such as fibrous foods are expected. Studies on physical activity, such as the influence of elderly exercise, in a better design such as cohort and Randomized controlled trials are needed.

Ethical consent

This study was verified by the Research Ethics Commission (KEPK), Health, Faculty of Public Health, Nusa Cendana University Kupang. The ethics permit number is 2022435-KEPK. The approval date for the ethics permit is November 25, 2022

Availability of data and materials

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Confession

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