The Effect of Food Consumption, Stress Level and Nutritional Status with Hypertension among Elderly in Kerinci

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ABSTRACT

The prevalence of hypertension among the elderly is quite high, namely 40% with mortality around >65 years. The prevalence of hypertension in Indonesia increased in 2018 by 34.1%. The prevalence rate of hypertension has increased in Jambi Province from 24.6% in 2013 to 28.99% in 2018. Hypertension can be caused by factors that can be controlled, including food consumption, stress levels and nutritional status. The purpose of this study was to determine the effect of food consumption, stress levels, and nutritional status on the incidence of hypertension in the elderly in the Work Area of the Gunung Labu Health Care of Kerinci in 2020. This research is an observational analytic study with a case control study design. The population of this study were all elderly with a total of 1,425 people. The sample was drawn by purposive sampling with a comparison of cases and controls (1:1) in order to obtain a case sample of 41 people and a control sample of 41 people. Data were collected through a questionnaire by observation and interviews. Data analysis perform with univariate, bivariate, and multivariate using chi square by looking at the odds ratio (OR). The results of the bivariate analysis showed the influence of sodium consumption (p value= 0.009; OR = 4.195), fat consumption (p value = 0.046; OR = 2.723), stress level (p value= 0.007; OR = 4.053) affected hypertension among sample and the results of multivariate analysis were obtained that sodium consumption is the highest risk factor for triggering hypertension in the elderly (p value = 0.008; OR = 4.473). The conclusion of this study is the influence of sodium consumption, fat, and stress levels. It is recommended for the elderly to reduce foods that contain high sodium and Monosodium Glutamate (MSG).

Keywords: Hypertension, Food Consumption, Stress Level, Nutritional Status

INTRODUCTION

Hypertension is the silent killer or it is also called the stealth killer because a person does not know if he has increased blood pressure, either slowly or suddenly before checking his blood pressure. Hypertension is also said to be a symptom of a syndrome that can trigger a hardening of blood pressure, causing damage to target organs such as heart attacks, brain (stroke), chronic kidney disease and peripheral artery disease. Nearly 1 billion people worldwide have high blood pressure. Hypertension is one of the leading causes of premature death worldwide. In 2020 about 1.56 billion adults will live with hypertension. Hypertension kills nearly 8 billion people every year in the world and nearly 1.5 million people every year in the East-South Asia region. Approximately one third of adults in East - South Asia suffer from hypertension[1].

The prevalence of hypertension in Indonesia in 2013 was 25.8% and increased in 2018 by 34.1%, the prevalence of hypertension based on measurements was 34.11%, with the characteristics of the age group 55-64 years as much as 55.23%, male

gender as much as 31.34% and female as much as 36.85%, while the characteristics of urban dwellings were 34.43% and rural areas 33.72% [2]. Jambi is one of the provinces that has a fairly high hypertension rate, the prevalence rate of hypertension at ≥18 years of age based on measurement results was 24.6% in 2013 and in 2018 an increase of 28.99% and this figure is almost close to the national 34,11%, in the 55-64 years age group as much as 53.89% and for the 65-74 years old as much as 62.21% (Riskesdas, 2018). Meanwhile, hypertension is the 3rd most common disease in Jambi Province in 2017, namely 14.47% [3].

The factors that influence the occurrence of hypertension are divided into two major groups, namely inherent or uncontrollable factors such as gender, age, genetics and controllable factors such as diet, exercise habits and others. For the occurrence of hypertension, it is necessary to play the role of these risk factors together (common underlying risk factors), in other words, one risk factor alone is not enough to cause hypertension[4]. There was a trend toward increasing prevalence with increasing age and usually > 40 years. As the age increases, the risk of developing hypertension becomes greater so that the prevalence of hypertension among the elderly is quite high, namely 40% with mortality around > 65 years. However, body weight and diet are also determinants of blood pressure for most ethnic groups at all ages[5].

Based on the initial survey, the researchers obtained data on hypertension in the Gunung Labu Kerinci Community Health Center Work Area, including the 3rd highest disease after ISPA with 87 cases in 2019. The majority of people in Kerinci, especially in Kayu Aro District, work as farmers so that they spend more time in the garden so that people rarely take the time to have their health checked at the health care or the nearest health service. From the results of the data above, the researchers had the idea to examine the effect of food consumption, stress levels and nutritional status on the incidence of hypertension in the elderly in the Work Area of the Gunung Labu Health Care of Kerinci.

MATERIALS & METHODS

This study used case control study. The study population was all elderly in the working area of the GunungLabu Public Health Center, Kerinci with 82 samples divided into 41 cases and 41 controls. Sampling was selected by Non Probability Sampling (purposive sampling) where the sample is selected from among the population by determining specific characteristics that are by following per under the research objectives.

Statistical Analysis

The data were processed and analyzed using SPSS. The analysis performed was univariate and bivariate and multivariate analyzes using chi square test.

RESULT
Characteristics of respondents

Characteristics of respondents according to age, level of education and level of work can be seen in Table 1.

Table 1. Characteristic of sample

Characteristics	n	%
Age		
60 – 64	72	87,8
>70	10	12,2
Level of education		
No education	29	35,4
Elementary	43	52,4
Junior	7	8,6
Senior	3	3,7
Level of education		
Jobless	5	6,1
Farmer	63	76,8
Housewife	11	13,4
Entrepreneur	3	3,7

The results of the analysis of the effect of sodium consumption on the incidence of hypertension showed that there were 22 out of 41 (53.7%) respondents with hypertension who consumed more sodium in the category, while 34 out of 41 (82.9%) respondents who did not have hypertension consumed sodium. good category. The results of the statistical test chi square show that the p value is 0.009, so it can be

concluded that there is an influence between sodium consumption and the incidence of hypertension. The results of the association size analysis (OR) obtained a value of 4.095, which means that respondents who consume more sodium category have a 4.195 times greater risk of experiencing hypertension than respondents who consume good category of sodium.

Table 2. Analysis of the Effect of Food Consumption on the Incidence of Hypertension

Consumption	Case		Control		Total		p value	OR (CI 95%)	LowerlimitUpperlimit
	n	%	n	%	n	%			
Sodium									
Well	19	46	34	83	56	68	0.009	4.195	1.514-11.623
More	22	54	7	17	26	32			
Fat									
Well	14	34	24	58	38	46	0.046	2.723	1.111-6.670
More	27	66	17	42	44	54			
Carbohydrates									
Well	22	54	29	71	46	56	0.279	1.825	0.740-4.504
More	19	46	12	29	36	44			
Fiber									
Well	32	71	29	78	61	74	0.613	0.680	0.250-1.847
More	9	29	12	22	21	26			

The results of the analysis of the effect of fat consumption on the incidence of hypertension showed that there were 27 out of 41 (65.9%) respondents with hypertension who consumed more fat in the category, while 24 out of 41 (58.5%) respondents who were not hypertensive consumed fat. good category. The results of the statistical test chi square show that the p value is 0.046, so it can be concluded that there is an influence between fat consumption and the incidence of hypertension. The results of the association size analysis (OR) obtained a value of 2.273, which means that respondents who consume more category fat have a risk of developing hypertension 2.273 times greater than respondents who consume good category fat.

The results of the analysis of the effect of carbohydrate consumption on the incidence of hypertension showed that there were 22 (55%) respondents with hypertension who consumed carbohydrates in the good category, while there were 29 out of 41 (69%) respondents who did not consume carbohydrates in the good category. The results of the statistical test chi square show that the p value is 0.279, so it can be concluded that there is no effect between carbohydrate consumption and the incidence of hypertension. The result of the association size analysis (OR) obtained a value of 1.825, which means that respondents who consume more category of carbohydrates have a risk of experiencing hypertension 1.825 times greater than respondents who consume good category of carbohydrates.

The results of the analysis of the effect of fiber consumption on the incidence of hypertension showed that 32 out of 41 (70.7%) respondents with hypertension consumed less fiber, while 29 out of 41 (78%) respondents who did not have hypertension consumed less fiber. The results of the statistical test chi square show that the p value is 0.0613, so it can be concluded that there is no effect between fiber consumption and the incidence of hypertension. The results of the association size analysis (OR) obtained a value of 0.680 who consumed less category fiber had a risk of experiencing hypertension 0.680 times greater than respondents who consumed good category fiber**.**

Table 3. Analysis of Effect of Stress on the Genesis of Hypertension in the Elderly

Stress level	Case		Control		Total		p value	OR (CI 95%)	Lower limit-Upper limit
	n	%	n	%	n	%			
Moderate	19	48	33	79	52	63	0.007	4.053	1.546-10.621
Weight	22	52	8	21	30	37			
Total	41	100	41	00	82	100			

The analysis showed that there were 22 out of 41 (52.5%) respondents with hypertension who experienced severe stress levels while among the respondents who were not hypertensive there were 33 of 41 (58.5%) respondents who experienced moderate stress levels. The results of the statistical test chi square show that the p value is 0.007, so it can be concluded that there is an influence between stress levels and the incidence of hypertension. The result of the association size analysis (OR) obtained a value of 4.053, which means that respondents who experienced a level of severe stress had a risk of experiencing hypertension 4.053 times greater than respondents who experienced moderate stress.

Table 4. Analysis of Effect of Nutritional Status on Incidence of Hypertension

Nutritional Status	Case		Control		Total		p value	OR (CI 95%)	Lower limit-Upper limit
	n	%	n	%	n	%			
Normal	34	83	35	85	69	84	1.000	1.201	0.366-3.941
More	7	17	6	15	12	16			
Total	41	100	41	100	82	100			

The results of the analysis showed that there were 7 out of 41 (53.8%) respondents with hypertension who had more nutritional status, while among the respondents who were not hypertensive, 35 out of 41 (50%) respondents experienced normal nutritional status. The results of the statistical test chi square show that the p value is 1,000, so it can be concluded that there is an influence between fat consumption and the incidence of hypertension. The result of the association size analysis (OR) obtained a value of 1.201, which means that respondents with higher nutritional status have a risk of experiencing hypertension by 1,000 times compared to elderly people with normal nutritional status.

Table 5. Multiple Regression Logistic Multivariate Analysis Test

Variable	p value	OR (95%CI)
Sodium consumption	0.008	4.473
Fat consumption	0.026	3.263
Stress level	0.010	4.211

Sodium intake showed an influence on the incidence of hypertension with p value = 0.008 and OR value (95% CI): 4.473. This means that respondents with high sodium consumption have a 4.473 times greater risk of developing hypertension than respondents with good sodium intake.

DISCUSSION

1. Effect of sodium consumption on the incidence of hypertension

Based on Table 2, the results of chi square test show that there is a relationship between sodium consumption and the incidence of hypertension; this is because most respondents often consume salted fish 2-3 times a week. The effect of salt intake on hypertension occurs through an increase in plasma volume of cardiac output and blood pressure. Based on the food recall, it is 2 x 24 hour known that some respondents often consume salted, fried fish, each cooking using table salt and Mono Sodium Glutamate (MSG).

Other research results such as, concerning the relationship between calcium and sodium intake on systolic blood pressure in hypertensive patients who are hospitalized at Tugurejo Hospital Semarang, which shows that there is a significant relationship between sodium intake and blood pressure[6]. Consuming foods that are high in sodium can increase blood pressure. Sodium that enters the body will be directly absorbed into the blood vessels. This causes the level of sodium in the blood to increase. Sodium has water retention properties, causing blood volume to increase. Consuming sodium continuously can cause hypertension. Sodium intake consumed by respondents came from foods that contain high sodium.

Research conducted by Adhyanti 2013 on risk factors for sodium and potassium consumption patterns and obesity status on the incidence of hypertension in outpatients at Lailangga Public Health Center, Mina Regency, Southeast Sulawesi stated that patients with excessive sodium consumption patterns had a risk of suffering from hypertension by 2.643 times compared to patients with consumption patterns low sodium[7].

2. Effect of fat consumption on the incidence of hypertension

Based on Table 2, the results of chi square test show that there is an effect of fat consumption with the incidence of hypertension, this is because from the results of the interview, it is food recall 2 x 24known that respondents often consume food sources of saturated fat such as meat, offal and some vegetable fat sources such as palm oil and coconut milk. Respondents also often consume sources of saturated fat in the form of fried foods such as fritters, fried banana, fried tempeh, crackers, chips, and others. Also besides, the respondents processed most of their daily side dishes by frying, sauteing, or cooking them using coconut milk. Most of the respondents also explained that they often process beef into rendang and side dishes typical of Padang food stalls. The saturated fat in these foods can increase blood cholesterol levels.

This study is in line with research conducted[8] on fat intake and physical activity and their relationship with the incidence of hypertension in outpatients. Based on the results of the research and data analysis that was carried out during the study at the Outpatient Clinic of Panembahan Senopati Bantul Hospital, it can be concluded that there is a significant relationship between fat intake and the incidence of hypertension (p = 0.009). Respondents with more fat intake (> 30% total daily calories) 3.8 times greater risk of developing hypertension (OR: 3.839, 95% CI: 1.357–10.861).

Eating a diet high in saturated fat, hydrogenated fat, and high cholesterol but low Polyunsaturated Fatty Acid in excess amounts of (PUFA) can affect cholesterol levels in the blood. Excess fat consumption can increase cholesterol levels in the blood, especially Low Density Lipoprotein (LDL) cholesterol. Cholesterol will stick to the walls of the blood vessels to form plaque. Plaque will clog the blood vessels and this can affect the flexibility of the blood vessels[9]. Excessive fat intake will cause an increase in free fatty acids in the body. The increase in free fatty acids can increase the levels of Low Density Lipoprotein (LDL) in the blood, so that it can trigger atherosclerosis which can cause blockages in blood vessels and cause hypertension[10].

3. Effect of carbohydrate consumption on the incidence of hypertension

Based on Table 2, the results of chi square test show that there is no effect of carbohydrate consumption with the incidence of hypertension, this is because the respondents' daily carbohydrate consumption is still less than their need This can be because in the elderly, a person will experience a decrease in the sense of taste and smell which can lead to reduced appetite. Also many elderly people begin to lose teeth, causing discomfort when chewing. Other research results such as, on the relationship between food consumption and the incidence of hypertension in Tandengan Satu Village, Eris District, Minahasa Regency, showing that there is no relationship between carbohydrate intake and the incidence of hypertension in processors p = (0.392)[11].

Carbohydrates play an important role in nature, because they are the main source of energy[12]. However, excess energy will occur if the energy consumption that enters through food exceeds the energy expended. This excess energy will be converted into fat which causes obesity. High carbohydrate intake is one of the factors causing obesity[13]. In the metabolic process, carbohydrates are converted into

mono saccharides so that they are easily absorbed by the body. Glucose is an important monosaccharide for the body. When the amount of carbohydrates consumed exceeds the body's needs, most of it will be stored in the muscles and the liver as glycogen. The capacity for glycogen formation is very limited, which is a maximum of 350 grams. If the storage in the form of glycogen has reached its maximum limit, the excess carbohydrates will be converted into fat and stored in the adipose tissue. When the body needs the energy back, the glycogen stores will be broken down first, followed by fat mobilization[14]. Therefore, limiting carbohydrate consumption also needs to be done if it is not balanced with existing energy expenditure and is not balanced with the required daily calorie count.

4. Effect of fiber consumption with the incidence of hypertension

Based on Table 2, the results of chi square test show that there is no effect between fiber consumption and the incidence of hypertension, this is because respondents consume small amounts of vegetables and fruit, especially water soluble fiber sources so that it is not enough to meet their daily needs or is still in deficient category. Meanwhile, water soluble fiber can lower plasma cholesterol levels so that it can lower blood pressure. Based on respondents' statements, the lack of fruit and vegetable consumption was due to respondents being picky about the types of vegetables consumed, some subjects said they did not like vegetables and every time they ate only vegetable and animal side dishes without using vegetables.

This study is in line with previous research that there is no significant relationship between fiber intake and blood pressure in hypertensive patients, most patients with stage 1 hypertension (37%) have less fiber intake (<20g / day). Fiber has the benefit of reducing systolic blood pressure to 5.5 mmHg and diastolic 3 mmHg. Consumption of fiber in the good

category, as much as 25-30 grams, can bind bile acids so that it can reduce the absorption of blood fats and cholesterol which in turn can reduce the risk of high blood pressure. Consumption of fiber can make you feel full, help prevent constipation, and reduce the risk of heart disease because cholesterol levels are within normal limits[15].

American research on fiber intake states that a low fiber intake of ≤8.8 g / day can increase C-Reactive Protein (CRP) 4 times higher in people with two or three risk of disease (obesity, hypertension, diabetes) compared with people who are without a risk of disease (King DE et al., 2005). Low fiber intake results in less bile acid excreted in feces, so that a lot of cholesterol is absorbed from the residual bile. The more cholesterol circulating in the blood, the greater the accumulation of fat in the blood vessels and inhibits blood flow which has an impact on increasing blood pressure.

5. Effect of stress levels with the incidence of hypertension

Based on Table 3, the results of chi square test show that there is an influence between the level of stress and the incidence of hypertension, stress in the elderly which is categorized as severe because the elderly often feel tired because most of the elderly are still working other than that because the respondent has personal problems, and is usually considered underestimated by everyone however, these personal problems can cause anxiety in themselves, the elderly often feel restless and often suddenly get angry. As stated by Alvin (2007), internal stressors come from oneself in the form of negative thoughts, inner beliefs, and personalities[16].

Stress is a physiological and psychological response from the body to emotional stimuli that are influenced by both the environment and appearance in a person's life[17]. Stress can trigger hypertension through activity of the sympathetic nervous system which results in an intermittent (erratic) increase in blood

pressure[18]. When a person experiences stress, the hormone adrenaline will increase blood pressure through contraction of the arteries (vasoconstriction) and an increase in heart rate. If stress continues, blood pressure will remain high so that the person will experience hypertension[19].

6. Effect of nutritional status with the incidence of hypertension

Based on Table 4, the results of the test chi square show that there is no relationship between nutritional status and the incidence of hypertension; this is because there are other factors that contribute to the incidence of hypertension such as sodium consumption. The results of this study support the results of previous research conducted by[20] that there is no relationship between nutritional status and hypertension in the elderly at Puskesmas Lubuk Buaya Padang. This means that the results of this study support the results of previous studies by many experts who say that the pathogenesis of hypertension in excess nutrition is still unclear. Some experts argue that the role of genetic factors determines the incidence of hypertension in obesity, but others argue that environmental factors have a more important role.

Hypertension that occurs in someone who has a deficient or normal nutritional status can also be caused by the sympathetic system and the system renin angiosterone[20]. The activity of the sympathetic nerves is to regulate nerve and hormone function, so that it can increase heart rate, constrict blood vessels, and increase water and salt retention. In the system renin-angiotensin, renin triggers the production of aldoesterone which affects the kidneys to retain water and sodium, while angiostensin will shrink the diameter of the blood vessels so that blood pressure will rise[21].

Epidemiological investigations have shown that obesity is a characteristic feature of the hypertensive patient population. Cardiac output and blood volume of obese patients with hypertension were higher than those of normal weight patients with equivalent blood pressure. Due to obesity, sufferers tend to suffer from cardiovascular disease, hypertension and diabetes mellitus[22]. According to research conducted by Sapitri in 2016, it shows that people with obesity (BMI> 25) are at risk of suffering from hypertension by 6.47 times compared to people who are not obese[23].

7. Multivariate Analysis

Some of the independent variables included in the multivariate analysis were independent variables that had a p value of less than 0.25. In this analysis, the variables with a p value of less than 0.25 were sodium consumption, fat consumption and stress levels. Based on Table 13, the results of multivariate analysis using multiple logistic regression showed that the most influencing variable on the occurrence of hypertension in the elderly in the Gunung Labu Health Care was the consumption of sodium. These results are in line with research conducted other researcher that sodium and fat intake is related to the incidence of hypertension in the elderly in the Poasia Region, Kendari City. The results show that there is a relationship between sodium intake and the incidence of hypertension in the Poasia Region, Kendari City[24].

CONCLUSION

Based on the research results, the following conclusions were obtained:
1. Based on the characteristics of the respondents, seen from the average age of the respondents, the average age of the respondents is 63 years, where the most respondents are in the 60 year age group, most of the respondents are farmers, the education level of the respondents is mostly elementary school, some respondents consume more sodium, some respondents consume more fat , some respondents consume carbohydrates in good category, some respondents consume less fiber, some respondents experience severe stress levels and some respondents experience normal nutritional status.

2. Food consumption factors that influence the incidence of hypertension are sodium consumption (p value 0.009; 95% OR CI = 4.195) and fat consumption (p value 0.046; 95% OR CI = 2.723).
3. The level of stress affects the incidence of hypertension (p value 0.007; 95% OR CI = 4.053),
4. Sodium consumption is the highest risk factor for triggering hypertension in the elderly.

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Conflict of Interest

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