



Relationship between Dietary Fat-Sodium and Hypertension in Prolanis at Jarak Kulon Public Health Center

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ABSTRACT

Hypertension is a disease that causes high pain. Consuming sodium and fatty acids every day can increase the risk of hypertension. The impact of high fatty acids affects the presence of cholesterol deposits in the blood, while the levels of fatty acids cause increased blood pressure. This study aimed to analyze the relationship between sodium fat and hypertension in the Chronic Disease Management Program (Prolanis) at the Jarak Kulon Public Health Center Jombang. The research design used was cross-sectional. The population of this study was all hypertensive patients who participated in Prolanis, as many as 50 people. The sampling technique used was total sampling. The independent variable is the fat-sodium diet, and the dependent variable is hypertension. The instrument for the fat-sodium diet uses a questionnaire, while the incident uses observation. Statistical tests use Spearman Ranks. Spearman ranked data analysis with a significance of 0.01 and obtained a value of 0.000. Because (α) means there is a relationship between the fat-sodium diet and hypertension. The test results also show that the relationship level of 0.695 is included in the strong category. Based on the research results, it is hoped that food content that is low in fat and low in sodium levels will help blood pressure to reach near-normal levels to avoid more severe complications.

KEYWORDS

Diet, Fat, Hypertension, Sodium

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1. BACKGROUND

The problem that many people often need help with is that they consume more than the average amount of sodium and fat per person daily. This is caused by each person's tendency to consume salty and fatty foods, which increases blood pressure.

The general public widely consumes sodium chloride, food flavoring (Monosodium Glutamate = MSG), and sodium carbonate. Nutrient intake that is considered to have a role in the incidence of hypertension is fat and sodium (Guastadisegni et al., 2020). The prevalence of hypertension is high and tends

to increase, becoming the leading cause of heart disease, stroke, and kidney disease (Wu et al., 2015).

High blood pressure is a phenomenon that causes high morbidity rates. According to data, The World Health Organization states that an estimated 1.28 billion adults aged 30–79 years worldwide have hypertension (WHO, 2023). According to Basic Health Research (Riskesdas) results in 2016, 26.2% of the Indonesian population aged over 10 years consume salty food once or more per day, while 40.7% of the Indonesian population is classified as frequently consuming high-fat foods. The national prevalence of hypertension based on the Health Indicator Survey (Sirkesnas) 2016 amounted to 32.4%. Meanwhile, data from the Jombang District Health Service 2016 showed 53,555 (14.30%) hypertension sufferers (Dinkes Jombang, 2016).

The World Health Organization (WHO) plays a crucial role in setting dietary guidelines to combat hypertension. It recommends a sodium intake of no more than 2000 mg a day (equivalent to 5 g of salt) and a fat intake of around 20-35%, with saturated fat limited to <10%, MUFA at 15-20%, and PUFA at 6- 11% of the total energy required. It's important to be mindful of these recommendations when consuming

foods that can trigger hypertension, such as salty and fatty foods (DiNicolantonio & O'Keefe, 2017).

The impact of excessive saturated fat intake causing dyslipidemia is a risk factor for atherosclerosis. Atherosclerosis can trigger hypertension. This is caused by blood vessels experiencing atherosclerosis; in addition to increasing wall resistance, they also narrow, triggering an increase in heart rate and blood flow volume, which results in increased blood pressure (Jebari-Benslaiman, 2022). High salt intake can cause the sodium concentration in the extracellular fluid to increase to normalize it. The intracellular fluid is drawn out, which increases the extracellular fluid, which results in an increase in blood volume and an impact on increasing blood pressure (Bhave & Neilson, 2011).

Given the above, our research is focused on examining the relationship between a fat-sodium diet and the incidence of hypertension at the Prolanis Health Center, Jarak Kulon Jombang. We aim to provide valuable insights into this relationship. By understanding how diet affects hypertension, we hope to empower sufferers to manage their condition more effectively. Our goal is to guide hypertension sufferers in adjusting their food intake to

maintain blood pressure within normal limits.

2. METHODS

The design of this research is Cross-sectional. The research variables were the independent variable, the fat-sodium diet, and the dependent variable, the incidence of hypertension. The population in this study were all 50 hypertensive patients at the Prolanis Public Health Center Jarak Kulon

Jombang. The sampling technique used is total sampling. The measuring instruments used are observation and questionnaires.

3. RESULTS

The research results will describe the research location and characteristics. The general data of respondents at the Prolanis in Jarak Kulon Public Health Center on May 24, 2018, was 50 people.

Table 1. Characteristics of respondents

Characteristics	N	(%)
Age		
21 - 44 years old	1	2.0
45 - 59 years old	39	78,0
60-69 years old	7	14.0
>70 years n	3	6.0
Gender		
Male	7	14.0
Female	43	86.0
Family history of hypertension		
Yes	16	32.0
No	34	68.0
Fat-sodium Consumption		
Sodium	33	66.0
Fat	17	34,0
Hypertension Stage		
Stage 1	40	80.0
Stage 2	9	18.0
Stage 3	1	2.0

Table 1 shows the respondents' Characteristics at Prolanis in Jarak Kulon Public Health Center, Jombang. It reveals that a significant majority (78.0%) were in the age group of 45-59 years, with 86.0% female. Moreover, a substantial portion (68.0%) did not have a hereditary hypertension disease.

Based on fat-sodium consumption, 66.0% of respondents consume sodium every day. Based on the stage of hypertension, it shows that almost all (80.0%) respondents have stage 1 hypertension, as many as 40 people.

Table 2. Cross tabulation between Family history related hypertension and hypertension

Family history related hypertension	Hypertension							
	Stage 1		Stage 2		Stage 3		Total	
	F	%	F	%	f	%	F	%
Yes	7	14.0	8	16.0	1	2.0	16	32.0
No	33	66.0	1	2.0	0	0.0	34	68.0
Total	40	0.0	9	18,0	1	2.0	50	100.0

Table 2 shows that the majority (66.0%) of respondents who had no family history of hypertension suffered from stage 1 hypertension, 33 people.

Table 3. Cross tabulation between fat-sodium diet with hypertension

Diet	Hypertension							
	Stage 1		Stage 2		Stage 3		Total	
	F	%	F	%	f	%	F	%
Sodium	33	66.0	0	0.0	0	0.0	33	66.0
Fat	7	14.0	9	18.0	1	2.0	17	34.0
Total	40	80.0	9	18.0	1	2.0	50	100.0

Table 10 shows that the majority of respondents who consumed high levels of sodium (66.0%) suffered from stage 1 hypertension, 33 people. Meanwhile, a small percentage of respondents who consumed high fat (18.0%) suffered from stage 2 hypertension, as many as 9 people.

4. DISCUSSION

Based on the results of the researcher's research in Table 1, it can be seen that the majority (66.0%) of respondents consume high levels of sodium, 33 people. Diet is a specific food regimen for health and is carried out according to a doctor's or consultant's instructions. The results of this research show conformity

with theory (Cena & Calder, 2020). Factors that influence fat-sodium consumption behavior include internal factors such as age, ethnicity, gender, and genetics. Meanwhile, external factors include smoking, obesity, stress, physical exercise, salt intake, carbohydrate and fat intake factors, levels of fiber consumption, and alcohol consumption (Fang et al., 2021).

Based on the data above, the large amount of sodium consumption is likely influenced by age and gender. Meanwhile, heredity/genetics does not affect the incidence of hypertension. In terms of gender, premenopausal women begin to lose little by little the hormone estrogen, which protects blood vessels from damage,

so premenopausal women are significantly at risk of developing hypertension.

Based on the results of the researchers' research in Table 1, It can be seen that almost all (80.0%) of the respondents experienced stage 1 hypertension in 40 people. Systolic pressure is related to the high pressure in the arteries when the heart contracts (heart rate) (Khan, 2006). The division of hypertension classification is based on WHO criteria, which groups it into five classifications. The determination of respondents' systolic and diastolic hypertension was measured using a sphygmomanometer (Alfaqeeh et al., 2023).

Based on table 2 shows that the majority (66.0%) of respondents who had no family history of hypertension suffered from stage 1 hypertension, as many as 33 people. A person will have a greater chance of getting hypertension if their parents are hypertensive sufferers. In 70-80 cases of essential hypertension, there was also a history of hypertension in their parents (Ranasinghe et al., 2015). The presence of genetic factors in certain families will cause that family to be at risk of suffering from hypertension. This is associated with increased intracellular sodium levels and a lower potassium-to-sodium ratio. Individuals whose parents suffer from hypertension are

higher than those who do not have a family history of hypertension (Xi et al., 2015).

Implicitly, the results of this research are different from existing theory. However, if we examine it further, it can be seen that the respondents in this study were aged 40 - > 75 years, whereas blood pressure will also increase as age increases. In old age, hypertension is found only in the form of an increase in diastolic pressure as part of the more appropriate pressure to determine the presence or absence of hypertension.

The relationship between fat-sodium diet and the incidence of hypertension in Prolanis in Jarak Kulon Public Health Center Jombang

Based on the research results, it is known that the majority of people (66.0%) suffer from stage 1 hypertension, and as many as 33 people suffer from a diet high in sodium. Meanwhile, of the 17 dietary behaviors consumed fat, a small proportion (18.0%) of respondents suffered from stage 2 hypertension in 9 people.

The results of the Spearman rank statistical test carry significant implications. With a value of 0.000, much smaller than the alpha (α) value of 0.01, we can confidently accept H₁, indicating a strong relationship between a fat-sodium diet and the incidence

of hypertension at Prolanis in Jarak Kulon Public Health Center Jombang. The level of relationship between the numbers falls in the Strong category, further reinforcing our findings.

The relationship between the level of sodium consumption and the incidence of hypertension is that when there is an excess of salt in the body, it will be reabsorbed disproportionately by around 20% through a process known as osmosis so that the saltwater remains stable. Excessive salt content continuously causes the volume in the blood circulation to be higher than it should be. As a result, the excess fluid increases pressure on the walls of blood vessels. These walls react by thickening and narrowing, providing narrower space in the blood capillaries and increasing “resistance,” which ultimately requires higher pressure to move blood to the organs (Pitman, 2011). Another research results which stated that there was a significant relationship between salt consumption and the incidence of hypertension in people over 30 years ($p = 0.000$) (Yunus et al., 2023).

The pathophysiology of fat metabolism, which causes hypertension, begins when lipoproteins, as a means of transporting lipids, circulate in the body and are carried to muscle cells, fat, and other

cells. Likewise, the lipoprotein lipase enzyme in capillary endothelial cells breaks down triglycerides into glycerol and free fatty acids in the bloodstream (Feingold, 2024). Cholesterol, primarily found in LDL, will accumulate on the walls of blood vessels and form plaque. Plaque will be mixed with protein and covered by muscle cells and calcium, eventually developing atherosclerosis. Coronary blood vessels suffering from atherosclerosis, apart from becoming inelastic, also experience narrowing, so the resistance to blood flow in the coronary vessels increases, which will later trigger hypertension (Poznyak et al., 2022).

According to researchers, the body needs fat and sodium. Fat is a protective and building agent, while sodium functions to maintain fluid balance in the body (extracellular). However, consuming too much can increase blood pressure. So, by limiting fat and sodium consumption is necessary to maintain a healthy body according to age.

5. CONCLUSION

The study on the relationship between fat-sodium diet and the incidence of hypertension at Prolanis, Jarak Kulon Public Health Center, Jombang, May 24 2018, has

yielded crucial findings. These findings have the potential to significantly impact public health.

In the fat-sodium diet in Prolanis at Jarak Kulon Public Health Center Jombang, the majority (66.0%) of respondents consumed excess sodium, 33 people. The incidence of hypertension at Prolanis in Jarak Kulon Public Health Center Jombang was almost entirely (80.0%) of respondents with stage 1 hypertension, as many as 40 people. There is a relationship with a strong level of correlation between the fat-sodium diet and the incidence of hypertension at the Prolanis in Jarak Kulon Public Health Center Jombang with a significant value of 0.000 and a correlation of 0.695 as proven by the Spearman Rank test $< \alpha$, namely $0.000 < 0.01$, then H_1 is accepted.

Respondents should adopt a low-salt, low-fat, and high-fiber diet to achieve close to standard blood pressure to avoid more severe complications by giving instructions to reduce salt intake than usual, reduce consumption of foods that contain high levels of sodium such as sauces and soy sauce, canned food and others. People should be more motivated to maintain a nutritionally balanced diet, such as consuming foods low in fat and sodium, and adopt a healthy lifestyle, such as exercising

regularly, not smoking, not drinking alcohol, and not getting stressed easily according to age to prevent high blood pressure.

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AUTHOR CONTRIBUTIONS

Substantial contributions to conception, data collection, and analysis: Wiwik Dwi Heryanti, Rifai, Pepin Nahariani, and Fahrudin Kurdi. Manuscript revisions: Pepin Nahariani, and Fahrudin Kurdi.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest.

DATA AVAILABILITY STATEMENT

The data are not publicly available due to privacy or ethical restrictions.

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279