



The Effect of Salt Consumption and Obesity on the Event of Primary Hypertension in the Work Area of Poleang Community Health Centers

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Abstract

One of the health problems that are often faced by the Indonesian people today is the problem of degenerative diseases. There has been a change in disease patterns in the community from infectious diseases to non-infectious diseases, this is marked by an increase in the number of sufferers from year to year. This can be seen from the 2018 regional Health Research data that the number of hypertension cases in Indonesia is 34.1%. The purpose of this study was to determine the effect of salt consumption and obesity on the incidence of primary hypertension in the work area of Poleang Health Center, Bombana Regency. This type of research is a survey with a retrospective approach, and uses a case control study design. The number of samples as many as 110 respondents with a purposive sampling technique. Data collection using questionnaires, measurement of weight and height. Data analysis using Chi Square test. The results showed that salt consumption and obesity were risk factors for primary hypertension in Poleang District, Bombana Regency. Suggestion; Increased socialization of Prolanis to patients with hypertension and optimization of posyandu for the elderly, early detection of hypertension and risk factors for hypertension. It is hoped that the community will adopt a healthy lifestyle, following the activities of the Community Health Center Chronic Disease Management Program.

Key Words: Salt Consumption; Obesity; Hypertension; Community Health centers.

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1. Introduction

The Unitary State of the Republic of Indonesia is an archipelagic country with 3/4 of its territory consisting of the sea so that it has a broad category of coastal areas. This is evident from the fact that Indonesia has the most islands in the world, totaling 17,504 islands and has the second longest coastline in the world after Canada among 198 countries and 55 regions of the world [1].

The increasing prevalence of hypertension is generally caused by changes in lifestyle, causing a shift in disease patterns from infectious diseases to chronic degenerative diseases such as hypertension [2]. Hypertension often causes cardiovascular disease, kidney and stroke. There have been 9.4 million people out of 1 billion people in the world who died from cardiovascular disorders. The prevalence of hypertension in developed and developing countries is still relatively high, while the prevalence of hypertension in developed countries is 35% of the adult population and the prevalence of hypertension in developing countries is 40% of the adult population [3].

Hypertension is one of the most common health problems in the world, marked if a person has a systolic blood pressure of ≥ 140 mmHg and or a diastolic blood pressure of ≥ 90 mmHg, on repeated examinations. The prevalence of hypertension in Indonesia reached 34.1% in 2018. Hypertension for some people does not have any complaints, but if hypertension is not controlled properly then certain complications can arise in organs such as the brain, eyes, kidneys, heart, blood vessels, or other vital organs. There are several risk factors for the occurrence of hypertension, namely genetics, age, gender and unhealthy lifestyles. One of the unhealthy lifestyles is the possibility of being overweight or obese. The presence of obesity in a person is thought to have a significant relationship with the incidence of hypertension [4].

The highest prevalence of hypertension is in Africa, which is 46% and the lowest is in the Americas (35%). In the Southeast Asian region, one in three adults has high blood pressure, the prevalence of hypertension ranges from 19% in the Democratic People's Republic of Korea, to 42% in Myanmar. In India the increase occurred from 5% in 1960 to almost 12% in 1990 and more than 30% in 2008 [3]. In Indonesia, the highest incidence of hypertension in the 3 most recent Regional Health Research (RHR) surveys is in coastal areas. In the 2018 RHR, the highest hypertension was in South Kalimantan at 44.13%. The latest data from RHR 2018 shows that hypertension in Indonesia has reached 34.1% [5].

Hypertension is the silent killer, so treatment is often too late. Based on a report from the Ministry of Health that of 50% of hypertension sufferers, 25% of them are known to receive treatment, but only 12.5% of them are treated well. The number of people with hypertension in Indonesia is 70 million people (28%), but only 24% of them are controlled hypertension [6].

The epidemic of cardiovascular disease, especially hypertension, is driven by demographic and socio-economic changes that affect the living, eating and working habits of the population, so that the incidence of non-communicable diseases is increasingly varied in the epidemiological transition. One of the diseases included in the group of non-communicable diseases is hypertension. Besides being known as a disease, hypertension is also a risk factor for heart disease, blood vessels, kidneys, stroke and diabetes mellitus [7].

Patients with hypertension are classified or caused by primary hypertension, 90% of the biggest causes of primary hypertension are heredity and lifestyle, but apart from these two factors, the incidence of hypertension can be changed into a risk factor that also greatly influences the incidence of primary hypertension. In some cases, obesity as a result of unbalanced nutritional intake and lack of exercise can increase the risk of primary hypertension. Based on smoking habits, hypertension occurs 46.6% in patients who are active smokers and 8.5% passive smokers. Meanwhile, 77.8% of hypertensive patients have smoked for 10 years [8]. One of the other risk factors for hypertension is the geographical location of an area. Bustan (2015) states that people who live in coastal areas have a higher risk of suffering from hypertension than people who live in mountainous areas [9].

In Southeast Sulawesi, the prevalence of hypertension is also one of the top ten largest diseases, based on integrated disease surveillance data based on health centers, it was stated that in 2014 there were 46,656 cases of hypertension, in 2015 the number of hypertension cases was 24,419 cases and in 2016 the number of cases of hypertension was as many as 19,743 cases [10]

For Bombana Regency, the number of hypertension cases in 2017 based on blood pressure measurements of residents aged 18 years, hypertension cases were 4,319 cases, in 2018 the number of hypertension cases was 4,310 cases, while in 2019 the number of hypertension cases was 5,448 cases [11]. From the data above for Poleang District itself as one of the Community Health centers whose work areas are mostly located in coastal areas, the number of cases of hypertension sufferers aged 18 years in 2018 was 961 cases, in 2019 there were 786 cases, and in 2020 there were 388 cases, and hypertension was included in the number of cases. ranked 2nd for cases of the top ten diseases with the most patient visits [12].

The high number of hypertension cases in Bombana district, especially in Poleang District as one of the health centers whose work area is mostly located in coastal areas with an area of 115.39 km² with a population of 18,896 people, unhealthy habits and lifestyles of the community are important for research. on the risk factors for primary hypertension in the coastal area of Poleang and based on the results of previous studies indicate that the prevalence and risk of hypertension in coastal areas is more significant, therefore further research needs to be done.

The purpose of this study was to determine the effect of food consumption and obesity on the incidence of primary hypertension in the work area of the Poleang Health Center

2. Materials and Methods

This type of research is a survey with a retrospective approach, and uses a case control study design. The number of samples as many as 110 respondents with a purposive sampling technique. Data collection using questionnaires, measurement of weight and height. Data analysis was carried out bivariate using the Chi Square test. The basis for making the decision to accept the research hypothesis is based on the significant level (p value) if the p value > 0.25 then the research hypothesis is rejected, and if the p value < 0.25 then the research hypothesis is accepted. Presentation of data in the form of a frequency distribution accompanied by an explanation

3. Results

Bivariate Analysis

Effect of Salt Consumption on the Incidence of Primary Hypertension

Table 1: The Effect of Salt Consumption Risk Factors on the Incidence of Primary Hypertension

| Salt Consumption | Hypertension | | | | Amount | | Statistic Test | Score p -value |
|------------------|--------------|------|-----------------|------|--------|-----|---|----------------|
| | Hypertension | | No Hypertension | | | | | |
| | n | % | n | % | n | % | | |
| Excess | 48 | 73.8 | 17 | 26.2 | 65 | 100 | OR = 15.328 CI = 95% 5.766 – 40.746 | 0,000 |
| Enough | 7 | 15.6 | 38 | 84.4 | 45 | 100 | | |
| Total | 55 | 50 | 55 | 50 | 110 | 100 | | |

Source: Primary Data, 2021

Based on table 1, it was found that of the 65 respondents who consumed excess salt, the hypertensive respondents were 48 (73.8%) and those who were not hypertensive were 17 (26.2%) while of the 45 respondents who consumed sufficient salt, the hypertensive respondents were 7 (15.6%) and those without hypertension were 38 people (84.4%). Statistical test results obtained p value = 0.000 where $p < (\alpha = 0.05)$ then H_0 is rejected, it can be concluded that salt consumption is a risk factor for primary hypertension in the Pesisir area, Poleang District, Bombana Regency and the OR value is 15.3 which is significant that excessive salt consumption has a 15.3 times risk of developing hypertension compared to sufficient salt consumption. At 95% CI, with a lower limit value of 5.766 and an upper limit value of 40.746 because the confidence interval range does not include a value of 1, it means that excessive salt consumption is a risk factor for hypertension.

The Effect of Obesity Variables on the Incidence of Primary Hypertension

Table 2: The Effect of Obesity Risk Factors on the Incidence of Primary Hypertension in Poleang District, Bombana Regency

| Obesity | Hypertension | | | | Amount | | Statistic Test | Score p -value |
|---------|--------------|------|-----------------|------|--------|-----|--|----------------|
| | Hypertension | | No Hypertension | | | | | |
| | n | % | N | % | n | % | | |
| Excess | 34 | 79.1 | 9 | 20.9 | 43 | 100 | OR = 8.271 CI = 95% 3.371 – 20.311 | 0,000 |
| Enough | 21 | 31.3 | 46 | 68.7 | 67 | 100 | | |
| Total | 55 | 50 | 55 | 50 | 110 | 100 | | |

Source: Primary Data, 2021

Based on table 2, it is found that from 43 obese respondents who suffer from hypertension, 34 people (79.1%) and those who are not hypertension are 9 people (20.9%) while from 67 respondents who are not obese, 21 people (31.3%) suffer from hypertension and those who are not. hypertension is 46 people (68.7%).

Statistical test results obtained p value = 0.000 where $p < (\alpha = 0.05)$ then H_0 is rejected, it can be concluded that obesity is a risk factor for primary hypertension in coastal areas of Poleang sub-district, Bombana and OR value of 8.2 which means that obesity has an 8.2 times risk of developing hypertension compared to non-obese. At 95% CI, with a lower limit value of 3.371 and an upper limit value of 20.311 because the confidence interval range does not include a value of 1, it means that obesity is a risk factor for hypertension.

4. Discussion

Effect of salt consumption on the incidence of primary hypertension

Salt consumption is a person's habit of consuming foods and drinks that contain salt levels in daily life which can cause hypertension. Sodium levels are in accordance with the standard, namely 2000 mg sodium, consuming 2000 mg table salt / day or the equivalent of 1 teaspoon of salt / person / day. With the consumption of foods and beverages that contain high levels of salt will increase the sodium in the extracellular fluid. Thus, it is necessary to change the pattern of food and beverage consumption to reduce salt consumption which can reduce the risk of hypertension. Thus, the consumption of salt at the household level should be limited to prevent an increase in blood pressure or hypertension

Hypertension can cause damage to organs, either directly or indirectly. Several studies have found that the cause of damage to these organs can be through a direct result of an increase in blood pressure in organs, or because of the indirect effect of an increase in blood pressure on organs, or because of indirect effects, including the presence of autoantibodies against angiotensin II receptors, oxidative stress. , down regulation, and others. This study also proves that a high-salt diet and sensitivity to salt play a major role in the occurrence of target organ damage, such as blood vessel damage due to increased expression of transforming growth factor- β [13].

From the findings during the study as shown in table 1, it was found that the number of respondents who had hypertension was more than those who did not have hypertension, this happened because an increase in consumption of excess salt in a person's body would have an impact on increasing the incidence of hypertension. The input is high salt levels, the work of the kidneys becomes heavy in carrying out secretions to remove the salt levels. Excess salt levels in the body will be stored so that it causes hypertension. On the other hand, the lower the consumption of salt in food or drink, the smaller the chance of occurrence of hypertension in a person.

Salt causes a buildup of fluid in the body because it pulls fluid outside the cells from being expelled, thereby increasing blood volume and pressure. In about 60% of cases of primary (essential) hypertension there is a response to lowering blood pressure by reducing salt intake. In people who consume 3 grams of salt or less, the average blood pressure is found to be low, while in people who consume about 7-8 grams of salt the average blood pressure is higher.

The effect of salt intake on hypertension is through an increase in plasma volume or body fluids and blood pressure. This situation will be followed by an increase in the excretion of excess salt so that it returns to the normal state of the hemodynamic system. In primary (essential) hypertension, this mechanism is disrupted, in addition to the possibility that other factors may have an effect [14].

Salt has a comparable relationship with the onset of hypertension. The more the amount of sodium in the body, there will be an increase in plasma volume, cardiac output and blood pressure. Renal tubular sodium reabsorption is increased in patients with primary hypertension due to stimulation of several sodium transporters located in the luminal membrane and providing energy for this transport. In addition, endogenous substances which are stereoisomers are released by the adrenal glands in response to high sodium intake

From the results of statistical tests obtained p value = 0.000 where $p < (\alpha = 0.05)$ then H_0 is rejected, it can be concluded that salt consumption is a risk factor for primary hypertension in the Coastal area, Poleang sub-district, Bombana and an OR value of 15.3 which means that excessive salt consumption has a 15.3 times risk of developing hypertension compared to sufficient salt consumption. At 95% CI, with a lower limit value of 5.766 and an upper limit value of 40.746 because the confidence interval range does not include a value of 1, it means that excessive salt consumption is a risk factor for hypertension. The results of this study are in line with the results of research conducted by [15], showing that there is a relationship between salt consumption and the incidence of hypertension in productive age (25-54 years) with p value = 0.004 ($p < 0.05$). Respondents who experienced hypertension of productive age (25-54 years) tended to consume salt > 7 grams per day (63.3%) and respondents who did not experience hypertension of productive age (25-54 years) consumed salt = 3 grams per day (76, 7%). From the results of the analysis, the OR value = 5.675 (not including the number 1) means that patients who consume salt > 7 grams per day have a 5.675 times risk of experiencing hypertension compared to patients who consume salt = 3 grams per day.

Several other research results that are in line with the findings of this study are the results of research [16] which showed that the frequency of consumption of high cholesterol and high sodium foods, salt consumption patterns and obesity status had a significant effect on hypertension in the elderly. The results of the study [17] found that there was a significant relationship between sodium intake and hypertension levels in hypertensive patients and there was a significant relationship between obesity nutritional status and hypertension levels in outpatient hypertension patients at Makassar City Hospital. The results of the study [18] found that there was a relationship between salt consumption and hypertension. The risk of hypertension in respondents who have a habit of consuming salt OR = 19.8 (95% CI 8.34-47.85), has 19.98 times greater risk of suffering from hypertension than respondents who do not have a habit of consuming salt. The results of the study [19] showed that there was a significant effect between protein intake ($p = 0.009$, OR = 27.66, 95% CI = 0.762-73.65), and salt intake ($p = 0.000$, OR = 977, CI 95 % = 41.58-22965)

The findings of this study are also in line with the research conducted by Elvvin and his colleagues [20], the results of the analysis of the risk of consuming salt are obtained, the OR value is 5.271. This means that respondents who consume salt three times a day have a risk of experiencing hypertension 5.271 times greater than respondents who consume salt once to never in a day Because the range of values at the confidence level

(CI) = 95% with a lower limit (lower limit) = 1.753 and the upper limit = 15,855 does not include a value of one, then the amount of risk is considered significant. Thus the habit of consuming salt is a risk factor for the incidence of hypertension in the fishing community of the Bajo tribe on Tasipi Island, West Muna Regency. The findings of this study also support the results of the study [21], the statistical test results obtained that the P value = 0.003 means the P value <0.05, so it can be concluded that there is a significant relationship between salt intake and hypertension. The value of OR = 5.598 means that respondents who consume salt intake are at risk of 5.598 times than respondents who do not consume salt (sodium.) and 17 people with no hypertension (26.2%), this is also influenced by the habits of the Poleang people, most of whom are in coastal areas, who have a habit of consuming marine products in the form of shellfish, snails and other marine animals that contain a lot of sodium. However, the results of this study are not in line with the results of research [2]. It was found that bivariate showed no relationship between smoking behavior (p=0,584), coffee consumption (p=0,671), stress (p=1,000), salt consumption (p=0,100). and the use of used cooking oil (p=0.762) with the incidence of hypertension According to [7] reducing salt is often also offset by intake of more calcium, magnesium, and potassium. Salt fasting in certain cases can significantly lower blood pressure. Generally we consume more salt than the body needs. Ideally we just use about a teaspoon or about 5 grams of salt per day. Some of our society often associates excessive salt consumption with the possibility of suffering from hypertension. Salt is important in the mechanism of hypertension. The effect of salt intake on hypertension is through an increase in plasma volume or body fluids and blood pressure. This situation will be followed by an increase in the excretion of excess salt so that it returns to the normal state of the hemodynamic system. In primary hypertension the mechanism is disturbed, besides the possibility that there are other factors that influence [14].

The Effect of Obesity on the Incidence of Primary Hypertension

Obesity is the accumulation of excess or abnormal fat that can interfere with health. A person is said to be obese if there is an increase or enlargement of their body fat cells. Obesity is a condition of abnormal or excess fat accumulation in adipose tissue. Obesity is not only a condition with excess fat stores, but also the distribution of fat throughout the body. Fat distribution can lead to risks associated with various degenerative diseases. Obesity is considered as one of the factors that can increase the prevalence of hypertension, glucose intolerance, and atherosclerotic coronary heart disease in obese patients [22]. From the findings during the study as shown in table 2, it was found that the number of respondents who had hypertension was more than those who did not have hypertension in the obese group. This happened because an increase in obesity in a person's body would have an impact on an increase in the incidence of hypertension, and vice versa, a decrease in obesity. in a person's body will have an impact on reducing the incidence of hypertension. Hypertension can cause damage to organs, either directly or indirectly. Several studies have found that the cause of damage to these organs can be through a direct result of an increase in blood pressure in organs, or because of the indirect effect of an increase in blood pressure on organs, or because of indirect effects, including the presence of autoantibodies against angiotensin II receptors, oxidative stress. , down regulation, and others. This study also proves that a high-salt diet and sensitivity to salt play a major role in the occurrence of target organ damage, such as blood vessel damage due to increased expression of transforming growth factor-b [13]. Based on the results of statistical tests, the OR value was 8.2, which means that obesity has an 8.2 times risk of developing hypertension compared to non-obese. At 95% CL, with a lower limit value of 3.371 and an upper limit value of 20.311

because the confidence interval range does not include a value of 1, it means that obesity is a risk factor for hypertension. Obesity will increase the risk of hypertension because the greater body mass, the more blood needed to supply oxygen and food to body tissues. This means that the volume of blood circulating through the blood vessels increases, which puts greater pressure on the artery walls. Obese patients are at risk of 8.2 times greater for developing primary hypertension than people with normal weight. Cardiac output and circulating blood volume of obese hypertensive patients are higher than non-obese hypertensive patients. In obesity, peripheral vascular resistance is reduced or normal, whereas sympathetic nerve activity is elevated with low plasma renin activity. The results of this study are in line with the results of research conducted by Sapitri and his colleagues [23], where the results of research that have been carried out are that there is a statistically significant relationship between obesity and the incidence of hypertension. Based on the analysis, the OR value = 6.47 and it means that obese people have a risk of developing hypertension by 6.47 times compared to people who are not obese. So it can be concluded that obesity is a risk factor for hypertension. The results of the study [24] revealed that obese people are prone to hypertension. Women who are very obese at the age of 30 years have a 7-fold risk of developing hypertension compared to slim women of the same age. Cardiac output and circulating blood volume in obese hypertensive patients. Although the relationship between hypertension and obesity is not known for certain, it is proven that the pumping power of the heart and circulating blood volume of obese patients with hypertension is higher than that of hypertensive patients with normal weight. The results of this study are also in line with the results of research by Kurnianingtyas and his colleagues [25], showing that the risk factor for obesity has an OR = 28.6 (95% CI = 3.52-233.07), it can be concluded that obesity is a risk factor for obesity. the incidence of hypertension in high school students in Semarang City. Great research [26], obtained the chi-square test results obtained p value = 0.016, because p-value < a (0.05), then Ho is rejected, so it can be concluded that there is a significant relationship between obesity and the incidence of hypertension in the elderly. The value of the odds ratio (OR) = 2,941 because the OR value > 1, obesity is a risk factor for the incidence of hypertension in the elderly, where the elderly who are obese are 2,941 times more likely to have hypertension than the elderly who are not obese. Rahmayani's research [27], showed that as many as 79.2% of respondents who were obese suffered from primary hypertension, while the incidence of primary hypertension in respondents who were not obese was only 40.5%. The results of statistical tests with Chi-Square obtained p value = 0.007 which is smaller than a value of 0.05 which means obesity status is a risk factor for primary hypertension as evidenced by the POR value: 5.573 Confidence Interval (CI = 95%: 1.706-18.205) which means that the risk of experiencing primary hypertension for respondents with obesity status is 5.573 times greater than those who are not obese. (20.9%) while from 67 respondents who are not obese suffer from hypertension, namely 21 people (31.3%) and those who are not hypertension are 46 people (68.7%), this is also influenced by people's habits with unhealthy eating patterns where most people do not regulate diet and lack of daily physical activity. Several other research results that are in line with the findings of this study are the results of research [16] which showed that the frequency of consumption of high cholesterol and high sodium foods, salt consumption patterns and obesity status had a significant effect on hypertension in the elderly. The results of the study [17] found that there was a significant relationship between sodium intake and hypertension levels in hypertensive patients and there was a significant relationship between obesity nutritional status and hypertension levels in outpatient hypertension patients at Makassar City Hospital. The results of the study [28] showed that there was a relationship between obesity and the incidence of grade 1 hypertension of 1.681 (95%

CI: 1.049-2.696), meaning that respondents with obesity had a risk of 1.681 times for suffering from hypertension grade 1 compared to those who were not obese after controlling for the variable. age, family history of hypertension and physical activity. The results of the study [19] showed that there was a significant effect between protein intake ($p = 0.009$, $OR = 27.66$, $95\% CI = 0.762-73.65$), and salt intake ($p = 0.000$, $OR = 977$, $CI 95\% = 41.58-22965$). The results of the study [2] showed that there was a relationship between obesity ($p=0.014$) and the incidence of hypertension. The results of the study [4] showed that there was a relationship between obesity and hypertension. Someone who has obesity tends to have a higher risk of developing hypertension. The presence of obesity in hypertensive patients will determine the severity of hypertension. The results of the study [18] found that there was a relationship between obesity and hypertension. The risk of hypertension in respondents who had obesity $OR=3.56$ ($95\% CI 2.77-6.04$), had 3.56 times greater than respondents who had obesity. do not have obesity. Obesity is a hallmark of the population of primary hypertension and it is proven that this factor has a close relationship with the occurrence of primary hypertension in the future. Although there is no clear definite mechanism for the relationship between obesity and primary hypertension, investigations have shown that the pumping power of the heart and circulating blood volume in obese patients with hypertension is higher than in patients with normal weight. Some of the limitations faced in this study are the problem of the respondents' busyness at work so that they do not have sufficient time to provide information and data when the researcher collects data/information, the problem of the distance to the research place is quite far and access to research locations that are difficult to reach.

5. Conclusion

Conclusion; Salt consumption and obesity are risk factors for primary hypertension in Poleang District, Bombana Regency. Suggestion; Increased socialization of Prolanis to patients with hypertension and optimization of posyandu for the elderly, early detection of hypertension and risk factors for hypertension. It is hoped that the community will implement a healthy lifestyle, following the activities of the Community Health Center Chronic Disease Management Program.

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