

Description of Macro Nutrition Intake, Natrium, Fiber, Physical Activity, and Blood Pressure in Hypertension Patients

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Article Info

Article history:

Received July 15th, 2022

Revised August 20th, 2022

Accepted September 25th, 2022

Keyword:

Blood pressure; Hypertension;

ABSTRACT

Background. Hypertension is a disease in which blood pressure is ≥ 140 mmHg for systolic and ≥ 90 mmHg for diastolic. Hypertension is often called the silent killer because sufferers cannot feel the symptoms. Excess sodium intake, less fiber, and inadequate physical activity can all contribute to hypertension. This study aims to determine the picture of sodium intake, fiber, and physical activity on the blood pressure of hypertensive patients at Sukarami Health Center in Palembang.

Research Methods. This kind of research uses an incidental sampling method and a cross-sectional research design and is descriptive. The sample in this study was 42 people, with a reserve of 10% to 46 people. Primary data was taken by measuring blood pressure, and interviews and secondary data were taken from the profile of the Sukarami Health Center in Palembang.

Research Result. The results showed that most of the energy intake was good at 52.2%, protein intake was mainly good at 47.8%, fat intake was primarily good at 45.7%, carbohydrate intake mainly was good at 56.5%, sodium intake was mostly more 67.3%, fiber intake mainly was 78.4% less, physical activity was primarily light 56.5% and the hypertension level was mostly mild 69.6%.

Conclusion. Based on the condition of hypertensive patients, they still have more sodium intake, low fiber intake, and less physical activity. It is recommended that patients pay attention to sodium intake, fiber, and physical activity so that blood pressure becomes normal.

BACKGROUND

Currently, degenerative or non-communicable diseases are developing at a rapid rate. This is consistent with the Basic Health Research (Riskesdas) findings in 2007, 2013, and 2018 which indicate a rising prevalence of non-communicable diseases, including hypertension. Annually, worldwide, hypertension is the leading cause of death. (Kemenkes RI, 2019).

Hypertension is defined as an increase in systolic blood pressure of more than 140 mmHg and diastolic blood pressure of more than 90 mmHg on two measurements with a five-minute interval in a state of adequate rest or tranquility. A persistent rise in blood pressure can cause damage to the kidneys (kidney failure), heart (coronary heart disease), and brain (stroke) if it is not detected early and treated appropriately. (Kemenkes RI, 2014).

A high sodium intake can cause a rise in blood pressure. A higher sodium intake causes the body to retain fluids, increasing blood volume. Hypertension results from the heart pumping harder to force the increased blood volume through increasingly constricted spaces. (Mulyati, Syam, and Sirajuddin, 2011).

Low fiber intake can reduce fat and bile acid excretion through the feces and reabsorption into the bloodstream. As a result, the amount of cholesterol circulating in the blood rises, accumulates in the blood vessels and restricts blood flow. This contributes to an increase in blood pressure. This is consistent with Yuriah et al.'s (2019) finding that hypertensive patients have a significant relationship between fiber intake and blood pressure.

According to WHO (2011), a lack of exercise contributes to hypertension. According to the WHO, inactivity is the fourth most prominent risk factor for death globally and a significant risk factor for non-communicable diseases like hypertension. An estimated 3.2 million people per year pass away as a result of the issue of inactivity. (Wijaya, et al, 2013).

Blood pressure stability is significantly impacted by physical activity. A person with a less active lifestyle typically has a higher heart rate. The heart muscle has to work harder during each contraction as a result. Peripheral resistance causes an increase in blood pressure because the arterial walls are subjected to higher blood pressure the more complicated the heart muscle pumps blood. (Triyanto, 2014).

According to the Riskesdas 2018 findings, the prevalence of hypertension in Indonesian adults aged 18 and older increased from 25.8% in 2013 to 34.1% in 2018. Additionally, South Sumatra Province has grown. Whereas it increased from 26.1% in 2013 to 30.44% in 2018, South Sumatra ranked 14th out of 34 provinces.

Based on the Profile of the Palembang City Health Office (2018), in 2017, hypertension was ranked first among the ten most diseases in Palembang City, with a total of 79,192 cases. The estimated number of hypertensive patients aged 15 years at the Sukarami Health Center Palembang for males and females gender is 15,280 people, the second highest number of hypertension sufferers after the Nagaswidak Health Center Palembang.

RESEARCH METHODS

This study employed a cross-sectional, descriptive methodology. Individuals with hypertension who sought care at Palembang's Sukarami Health Center constituted the study population. Patients with hypertension who agreed to participate as research samples were drawn from the entire population who met the inclusion criteria, which included being recorded as hypertensive patients at the Sukarami Health Center Palembang, between the ages of 18 and 60, and having adequate communication skills. Excluded were hypertensive patients who did not respond to invitations to participate or had other severe medical conditions, such as kidney, heart, stroke, or diabetes. Forty-six respondents were randomly selected after the sample size was determined using the gameshow formula from 1997. This study used a sampling method called accidental sampling, in which a person the researcher meets by chance may be included in the sample if they are deemed to be a good data source.

Hypertension served as the study's dependent variable, with macronutrient intake, sodium intake, fiber intake, exercise, and blood pressure as independent variables. This study used univariate analysis to describe the relationship between hypertensive patients' intake of macronutrients, sodium, fiber, exercise, and blood pressure.

RESULTS

Table 1. Frequency Distribution of Respondents According to Hypertension Level and Frequency Distribution of Respondents by Gender

Blood Pressure	Total	
	n	%
Mild Hypertesion	32	69,6
Moderate Hypertension	14	30,4
Total	46	100
Male	22	47,8
Female	24	52,2
Total	46	100
19-29 years old	1	2,2
30-49 years old	6	13
50-64 years old	39	84,8
Total	46	100

Based on table 1 shows that the blood pressure of most of the respondents included in the category of mild hypertension as many as 32 people (69.6%). Based on table 1 shows that most of the respondents with hypertension at the Sukarami Health Center Palembang are women, with a total of 24 people (52.2%). According to Table 1, 39 respondents were in the 50–64 age group (84.8% of the total), compared to just one respondent (2.2%) in the 19–29 age group.

Table 2. Frequency Distribution of Respondents by Energy Intake

Energy Intake	Total	
	n	%
Less Intake	16	34,8
Good Intake	24	52,2
More Intake	6	13
Total	46	100

According to Table 2, up to 24 respondents (52.2%) have good energy intake compared to 6 (13%), which is the majority of the respondents.

Table 3. Frequency Distribution of Respondents by Protein Intake

Protein Intake	Total	
	n	%
Less Intake	14	30,4
Good Intake	22	47,9
More Intake	10	21,7
Total	46	100

Based on Table 3, it can be seen that 22 respondents (47.9%) have good protein intake, compared to 10 respondents (21.7%) who consume more protein.

Table 4. Frequency Distribution of Respondents by Fat Intake

Fat Intake	Total	
	n	%
Less Intake	11	23,9
Good Intake	21	45,7
More Intake	14	30,4
Total	46	100

According to table 4, there are up to 21 respondents who have a healthy fat intake (45.7%), compared to up to 11 respondents (23.9%) who have a less nutritional fat intake.

Table 5. Frequency Distribution of Respondents by Carbohydrate Intake

Carbohydrate Intake	Total	
	n	%
Less Intake	16	34,8
Good Intake	26	56,5
More Intake	4	8,7
Total	46	100

According to Table 5, most respondents have good carbohydrate intake, with 26 people (56.5%) doing so compared to 4 people (8.7%) who consume more.

Table 6. Frequency Distribution of Respondents by Sodium Intake and Frequency Distribution of Respondents by Fiber Intake

Sodium Intake	Total	
	n	%
Adequate Intake	10	21,7
More Intake	36	78,3
Total	46	100
Less Intake	31	67,4
Adequate Intake	15	32,6
Total	46	100

Based on table 6, shows that most of the respondents have more sodium intake as many as 36 people (78.3%). Table 6, shows that most respondents have less fiber intake, as many as 31 people (67.4%).

Table 7. Frequency Distribution of Respondents by Physical Activity

Physical Activity	Total	
	n	%
Light Activity	26	56,5
Moderate Activity	12	26,1
Vigorous Activity	8	17,4
Total	46	100

Table 7, shows that most respondents have light physical activity, 26 people (56.5%), compared to respondents who have heavy physical activity, as many as eight people (17.4%).

DISCUSSION

Respondent characteristics

Among the senior group, females comprise the vast majority, and their average age ranges from 56 to 65. Wahyuni and Eksanoto's (2013) assertion that women will have an increased risk of hypertension after menopause, precisely over 45 years, supports the idea that gender is a strong predictor of hypertension.

Women who have gone through menopause have low levels of estrogen. At the same time, this estrogen elevates good cholesterol (HDL) levels, which are crucial for a stable cardiovascular system. Therefore, if menopausal women do not adopt a healthy lifestyle, their falling estrogen levels will eventually lead to falling HDL levels. It is possible that respondents in this study will also feel the effects of low estrogen levels and lower HDL levels. If your HDL levels are low and your LDL levels are high, atherosclerosis will develop, and your blood pressure will rise.

The ages of the participants ranged from 29 to 60 years old, with the average age being 54 years old. Respondents, on average, are of an age where they could develop hypertension. Similarly, Andria (2013)

argues that the prevalence of hypertension rises with age. This is because the heart, blood vessels, and hormones are all susceptible to the effects of normal aging.

Kurnia (2013) stated that the age of 40-49 years would increase the likelihood of developing hypertension by 6.42 times, then the age of 50-54 years will increase by 10.56 times, and the age of 55-59 years will increase again to 19.05 times.

Blood Pressure

In this study, the average systolic blood pressure of the respondents was 154.5 mmHg, with the highest systolic blood pressure of 179 mmHg and systolic blood pressure of 140 mmHg; and diastolic blood pressure of 95 mmHg, with a diastolic blood pressure of 109 mmHg and a diastolic blood pressure of 90 mmHg, on average. Most participants had mild hypertension, defined as a systolic blood pressure between 140 and 159 mm Hg and a diastolic blood pressure between 90 and 99 mm Hg. Obesity, salt intake, smoking, caffeine and alcohol consumption, stress and physical activity, age, genetics, gender, race/ethnicity, and many other factors all play a role in the development of hypertension. Sodium is a crucial micronutrient for raising blood pressure. To increase blood volume and blood pressure, sodium causes the body to retain water beyond what is considered healthy.

Energy Intake

Energy intake can be seen from the results of recall intake. The respondent's food intake was seen for three consecutive days. After analyzing the respondent's energy intake, the average information was 80-110% of the total energy requirement. This is due to the absence of eating disorders or appetite, which causes a lack of food intake among respondents.

This is in line with research conducted by Simamora et al. (2018), that most of the 18 respondents (69.2%) had an average level of energy adequacy. The story of energy sufficiency does not have a direct relationship to hypertension. Still, excess energy adequacy can impact nutritional status (overweight), so it can affect blood pressure.

At the time of the interview, respondents with less energy intake had less food intake. This can be seen from the respondents only eating a few spoonfuls of rice, where rice has an enormous calorie contribution. Because the respondent only ate a few spoonfuls of rice, the intake of other nutrients was also reduced, such as animal protein, vegetable protein, fat, and vegetables, because it was adjusted to the amount of staple food consumed.

In this study, the average energy intake of respondents was 1654.6 kcal, with the highest energy intake being 2298.6 kcal and the lowest being 986.8 kcal. The source of energy consumed by patients is white rice, white bread, wheat flour, tapioca flour, chicken, and eggs.

Protein Intake

In this study, the average protein intake of respondents was 62.4 grams, with the highest protein intake of 81.5 grams and the lowest being 41.7 grams. From the results of interviews conducted with respondents, it is known that the respondent's protein intake is good because every day, they always consume animal and vegetable protein, both in main meals and snacks. Sources of animal protein commonly consumed are fish, eggs, chicken, and milk. At the same time, the sources of vegetable protein that are often consumed are tofu and tempeh.

The research of Candra et al. (2017) stated that there is a relationship between protein intake and hypertension. High protein intake can cause blood pressure to increase. So excessive protein intake can lead to the risk of hypertension and will increase cholesterol levels in the blood. Excess cholesterol levels will stick to the walls of blood vessels. Blockage of blood vessels will increase blood volume so that blood pressure will increase.

Fat Intake

In this study, the average fat intake of respondents was 49.5 grams, with the highest fat intake of 68.8 grams and the lowest at 32 grams. From the results of interviews conducted with respondents, it is known that every day is limiting high-fat foods by reducing foods that contain coconut milk, fried foods, and offal and getting

used to reducing food processing using frying, which is replaced by sauteing, steaming, or boiling. Meanwhile, respondents with excessive fat intake were caused by frequent consumption of fried foods, more processed food by frying, and consuming snacks in the form of cakes.

Consuming fat regularly is closely linked to gaining weight and developing hypertension. Free fatty acids will accumulate in the body if you drink too much fat. Increased free fatty acids may raise LDL levels in the blood, which could cause atherosclerosis and blood vessel blockage, resulting in hypertension. 2016; Mafaza et al.

Carbohydrate Intake

From the results of the study, the average carbohydrate intake of respondents was 242.7 grams, with the highest carbohydrate intake of 369.3 grams and the lowest being 149.4 grams. The majority of respondents consumed carbohydrates in the excellent category. From the respondents' information, the types of carbohydrate nutrients that are often consumed are rice and sugar used in foods and beverages such as sweet tea and coffee, spices in cooking, and other processed foods such as cakes which are a source of simple carbohydrates.

Eating high simple carbohydrates can increase blood pressure and macrovascular changes. Consumption of simple carbohydrates will increase blood sugar shortly after consumption. Rising blood sugar will increase the heart rate, where the heart pumps blood faster, increasing cardiac output and blood pressure, which causes hypertension (Ramarianda and Kamiah, 2015).

Sodium Intake

This study is in line with the research of Fitri et al. (2018), which stated that as many as 82.4 percent of hypertensive subjects had more sodium intake than those with sufficient sodium intake, which was 7.7 percent.

In this study, the average sodium intake of respondents per day was 2384.5 mg, with the highest sodium intake being 3352 mg and the lowest being 1325.3 mg. The interview results showed that the sources of sodium consumed by the respondents mostly came from soy sauce and table salt purchased by the respondents.

The use of seasonings, such as flavoring, tomato sauce, and soy sauce, during food processing also increases the amount of sodium intake. In fact, from interviews, several respondents admitted that they bought sodium sources, such as soy sauce and table salt, and kept them for themselves so they could be added to their food.

Most of the respondents consume table salt in cooking during the day for each dish, one or even two teaspoons per day. This is because the food will taste bland or less tasty if it has a little salt. In addition, respondents also often consume other foods that contain high sodium, such as instant food, canned milk, and powdered milk. This, of course, can be one of the factors causing the high rate of hypertension at the Sukarami Health Center in Palembang.

High salt intake can reduce artery diameter, which forces the heart to work harder to push the blood volume through the narrowed arteries, increasing blood pressure. This is why sodium is linked to the prevalence of high blood pressure.

Fiber Intake

In this study, the average fiber intake of respondents per day was 19.5 mg, with the highest fiber intake being 27.9 mg and the lowest being 9.3 mg. The majority of respondents' fiber intake was not sufficient after the interview, which was due to the lack of consumption of fiber sources such as vegetables, fruit, and whole grains as well as in consuming food sources of fiber, the portions were less diverse, and the portions were insufficient.

Fiber consists of soluble fiber and insoluble fiber. Soluble fiber commonly consumed by respondents are spinach, carrots, mustard greens, beans, cucumber, kale, chayote, and long beans. Fruits often consumed include papaya, banana, orange, melon, and watermelon. According to the findings of interviews with direct respondents, the majority of respondents eat fruit and vegetables infrequently. In particular, respondents

ingested soluble fiber-rich fruits and vegetables in moderation. Water soluble fiber, meantime, can lower blood plasma cholesterol levels, which in turn lowers blood pressure (Yuriah, 2019).

Based on the research, the lack of vegetable consumption in the respondents was caused by the amount consumed that was not following the recommended needs. Most of the respondents only consumed 2-3 spoons, and according to the respondents, the dose was sufficient. As for the lack of fruit consumption, it is due to the lack of availability at home because they rarely buy. The average respondent buys fruit because he wants to eat it.

Physical Activity

Based on the study's results, 56.5% of respondents did light physical activities such as walking for a few minutes, walking from one place to another, watching TV, exercising, washing dishes, and cooking—26.1% of respondents with moderate physical activity, such as gardening and cycling. At the same time, as many as 17.4% of respondents do a strenuous physical activity such as aerobics and lifting weights. Physical activity is light, moderate, or heavy depending on the type of activity, intensity in a day, duration, and frequency.

In this study, the average physical activity was 820.6 METs-min/week with a maximum value of 3360 METs-min/week and 231 METs-min/week. The results showed that the majority of respondents with light physical activity. This is because most of the activities carried out are household activities. In addition, physical activity is also influenced by the age factor of the majority of respondents aged 50-64 years. This causes the ability to do activities to decrease because the ability or maturity of the locomotion function is in line with a person's development (Anisah, 2018).

Since the majority of study participants fell into the elderly age group, they were no longer able to engage in physically demanding activities. Additionally, most respondents are housewives who engage in light physical activity at home. Due to a lack of time and laziness, respondents also rarely engage in regular exercise in their free time. Harahap (2017) asserts that exercise has a significant impact on blood pressure stability. The heart rate is typically higher in those who are not physically active. The heart muscle has to work harder during each contraction as a result. The more forcefully the heart muscle pumps blood, the more pressure is placed on the arterial walls, raising blood pressure due to peripheral resistance. Lack of exercise can also increase the risk of being overweight, which raises the risk of developing hypertension.

CONCLUSIONS

Hypertension levels were mostly found in the mild hypertension category, gender was mostly found in women, the age of respondents was mainly in the 50-64 year category, sodium intake was mostly more, fiber intake was mainly less, and physical activity was primarily light.

RECOMMENDATION

It is recommended to increase counseling and nutrition consultation about recommended, not recommended, and limited food and beverages for hypertensive patients at Sukarami Health Center Palembang. As well as for hypertensive patients to carry out a balanced nutritional diet to normalize blood pressure by limiting sodium intake and increasing fiber intake.

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