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Risk Factors For Hypertension on Productive Age Group in Alak Health Center, Kupang City

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Abstract

Introduction: Hypertension is a non-communicable disease that is one of the leading causes of premature death in the world. Hypertension mostly occurs in the elderly group, but recently it is found in the productive age group, especially at the age of 20-44 years. The purpose of the study was to determine the risk factors for hypertension in productive age group in the working area of Alak Health Center, Kupang City in 2023.

Methods: The analytical observational research with a case-control design was used. The study was conducted in the working area of the Alak Health Centre in Kupang City in November-December 2023. The population in the study was divided into the case (productive age 20-44 years who had hypertension) and the control (productive age 20-44 years who did not suffer from hypertension). The risk factors studied were risky diet (high fat, salt and sugar), obesity, and light physical activities. Data were collected through interviews using structured questionnaires. Data analysis was conducted in chi-square tests.

Results: The results showed that 3 risk factors of hypertension incidence in the productive age group were risky diet (OR = 4.448, 95% CI = 1.675-11.811, p = 0.003,), obesity (OR = 5.073, 95% CI = 1.994-12.903, p=0.0001), and light physical activity (OR = 6.250, 95% CI = 2.425-16.108; p = 0.002).

Conclusion: The risk factors for hypertension among the productive age group in Alak Health Center working area, Kupang, were diet high in fat, salt, and sugar, obesity, and light physical activity.

Keywords: Diet, Obesity, Physical Activity, Productive Age, Hypertension

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Introduction

Hypertension is characterized as an increased in arterial blood pressure where the systolic blood pressure ≥ 140 mmHg or diastolic pressure ≥ 90 mmHg according to the standard measured by using mercury, digital or aneroid sphygmomanometers.[1] Data from the World Health Organization (WHO) in 2019, showed that around 1.13 million (22%) people in the world experience hypertension, WHO states that developing countries have 40% of people with hypertension. Based on regions in each continent, the highest prevalence of hypertension occurs in the African region (46%) and the lowest occurs in the United States region (35%) while in Southeast Asia, the incidence of hypertension reached 36%. Of these patients, only less than a fifth did efforts to control their blood

pressure.[1] The results of the latest Indonesian Basic Health Research or *Riset Kesehatan Dasar* (*Riskesdas*) in 2018, the prevalence of hypertension was 34.1%. This data showed an increase quite high compared to the results of *Riskesdas* in 2013 which conveyed the incidence of hypertension based on the results of blood pressure measurements in Indonesian society 25.8%. The estimated number of hypertension cases in Indonesia is 63,309,620 people, while the death rate in Indonesia due to hypertension is 427,218 deaths. Non-Communicable Disease (NCD) prevention and control program indicators on reducing one third of NCD mortality by 2030, have now obtained data on the decline in hypertension distribution which is still far from the target of 25.8% (2013) to 24.4% (2019).[2]

The prevalence of hypertension throughout East Nusa Tenggara (NTT) Province was 27.72%. NTT Province ranks 19th out of 34 provinces with a total of 25,563 cases of hypertension.[3] Hypertension is again among the top 10 types of diseases in NTT, data from the health profile of each district in 2018 the incidence of hypertension in NTT has increased cases to 183,152 cases (26.5%). The highest district/city of hypertension cases was in Ende Regency with a total of 17,609 cases and the lowest was in Central Sumba Regency with 1,615 cases. In 2019, there was an increase in the incidence of hypertension in NTT to 189,781 cases (18.3%). The highest district/city of hypertension cases was in Lembata Regency with 23,754 cases and the lowest was in East Manggarai Regency with 2,383 cases.[3]

Data from the Kupang City Health Office showed that hypertension is one of the top 10 diseases in Kupang City. The number of hypertension patients who received health services from January to December 2022 was 24,811 cases (85.1%). Of the 11 health centers in Kupang City, the highest number of hypertension cases in all health centers in Kupang City was Alak Health Center with 3,615 cases (121.9%) and the lowest cases were in Naioni Health Center with 637 cases (56.9%). From the overall data obtained, it is known that hypertension begins to occur at an age above 15 years.[4]

Alak Health Center is the first health center in Kupang City to have the highest number of hypertension cases in 2022.[4] Hypertension is included in the 10 highest diseases, in the data for the last 3 (three) years has experienced ups and downs in the number of hypertension cases in 2020 there were 2,299 cases, in 2021 there were 1,995 cases, in 2022 there were 3,615 cases. The prevalence of hypertension is based on age characteristics, namely age 20-44 years 280 cases, age 45-54 years 503 cases, age 55-59 years 691 cases, age 60-69 years 868 cases, age >70 years 348 cases.[5]

In general, the prevalence of hypertension disease mostly occurs in the elderly, however, it turns out that the prevalence of hypertension in the productive age group tends to increase from year to year. Productive age is prone to hypertension because of the level of busyness and lifestyle that pay less attention to health.[6] The young adult age is between 20-44 years old. This age is also called the working age in population groups of a certain age. The age range of 20-44 years is the age group in which humans are physically and biologically mature. At this age humans are also at the peak of activity which tends to be heavier than adolescence and old age.[7]

A diet high in fat, salt, and sugar, obesity, and light physical activity are risk factors for hypertension. In general, diet in a productive age is often contains high fat, salt, and sugar. Foods that contain a lot of salt and fat, such as fast food that is high in saturated fat and salt, are highly preferred by most productive age groups. Eating salty and fatty foods increases the risk of hypertension. Salt contains sodium which can cause water retention, resulting in increased blood volume. This causes increased blood pressure as the heart works harder to pump blood and causes hypertension.[8] The results of previous studies showed that there was a relationship between dietary patterns such as consumption of foods high in sodium and fat with the incidence of hypertension in productive age in the working area of the Molibagu Health Center Bolaang Mongondow Regency.[9]

Obesity or excessive weight is one of the risk factors for hypertension. Obesity in

males is defined as the body fat percentage exceeds 25% of the total body weight while in females as more than 30% of the total body weight. Another most commonly used criteria for obesity is the body weight exceeds 120% of the ideal body weight. Obesity can occur due to an imbalance between energy intake and energy output in the body, causing excess energy to be stored in the body in the form of fat tissue.[10]

Physical activity greatly affects blood pressure stability. People who are not physically active tend to have a higher heart rate frequency. The harder the effort of the heart muscle in pumping blood, the greater the blood pressure imposed on the arterial wall so that peripheral resistance causes an increase in blood pressure.[11] A study showed an association between physical activity and the incidence of hypertension at Kedu Health Center, Temanggung Regency (p = 0.001).[12]

Methods

Types and Design of Research

This analytic observational study was conducted in a case-control design. Cases were all hypertensive patients aged 20-44 years who underwent examination and were recorded in the medical records of the Alak Health Center. The controls were people aged 20-44 years who did not suffer from hypertension who lived in the Alak Health Center working area. The research was conducted in November-December 2023. The risk factors studied were risky diet, obesity and light physical activity.

The diet questionnaire used a questionnaire adopted from Meghan Shiffa's study entitled “The relationship between diet and increased blood pressure in hypertensive patients at the Jatimulya Health Center, South Tambun, Bekasi Regency”. The dietary patterns were measured by food frequency questionnaires (FFQ) on carbohydrates, fat and sodium consumption. The consumption rate was scored 50 if the subject consumed >3x/day, 25 if the subject consumed 1x/day, 15 if the subject consumed 3-6x/week, 10 if the subject consumed 1-2x/week, 5 if the subject consumed 2x/month and 0 if the subject never consumed. Dietary pattern is categorized as risky if the average score is 15 - 50 and not at risk if the average score is 0-14. The obesity was defined through BMI levels of ≥ 25. The physical activity was determined by physical activity levels (PAL). This PAL formula of = PAR xW / 24 hours was used. Categories of physical activity levels were based on PAL values: Light (sedentary lifestyle) 1.40 - 1.69 kcals/ hour and Heavy (vigorous or active lifestyle) 2.00 kcals - 2.40 kcals/ hour. For hypertension cases, data were taken from the health center, thus, no measurements were taken by researchers.

The sampling technique for choosing cases and controls was done by simple random sampling, so all members of the population have the same opportunity to be sampled using Microsoft Excel software (rand between function) to generate random numbers taken according to the number of samples, namely 42 for case samples 42 for control samples. The sample size in this study was calculated using the Lemeshow Formula. Univariate analysis was carried out to describe the characteristics and diet, obesity and physical activity variables. Chi-square tests did bivariate analysis with a confidence level of 95% and p values of <0.05 to find the risk factors for hypertension in productive age group at the Alak Health Center in Kupang City.

Results

Table 1 showed that based on the age category, hypertension cases were greater in the 40-44 years age group (45%). In the gender category, hypertension cases were greater in males (46%). The education category showed that hypertension cases were greater in the high school group (43%). In the occupational category, more cases of hypertension were in the entrepreneurial group (31%).

Table 2 shows that of the 42 respondents in the case group, there were 73.8% at risk, while only 59.5% in the control group were at risk. The results showed that risky diet was a risk factor for hypertension in productive age group. Subjects with a risky diet have a 4.45 times risk for hypertension compared to the subjects who had non-risky diet.

Table 3 showed that 76.2% subjects who were obese in the case group, while in the control group only 66.7% who were obese. Thus, obese subjects had a risk of

5.07 times higher to get hypertension compared to the non-obese subjects.

Table 4 shows that of 71.4 % of subjects in the case group had light physical activity, while only 57.1% in the control group had light physical activities. Subjects with light physical activity have a risk of 6.250 times experiencing hypertension compared to people who had heavy physical activity.

Table 1. Characteristics of Respondents Based on Age, Gender, Education, Occupation, Diet, Obesity and Physical Activity

NO	Variables	Hypertension				Total	Percentage (%)
		Case		Control			
		n	%	n	%		
1.	**Age**						
	20-24	2	5	2	5	4	5
	25-29	13	31	16	38	29	35
	30-34	2	5	5	12	7	8
	35-49	6	14	5	12	11	13
	40-44	19	45	14	33	33	39
2.	**Gender**						
	Woman	15	36	16	38	31	37
	Man	27	46	26	62	53	63
3.	**Education**						
	No school	2	5	1	2	3	4
	Elementary school	5	12	5	12	11	13
	School Intermediate First	3	7	3	7	6	7
	School Upper Middle	18	43	18	43	36	43
	College	14	33	14	33	28	33
4.	**Work**						
	Government employees	8	19	8	19	16	19
	Not working	9	21	9	21	18	21
	Businessman	13	31	12	29	25	30
	Employee private	8	19	4	10	12	14
	Fisherman	4	10	9	21	13	15
Total		**42**	**50**	**42**	**50**	**82**	**100**

Table 2. Effect of diet on the incidence of hypertension

Dietary habit	Hypertension				Total		*p-value*	OR 95%CI
	Case		Control					
	n	%	n	%	N	%		
At risk	31	73.8	25	59.5	56	66.7	0.003	4.45 (1.68-11.81)
No risk	11	26.2	17	40.5	28	33.3		
Total	42	100	42	100	84	100		

Table 3. Effect of Obesity on the Incidence of Hypertension

Obesity	Hypertension						*p-value*	OR 95%CI
	Case		Control		Total			
	n	%	N	%	n	%		
Obesity	32	76.2	28	66.7	60	71.4	0,000	5.07 (1.99 – 12.90)
Not obese	10	23.8	14	33.3	24	28.6		
Total	42	100	42	100	84	100		

Table 4. Effect of Physical Activity on the Incidence of Hypertension

Physical activity	Hypertension						*p-value*	OR 95%CI
	Case		Control		Total			
	n	%	n	%	N	%		
Light	30	71.4	24	57.1	54	64.3	0.002	6,25 (2,43-16,11)
Heavy	12	28.6	18	42.9	30	35.7		
Total	42	100	42	100	84	100%		

Discussion

Risky Diet

Diet is a description of the kinds, amounts and composition of foodstuffs eaten each day by a person. Urban lifestyles where people consume excessive food with dietary patterns that are high in fat, salt, and sugar resulted in various diseases.[13]

Based on the results of the study, it showed that risky diet (high in fat, sugar and salt) was a risk factor for hypertension in the productive age group in the working area of the Alak Health Center. The results of this study indicated that productive age subjects in the Alak Health Center working area like foods that are high in salt, fat and carbohydrates. Fifteen percents of the subjects in this study had a high level of consumption of foods containing high sodium, such as salted fish and anchovies (8.6%) with a frequency (1-2x / week). Salted fish and anchovies are cheap and easy to find. A total of 20-25% of the subjects also often consumed high-fat foods such as fried foods and fatty pork (90%) with a frequency of (1-2x/week). In addition, subjects also often consumed high carbohydrate food, such as instant noodles and biscuits (1-2x/week) with an amount of (60-65%) as snacks.

Obesity

Obesity is a condition where excessive fat accumulation in the body can pose a risk to health.[14] Obesity can cause hypertension because fat deposits will narrow blood vessels so that blood flow is not sufficient and the heart has to work harder to fulfill blood flow which has an impact on the occurrence of hypertension. Obesity is not the cause of hypertension, but the prevalence of hypertension in obesity is much greater.[15]

This study showed that obesity was one of the risk factors for hypertension in productive age group in the working area of the Alak Health Center in 2023. Based on the results of direct interviews with respondents, it shows that the consumption patterns of the surrounding community are unhealthy where they eat junk food or fast food too often, rarely do daily physical activity so that calories and energy are just a little bit expended and also the lack of balanced nutritional intake received by the surrounding community. Some of them said that they often ate rice with instant noodles,

salted fish and anchovies, pork, fried tempeh, other seasonings and also rarely consume vegetables. People should pay more attention to the diet they eat every day that contains nutrients to prevent obesity.

Physical Activity

Physical activity was one of the risk factors for the incidence of hypertension in this study. Increased physical activity is recommended as a means to prevent hypertension. The lower the physical activity, the higher the blood pressure. Physical activity can reduce the risk of hypertension because it can suppress sympathetic nervous system activity in lowering blood pressure. A person who had sedentary behavior such as sitting, there will be constriction of the main blood vessels in the lower limbs, especially under the thighs. This results in increased peripheral resistance of the blood vessels and also fluid accumulation in the lower limbs. The heart muscle will also work harder with each contraction of the heart. The harder the heart pumps blood, the greater the pressure imposed on the arterial wall, increasing peripheral pressure and causing hypertension.[16]

Based on the results of the study, it shows that there is an effect of physical activity on the incidence of hypertension in productive age in the working area of the Alak Health Center in 2023. Based on the results of interviews in the field with respondents using the PAL (Physical Activity Level) questionnaire, it was found that of the 71.4% respondents in the case group were in the category of light physical activity, while in the control group, 57.1% in the category of light physical activity showed (57.1%). Respondents in the Alak Health Center work area mostly do light physical activity due to the increasingly sophisticated or rapid development of technology at this time which causes respondents to be less productive, causing the body to move less and do physical activity that can reduce the impact of hypertension. The results of interviews with respondents at the Alak health center show that the age of 20-44 years is the age with the highest cases of hypertension. This is due to many respondents having light physical activity, sitting habits (playing cellphones) (6 hours), watching TV (7 hours), sleeping which takes up a lot of respondents' time (10 hours). It is expected that respondents do regular physical activity to facilitate blood circulation in the body, which result in reducing the risk of hypertension. Lack of physical activity can also increase the risk of being overweight which will cause the risk of hypertension to increase.

Conclusion

This study found that the risk factors for hypertension in 20-44 years old are risky diet (high in fat, salt and), obesity and physical activity. People are expected to adopt a healthy diet by avoiding eating high sodium and fat, maintaining an ideal body weight and doing regular physical activity or exercise.

Ethics approval

This research has been approved by the health research ethics commission (KPEK), Faculty of Public Health, Nusa Cendana University, Kupang, the ethics permit number is 2023388-KEPK. The date of ethical approval is November 7, 2023.

Availability of data and materials

Available

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Author's Contribution

ANH collected and processed data using a questionnaire to analyze the influence between diet, obesity and physical activity on the incidence of hypertension in the Alak Health Center area. The author has read and approved the final manuscript.

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