

Risk Factors of Hypertension in Reproductive Age Women in Kedai Durian Health Center, Medan, Indonesia

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ABSTRACT

Background: Hypertension is a global problem in the world. Data from the World Health Organization (WHO) in 2013 showed that deaths from complications of hypertension reached 9.4 million deaths worldwide. This study aims to determine the risk factors to the incidence of hypertension in women of reproductive age in Kedai Durian Health Center.

Subjects and Method: This was a case control study carried out at Kedai Durian Health Center, Medan, Indonesia. A sample of 100 women of reproductive age was selected for this study. It consists of 50 women of reproductive age with hypertension and 50 women of reproductive age without hypertension. The dependent variable was hypertension. The independent variables were physical activity, obesity, and family history. Hypertension was measured by sphygmomanometer. The other data were collected by questionnaire. The data were analyzed by a multiple logistic regression.

Results: Hypertension was associated with physical activity (OR=3.46;95% CI=1.52 to 7.90;p=0.003), obesity (OR=4.57;95% CI= 1.96 to 10.64 p<0.0001), family history (OR= 9.33;95% CI=720 to 23.41;p<0.0001), and fat consumption (OR=4.14;95% CI=1.79 to 9.57;p=0.001).

Conclusion: Physical activity, obesity, family history, and fat consumption are associated with an increased risk of hypertension.

Keywords: Physical activity, obesity, family history, hypertension

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BACKGROUND

Hypertension is a global problem. Data from the World Health Organization (WHO) in 2013, deaths due to complications of hypertension reached 9.4 million deaths worldwide. In 2008 around the world around 40 percent of adults aged 25 years and over had been diagnosed with hypertension (Masriadi, 2016). Based on the National Health and Nutrition Examination Survey (NHANES) in 2010, out of 66.9 million hypertension sufferers in the USA, 46.5% hypertension was under con-

trol and 53.5% hypertension was not controlled (NHANES, 2010).

Every year hypertension kills 2.5 million Southeast Asians (Masriadi, 2016). Meanwhile, the results of the Basic Health Research (Riskesdas) in 2013 showed the prevalence of hypertension in Indonesia was very high (25.8%) compared to other cardiovascular diseases (coronary heart disease 2.0%, heart failure 0.16% and stroke 19.1/mile) and is estimated to increase to 42% in 2025. The prevalence of hypertension in North Sumatra is 24.7% in

women, while in Medan it is 28.1% (Ministry of Health, 2013).

Hypertension is a degenerative disease which is a serious problem today. Hypertension is categorized as a silent disease or silent killer because there is no response to hypertension or not knowing before checking his blood pressure. The incidence of hypertension increases with age. Hypertension in women of childbearing age mostly occurs at the age of 25-45 years, and only 20% occurs under the age of 20. However, the prevalence of hypertension in women began to be higher than men at the age of 35 years (Ministry of Health, 2013).

Generally, people with hypertension are people who are over 40 years old, but currently it is possible to suffer them at a young age (Delima, et al., 2012). Women of childbearing age have a higher risk of developing hypertension than men. This is because women of childbearing age pay less attention to health conditions, unhealthy lifestyles such as the use of hormonal drugs or consumption of fast food (Junk food) (Yeni, et al, 2010).

Based on the results of a preliminary survey conducted at the Kedai Durian Public Health Center, Medan, there were 904 cases of hypertension in 2016. And cases of hypertension in women of childbearing age (15-49 years) were 158 people (17.4) (17.4). %. Hypertension sufferers rank second of the 10 most diseases in the Kedai Durian Medan Health Center. Meanwhile, based on interviews with 5 women of childbearing age with hypertension, that 4 out of 5 (80%) of these people did not have a family history of hypertension, 3 out of 5 (60%) of these people had a regular diet and 3 out of 5 (60%). Referring to the above background, it is necessary to conduct research on risk factors for the incidence of hypertension in women of childbearing age

(15-49 years) in the work area of the Kedai Durian Medan Health Center in 2017.

SUBJECTS AND METHOD

1. Study Design

This was an analytic observational study with a case control design. The study was conducted at Kedai Durian Medan Health Center, in 2017.

2. Population and Sample

The case population in this study were all women of childbearing age (15-49) years in the work area of the Kedai Durian Medan Public Health Center who were diagnosed with hypertension and not hypertension in 2016 as many as 158 people.

Case samples were several groups of women of childbearing age (15-49 years) suffering from hypertension in the work area of the Kedai Durian Public Health Center, Medan. The inclusion criteria were women of reproductive age (15-49 years) with hypertension, residing in the work area of the Kedai Durian Public Health Center in Medan, willing to take part in the research.

The control sample was a group of women of childbearing age (15-49 years) who did not suffer from hypertension in the Kedai Durian Public Health Center, Medan and willing to participate. The exclusion criteria for cases and controls were those who did not live in the work area of the Kedai Durian Medan Community Health Center who were not willing to be the study subjects. The study sample was selected by purposive sampling.

3. Study Variables

The dependent variable was hypertension. The independent variables were physical activity, obesity, family history, and diet.

4. Operational Definition of Variables

Hypertension, given code 0= no hypertension, if TDS <140 and TDD <90 mmHg and given code 1 = hypertension, if TDS

≥140 and TDD ≥90 mmHg.

Family history/ offspring suffering from hypertension, given code 0= no, if you do not have a family history/ offspring suffering from hypertension, and given, ccm, code 1= yes, if you have a family history/ offspring suffering from hypertension.

Obesity, given code 0 = no, if BMI ≤25 kg/m², and given code 1 = yes, if BMI >25 kg/m².

Measurement of physical activity variables according to FAO/WHO/UNU (2001), the amount of physical activity performed by a person for 24 hours is expressed in Physical Activity Level (PAL). PAL is determined using a formula:

$$= \sum \frac{(\text{PAR} \times \text{W})}{24}$$

The category of physical activity level based on PAL value is said to be sufficient= 1.70-2.40, given code 0 and said to be less= 1.40-1.69, given code 1.

Measurement of carbohydrate consumption variables is based on an ordinal measuring scale using a food recall questionnaire. Furthermore, all answers will be categorized into 2, namely coded 0= sufficient, if carbohydrate consumption is ≤60% of total energy intake and coded 1= high, if carbohydrate consumption is > 60% of total energy intake.

Measurement of the fat consumption variable is based on an ordinal measuring scale using a food recall questionnaire. Furthermore, all answers are categorized into 2, namely coded 0= sufficient, if fat consumption is ≤25% of total energy intake and coded 1= high, if fat consumption is > 25% of total energy intake.

Measurement of fiber consumption variables (vegetables and fruit) is based on an ordinal measuring scale using a food recall questionnaire. Furthermore, all answers are categorized into 2, namely given a code of 0= sufficient, if the con-

sumption of vegetables and fruit is ≥30 grams/ day and given code 1= less, if the consumption of vegetables and fruit is <30 grams/ day.

5. Data Analysis

Univariate analysis to describe the frequency distribution or the proportion size according to the various characteristics of the studied variables for both the dependent variable and the independent variable. Bivariate analysis was performed using simple logistic regression. Multivariate analysis was performed using a multiple logistic regression.

6. Study Instrument

Study instrument for measuring blood pressure was using a sphygmomanometer, physical activity was measured by the International Physical Activity Questionnaire, obesity was measured using scale (kg) and meters (cm), to determine the Body Mass Index (BMI).

RESULTS

1. Univariate Analysis

Univariate analysis aims to explain or describe data on the characteristics of respondents and research variables. Data on the characteristics of respondents in this study were seen from the education and type of work. The independent variables in this study were family history, obesity, physical activity, carbohydrate consumption, fat consumption and fiber consumption.

Based on the Table 1, it is known that the most recent education of the respondents in the case group was high school graduates, namely 18 people (36.0%) and the control group was junior high school graduates, namely 23 people (46.0%). Based on the type of work of the respondents, the majority of the work in the case group was IRT, namely 22 people (44.0%) and the control group was private employees, namely 21 people (42.0%).

Table 1. Frequency Distribution of Respondent Characteristics by Education and Occupation

Characteristics of Respondents	HT (+)		HT (-)	
	n	%	n	%
Education				
PS	12	24.0	4	8.0
JHS	12	24.0	23	46.0
SHS	18	36.0	16	32.0
University/Higher Education	8	16.0	7	14.0
Occupation				
Housewife	22	44.0	17	34.0
Civil Servant	4	8.0	4	8.0
Entrepreneur	6	12.0	8	16.0
Private employees	18	36.0	21	42.0

Table 2. Frequency Distribution of Independent Variables on the Incidence of Hypertension at the Kedai Durian Health Center, Medan City

Independent Variable	HT (+)		HT (-)	
	n	%	n	%
Family History				
Yes	40	80,0	15	30,0
No	10	20,0	35	70,0
Obesity				
Yes	36	72,0	18	36,0
No	14	28,0	32	64,0
Physical Activity				
Lacking	34	68,0	19	38,0
Enough	16	32,0	31	62,0
Carbohydrates Consumption				
High	34	68,0	30	60,0
Enough	16	32,0	20	40,0
Fat Consumption				
High	32	64,0	15	30,0
Enough	18	36,0	35	70,0
Fiber Consumption				
Lacking	35	70,0	31	62,0
Enough	15	30,0	19	38,0

Based on the table, it is known that the majority of respondents in the case group are family history, namely 40 people (80.0%), obesity is 36 people (72.0%), lack of physical activity is 34 people (68.0%), high consumption of carbohydrates is 34 people (68.0%), 32 people (64.0%) consume high fat, and 35 people (70.0%) consume less fiber.

The majority of respondents in the control group did not have a family history,

namely 35 people (70.0%), 32 people were not obese (64.0%), 31 people (62.0%) had enough physical activity, 30 people consumed high carbohydrates (60.0%), 35 people (70.0%) consumed enough fat, and 31 people (62.0%) consumed less fiber.

2. Bivariate Analysis

Bivariate analysis was carried out to determine and test the effects of the associations between variables.

Table 3. Risk Factors for Incidence of Hypertension

Independent Variables	Hypertension				OR	p
	No		Yes			
	n	%	n	%		
Family History						
Yes	40	80.0	15	30.0	9.33	0.033
No	10	20.0	35	70.0		
Obesity						
Yes	36	72.0	18	36.0	4.57	0.001
No	14	28.0	32	64.0		
Physical Activity						
Lacking	34	68.0	19	38.0	3.47	0.007
Enough	16	32.0	31	62.0		
Carbohydrate intake						
High	34	68.0	30	60.0	1.42	0.405
Enough	16	32.0	20	40.0		
Fat Consumption						
High	32	64.0	15	30.0	4.15	0.001
Enough	18	36.0	35	70.0		
Fiber Consumption						
Lacking	35	70.0	31	62.0	1.43	0.399
Enough	15	30.0	19	38.0		

The results of statistical tests showed that family history increased the risk of hypertension (OR= 9.33; 95% CI= 3.72 to 23.42; p<0.001). It indicates that women who have a family history with hypertension had the risk of having hypertension 9.33 times

than those without family history of hypertension. The results of this study showed that obesity increased the risk of hypertension (OR= 4.52; 95% CI= 1.96 to 10.65; p <0.001). It indicates that obese women had the risk to hypertension 4.57 times.

Table 5. Risk Factors for Incidence of Hypertension

Independent Variables	OR	95% CI		p
		Lower limit	Upper limit	
Family History				
Yes	7.69	2.97	19.93	<0.0001
No				
Obesity				
Yes	3.36	1.31	8.64	0.012
No				
Physical Activity				
Lacking	3.47	1.52	7.91	0.003
Enough				
Carbohydrates Consumption				
High	1.42	0.62	3.22	0.405
Enough				
Fat Consumption				
High	4.15	1.79	9.57	0.001
Enough				
Fiber Consumption				
Lacking	1.43	0.62	3.29	0.399
Enough				

The results of this study showed that low physical activity increased the risk of hypertension (OR= 3.47; 95% CI= 1.52 to 7.91; p= 0.003). It shows that women with low activity have had the risk to hypertension 3.47 times.

The results of statistical tests showed that high fat consumption increased the risk of hypertension (OR= 4.15; 95% CI= 1.79 to 9.57; p= 0.001). The results of statistical tests showed that there was no effect between fiber consumption on hypertension (OR= 1.43; 95% CI= 0.62 to 3.28; p= 0.399). There was no effect between carbohydrate consumption on hypertension (OR= 1.42; 95% CI= 0.62 to 3.21; p= 0.405).

3. Multivariate Analysis

Family history (OR= 7.69; 95% CI= 2.97 to 19.93; p<0.001) and obesity (OR= 3.36; 95% CI= 1.31 to 8.64; p= 0.012) increased the risk of hypertension.

RESULTS

1. The effect of family history on the incidence of hypertension

In this study, family only considered close relatives such as father, mother, grandmother or grandfather. Hypertension has a tendency to decline in the next generation. This risk factor cannot be eliminated but it can be anticipated as early as possible by diligently controlling blood pressure at the nearest health facility both at the health center and hospital, and maintaining a healthy lifestyle. Sutomo (2009) stated that a person with a history of high blood pressure from one of his parents has a 25% risk of suffering from high blood pressure as well. If both parents suffer from high blood pressure, there is a 60% risk of suffering from high blood pressure.

2. The effect of obesity on the incidence of hypertension

Obesity is closely related to the occurrence of hypertension in the future. Obesity occurs due to consuming more calories than needed by the body. The environment also plays an important role in the case of obesity, for example what you eat and how many times you eat a day, and how your activities are. In the condition of obesity, there is an increase in the amount of free fatty acids which will narrow the blood vessels so that blood pressure increases. Heart pump power and circulating blood volume of obese patients with hypertension are higher than those of normal body weight (Susalit, 2001).

Aryatiningsih and Silaen (2018), showed that there is a significant relationship between obesity and hypertension (OR= 3.115; p= 0.010). The Framingham study shows the same thing, namely that out of 165 respondents who had hypertension, 133 respondents were obese. This means that only 32 people are not obese (Wilson, 2002).

Meanwhile, Akintunde et al. (2010) also show the same thing, namely, of the 816 respondents who experienced essential hypertension, more than half (494 people) were obese. Obese individuals have higher blood pressure so that early and intensive non-pharmacological interventions are needed to prevent cardiovascular disease and metabolic syndrome in obese people.

3. The effect of physical activity on the incidence of hypertension

Physical activity is a movement performed by the muscles of the body and their support systems. During activities, muscles need energy outside of metabolism to move, while the heart and lungs need additional energy to supply nutrients and oxygen throughout the body and to remove

waste products from the body (Supariasa, 2002).

According to Sutanto (2010), regular exercise is good for increasing the strength of the heart in pumping blood which has an effect on controlling blood pressure, and it is enough to do it with mild or moderate exercise three to five times a week and at least 30 minutes. Activities that are often carried out by respondents such as cooking, washing, ironing, and cleaning the house every day are still categorized as light physical activity, while the food intake consumed by respondents is not balanced. This can lead to an increase in blood pressure in the body.

The results of this study are in line with Anggara and Prayitno (2013), which stated that that irregular exercise increased the risk of hypertension 44.1 times compared to those who had regular exercise.

Atun et al. (2014) states that inadequate physical activity can lead to high blood pressure (OR= 4.69; p= 0.035). The benefits of physical activity and sports are to improve the work and function of the heart, lungs and blood vessels, which is characterized by a decreased resting pulse, reduced lactic acid buildup, increases HDL cholesterol, and reduces atherosclerosis..

4. The effect of carbohydrate consumption on the incidence of hypertension

Carbohydrates play an important role in nature, because they are the main source of energy. 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 (Almatsier, 2009).

According to Baliwati et al. (2004) carbohydrates function as a source of energy, building blocks for various body compo-

unds, essential amino acid-forming materials, normal metabolism of fat, saving protein, increasing the growth of intestinal bacteria to maintain bowel movements, increasing consumption of protein, minerals and vitamins. More carbohydrate intake can cause diseases, one of which is obesity and people who are obese or overweight are at risk of increasing the prevalence of cardiovascular diseases including hypertension (MOH, 2013).

5. The effect of fat consumption on the incidence of hypertension

The results of this study showed that there was an effect of fat consumption on the incidence of hypertension in women of reproductive age (OR= 4.15; p = 0.001). It indicates that women who consume high fat had the likelihood to suffer from hypertension 4.15 times.

6. The effect of fiber consumption on the incidence of hypertension

Fiber intake is associated with high blood pressure because fiber intake can help increase cholesterol excretion through feces by increasing the transit time of food items through the intestines. Consuming fiber is very beneficial because it can reduce energy intake and obesity which in turn reduces the risk of high blood pressure (Baliwati et al, 2004).

According to Kowalski (2010) there is a tendency that the more fiber a person has, the lower their blood pressure. A study in 25 randomized trials regarding the effect on the effect of blood pressure found that the fiber intake given ranged from 3.8 grams/day to 125 grams/day, showing a significant role in diastolic blood pressure and a significant reduction in systolic pressure. The impact resulting from lack of fiber intake for the short term is causing constipation (constipation). As for the long term, lack of fiber intake can increase the incidence of colon cancer, cholesterol in the

blood, obesity, and increase the risk of coronary heart disease (CHD).

The results of this study are in line with Sulistijani (2011) showing that there is no relationship between fiber intake and blood pressure. The results of the study are not in line with Baliwati et al. (2004), which showed that the mechanism of high blood pressure was related to the consumption of nutrients, one of which was insufficient fiber intake in the daily menu, people who consumed less fruit and vegetables usually have an unhealthy lifestyle so they can raise blood pressure.

AUTHOR CONTRIBUTION

Friza Novita Sari Situmorang designed, performed the experiments, and analysed data. Friza Novita Sari Situmorang wrote the manuscript in consultation with Erna Mutiara and Fazidah Aguslina Siregar. Erna Mutiara and Fazidah Aguslina Siregar are reviewing research documents.

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CONFLICT OF INTEREST

There was no conflict of interest in this study.

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