

The Major Factor of Hypertension, Study Case at Posbindu Cipayung, East Jakarta

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Abstract— The objective study to explain the relationship between physical activity, family history, age, obesity and stress with hypertension. The research method is a quantitative study with cross-sectional study design. The population in this study are Posbindu visitors who are aged > 15 years in Cipayung District, East Jakarta. The sample taken proportionally from the number of visitors Posbindu (n=210 person). Data analysis was done by univariate, bivariate (chi square) and multivariate with multiple logistic regression. The variable influence of hypertension were a family history, age, physical activity, obesity and stress. The dominant factor of hypertension was physical activity with OR=4,5 (95% CI: 2,14-9,28). In this study there are confounding variable: consumption of salt/sodium, gender and smoking. The conclusion that people with less physical activity are at higher risk of developing hypertension than people with moderate physical activity.

Keywords—family history, hypertension, obesity, physical activity and stres.

I. INTRODUCTION

Non Communicable Diseases (PTM) is the main cause of death globally in developed and developing countries. WHO data show that the 57 million deaths occurring in the world in 2008, 36 million or nearly two thirds were caused by Non-communicable diseases. PTM also kills the population at younger age. The proportion of causes of PTM death in people younger than 70 years old, cardiovascular disease is the biggest cause (39%) [1]. The proportion of mortality due to PTM include heart and blood vessel disease such as Hypertension and Diabetes Mellitus [2].

Hypertension is a condition the blood pressure in blood vessels increases chronically. This can happen because the heart works harder to pump blood to get of oxygen and nutrients the body. Today's hypertensive disease is a big and serious problem, because the prevalence of hypertension is high and tends to increase[2].

Based on data from Riskesdas (2013) [2], hypertension prevalence in Indonesia is 25,8% with hypertension diagnosis coverage by health manpower reach 36,8%, or in other words most of hypertension in society has not been diagnosed reach 63,2. While the case of Hypertension in DKI Jakarta Province

has a high prevalence of 20.0% [2]. The PTM surveillance system in East Jakarta classifies new cases of hypertension by 2016 amounting to 52.288 cases. The highest new cases of hypertension during 2016 are located at Cipayung District Health Center 9.264 with total visit number 23.499 cases [3].

Hypertension risk factors consist of 1) Risk factors that can not be changed or modified: age, familyhistory, and gender. 2) Risk factors that can be changed or modified: smoking habit, obesity, lackof physical activity, alcohol and excess salt consumption [4].

Based on the recapitulation of integrated coaching center (Pos Pembinaan Terpadu, Posbindu) PTM results in East Jakarta Sub-Dept. Of Health in 2016, some of the most prevalent risk factors are central obesity withmeasurement of abdominal circumference (> 80 cm for women, and> 90 cm for men) with prevalence of 26.78%, followed by obesity (BMI≥25) with prevalence of 21.59%, less physical activity with prevalence 10, 64%, less eating vegetables/ fruits 10.14%, stress 3% and smoking at 1.79%. This suggests that risk factors for non-infectious diseases, especially hypertension is quite high [3].

The aim of the study was to explain the relation of age, family history, smoking, obesity, physical activity, stress, alcohol, and excessive salt intake with hypertension.

II. MATERIALS AND METHODS

This research is a quantitative study with cross sectional design. The dependent variable is hypertension. The independent variables are obesity, physical activity, stress, salt consumption, smoking, age, family history, gender.

The number of sample is 210 people from 10 Posbindu in District Cipayung. Inclusion criteria are 15 year olds, visiting Posbindu and willing to be respondents. Exclusion criteria are: in the condition of pregnant, consumption of hypertension medication, suffer stroke, heart disease. Sampling by accidental sampling.

The primary data were collected by interview for variable age, family history, smoking, physical activity, stress with Stress Reporting Questionnaire (SRQ), and excessive salt consumption by Food Frequency Questionnaire (FFQ). Obesity

is measured by body mass index (measuring body height and weight). Hypertension variables were measured using a digital tensimeter performed three times the measurement.

Data analysis using Chi-Square test. Then multivariate analysis by multiple logistic regression. All independent variables that become candidates are incorporated into multivariate analysis ($P < 0.25$).

III. RESULTS AND DISCUSSION

The research was conducted in ten Posbindu Sub district of Cipayang spread in 8 villages. From the result of bivariate analysis and continued with multivariate analysis showed that from eight variables studied were found independent variable related to hypertension occurrence is obesity (IMT), less of physical activity, age ≥ 40 years, family history of hypertension and stress.

Table 1 shows that the number of respondents who suffer from hypertension is 144 (68.6%) more than the respondents who are not hypertension (normal) is 66 (31.4%). There is one independent variable homogeneous: age < 40 at 13.3% (proportion $< 15\%$). Furthermore, there is a proportion of obesity ($IMT \geq 25$) of 57.1%, lack of physical activity by 54.3%, stress 58.6%, excessive salt / sodium intake 73.3%, proportion of smoking 34.3%, age ≥ 40 years of 86.7%, there is a history family hypertension of 43.3% and 36.2% for male.

TABLE I. DISTRIBUTION OF FREQUENCY OF RESPONDENTS BY BLOOD PRESSURE, OBESITY, PHYSICAL ACTIVITY, SALT CONSUMPTION, SMOKING, AGE, FAMILY HISTORY, GENDER

Variable		n (%)
Blood Pressure	Hypertension	144 (68,6)
	Not Hypertension	66 (31,4)
Obesity(BMI>25)	Obesity	120 (57,1)
	Not Obesity	90 (42,9)
Physical Activity	Less	(54,3)
	Moderate	96(45,7)
Stress	Stress	123 (58,6)
	Not Stress	87 (41,4)
Salt Consumption	Excessive	154 (73,3)
	Not excessive	56 (26,7)
Smoking	Smoke	72(34,3)
	Not Smoke	138(65,7)
Ages	≥ 40 Years	182(86,7)
	< 40 Years	28(13,3)
Family History	There are Family History	91(43,3)
	There are not family history	119 (56,7)
Gender	Male	(36,2)
	Female	134(63,8)

Bivariate analysis using Chi Square (table 2) showed that gender did not have a significant relation with the incidence of hypertension ($p > 0.05$). Male and female have the same risk for hypertension.

TABLE II. THE RELATIONSHIP BETWEEN OBESITY, PHYSICAL ACTIVITY, STRESS, SALT CONSUMPTION, SMOKING HABITS, AGE, FAMILY HISTORY, GENDER WITH HYPERTENSION

Variable		Hypertension	Not Hypertension	OR (95% CI)	P
Obesity(BMI>25)	Obesity	96 (66,7)	24 (36,4)	3,5 (1,91-6,44)	0,00
	Not Obesity	48 (33,3)	42 (63,6)		
Physical Activity	Less	90 (62,5)	24 (36,4)	2,92 (1,59-5,34)	0,00
	Moderate	54 (37,5)	42 (63,6)		
Stress	Stress	95 (66)	28 (42,4)	2,63 (1,45-4,78)	0,001
	Not Stress	49 (34)	38 (57,6)		
Salt Consumption	Excessive	114 (79,2)	40 (60,6)	2,47 (1,31-4,47)	0,005
	Not excessive	30 (20,8)	26 (39,4)		
Smoking	Smoke	57 (39,6)	15 (22,7)	2,23 (1,42-4,33)	0,017
	Not Smoke	87 (60,4)	51 (77,3)		
Ages	≥ 40 Years	131 (91)	51 (77,3)	2,96 (1,32-6,66)	0,007
	< 40 Years	13 (9)	15 (22,7)		
Family History	There are Family History	74 (51,4)	17 (25,8)	3,41 (1,61-5,79)	0,001
	There are not family history	70 (48,6)	49 (74,2)		
Gender	Male	56 (38,9)	20 (30,3)	1,46 (0,79-2,73)	0,229
	Female	88 (61,1)	46 (69,7)		

Obese respondents (BMI > 25) had a risk of 3.5 times more hypertension than non-obese. Less of physical activity is at risk 3 times affected by hypertension compared with moderate physical activity. Stress risks triggering hypertension 2.6 times compared with no stress. Consumption of excess salt risk 2.5 times trigger hypertension. Smoking risks 2.2 times more hypertension than non-smokers. People aged over 40 years are at risk 3 times affected by hypertension. Respondents who had a family history of hypertension would have 3.4 times greater risk of hypertension than those without family history of hypertension (Table 2).

TABLE III. BIVARIAT SELECTION

Variable	P Value	Information
Obesity	0,000	Candidate
Physical Activity	0,000	
Stress	0,001	
Salt Consumption	0,005	
Smoking	0,007	
Ages	0,017	
Family History	0,001	
Gender	0,229	

TABLE IV. MULTIVARIATE ANALYSIS (FIRST MODELS) THE RELATES FACTORS WITH HYPERTENSION

Variable	P Value	Exp (B)	95% CI FOR EXP (B)	
			Lower	Upper
Obesity	0,004	2,936	1,419	6,072
Physical Activity	0,001	3,506	1,620	7,588
Stress	0,017	2,400	1,166	4,939
Salt Consumption	0,142	1,809	0,820	3,993
Smoking	0,009	3,846	1,470	10,517
Ages	0,061	2,773	0,956	8,044
Family History	0,001	3,784	1,772	8,080
Gender	0,120	0,453	0,167	1,230

TABLE V. LAST MODELS

Variable	P Value	Exp (B)	95% CI FOR EXP (B)	
			Lower	Upper
Obesity	0,004	2,870	1,399	5,889
Physical Activity	0,000	4,456	2,140	9,281
Ages	0,016	3,192	1,239	8,227
Family History	0,001	3,681	1,744	7,771
Stress	0,037	2,108	1,046	4,247

Based on the results of multivariate analysis with multiple logistic regression, the variables significantly related with hypertension were obesity, physical activity, age, family history and stress (Table 5). Variables that have a cause relationwith hypertension in Posbindu District Cipayung are as follows:1) Obesity people risk 2.9 times (95% OR OR 1,399-5,889) suffer from hypertension compared to people who are not obese. 2) People with less physical activity were at risk 4.5 times (95% CI OR 2,140-9,281) suffered from hypertension compared to people with moderate physical activity. 3) People aged ≥ 40 years are at risk 3.2 times (95% OR 1,239- 8,227) have hypertension compared with people <40 years old. 4) People with family history of hypertension is the greater risk of 3.7 times (95% CI 1,744 - 7,771) have hypertension compared with people who do not have a family history of hypetension. 5) People who are more at risk of stress 2.1 times (95% CI OR 1, 046 - 4,247). 6) The counfounding variables are 1) Excessive salt / sodium consumption to obesity variable 2) gender to stress, age, and family history, and 3) Smoking habit to physical activity, stress, and age.

Obesity is related with hypertension [5, 6, 7, 8].Obesity will trigger the occurrence of hypertension because if a person's body weight increases then the volume of blood also increases so the burden of the heart to pump blood also increases [9]. Fat accumulation due to obesity raises plaque that will clog the blood flow so that blood pressure increases [4, 10].

Less physical activity can risk of high blood pressure [11, 12]. This can increase the risk of becoming obese. People with less physical activity tend to have a faster heart beat and heart muscle should work harder on every contraction and often. The heart must pump bigger and urgent arteries so that blood pressure will increase.

Increased age may increase the risk of hypertension [7, 13, 14].The addition of age is caused by the thick of the arterial wall by accumulation of connective tissue. At that time it's also decrease in elasticity and densibilitas vessels, so that the aorta becomes stiff. A rigid aorta causes blood-constricted areas during cardiac constriction to be limited, resulting in increased systolic blood pressure without the increase in diastolic blood pressure [15].

People who have hypertension offspring are congenital to suffer from hypertension, the more likely adults are suffering from greater hypertension [7, 16, 17].When viewed from the side plausibility (+) in theory a person suffering from hypertension, has a genetic factor of his family and at risk of suffering from hypertension. This is related to elevated intracellular sodium levels and low ratio between potassium to sodium Individuals with elderly people with hypertension [4].. If both parents suffer from hypertension, then about 45% down to his children.

Stress associated of hypertension [6, 18, 19, 20]. This is due to hypertension related to sympathetic nervous activity, in conditions stress will increase and affect the blood flow, thus causing the heart to pump blood faster, and it can lead to increased blood pressure [18]. According to the Framingham study, women aged 45-64 years have a number of stress-triggering factors such as tense circumstances, domestic problems, economic stress, daily stress, job mobility, anxiety and buried anger. All of these are associated with increased blood pressure and clinical manifestations of cardiovascular disease. In addition, emotional pressure and activation of the nerve causing increased blood pressure due to vascular arteriolar vascular arterioles post glomerulus resulting in sodium retention with the consequent increase in plasma volume and extra fluid volume of cells affecting the occurrence of hypertension [21]. Individuals living in urban areas with higher levels of stress have a higher risk of hypertension than individuals living in rural areas [19].

IV. CONCLUSION

The proportion of hypertensive patients who visited Posbindu in Cipayung Puskesmas area in June 2017 was 68,6%. Variables that have a causal relationwith hypertension in Posbindu District Cipayungis as follows: obese, less physical activity, age ≥ 40 years, have a family history of hypertension, stress. Counfounding variables are excessive salt / sodium consumption, gender, and smoking.

It is suggested that health officers from Cipayung Community Health Center conduct socialization of CERDIK behavior (Regular health check including blood pressure check, Awareness of cigarette smoke, Diligent physical activity, healthy and balanced diet, adequate rest and manage stress) for the community.

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