Gorontalo
Journal of Public Health
Volume 5 – No. 1 – April 2022
P-ISSN: 2614-5057, E-ISSN: 2614-5065

Factors Related to the Incidence of Hypertension in Bitung City, North Sulawesi Province

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Abstract

Hypertension is a silent killer which is a factor in the occurrence of non-communicable diseases throughout the world. This has become one of the priority public health problems in Indonesia. This study aimed to determine the risk factors for hypertension > stage 1 in the working area of the Sagerat Health Center, Bitung City, Indonesia. This study used a cross-sectional design. A total of 107 people have agreed to become respondents according to the inclusion and exclusion criteria. Simple random sampling was used to determine the research sample. The results of this study indicate that more than 50% of respondents suffer from hypertension > stage 1. While the chi-square test shows that age, genetic history, obesity, alcohol consumption, and tobacco use have a relationship with the incidence of hypertension > stage 1. The only variable of age did not have a significant relationship. While the results of the binary logistic regression showed that people aged 46 or older, had a hereditary history of hypertension, were obese, consumed alcohol, and smoked had a risk of hypertension > stage 1. Based on the results of this study, it is hoped that the Bitung City government will campaign for a healthy diet such as reducing smoking behavior and alcohol consumption in the community.

Keywords: Bitung City; Hypertension; Incidence

BACKGROUND

Hypertension has resulted in the death of about eight million people every year, 1.5 million deaths occur in Southeast Asia where one-third of the population suffers from hypertension (Kothavale et al., 2021). Indonesia was currently facing a shift in disease patterns, from infectious to non-communicable diseases (Asogwa et al., 2022). Non-communicable disease in this case is hypertension, this disease is often referred to as the silent killer because it is a deadly disease without any symptoms (Grote et al., 1999; Mai et al., 2022). In general, hypertension occurs in middle-aged people (over 40 years), but now hypertension begins to develop at the age of 18 (Mokhtari et al., 2022). However, many people do not realize that they suffer from hypertension because the symptoms do not appear immediately (Balwan & Kour, 2021).

The prevalence of hypertension in North Sulawesi Province based on the results of Basic Health Research *(Riset Kesehatan Dasar)* in 2018 was 34.1% (Kemenkes, 2018). This figure was higher than in 2013 which touched a prevalence rate of 25.8% (Kemenkes RI, 2013). The risk factors for hypertension were divided into two groups. First, factors that can be intervened such as obesity, alcohol consumption, and smoking. Second, risk factors that cannot be intervened are family history of hypertension, gender, and age (Asemu et al., 2021). Hypertension in young adults is associated with BMI (Body Mass Index),

being overweight will increase the incidence of hypertension five times higher than normal weight (Amponsem-Boateng et al., 2019).

Hypertension can trigger other health problems, even death. A persistent increase in internal blood pressure can cause damage to the kidneys (kidney failure), heart (coronary heart failure), and brain (which causes stroke) if not detected early and with proper and appropriate treatment. Hypertension can cause various complications (Aksoy et al., 2021; Berta et al., 2019; Wajngarten & Silva, 2019). Complications of hypertension cause about 9.4 deaths worldwide each year (Berek et al., 2021). Hypertension causes at least 45% of deaths due to heart disease and 51% of deaths due to stroke (Michas et al., 2019). Deaths from cardiovascular disease are expected to continue to increase to reach 23.3 million deaths by 2030 (Virani et al., 2021).

To find out the factors that influence the increase in hypertension cases and the incidence of hypertension in Bitung City, this study aims to predict the factors that influence the incidence of hypertension in the working area of the Sagerat Health Center, Matuari Sub-district, Bitung City, North Sulawesi Province.

METHOD

This study used a cross-sectional design with a total population of 3055 people. After calculating the Slovin formula, it was found that a total sample of 107 people was used as respondents in this study. Data collection was carried out in January 2022, in the working area of the Sagerat Health Center, Bitung City, North Sulawesi Province.

Simple random sampling was used for selecting the sample. The inclusion criteria for this study were living in the research location for at least 6 months, being willing to be a respondent, being willing to have blood pressure checked, and being able to communicate well. While the exclusion criteria were the presence of comorbidities or complications (diabetes mellitus, stroke, impaired kidney function, heart failure) that caused discrepancies with the research objectives. Data collection in this study is not coercive, because respondents have the right to refuse and disagree with actions against themselves.

The results of the study were taken from the examination of systolic and diastolic blood pressure in each respondent. The blood pressure test has been checked once. Hypertension stage 1 is someone who has a blood pressure of 140/90 mmHg or higher. After the examination, the respondents answered several questions in the form of age, gender, family history of hypertension, obesity status, alcohol consumption, and tobacco use. The research results are presented in the form of univariate, Chi-square, and binary logistic regression. The data were analyzed using IBM SPSS version 20 software.

RESULT

According to Table 1 below, the findings of this study shows that more than half of the respondents suffer from hypertension stage 1 or over. The majority of them were <46 years old (93.5%) and being female (64.5%). In addition, most of them already have a history of hereditary diseases of hypertension and more than 50% of them have obesity status and consume alcohol and tobacco use.

Table 1. Characteristics of the Respondents in this Study

Independent Variables	Frequency	Percent
Hypertension		
Stage 1	50	46.7
Stage 1 over	57	53.3
Age (year)		
≥ 46	7	6.5
< 46	100	93.5
Sex		
Male	38	35.5
Female	69	64.5
History of hereditary		
Yes	79	73.8
No	28	26.2
Obesity status		
Yes	58	54.2
No	49	45.8
Alcohol consumption		
Yes	62	57.9
No	45	42.1
Tobacco use		
Yes	57	53.3
No	50	46.7

The results of the chi-square test (Table 2) between the independent variables and hypertension status showed that age, history of heredity, obesity status, alcohol use, and tobacco use had significant correlation with hypertension. While the sex variable did not show significancy related to hypertension (*p-value* = <0.05).

Table 2. Correlation between independent variables with hypertension

		Hypertension			
Independent variables	n	Normal	High	Crude OR (95% CI)	*p-value*
Age (year)					
< 46	10	15	23	1	0.020
≥ 46	7	35	34	3.191 (1.367-7.446)	0.024
Sex					
Male	10	45	55	1	0.314
Female	7	5	2	1.182 (0.252-5.557)	0.266
History of hereditary					
No	10	36	43	1	0.042
Yes	7	14	14	0.567 (0.237-1.354)	0.037
Obesity status					
No	10	25	33	1	0.044
Yes	7	25	24	0.458 (0.211-0.995)	0.049
Alcohol consumption					
No	10	29	33	1	0.045
Yes	7	31	24	0.393 (0.179-0.865)	0.020
Tobacco use					
No	10	21	36	1	0.034
Yes	7	29	21	0.422 (0.194-0.919)	0.030

The table below (Table 3) shows that respondents who suffer from stage 1 hypertension aged 46 years or older have 1.5 times the risk compared to those aged < 46 years (AOR = 1.541, 95% CI = 0.262 – 9.066). Likewise, people who have a hereditary history of hypertension will have 2 times the risk compared to people who do not have a hereditary history (AOR = 2.025, 95% CI = 0.746 - 5.502). Obesity shows that people who are obese are 3.2 times at risk of hypertension than those who are not obese (AOR = 3.250, 95% CI = 1.296 – 8.152). People who consume alcohol have a 1.4 times risk than people who do not consume alcohol to develop hypertension (AOR = 1.488, 95% CI = 0.556 – 3.981). Tobacco use showed the highest risk, namely 4.6 times the risk of developing hypertension compared to people who did not use tobacco (AOR = 4.683, 95% CI = 1.518 – 14.446).

Table 3. Binary logistic regression result of risk factors of hypertension

Independent variables	Adj. OR	Confident Interval (95%)		*p-value*
		Lower	Upper	
Age (year)				
≥ 46	1.541	0.262	9.066	0.006
< 46	1			
Sex				
Male	1			0.600
Female	1.372	0.421	0.477	
History of hereditary				
No	1			0.016
Yes	2.025	0.746	5.502	
Obesity status				
No	1			0.012
Yes	3.250	1.296	8.152	
Alcohol consumption				
No	1			0.042
Yes	1.488	0.556	3.981	
Tobacco use				
No	1			0.007
Yes	4.683	1.518	14.446	

DISCUSSION

The result of this study shows that hypertension is influenced by several factors. Age is one factors related to hypertension. The result of this study is in line with previous studies that show the correlation between age and hypertension (Hisamatsu & Miura, 2021). In this study, respondents were classified into 2 age categories, namely < 46 years and 46 years or older. This age classification aims to prove that the older a person gets, the greater the risk of developing hypertension. Sensitivity to hypertension will increase as a personage. For individuals over the age of 60 years, 50-60% have greater blood pressure (Fitriani et al., 2020). Therefore, the older a person is, the more they must maintain their diet.

The results of this study showed a relationship between heredity and hypertension. These results are in line with the theory that shows hypertension is a condition that is hereditary in a family. Individuals with hypertensive parents have twice the risk of suffering from hypertension than individuals who do not have a family history of hypertension (Do Nam et al., 2020). Hypertension

in individuals who have a history of hypertension in the family is about 15-35% (Egbi et al., 2021).

Apart from heredity, obesity is a risk factor for hypertension. These results were in line with previous research, which states a relationship between obesity and hypertension (Shariq & McKenzie, 2020). Obese patients have a risk of experiencing hypertension 2.2 times greater than respondents who have a normal BMI (Body Mass Index) (Simbolon et al., 2020). If bodyweight increases, then there is an increase in the amount of fat tissue. These tissues depend on oxygen and nutrients from the blood to stay alive. With the increased need for oxygen and nutrients, the amount of circulating blood also increases. The more blood that passes through the arteries, the greater the pressure against the artery walls. As a result, the volume of blood circulating in the blood vessels will increase so that the pressure on the artery walls becomes greater.

Based on the results of the study, it was found that there was a relationship between alcohol consumption and hypertension. These results indicate that alcohol consumption is a risk factor for hypertension. Alcohol consumption in question from this study is the respondent's history of alcohol consumption of as much as 2-3 glasses per day. This study is in line with previous research which states that there is a relationship between alcohol consumption and hypertension (Tatsumi et al., 2020). The more alcohol consumption, the higher the blood pressure (Mills et al., 2020). The same thing is also explained by another study which states that someone who drinks alcohol too often or who drinks too much has higher blood pressure than individuals who don't drink or drink little (Lanaspa et al., 2020). The effects of alcohol consumption also stimulate hypertension due to an increase in catecholamine synthesis which in large quantities can trigger an increase in blood pressure.

Based on research that has been done, tobacco use is a risk factor for hypertension, indicating that there is a relationship between using tobacco and hypertension. Previous research has also stated that there was a relationship between smoking and hypertension (Mohialdeen et al., 2022). Carbon monoxide contained in cigarettes is known to bind to hemoglobin in the blood and thicken the blood. Hemoglobin is an iron-containing protein in red blood cells that functions to transport oxygen (Lewandowska & Więckowska, 2020). In this case, carbon monoxide replaces oxygen binding in the blood, forcing the heart to pump to include sufficient oxygen in the organs and tissues of the body. This can increase blood pressure (Kim et al., 2020).

CONCLUSION

It can be summarized that the factors that increase the risk of hypertension in this study are tobacco use, alcohol consumption, obesity, being older, and heredity. Therefore, it is recommended that the related health centers will improve their health promotion about the dangers of hypertension and its precipitating factors. Promoting the importance of diet management and drink less alcohol. In addition, local government policies need to ban the smoking in public area. The family support is needed to control the hypertension status and checked the blood pressure regularly.

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