



The Relationship between Smoking and the Incidence of Hypertension in Kebun Lada Public Health Center, Binjai, Indonesia

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ABSTRACT

Hypertension is a cardiovascular disease characterized by an increase in blood pressure. An increase in blood pressure causes a disruption in the distribution of blood to the target organs. The nicotine content in tobacco is believed to play a role in triggering a series of oxidative stress processes in the body. Oxidative stress plays a role in triggering a series of chronic inflammatory processes in the smoker's body. This study aimed to determine the relationship between smoking and the incidence of hypertension in patients at Kebun Lada Public Health Center, Binjai, Indonesia. Cross-sectional analytic observational study. A total of 75 research subjects participated in this study. Data analysis was carried out using SPSS using univariate and bivariate methods to determine the relationship between smoking and the incidence of hypertension. Subjects with normal blood pressure have a habit of not smoking. Meanwhile, the majority of research subjects with smoking habits experienced stage 1 hypertension. In conclusion, there is a relationship between smoking habits and the incidence of hypertension.

1. Introduction

Hypertension is a cardiovascular disease characterized by an increase in blood pressure. An increase in blood pressure causes a disruption in the distribution of blood to the target organs. As a result of the disruption in blood distribution, there is a disruption in the distribution of oxygen and nutrients, which affects cell life. Disruption of oxygen and nutrient intake triggers a hypoxic condition that triggers a series of chronic inflammatory processes. Activation of chronic inflammatory processes triggers a series of apoptotic processes of cells. Cell apoptosis causes cell death which leads to decreased cell performance in carrying out the basic functions of organs. Hypertension is likened to a condition that

triggers a series of complications and damage to various organs such as the brain, eyes, lungs, liver, kidneys, and heart itself. Various studies show that hypertension is the most common cardiovascular disease experienced by people in various parts of the world. This global condition also occurs in Indonesia, and cases of hypertension are one of the highest causes of morbidity in Indonesia. Hypertension triggers various complications of disorders in various organs, such as disorders of the brain, eyes, and kidneys.¹⁻⁴

Cigarettes are processed tobacco products that are almost widespread in various parts of the world. Cigarettes are used by about 75% of the world's population. The nicotine content in tobacco is believed

to play a role in triggering a series of oxidative stress processes in the body. Oxidative stress plays a role in triggering a series of chronic inflammatory processes in the smoker's body. Of course, this is a biological aspect related to the pathophysiology of hypertension.⁵⁻⁸ This study aimed to determine the relationship between smoking and the incidence of hypertension in patients at Kebun Lada Public Health Center, Binjai, Indonesia.

2. Methods

This study was an analytic observational study with a cross-sectional approach and used primary data obtained from direct observation of the blood pressure of patients at Kebun Lada Public Health Center, Binjai, Indonesia. A total of 75 research subjects participated in this study. The subjects of this study met the inclusion criteria in the form of patients diagnosed with hypertension during their first visit to Kebun Lada Public Health Center, Binjai, Indonesia, and patients who had expressed their willingness to participate in this study. This study was approved by the medical and health research ethics committee of the Faculty of Medicine, Dentistry and Health

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This study observed sociodemographic data, namely age and gender. This study also observed smoking history and smoking degree according to the Brinkman index. The blood pressure of the study subjects was observed based on the results of an aneroid tensimeter examination conducted by professional health workers at Kebun Lada Public Health Center, Binjai, Indonesia. Data analysis was carried out with the help of SPSS version 25 software. Data analysis was carried out in a univariate manner to present the frequency distribution of the test variables. Bivariate analysis was conducted to determine the relationship between smoking and the degree of hypertension, with a p-value <0.05.

3. Results and Discussion

Table 1 shows the baseline characteristics of the research subjects. The majority of research subjects were between 40-59 years old and female. The majority of research subjects smoked with moderate smoking degrees. The majority of research subjects experienced hypertension, especially stage 1 hypertension.

Table 1. Baseline characteristics of research subjects.

Variable	Frequency	Percentage (%)
Age		
30-39 years	17	22,7
40-49 years	26	34,7
50-59 years	27	36,0
≥ 60 years	5	6,6
Gender		
Female	19	25,3
Male	56	74,7
Smoking history		
Smoking	41	54,7
Not smoking	34	45,3
Smoking degree		
Not smoking	34	45,3
Mild	4	5,4
Moderate	30	40
Severe	7	9,3
Blood pressure		
Normal	23	30,7
Prehypertensive	15	20
Stage 1 hypertension	25	33,3
Stage 2 hypertension	12	16

Table 2 shows the relationship between smoking and hypertension. Table 2 shows that subjects with normal blood pressure have a habit of not smoking. Meanwhile, the majority of study subjects with smoking habits had stage 1 hypertension. The results

of this study indicated that there was a relationship between smoking habits and the incidence of hypertension in the study subjects, with a p-value <0.05.

Table 2. The relationship between smoking and hypertension.

Smoking history	Blood pressure										p-value*
	Normal		Prehypertensive		Hypertension 1		Hypertension 2		Total		
	F	%	F	%	F	%	F	%	F	%	
Not smoking	13	38.2	4	11.8	8	23.5	9	26.5	34	100	p = 0.024
Smoking	10	24.4	11	26.8	17	41.5	3	7.3	41	100	

*Pearson chi-square, p<0,05.

The results of this study reinforce several previous studies, which clearly state that there is a relationship between smoking and the incidence of hypertension in various study populations.⁹⁻¹² Smoking causes activation of oxidative stress in endothelial cells. The process of oxidative stress will lead to the formation of various oxidants, which will then trigger a series of activation processes of proinflammatory cytokine gene transcription factors. Activation of proinflammatory cytokines triggers an inflammatory process in endothelial cells. Chronic inflammation that occurs over a long period of time causes damage to various endothelial cell functions. Decreased endothelial cell function causes a decrease in various vasodilator mediators, such as nitric oxide, which triggers the process of vasoconstriction. This leads to a decrease in the diameter of the blood vessels resulting in an increase in blood vessel pressure which leads to the occurrence of hypertension.¹³⁻¹⁵

4. Conclusion

There is a relationship between smoking and the incidence of hypertension in patients at Kebun Lada Public Health Center, Binjai, Indonesia.

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