

# Prevalence and Determinants of Hypertension in Indonesia

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## Abstract

It is estimated that there are 15 million people with Hypertension in Indonesia, but only 4% are controlled. The prevalence of hypertension sufferers is relatively high, 7% to 22%. Prevention of Hypertension can be done by eliminating or minimizing risk factors, one of which causes it, such as reducing salt consumption, if not done, then there is a risk of Hypertension. This study aims to determine the risk factors with the behaviour of Hypertension in Puskesmas. This research is a quantitative study with a cross-sectional method. A sample of 225 respondents who visited/sought treatment at the health centre using Accidental Sampling technique. Data analysis was performed using the chi-square test. The results showed that the factors causing Hypertension were age, exercise habits, smoking habits, alcohol consumption, nutritional status, sodium intake and stress. To reduce people suffering from Hypertension, the Puskesmas should be able to provide information to the public about Hypertension and how to prevent it by doing health promotion or counselling either individually or in groups.

**Keywords:** Risk factors, Hypertension, prevalence and determinants

## Introduction

Hypertension or better known as high blood pressure is a condition in which a person's blood pressure is above the standard limit, where the systolic pressure is  $\geq 140$  mmHg. In comparison, the diastolic pressure is  $\geq 90$  mmHg, the causes of Hypertension are smoking, drinking alcohol, obesity, genetics, stress, excessive salt consumption, consumption of seafood, such as shrimp, fish, shellfish, and others. Symptoms that often appear in Hypertension are dizziness in circles, feeling heavy in the neck, tingling, palpitations, shortness of breath, headaches. Hypertension is not only at high risk of suffering from heart disease but also suffering from other conditions such as diseases of the nerves, kidneys, and blood vessels and the higher the blood pressure, the greater the risk.<sup>1-4</sup>

The increase in cases of Hypertension, especially in developing countries, is estimated to be around 80% in 2025 from a total of 639 million cases in 2019, estimated to be 1.15 billion cases in 2025. Predictions on the current number of hypertension sufferers and the recent population growth. In Indonesia, the number of hypertension sufferers is estimated at 15 million people, but only 4% are controlled. The prevalence of hypertension sufferers is relatively high, 7% to 22%. Based on the results of a survey of patients who ended up in 75% heart disease, 15% stroke, and 10% kidney failure. Research also shows the prevalence of Hypertension also increases with age. From various epidemiological studies conducted in Indonesia, it shows that 1.8% -28.6% of the population aged over 20 years are hypertensive sufferers<sup>5,6</sup>.

Until now Hypertension is still a problem because there are still many hypertensive patients who have not received treatment or have been treated, but their blood pressure has not reached the target, as well as the

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presence of comorbidities and complications that can increase morbidity and mortality<sup>7</sup>.

Hypertension is the third leading cause of death after stroke and tuberculosis in Indonesia. Hypertension will be a severe problem because if it is not treated as early as possible, it will develop and cause dangerous complications such as heart disease, congestive heart failure, stroke, vision problems, and kidney disease.<sup>8</sup>

Prevention is better than cure. Hypertension can be avoided by eliminating or minimizing the risk factors causing it. Risk factors that cannot be changed or eliminated are genetics, age, gender. In contrast, risk factors that can be changed are weight loss for those who are obese, controlling stress, reducing salt consumption, stop smoking, not drinking alcohol, doing regular exercise, limiting consumption of fat, reduce caffeine consumption<sup>9,10</sup>.

Public knowledge and attitudes about hypertension prevention are deemed necessary because it will affect their behaviour, to prevent it is better than a cure. So you can avoid attacks of Hypertension by eliminating

or minimizing the risk factors that cause it. We cannot control risk factors such as genetics, increasing age. But other risk factors can be reduced or even eliminated. If you are overweight to obesity, you can certainly try to reduce your weight to a healthy weight with diet and exercise. Smoking, drinking alcohol and caffeine habits can be reduced or even eliminated. Stress, which can cause blood pressure, can be managed in such a way that it is slightly reduced<sup>11,12</sup>.

## Material and Method

This study used a cross-sectional study and analyzed using chi-square, the population in this study were 225 people who visited the Puskesmas. The variables measured in this study were risk factors for Hypertension such as gender, age, exercise habits, smoking habits, alcohol consumption, BMI, sodium consumption and stress.

This study used a questionnaire which aims to act as a research tool to make it easier to conduct research and obtain accurate data from respondents so that it can describe the research variables which are risk factors for hypertension disease.

## Findings

**Table 1.**

Variable	Bivariate			
	Blood Pressure		P-Value	OR 95%CI
	Hypertension	Normal		
Sex			0.244	1.71 0.66-4.92
Male	27 (24.3%)	84 (75.7%)		
Female	42 (36.8%)	72 (63.2%)		
Age			0.000	11.71 3.41-40.24
≥ 40 years old	57 (55.9%)	45 (44.1%)		
< 40 years old	12 (9.8%)	111 (90.2%)		

Cont... Table 1.

Sports Habits Irregular	63 (67.7%)	30 (32.3%)	0.000	56.3 10.67-230.53
Regular	6 (4.5%)	126 (95.5%)		
Smoking Habit Yes	54 (52.9%)	48 (47.1%)	0.000	8.1 2.55-25.64
No	15 (12.2%)	108 (87.8%)		
Consumption of Alcohol Yes	15 (71.4%)	6 (28.6%)	0.048	7.346 1.236-40.114
No	54 (26.5%)	150 (73.5%)		
BMI Obesity	60 (76.9%)	18 (23.1%)	0.001	51.1 11.6-22.49
Normal	9 (6.1%)	138 (93.3%)		
Sodium intake Often	45 (51.7%)	42 (48.3%)	0.003	5.098 1.895-14.806
No	24 (17.4%)	114 (82.6%)		
Stress Yes	57 (61.3%)	36 (38.7%)	0.000	17.45 4.70-65.67
No	12 (9.1%)	120 (90.9%)		

### Discussion

Gender roles are part of social roles and are not only determined by the sex of the person concerned, but by the environment and other factors. In women, blood pressure generally increases after menopause. Postmenopausal women have a higher risk of hypertension than those who have not menopause. So far, it has been concluded that hormonal and biochemical changes after menopause are the main causes of changes in blood pressure. These hormonal changes make women experience increased sensitivity to salt and weight gain. Both of these have the potential to trigger higher blood pressure<sup>3,13</sup>.

Generally, people with Hypertension are people aged over 40 years, but at this time, it is possible to suffer from young people. Most of the primary Hypertension occurs at the age of 25-45 years, and only in 20% occurs under the age of 20 years and over 50 years. This is because people at a productive age rarely pay attention to health, such as eating patterns and unhealthy lifestyles such as smoking<sup>8,14</sup>.

There was a trend toward increasing prevalence with increasing age and usually at  $\geq 40$  years of age. This is due to the arterial pressure that increases with age, the occurrence of aortic regurgitation, and the presence of a degenerative process, which is more frequent in old

age. When there is an increase in age until they reach old age, there is also an increased risk of diseases including neurological/psychiatric disorders, heart and blood vessel disorders as well as the reduced function of the five senses and metabolic disorders in the body.<sup>15,16</sup>

Based on the results of the statistical test of exercise habits with Hypertension, the irregular exercise proved a significant relationship with Hypertension, with ( $p = 0.000$ );  $OR = 56.3$ ;  $95\% CI = 10.67-230.53$ ). This means that people who do not exercise regularly have a risk of developing Hypertension by 56.3 times compared to people who have regular exercise habits.

People who do not regularly exercise will have an increased risk of developing hypertension compared to those who regularly exercise. Exercise is widely associated with the management of Hypertension because regular and isotonic exercise can reduce peripheral resistance which will lower blood pressure. Exercise is also associated with a role for obesity in Hypertension. Lack of exercise will increase the likelihood of obesity, and if salt intake is also increased, it will facilitate hypertension<sup>17</sup>.

Exercise can reduce blood pressure not only due to weight loss but also how it is generated. Blood pressure is determined by two things, namely the amount of blood pumped by the heart per second and the obstacles faced by the blood in doing its work through the arteries. Exercise can lead to the growth of new capillaries and new blood vessels. Thus things that inhibit blood flow can be avoided or reduced, which means lowering blood pressure. Although the ability of the heart to do its job is increased through exercise, the effect of this reduction in resistance results in a significant reduction in blood pressure<sup>17-19</sup>.

Lack of physical activity increases the risk of suffering from Hypertension because it increases the risk of being overweight. Inactive people also tend to have a higher heart rate, so the heart muscle has to work harder with each contraction. The harder and often the heart muscle has to pump, and the more pressure is placed on the arteries<sup>18,19</sup>.

Based on the results of statistical tests between smoking habits and blood pressure, it was found that there was a significant relationship between smoking habits and blood pressure ( $p = 0.000$ ). The relationship between smoking and Hypertension is not clear. According to literature, nicotine and carbon dioxide contained in cigarettes will damage the endothelial lining of arteries, reduce the elasticity of blood vessels, causing blood pressure to rise. This mechanism explains why respondents who smoke every day have a risk of suffering from hypertension<sup>12,20</sup>.

Smoking behaviour is an act that has no positive value in all respects, especially in health. Smoking is the beginning that brings various types of deadly degenerative diseases, such as cancer and heart disease. The nicotine in tobacco is the cause of the increase in blood pressure immediately after the first inhale. Like other chemicals in cigarette smoke, nicotine is absorbed by the tiny blood vessels in the lungs and circulated into the bloodstream. In just a few seconds, the nicotine has reached the brain. The brain reacts to nicotine by signalling the adrenal glands to release epinephrine (adrenaline). This powerful hormone constricts blood vessels and forces the heart to work harder due to higher pressure. By smoking, a cigarette will have a big effect on increasing blood pressure. This is because cigarette smoke contains approximately 4000 chemicals, 200 of which are poisonous, and 43 other types can cause cancer in the body<sup>21-23</sup>.

In the alcohol consumption variable, respondents who consumed alcohol and were exposed to Hypertension were 71.4%, and those who did not consume alcohol were 26.5%. The results of statistical tests stated that there was a significant relationship ( $p = 0.048$ ).

Some theories support this statement, among others, people who drink alcohol too often or who drink too much have a higher blood pressure than individuals who do not drink or drink little. Blood pressure due to alcohol is unclear. However, it is suspected that an increase in cortisol levels and an increase in red blood cell volume and blood viscosity play a role in raising blood pressure.

Several studies have shown a direct relationship between blood pressure and alcohol intake and among them report that the effect on blood pressure is only seen when consuming 2-3 glasses of standard size alcohol per day.<sup>22,24,25</sup>

Overweight (obesity) is a characteristic of the hypertensive population, and it is proven that this factor is closely related to the occurrence of Hypertension in the future. To find out if someone is overweight or not, it can be seen from the calculation Body Mass Index (BMI). The relationship between blood pressure and body weight was more significant for systolic pressure than for diastolic pressure<sup>2,26</sup>.

The results showed that there was a significant relationship between BMI and Hypertension ( $p < 0.05$ ). One of the controllable risk factors for Hypertension is obesity. The risk of Hypertension in someone who is obese is 2 to 6 times higher than someone with normal weight. Based on the results of the study, it is known that there are 76.9% of hypertensive respondents who have a BMI which shows more nutrition (obesity) and 6.1% who have a BMI which shows no more or normal nutrition. This study shows the relationship between body weight and Hypertension. If the body weight increases above the ideal body weight, the risk of Hypertension also increases.

When body weight decreases, total blood volume also decreases, the hormones associated with blood pressure change, and blood pressure decreases.<sup>26</sup> Weight loss will result in a decrease in blood pressure. An experiment shows that a 1% reduction in body weight will result in a decrease of 1 mmHg for systolic pressure and two mmHg for diastolic pressure.<sup>2,26</sup>

The results of the analysis showed that the incidence of Hypertension was more prevalent in respondents who had frequent sodium intake (51.7%) than respondents whose sodium intake was not frequent (17.4%). From the statistical test, it is known that there is a significant relationship between sodium intake and blood pressure with a value of  $p = 0.000$ . People who frequently consume foods high in sodium have a greater number of

cases of Hypertension who do not frequently consume foods high in sodium.

Several studies have shown that an average decrease in sodium intake by  $\pm 1.8$  grams/day can reduce the systolic blood pressure of 4mmHg and diastolic 2mmHg in hypertensive patients. Another supporting theory is that a high-salt diet can pump harder to push the increased blood volume through narrower spaces which in turn causes blood pressure to rise.<sup>27,28</sup>

High sodium intake ( $\geq 2,300$  mg), when supported by decreased renal adaptation, can cause sodium retention in the kidneys and also reduce potassium stored in the body. This results in a volume displacement of the extracellular fluid resulting in the release of factors associated with  $\text{Na}^+ / \text{K}^+$ . Excess sodium and potassium deficiency in cells result in contraction of blood vessel cells.

The existence of contraction of blood vessels increases peripheral vascular resistance which results in Hypertension. High sodium intake can cause an increase in plasma volume, cardiac output and blood pressure. Sodium causes the body to retain water at levels exceeding the body's normal threshold, which can increase blood volume and high blood pressure. High sodium intake causes adipocyte cell hypertrophy due to lipogenic processes in white fat tissue. If it continues, it will cause narrowing of the blood vessels by fat and increase blood pressure. Besides, individuals who are overweight and obese are more likely to have salt sensitivity which affects blood pressure<sup>27,28</sup>.

The effect of stress is also still controversial, and the effect is thought to be through sympathetic nerve activity which can increase blood pressure as a physical reaction when someone experiences a threat (fight or flight response). One of the causes of increased blood pressure in hypertensive patients is stress. Stress is an unpleasant physical and psychological stress. Stress can stimulate the child's kidney glands to release adrenaline and stimulate the heart to beat faster and stronger, so that blood pressure will increase. If it occurs for a long time, it will be dangerous for people who already

suffer from Hypertension, causing complications. These complications can attack various target organs of the body, namely the brain, eyes, heart, arteries, and kidneys. As a result of the complications of Hypertension, the patient's quality of life is low and the worst possibility is the death of the patient due to complications of hypertension.<sup>29-31</sup>.

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