

## Research article



## View of Factors Associated With the Hypertension's Incident in Adults

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### Abstract

Hypertension is often referred to as the silent killer because initially, the cause is unknown or there are no symptoms. Hypertension risk factors are divided into modifiable risk factors and non-modifiable risk factors. This study aims to determine the factors associated with the incidence of hypertension in adults. This research is quantitative research with a cross-sectional design. The sampling was done using simple random sampling. Data were analysed using the Spearman rank test and the chi-square test. Of the five variables studied, 2 were significant: age and stress level. There were 110 respondents (78.5%) who were in the late adult age range. And there were 92 respondents (65.7%) who had normal stress levels. Bivariate test results using the chi-square showed genetic variables ( $p=0.000$ ), Spearman rank test showed variables age ( $p=0.042$ ), BMI ( $p=0.056$ ), physical activity ( $p=0.513$ ) and stress level ( $p=0.000$ ). Variables that are significantly related to the incidence of hypertension are age, genetics, and stress level. View of factors associated with the hypertension's incident in adults as shown by the rank and chi-square test with  $p$ -value  $<0.05$ . Age and stress levels are related to the incidence of hypertension in adulthood.

## INTRODUCTION

Hypertension is a disorder of the blood circulation system that increases blood pressure above normal or blood pressure  $\geq 140/90$  mmHg [1]. Hypertension is a leading cause of death. Hypertension is often called the silent killer because initially the cause is unknown or without any symptoms. Hypertension can cause some complications such as heart disease, stroke,

diabetes, and kidney failure. Hypertension is one of the chronic diseases affected by several factors. According to other research, the risk factors for hypertension are divided into two, modifiable risk factors and non-modified risk factors. The modifiable risk factors are obesity, smoking, coffee drinking habits, excess salt consumption, physical activity and stress. The unmodified risk factors are age, gender, and genetics [2].

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The WHO data (2018) stated that the prevalence of hypertension in the world was 26.4% or 972 million people. This figure has increased in 2021 to 29.2%. The average number of deaths caused by Non-Communicable Disease (NCD) in people in low- and medium-economic countries aged < 60 years was 29%, while in developed countries the deaths were 13%.

Based on Riskesdas results (2018), the prevalence of hypertension in Indonesia was 34.1% about 70 million people and the mortality rate was 427.218. The population of East Java province in 2022 were 40.348.441 people and the largest population were in Surabaya city. Based on data from SIRS (Hospital Information System) in 2022, hypertension was highest number of cases in East Java Province that was 192.225 cases. The prevalence of hypertension in Surabaya City 2023 was 761.441 people or 25.9% from the total population in Surabaya City i.e 2.936.833 people. The prevalence of hypertension in the Tambakrejo area in 2023 was 16.466 people or 30.1% from the total population of Tambakrejo area 54.644 people and with aged  $\geq 15$  years of 44.587 people. While, there were 3.888 people with controlled hypertension.

The government through the Ministry of Health is currently implementing several programs among the adolescents such as the socialization of Healthy Living Community Movement (GERMAS) and the implementation of healthy lifestyle with CERDIK behavior (Periodic Health Checks, Cigarette Smoke Removal, Regular Physical Activity, Healthy and Balanced Diet, Stress Management), as an attempt to control blood pressure in adolescents in Indonesia [3]. In organizing GERMAS, the main activities of GERMAS are formulated in six clusters, namely Increased physical activity, Increasing healthy living behavior, Providing healthy food and accelerating nutritional improvement, Increasing prevention and early detection of disease, Improving environmental quality, and

Increased education on healthy living [4]. Checking your health condition means checking your blood pressure, blood sugar and cholesterol regularly. Why do we need to have regular health checks, because we will know our health condition and can take the necessary preventive, control and treatment measures [5]. Based on these considerations, the present study aims to determine the factors associated with the hypertension incident in adults in Tambakrejo urban area Surabaya.

## METHODS

This study examined factors associated with the hypertension's incident in adults. The population in this study are 396 respondents. The study population comprised all adults patients with hypertension. Sampling was conducted by simple random sampling. A total of 199 samples obtained, selected respondents will be classified according to the predetermined inclusion criteria. The inclusion criteria were: respondents aged from 20 years to 65 years, and respondents who have a history of hypertension, either hereditary or newly diagnosed hypertension. The exclusion criteria were: respondents who withdrew as a sample.

This research has received ethical approval number: 324/01/KEPK-STIKESBWI/VII/2024 from the Health Research Ethics Commission of Institute of Health Science Banyuwangi. The research was conducted at the Tambakrejo Village Hall, Surabaya, and its planned that this research out in 10<sup>th</sup> June to 20<sup>nd</sup> 2024. Data were collected by having respondents complete research directly. The instruments were used: demographic characteristics questionnaire, *Digital Sphygmomanometer*, *microtoise*, body weight scale, *Depression Anxiety Stress Scale 21*, and *International Physical Activity Questionnaire*.

Data analysis was conducted through with bivariate analyses. Bivariate analysis is used

to determine the relationship between the two variables. *Spearman's rank test* and *chi-square* were used to analyze the relationship between factors. The analysis test was conducted using the SPSS program.

## RESULTS

The study include 199 respondents with hypertension. The spesific characteristics of the respondents are presented in Table 1. Almost all respondents were aged 46-65 years (78.5%) with a family history of hypertension (53.6%), normal BMI (47.86%), light physical activity (56.4%) and had normal stress levels (65.7%).

The analysis of variables related to the incidence of hypertension was assessed based on the p-value obtained from statistical tests, as presented in Table 2. Variables correlated with the incidence of hypertension include age, genetics, and stress levels. While variables that are not correlated with the incidence of hypertension include body mass index and physical activity. Based on Spearman's rank and chi-square analysis, the p-value is smaller than the significance level  $\alpha$  (0.05), which indicates that the variables are correlated, and the p-value is greater than  $\alpha$  (0.05) which means they are not correlated with the incidence of hypertension.

From the two tables, it was found that of the five factors that became variables, there were only 3 variables that had a relationship with the incidence of hypertension with a p-value  $<0.05$ , and 2 variables did not have a strong relationship with the incidence of hypertension with a p-value  $>0.05$ . Of the 5 variables, 3 variables were tested using the Spearman rank test which included the variables of age, body mass index, physical activity, and stress level. Meanwhile, the genetic variable was tested using the chi-square test.

Table 1  
Specific characteristics of respondents with a history of Hypertension.

| Characteristics    | n   | %     |
|--------------------|-----|-------|
| Age                |     |       |
| 21-35 years        | 7   | 5     |
| 36-45 years        | 23  | 16.5  |
| 46-65 years        | 110 | 78.5  |
| Genetic            |     |       |
| Family History     | 75  | 53.6  |
| Non family history | 65  | 46.4  |
| Body Mass Index    |     |       |
| Normal             | 67  | 47.86 |
| Overweight         | 54  | 38.57 |
| Obese              | 19  | 13.57 |
| Physical Activity  |     |       |
| Light              | 79  | 56.4  |
| Medium             | 50  | 35.7  |
| Weight             | 11  | 7.9   |
| Stress Level       |     |       |
| Normal             | 92  | 65.7  |
| Light              | 48  | 34.3  |

Table 2  
Analysis of variables related to the incidence of hypertension.

| Indicators        | p     |
|-------------------|-------|
| Age               | 0.042 |
| Genetic           | 0.000 |
| Body Mass Index   | 0.056 |
| Physical Activity | 0.056 |
| Stress Level      | 0.000 |

## DISCUSSION

The results of this study show that almost all respondents were aged 46-65 years. The results of this study are in line with Nuraeni's (2019) study which stated that with increasing age, changes occur. The high prevalence of age in the incidence of hypertension is related to the arteries in the body becoming wider and stiffer, resulting in a decrease in the capacity and recoil of blood accommodated through the blood vessels [6]. This reduction causes an increase in systolic pressure. Aging also causes disruption of neurohormonal mechanisms such as the renin-angiotensin-aldosterone system and also causes an increase in peripheral plasma concentrations and also glomerulosclerosis due to aging and intestinal fibrosis,

resulting in increased vasoconstriction and blood vessel resistance, resulting in increased blood pressure (hypertension). This is supported by the theory proposed by Toreh & Kalangi (2012) which states that the renin-angiotensin-aldosterone system (RAAS) is a very important regulator for regulating sodium balance, extracellular fluid volume, renal vascular resistance and systemic vascular resistance [7].

Hypertension risk factors are divided into two, namely modifiable risk factors and non-modifiable risk factors. According to Ekarini et al (2020), risk factors that can be modified are obesity, smoking, coffee drinking habits, excessive salt consumption, physical activity and stress. Risk factors that cannot be changed are age, gender, and genetics [2]. In this research, no significant relationship was found between physical activity and the incidence of hypertension in adulthood. As shown in Table 2, showed almost all respondents were in the age range of 46-65 years (late adulthood) with a total of 110 respondents (78.5%). Age is one of the factors that influences blood pressure. Age is one of the main factors that influences blood pressure, this is caused by the body's natural changes in the heart, blood vessels and hormones. As a person ages, the heart's workload will increase, causing the blood vessels to become stiff, causing an increase in blood pressure [6, 8].

Another variable that shows a relationship with the occurrence of hypertension is genetic. In line with previous research which shows that genetics is one of the factors that causes hypertension. Based on Mendel's law, if only one parent suffers from hypertension, then the chance of their child not suffering from hypertension is 50% [9]. Hypertension tends to be a hereditary disease. If one of the parents suffers from hypertension, then throughout their life the offspring has a 25% chance of suffering from hypertension [10]. If both parents suffer from hypertension, there is a 60% chance that their child will suffer from hypertension. This research is also in line

with Febrianti's (2019) research at the Community Health Center Inpatient Tanjung Morawa District Tanjung Morawa shows that hereditary factors of 27 respondents (61.4%) [11].

Stress levels are one of the risk factors for hypertension that can be changed. In this study, significant results were obtained between stress levels and the incidence of hypertension, but the results had a negative correlation, meaning that the relationship between the two variables was not the same. In line with previous research which found that there was a relationship between stress and the incidence of hypertension. Stress can increase sympathetic nerve activity, which then gradually increases blood pressure, meaning that the more stress a person experiences, the higher their blood pressure will be [12]. Stress is a feeling of fear and anxiety that arises in a person's emotions and body due to changes in the environment which then physiologically causes the hypothalamus to release hormones to activate the adrenal glands [13]. Activation of the hypothalamus can also stimulate sympathetic nerve activity. Direct activation of sympathetic nerves produces a vasoconstrictor response in blood vessels and increases cardiac activity which in turn can increase blood pressure (Pebriyani et al., 2022) [8]. A person's coping mechanisms for managing stress levels vary. So in the case of this research, where the majority of respondents are in late adulthood, it is necessary to manage stress well and do lots of positive activities to distract stress.

In this study, based on table 2, it is known that more than most of the respondents have light activities as many as 79 respondents. This research is in line with research by Azizah Julianti, et al which shows that there is no significant relationship between physical activity and the incidence of hypertension with a  $p$  value of 0,651 (  $p > 0,05$  ) [14]. Regular and moderate physical activity can reduce blood vessel stiffness and increase heart and lung

endurance and reduce blood pressure [15]. Good physical activity is ideal believes that heavy physical activity is dangerous for hypertension patients. Intense physical activity has serious risks because the greater the load that must be carried out, the greater the muscle tension and pressure on the blood vessels [16]. According to researchers, for the majority of respondents light physical activity did not affect the increase in blood pressure. The increase in blood pressure in respondents with moderate activity does not harm blood pressure in hypertensive patients

Body mass index is a risk factor for hypertension. This is related to obesity in a person. In this study, the results showed that there was no significant relationship between BMI and the incidence of hypertension [17]. This research is in line with previous research which found that BMI was not related to the incidence of hypertension. This is based on several factors that cause a person to become obese, such as unhealthy lifestyle behaviors, including frequent consumption of sweets, eating at night, especially in urban areas which have changed from traditional patterns to modern patterns with the habit of consuming food and risky drinking [18].

## CONCLUSIONS

Based on the research results, it can be concluded that the factors related to the incidence of hypertension are age, genetics and stress levels, while body mass index and physical activity are not related to the incidence of hypertension.

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