

# The Relationship Between Hypertension and Body Mass Index (BMI) Among Police Officers Aged 30–60 Years at the Pasuruan Police Resort

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## Article Info

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## ABSTRACT

Hypertension is one of the most common non-communicable diseases, often occurring without clear symptoms, making early detection difficult. One of the risk factors contributing to the occurrence of hypertension is an increase in Body Mass Index (BMI). Individuals with high BMI, particularly those categorized as overweight or obese, tend to have a higher risk of developing high blood pressure. This study aims to determine the relationship between hypertension and BMI among police officers aged 30 to 60 years, considering that this profession involves high levels of stress and workload, which can also impact cardiovascular health. The research employed a cross-sectional design with a total of 60 respondents. Data analysis was conducted using the Chi-Square test. The results showed a significant relationship between hypertension and BMI ( $p = 0.000$ ), where the majority of respondents with hypertension had BMI values classified as overweight or obese. Therefore, regular monitoring of body weight and blood pressure is highly recommended, especially for high-risk professions such as police officers, to prevent more serious health complications in the future.

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## INTRODUCTION

One of the common health problems affecting the Indonesian population is hypertension. In Indonesia, hypertension is widely known as high blood pressure. The distribution of oxygen to the tissues in the human body is directly proportional to body mass, meaning that the greater the body mass, the more blood volume is required. This results in the heart having to work harder to pump blood, as the pressure on the arterial walls increases (Susanto et al., 2019). A person is considered to have high blood pressure when the diastolic pressure is  $\geq 90$  mmHg and the systolic pressure is  $\geq 140$  mmHg (Apipin & Winarti, 2023).

According to data compiled by Indonesia's Basic Health Research (Riskesmas) in 2018, the national prevalence of hypertension in Indonesia reached 34.1%, with East Java Province recording a rate of 36.3%. Hypertension in Indonesia is primarily caused by lifestyle factors and age (Riskesmas, 2018). If left untreated, this condition can lead to fatal consequences, such as premature death, chronic kidney disease, and heart failure (Weldegiorgis & Woodward, 2020).

One of the main factors causing hypertension is Body Mass Index (BMI). Individuals who are overweight or obese are more susceptible and vulnerable to hypertension (Saputri et al., 2021). Nutritional status can be assessed by calculating BMI, which is the individual's body weight in kilograms (kg) divided by height in meters squared ( $m^2$ ). The World Health Organization (WHO) classifies human body weight into the following categories: underweight ( $<18.5 \text{ kg}/m^2$ ), normal weight ( $18.5\text{--}24.9 \text{ kg}/m^2$ ), overweight ( $25\text{--}29.9 \text{ kg}/m^2$ ), and obese ( $\geq 30 \text{ kg}/m^2$ ) (WHO, 2020). Based on Risesdas 2018, 21.8% of the adult population in Indonesia is classified as obese.

Previous research has consistently shown a significant relationship between high body mass and the risk of hypertension. This study focuses on members of the Pasuruan Police Resort, who possess unique characteristics such as structured work routines, relatively consistent physical activity patterns, and a similar working environment, all within the age range of 30–60 years. Therefore, this research is expected to contribute specific insights into the relationship between BMI and hypertension within this relatively homogeneous population, providing more relevant and applicable understanding.

The biological mechanisms explaining this relationship include increased blood volume, insulin resistance, and activation of the renin-angiotensin-aldosterone system, all of which contribute to elevated blood pressure (Hall et al., 2019; Brosolo et al., 2022). Several studies in Indonesia have also demonstrated a significant relationship between BMI and the incidence of hypertension. Khasanah (2022a) found that obesity, as measured by BMI, is a major risk factor for hypertension. Setyawan et al. (2022) similarly identified obesity as a contributing factor to elevated blood pressure. Furthermore, Nur's literature review revealed that a higher BMI is strongly associated with an increased risk of hypertension (Azzubaidi et al., 2023). Given the rising prevalence of both hypertension and obesity among the productive-age population in Indonesia, the main objective of this study is to analyze the relationship between BMI and hypertension. The findings are expected to provide valuable insights for hypertension prevention efforts and support health policies aimed at managing body weight and reducing prevalence rates.

## RESEARCH METHOD

This study employed a quantitative approach with a cross-sectional design aimed at analyzing the relationship between hypertension and Body Mass Index (BMI) among police officers aged 30 to 60 years at the Pasuruan Police Resort. The research was analytical-observational in nature, focusing on the simultaneous measurement of variables at a single point in time. A total of 60 respondents were selected through purposive sampling based on the following inclusion criteria: aged between 30 and 60 years, actively serving at the Pasuruan Police Resort, and willing to participate by providing informed consent. Exclusion criteria included officers on extended leave, those undergoing treatment for chronic illnesses other than hypertension, and individuals with medical conditions that could affect BMI measurements, such as edema or ascites.

Primary data were collected through direct examination of blood pressure and BMI measurements. Blood pressure was measured twice during rest, with a five-minute interval

between measurements, using a sphygmomanometer. BMI was calculated based on measurements of body weight (using a digital scale) and height (using a microtoise stadiometer), and computed using the formula: weight (kg) divided by the square of height (m<sup>2</sup>). The study was conducted in January 2025 at the Pasuruan Police Resort workplace, located in Pasuruan City, East Java, with logistical support from the relevant institution.

Collected data were analyzed using SPSS version 21 for Windows. Descriptive statistics were used to describe the characteristics of respondents and the frequency distribution of each variable. To test the relationship between hypertension and BMI, the Chi-Square test was used, as both variables were categorical in nature. The significance level was set at  $\alpha = 0.05$ .

The hypotheses tested in this study were as follows:

H<sub>0</sub>: There is no significant relationship between hypertension and BMI.

H<sub>1</sub>: There is a significant relationship between hypertension and BMI among police officers aged 30–60 years.

The statistical test results served as the basis for drawing conclusions regarding the relationship between the two variables. The findings are expected to support preventive and promotive efforts in managing hypertension, especially in high-risk professions such as law enforcement.

## RESULT AND DISCUSSION

### Result

This study employed purposive sampling with primary data obtained through direct examination of 60 police officers aged 30–60 years at the Pasuruan Police Resort. Data collection was carried out after coordination with the Pasuruan Police Resort authorities to ensure a smooth process without disrupting the respondents' operational duties.

The examinations were conducted in February 2025 in a designated room provided by the Pasuruan Police Resort. During the data collection process, the researcher was accompanied by medical personnel assigned to the police station. Respondents attended the examinations in scheduled turns. Each respondent was given an explanation of the examination procedures before measurements of body weight and height were taken to determine their Body Mass Index (BMI).

The data collection process proceeded smoothly thanks to the support from the Pasuruan Police Resort and the active participation of the respondents. The data obtained from the examination were then compiled and categorized based on gender, age, blood pressure status, and BMI classification. The collected data were analyzed to examine the relationship between the two variables using SPSS for Windows version 21.

### Respondent Characteristics

Data on respondent characteristics, such as age and gender, were obtained from the study involving 60 members of the Pasuruan Police Resort.

**Table 1.** Frequency Distribution of Respondents by Age and Gender

Characteristics	Frequency Respondents (n)	Percentage (%)
Ages		
30 Years	3	5.0%
31-40 Years	24	40.1%
41-50 Years	14	23.3%
51-60 Years	19	31.7%
Total	60	100%
Gender		
Male	43	71.7%
Female	17	28.3%
Total	60	100%

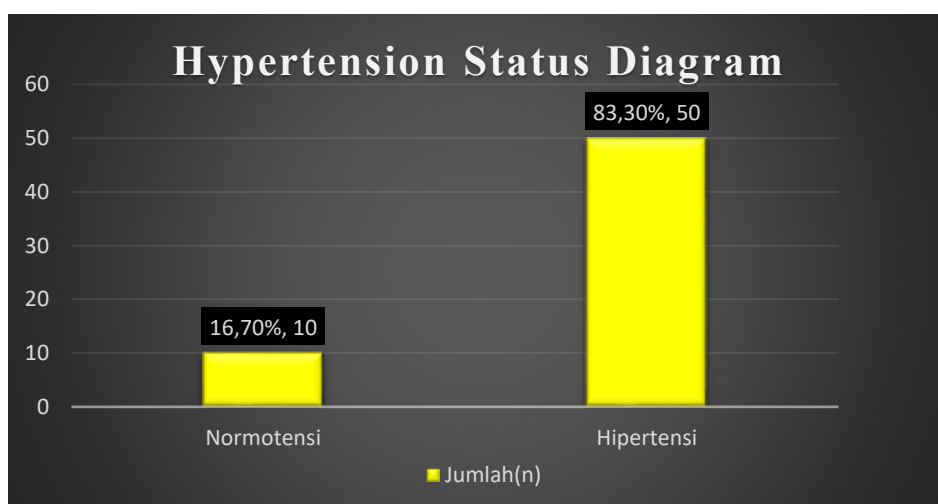
Based on Table 1, the characteristics of respondents show that the age group of 31–40 years had the highest incidence of hypertension, with 24 respondents (40%). In addition, the majority of respondents were male, totaling 43 individuals (71.7%), while female respondents accounted for 17 individuals (28.3%).

### Blood Pressure

Based on the study conducted on 60 respondents at the Pasuruan Police Resort, data on the respondents' blood pressure were obtained as follows:

**Table 2.** Frequency Distribution Based on Blood Pressure

Blood Pressure	Frequency (n)	Percentage (%)
Hypertension	50	83.3%
Normotensive/Non-hypertensive	10	16.7%
Total	60	100%



**Figure 1.** Hypertension Status Diagram

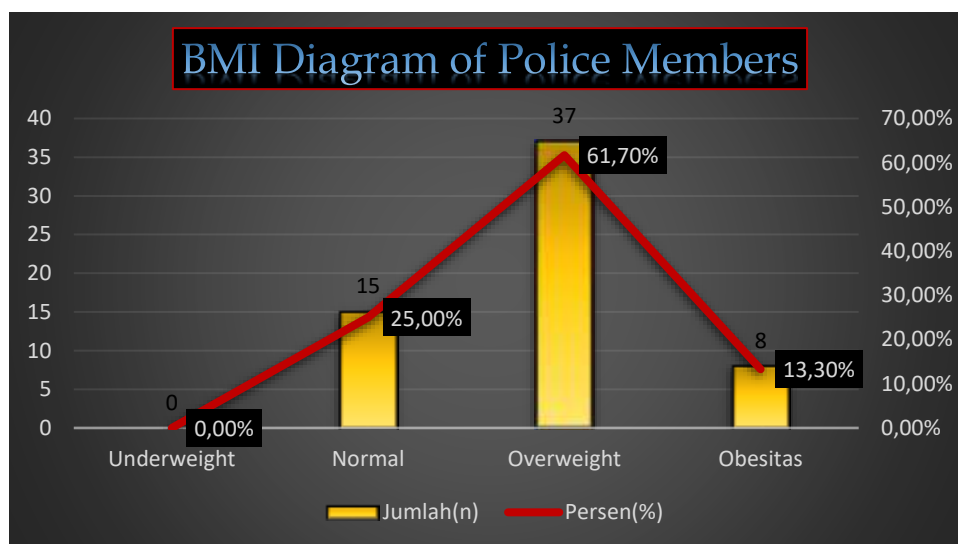
Based on Table 2, the frequency distribution of blood pressure shows that 50 respondents (83.3%) experienced hypertension, while 10 respondents (16.7%) had blood pressure within the normotensive category.

### Body Mass Index (BMI)

The frequency distribution based on Body Mass Index (BMI) among respondents with hypertension is as follows:

**Table 3.** Frequency Distribution Based on Body Mass Index (BMI) Among Respondents with Hypertension

BMI	Frequency (n)	Percentage (%)
Obesity ( $\geq 30$ )	8	13.3%
Overweight(25-29,9)	37	61.7%
Normal (18,5-24,9)	15	25%
Underweight (<18,5)	0	0%
Total	60	100%



**Figure 2.** BMI Diagram of Police Members

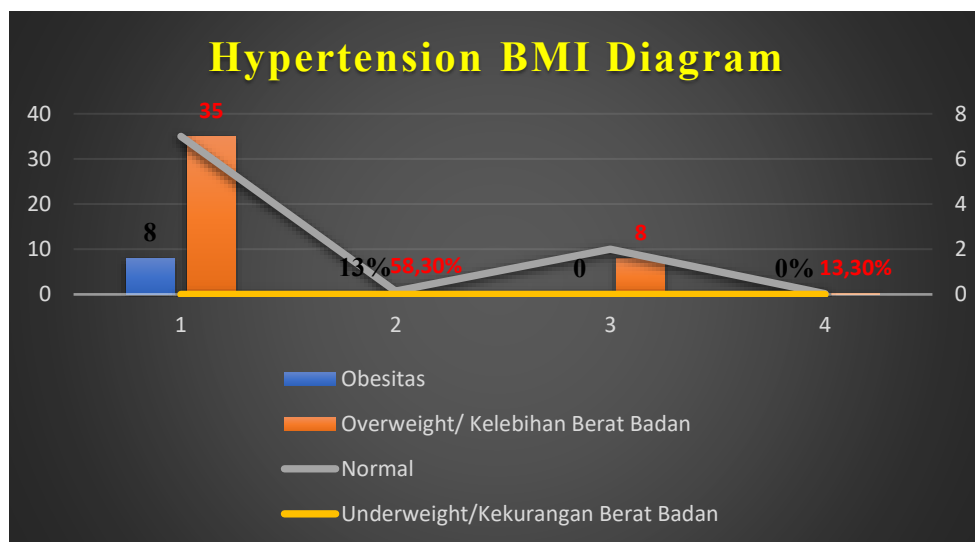
Based on Table 3, the majority of respondents with hypertension fell into the overweight category based on Body Mass Index (BMI) calculations, totaling 37 respondents (61.7%). Meanwhile, 15 respondents (25%) were in the normal category, and 8 respondents (13.3%) were classified as obese. No respondents were categorized as underweight.

### Data Analysis

This study analyzed the data to assess the association between high blood pressure (hypertension) and Body Mass Index (BMI) among police officers aged 30–60 years at the Pasuruan Police Resort. The results of this analysis indicate whether a significant relationship exists between hypertension and BMI among the respondents. The analysis results are presented as follows:

**Table 4.** The Relationship Between Hypertension and Body Mass Index (BMI) Among Police Officers Aged 30–60 Years at the Pasuruan Police Resort in 2025

BMI	Blood Pressure				P-Value
	Hypertension No		Total		
	N	%	N	%	
Obesity	8	13.3%	0	0%	8(13.3%)
Overweight	35	58.3%	2	3.3%	37 (61.7%)
Normal	7	11.7%	8	13.3%	15 (25%)
Underweight	0	0%	0	0%	0(0%)
Total	50	83.4%	10	16.6%	60(100%)



**Figure 3.** Hypertension BMI Diagram

Based on Table 4, out of a total of 60 respondents, 35 individuals (58.3%) with an overweight BMI experienced hypertension, while 2 respondents (3.3%) in the same category did not have hypertension. In addition, 8 respondents (13.3%) with an obese BMI also experienced hypertension. Among those in the normal BMI category, 7 respondents (11.7%) had hypertension, while 8 respondents (13.3%) did not. These findings indicate that the majority of individuals with hypertension in this study had a BMI classified as Overweight or Obese.

**Table 5.** Chi-Square Test Results

	Chi-Square Test		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.498 <sup>a</sup>	2	.000
Likelihood Ratio	17.779	2	.000
Linear-by-Linear Association	10.050	1	.002
N of Valid Cases	60		

The Pearson Chi-Square test between the variables of blood pressure (hypertension) and Body Mass Index (BMI) yielded a p-value of 0.000, which is smaller than the significance level of  $\alpha = 0.05$ . Therefore, the null hypothesis ( $H_0$ ) is rejected, indicating a significant relationship between hypertension and BMI among police officers aged 30–60 years at the Pasuruan Police Resort in 2025.

## Discussion

This study aimed to determine the relationship between hypertension and Body Mass Index (BMI) among police officers aged 30–60 years at the Pasuruan Police Resort. The Chi-Square test result showed a p-value of 0.000, indicating a very strong statistical significance ( $p < 0.05$ ). This suggests a statistically meaningful relationship between BMI and the incidence of hypertension. In other words, the higher a person's BMI, the greater their likelihood of developing hypertension.

The majority of respondents in this study were male and fell within the 31–40 age group. All respondents were classified within the normal, overweight, or obese BMI categories, with no participants in the underweight category.

Based on data distribution, respondents with a normal BMI mostly had normotensive blood pressure, particularly among males aged 31–40 years (6 individuals). However, there were also a few normal-BMI respondents with hypertension, both male and female, aged between 30 and 50 years. This indicates that even individuals within a normal weight range can still develop high blood pressure due to other contributing risk factors.

In the overweight group, most respondents had hypertension, especially males aged 31–50 years. Males aged 31–40 were the most represented subgroup among overweight individuals with hypertension, followed by those aged 41–50 and 51–60. There were only a few normotensive respondents in the overweight category, most of whom were females aged 31–40.

The obesity category showed a similar trend. Most obese respondents experienced hypertension, with the highest number observed in males aged 41–50. Hypertension was also found among obese males aged 31–40 and 51–60. Fewer normotensive respondents were found in the obese category, and they were spread across different age groups and genders.

Overall, the findings illustrate that the risk of hypertension increases with age and nutritional status. Respondents classified as overweight and obese were more prevalent in the 41–60 age group, with most of them experiencing hypertension. In contrast, respondents with a normal BMI were more likely to have normal blood pressure and were typically younger.

These results align with previous studies. Khasanah (2022a) found that hypertension was more common among individuals with obesity. Similarly, Setyawan et al. (2022) identified obesity as a major risk factor for hypertension. Nur's research further explained that obesity influences blood pressure through several mechanisms, such as increased blood volume, insulin resistance, activation of the sympathetic nervous system, and activation of the renin-angiotensin-aldosterone system (RAAS), all of which contribute to elevated blood pressure.

In this study, most obese respondents had hypertension, reinforcing the understanding that a high BMI is strongly associated with elevated blood pressure. However, the presence of hypertensive individuals with a normal BMI (around 11.7%) suggests that while BMI is an important factor, other variables also play a role. These include excessive sodium intake, work-related stress, genetic predisposition, lack of physical activity, and sedentary lifestyle (Suciana et al., 2020). High salt consumption, for instance, has been shown to significantly increase blood pressure (Tang et al., 2022).

Firmansyah & Santoso (2020) also emphasized that obesity is closely related to elevated blood pressure due to increased blood volume and cardiac workload. Meanwhile, Tiara (2020) noted that clinical weight loss can significantly reduce both systolic and diastolic blood pressure, making weight management a crucial component in hypertension prevention.

Furthermore, Asari and Helda (2021) highlighted that in older adults, obesity is a highly contributing factor to hypertension risk. This finding is consistent with the present study, where all obese respondents in the 51–60 age group had hypertension. In conclusion, this study reinforces the strong association between BMI and hypertension. An increase in nutritional status, especially in middle-aged individuals, is a significant risk factor for high blood pressure. Therefore, regular monitoring of blood pressure and BMI, along with the adoption of a healthy and active lifestyle, is essential particularly for high-stress professions such as law enforcement.

## CONCLUSION

Based on the data analysis, it was found that a high Body Mass Index (BMI) is significantly associated with increased blood pressure among police officers aged 30–60 years at the Pasuruan Police Resort. The majority of respondents with hypertension had a BMI in the overweight and obese categories, indicating that excess body weight is a contributing factor to the incidence of hypertension. These findings support the objective of the study, which was to determine the prevalence of hypertension, the distribution of BMI, and the relationship between the two among police officers a profession characterized by irregular work schedules and sleep patterns, which may further increase the risk of developing hypertension.

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