

Factors Associated with the Incidence of Hypertension Among Employees of PT. X in South Jakarta in 2025

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Hypertension remains one of the most common occupational health problems and may reduce employee productivity, quality of life, and overall well-being. This study aimed to analyze the factors associated with the incidence of hypertension among employees of PT. X in South Jakarta. The study applied a quantitative method with a cross-sectional design. Data were collected through questionnaires, anthropometric measurements, and company medical check-up records. The variables examined included age, physical activity, Body Mass Index, smoking habits, workload, and work stress. Data analysis was conducted using univariate and bivariate statistical tests to identify the relationships between independent variables and hypertension incidence. The findings showed that hypertension was highly prevalent among employees. Age, Body Mass Index, and smoking habits were significantly associated with hypertension incidence, indicating that biological and lifestyle-related factors play important roles in increasing hypertension risk among workers. Meanwhile, physical activity, workload, and work stress were not significantly associated with hypertension incidence. The study concludes that hypertension among employees is influenced by multifactorial conditions, particularly modifiable lifestyle factors. Therefore, workplace health promotion programs, regular health screening, smoking cessation interventions, nutrition education, and healthy lifestyle campaigns should be strengthened to improve employee health and reduce the risk of hypertension in the workplace.

Keywords: Hypertension, Employees, Body Mass Index, Smoking Habits, Occupational Health, Workplace Health Promotion

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1. Introduction

Hypertension or high blood pressure is a disorder of the circulatory system that causes blood pressure to exceed normal levels (Djafar, 2021). Hypertension occurs when systolic blood pressure is greater than 140 mmHg and diastolic blood pressure is greater than 90 mmHg (Auliani et al., 2024). Hypertension is one of the most common diseases suffered by the community and is a major cause of high morbidity and mortality rates worldwide (Sibulo et al., 2025).

Based on data from the World Health Organization (WHO), the global prevalence of hypertension in 2023 was estimated to reach 1.28 billion adults aged 30–79 years (World Health Organization, 2025). Africa has the highest prevalence in the world at 27%, followed by the Eastern Mediterranean at 26%, Southeast Asia at 25%, Europe at 23%, the Western Pacific at 19%, and the Americas at 18% (World Health Organization (WHO), 2022).

The prevalence of hypertension in Indonesia, based on the 2018 Riskesdas data among individuals aged ≥ 18 years, was 34.1%, an increase from 25.8% in 2013 (Kementerian Kesehatan RI, 2018). According to the 2023 Indonesian Health Survey (SKI), the prevalence of hypertension among individuals aged ≥ 18 years decreased to 30.8% (Kementerian Kesehatan RI, 2018). The prevalence of hypertension in DKI Jakarta was

recorded at 29.6% among individuals aged ≥ 15 years, which is below the national prevalence rate of 30.8% (Kementerian Kesehatan RI, 2023).

The high prevalence of hypertension in Indonesia is in line with the increasing prevalence of hypertension among workers (Wahyuni et al., 2024). Based on data from the Ministry of Health (2019), the national prevalence of hypertension among workers, particularly private employees, was 24.37%. Workers suffering from hypertension may experience decreased productivity, leading to work errors and accidents, job stress, and a higher tendency for absenteeism (Rahayuni et al., 2024).

Hypertension among workers can be caused by various risk factors, such as age, gender, family history of hypertension, smoking behavior, consumption of high-fat foods, excessive salt and MSG intake, obesity, lack of physical activity, and stress factors. In addition, occupational factors, work environment, and job characteristics are also considered risk factors for hypertension (Rahayuni et al., 2024). If these risk factors are not properly managed, hypertension may lead to complications such as arterial damage and organ disorders, including heart failure, kidney damage, stroke, retinopathy, and even blindness (Falo et al., 2023). Therefore, hypertension prevention efforts are necessary because hypertension can actually be prevented through risk factor control (Ibnu & Hidayati, 2025).

Research conducted by Putri et al. (2023) showed that there was a relationship between physical activity, smoking, and Body Mass Index (BMI) and the incidence of hypertension among employees of the Aceh Governor's Office. This finding is consistent with the study conducted by Kemalasari et al. (2025), which demonstrated a significant relationship between age, Body Mass Index (BMI), and stress and the incidence of hypertension among office workers at PT. X. Another study conducted by Adriana et al. (2022) also stated that there was a relationship between age, obesity, exercise habits, workload, and stress and the incidence of hypertension among employees at the Class II Jayapura Port Health Office in 2021.

PT. X is a company located on Jln. TB Simatupang, South Jakarta, DKI Jakarta. The company operates in the upstream oil and gas sector, particularly in oil and natural gas exploration and production across various regions in Indonesia and abroad. The company consists of 24 divisions with 806 employees. Based on the researcher's observations, the majority of employees' daily activities involve completing work while sitting in front of computer screens. The excessive workload they handle every day often forces employees to work overtime to meet deadlines. In addition, stress caused by heavy workloads makes some workers more susceptible to illness, resulting in the transfer of workloads to other employees. Employees who are assigned additional work tend to cope with work fatigue by consuming foods high in fat and salt, such as fried foods, or by smoking cigarettes. These conditions increase employees' risk of developing hypertension due to unhealthy lifestyle patterns among several workers.

Based on data from the Health Safety Security and Environment (HSSE) Division referring to the medical check-up (MCU) results of PT. X employees, hypertension is included among the ten most common diseases suffered by employees of PT. X, ranking second. In 2023, the prevalence of hypertension among PT. X employees reached 93 cases (19.0%) out of 489 workers, increasing in 2024 to 143 cases (26.2%) out of 545 workers, and decreasing in 2025 during the January–August period to 114 cases (14.1%) out of 806 workers. Based on these data and background descriptions, the researcher was interested in conducting a study on the factors associated with the incidence of hypertension among employees of PT. X in South Jakarta in 2025.

2. Literature Review and Problem Statement

Literature Review

Hypertension is one of the most prevalent non-communicable diseases and remains a major global public health concern due to its high morbidity and mortality rates. Hypertension occurs when systolic blood pressure exceeds 140 mmHg and diastolic blood pressure exceeds 90 mmHg (Auliani et al., 2024). According to the World Health Organization (WHO), hypertension affects approximately 1.28 billion adults worldwide and contributes significantly to cardiovascular diseases, stroke, kidney failure, and premature death (World Health Organization, 2025). The increasing prevalence of hypertension indicates that this disease is not only associated with individual health conditions but is also influenced by environmental, occupational, and lifestyle factors.

In Indonesia, hypertension prevalence remains relatively high. Data from Riskesdas 2018 showed that the prevalence of hypertension among individuals aged 18 years and above reached 34.1%, while the Indonesian Health Survey (SKI) 2023 reported a prevalence of 30.8% (Kementerian Kesehatan RI, 2018; Kementerian Kesehatan RI, 2023). The prevalence of hypertension among workers has also increased, especially among private-sector employees, where occupational demands, work stress, unhealthy lifestyles, and sedentary behavior contribute to elevated blood pressure levels (Wahyuni et al., 2024).

Several studies have identified various risk factors associated with hypertension among workers. These factors include age, obesity, smoking behavior, physical inactivity, stress, and workload (Rahayuni et al., 2024). Age is considered a non-modifiable risk factor because vascular elasticity decreases as individuals grow older, resulting in increased blood pressure. Obesity or increased Body Mass Index (BMI) also contributes to hypertension due to increased cardiac workload and metabolic disturbances. In addition, smoking behavior plays a significant role because nicotine stimulates sympathetic nervous activity, causing vasoconstriction and increased blood pressure.

Previous empirical studies have demonstrated inconsistent findings regarding factors associated with hypertension among workers. Putri et al. (2023) found significant relationships between physical activity, smoking behavior, and Body Mass Index (BMI) and hypertension among employees of the Aceh Governor's Office. Similarly, Kemalasari et al. (2025) reported significant relationships between age, BMI, and stress and hypertension among office workers at PT. X. Adriana et al. (2022) also identified significant associations between age, obesity, exercise habits, workload, stress, and hypertension among employees at the Jayapura Port Health Office. These studies indicate that hypertension among workers is multifactorial and influenced by both occupational and behavioral factors.

Occupational environments may also contribute to hypertension risk. Employees working in office settings often experience prolonged sitting duration, high workloads, tight deadlines, overtime work, and psychological pressure, all of which may affect cardiovascular health. Sedentary working conditions combined with unhealthy coping mechanisms such as smoking and consuming high-fat or high-salt foods can increase the likelihood of hypertension. Therefore, workplace health promotion programs are essential to reduce hypertension risk and improve employee productivity and well-being.

PT. X, an upstream oil and gas company located in South Jakarta, has reported hypertension as one of the top diseases affecting its employees. Data from the company's Health Safety Security and Environment (HSSE) Division showed fluctuations in hypertension prevalence from 2023 to 2025. The increasing number of hypertension cases among employees reflects the need to identify contributing factors associated with hypertension in the workplace. Understanding these factors is important to support the development of effective promotive and preventive health programs within the company.

Problem Statement

Hypertension has become a significant occupational health issue among employees due to its impact on workers' productivity, health status, and quality of life. Employees with hypertension are more vulnerable to work-related fatigue, decreased performance, absenteeism, and cardiovascular complications. Despite the implementation of workplace health programs, hypertension remains one of the leading health problems among employees at PT. X in South Jakarta.

Several factors such as age, physical activity, Body Mass Index (BMI), smoking behavior, workload, and work stress are suspected to contribute to the occurrence of hypertension among employees. However, previous studies have shown varying results regarding the significance of these factors. Some studies identified physical activity and stress as significant predictors, while others found stronger associations with age, obesity, and smoking behavior. These inconsistencies indicate the need for further investigation, particularly within different occupational settings and organizational environments.

At PT. X, employees are exposed to prolonged sedentary activities, heavy workloads, overtime schedules, and unhealthy lifestyle patterns that may increase the risk of hypertension. Based on the company's medical check-up data, hypertension consistently ranked among the highest diseases experienced by employees from 2023 to 2025. Therefore, identifying the factors associated with hypertension among employees at PT. X is important to provide evidence-based recommendations for workplace health promotion and preventive interventions.

3. Method

This study employed a quantitative research design using a cross-sectional approach to examine the factors associated with the incidence of hypertension among employees of PT. X in South Jakarta in 2025. The cross-sectional design was considered appropriate because the study aimed to identify the relationship between several risk factors and hypertension at a single point in time.

The study was conducted at PT. X, an upstream oil and gas company located in South Jakarta, DKI Jakarta. The research population consisted of all employees working at PT. X. A total of 92 respondents were selected as study samples using proportional random sampling to ensure that each employee had an equal opportunity to participate in the study.

The dependent variable in this study was the incidence of hypertension, while the independent variables included age, physical activity, Body Mass Index (BMI), smoking habits, workload, and work stress. Hypertension status was identified based on the employees' medical check-up (MCU) results obtained from company records.

Data collection was carried out using both primary and secondary data sources. Primary data were collected through structured questionnaires distributed directly to respondents. Physical activity was measured using the Global Physical Activity Questionnaire (GPAQ), workload was assessed using the National Aeronautics and Space Administration Task Load Index (NASA-TLX), and work stress was measured using the HSE Management Standards Indicator Tool questionnaire. In addition, Body Mass Index (BMI) data were obtained through anthropometric measurements using a digital weighing scale and stadiometer. Secondary data were collected from the company's medical check-up records in 2025 to determine hypertension status among employees.

The collected data were processed and analyzed using univariate and bivariate statistical analyses. Univariate analysis was conducted to describe the distribution of each research variable, including hypertension incidence, age, physical activity, BMI, smoking habits, workload, and work stress. Meanwhile,

bivariate analysis was performed using the chi-square test to determine the association between independent variables and the incidence of hypertension among employees. A significance level of 0.05 was used to assess statistical significance.

The research was conducted from November 2025 to January 2026. Throughout the study process, respondents were informed about the purpose of the research, and participation was carried out voluntarily while maintaining the confidentiality of respondents' information and research data.

4. Results and Discussion

Univariate Analysis

Table 1. Frequency Distribution of Hypertension Incidence, Age, Physical Activity, Body Mass Index (BMI), Smoking Habits, Workload, and Work Stress among Employees of PT. X in South Jakarta in 2025

Variable	Frequency (n)	Percentage (%)
Incidence of Hypertension		
Hypertension	71	77.2
Non-Hypertension	21	22.8
Age		
At Risk	51	55.4
Not at Risk	41	44.6
Physical Activity		
Light	2	2.2
Heavy	90	97.8
Body Mass Index (BMI)		
Obese	77	83.7
Non-Obese	15	16.3
Smoking Habits		
Yes	42	45.7
No	50	54.3
Workload		
Heavy	53	57.6
Light	39	42.4
Work Stress		
High	40	43.5
Low	52	56.5

The data presented in Table 1 show that the highest proportion in the hypertension incidence variable was employees with hypertension, totaling 71 individuals (77.2%). The majority of respondents were categorized as being at-risk age, accounting for 51 individuals (55.4%). Most respondents also reported heavy physical activity, with 90 individuals (97.8%). In terms of Body Mass Index (BMI), the majority of employees were classified as obese, totaling 77 individuals (83.7%). Furthermore, most respondents did not smoke, accounting for 50 individuals (54.3%). Heavy workload was experienced by 53 employees (57.6%), while low work stress was reported by 52 employees (56.5%).

Bivariate Analysis

Table 2. Analysis of the Relationship Between Age, Physical Activity, Body Mass Index (BMI), Smoking Habits, Workload, and Work Stress with the Incidence of Hypertension among Employees of PT. X in South Jakarta in 2025

Variable	Hypertension		Non-Hypertension		Total		p-value	PR (95% CI)
	n	%	n	%	n	%		
Age								
At Risk	44	86.3	7	13.7	51	100	0.038	1.310 (1.024–1.676)
Not at Risk	27	65.9	14	34.1	41	100		
Physical Activity								
Light	1	50	1	50	2	100	0.406	0.634 (0.160–2.583)
Heavy	70	77.8	20	22.2	90	100		
Body Mass Index (BMI)								
Obese	63	81.8	14	18.2	77	100	0.038	1.534 (0.945–2.491)
Non-Obese	8	53.3	7	46.7	15	100		
Smoking Habits								
Yes	37	88.1	5	11.9	42	100	0.042	1.296 (1.039–1.615)
No	34	68	16	32	50	100		
Workload								
Heavy	45	84.9	8	15.1	53	100	0.071	1.274 (0.993–1.634)
Light	26	66.7	13	33.3	39	100		
Work Stress								
High	35	87.5	5	12.5	40	100	0.069	1.264 (1.019–1.568)
Low	36	69.2	16	30.8	52	100		

The data presented in Table 2 indicate that there were significant relationships between age ($p=0.038$), Body Mass Index (BMI) ($p=0.038$), and smoking habits ($p=0.042$) with the incidence of hypertension among employees of PT. X in South Jakarta in 2025. Meanwhile, no significant relationships were found between physical activity ($p=0.406$), workload ($p=0.071$), and work stress ($p=0.069$) and the incidence of hypertension among employees of PT. X in South Jakarta in 2025.

Discussion

Univariate Analysis

Overview of Hypertension Incidence among Employees of PT. X

Based on the study results involving 92 respondents, the highest proportion was found among employees who experienced hypertension, totaling 71 individuals (77.2%). This finding is consistent with the study conducted by Mahira (2025), which reported that 70 respondents (52.2%) experienced hypertension.

Hypertension is a condition characterized by systolic blood pressure above the normal threshold of ≥ 140 mmHg and diastolic blood pressure ≥ 90 mmHg (Ledoh et al., 2024). Hypertension is often referred to as a “silent killer” because it is asymptomatic or occurs without symptoms like many other diseases, causing sufferers to be unaware that they have hypertension (Ibrahim et al., 2023). Hypertension is caused by several different factors. Factors that may contribute to health problems are commonly referred to as risk factors. Risk factors for hypertension include gender, age, family history, lack of physical activity, obesity, exposure to cigarette smoke, work stress, and workload (Putri, 2025). Hypertension can occur in all adults, including workers. Hypertension is multifactorial and is often considered one of the occupational-related diseases experienced by employees in the workplace (Nurhidayah, 2023). Employees suffering from hypertension may experience discomfort and reduced work productivity (Jumara et al., 2025).

According to the researcher’s analysis, hypertension represented the highest proportion among employees. Based on data from the HSSE Division, hypertension was included among the ten most common diseases experienced by PT. X employees and ranked second, with 143 cases (26.2%) among 545 workers in 2024. The number decreased during the January–August 2025 period to 114 cases (14.1%) among 806 workers. Hypertension among employees was caused by factors such as age, excess body weight, smoking habits, and other unhealthy lifestyle factors. The company has implemented programs related to hypertension prevention through routine screening by company paramedics, while employees diagnosed with hypertension are encouraged to regularly consult and receive treatment at the company clinic.

Overview of Age among Employees of PT. X

The study results showed that the highest proportion of respondents belonged to the at-risk age category of ≥ 45 years, totaling 51 individuals (55.4%). This finding is in line with the study conducted by Kemalasarri et al. (2025), which reported that the majority of respondents were categorized as being at-risk age, totaling 63 individuals (70.0%).

Age refers to the period of an individual’s life calculated from birth until their most recent birthday (Sa’adah et al., 2021). As age increases, the body experiences degenerative aging processes that increase vulnerability to chronic diseases and physical decline, especially after the age of 40 years and among older adults (Astuti, 2024). This condition occurs because body cells gradually deteriorate, causing cellular mechanisms to function less optimally and reducing body resistance (Rahmania, 2024). Aging also affects metabolism, hormonal balance, physical function such as bone density and muscle mass, and weakens the immune system (Astuti, 2024).

According to the researcher’s analysis, most employees belonged to the at-risk age category of ≥ 45 years. PT. X recruits employees starting at the age of 22 years, while the retirement age is 56 years. Most respondents were in their forties, with the youngest respondent aged 33 years and the oldest 55 years. The large number of employees aged ≥ 45 years is related to the company’s permanent employment system, where many employees have worked for years and remain employed because of relatively high salaries and favorable working conditions. To address age-related health issues, the company routinely conducts annual medical check-ups (MCU) and workplace health promotion programs related to employee health problems associated with aging.

Overview of Physical Activity among Employees of PT. X

The findings showed that the majority of employees engaged in heavy physical activity, totaling 90 individuals (97.8%). This finding is consistent with the study conducted by Triana et al. (2024), which found that most respondents belonged to the heavy physical activity category, totaling 79 individuals (79.0%).

Physical activity refers to body movement produced by skeletal muscles that requires energy expenditure. Physical activity involves light, moderate, or vigorous effort and can improve health when performed regularly (Marleni, 2020). Lack of physical activity over a prolonged period may lead to an imbalance between energy intake and expenditure, thereby increasing the risk of obesity and non-communicable diseases (Nabawiyah et al., 2023). In addition, insufficient physical activity may negatively affect mental health by increasing the risk of anxiety, stress, depression, and other mental disorders (Samsu et al., 2023).

According to the researcher's analysis, heavy physical activity dominated among employees. Although PT. X employees mainly perform office work and spend long periods in front of computers, the company demonstrates concern for employee health by encouraging exercise and implementing a wellness program. Through this program, employees participate in organized activities designed to improve physical, mental, and emotional health, thereby increasing productivity. The program lasts for six months and is mandatory for employees. Anthropometric measurements are conducted at the beginning and end of the program to assess employee progress. During the program, employees are free to choose activities such as running, badminton, aerobics, padel, or dietary interventions according to their individual needs.

Overview of Body Mass Index (BMI) among Employees of PT. X

The study found that the highest proportion of respondents were classified as obese, totaling 77 individuals (83.7%). This finding is consistent with the study by Kemalasari et al. (2025), which reported that the majority of respondents had abnormal BMI values, totaling 51 respondents (56.7%).

Body Mass Index (BMI) is a measurement used to classify individuals into categories such as normal weight, overweight, and obesity (Fraire et al., 2021). BMI is calculated by dividing body weight in kilograms by height in meters squared (El Meouchy et al., 2022). Elevated BMI is considered one of the risk factors for hypertension because excessive body weight may increase blood pressure. Therefore, employees with BMI above normal levels are encouraged to adopt healthy lifestyles through regular exercise, balanced nutrition, and adequate mineral intake without excessive caffeine consumption in order to prevent hypertension (Sitti et al., 2024).

According to the researcher's analysis, obesity was highly prevalent among employees due to unhealthy eating habits in the workplace. Employees frequently consumed snacks while working and preferred unhealthy foods and beverages such as sugary drinks and fried foods, including during lunch breaks. To address this issue, the company implemented an annual wellness program lasting six months, during which employees are allowed to participate in physical exercise activities or personalized dietary programs according to their individual needs.

Overview of Smoking Habits among Employees of PT. X

The study results showed that the highest proportion of respondents did not smoke, totaling 50 individuals (54.3%). This finding is in line with the study conducted by Kemalasari et al. (2025), which also reported that the majority of respondents were non-smokers, totaling 62 individuals (68.9%).

Cigarettes are complex mixtures of chemical compounds attached to aerosol particles or freely present in the gas phase. These chemical compounds react to form other substances that eventually become smoke. Smoke formation occurs when cigarettes are lit and inhaled or when cigarettes burn between puffs (U.S. Department of Health and Human Services, 2020). Smoking behavior has broader effects than merely causing individual health problems. Cigarettes contain more than seven thousand harmful chemicals that not only affect human health but also contribute significantly to environmental damage (Suryoadji et al., 2024). Smoking may cause various diseases such as cardiovascular disease, vascular disorders, lung cancer, oral cancer, laryngeal cancer, hypertension, impotence, pregnancy disorders, and fetal abnormalities. The

dangers of smoking are not only experienced by active smokers but also by passive smokers who inhale cigarette smoke around them, and passive smokers may suffer even more severe effects than active smokers (Ida, 2019).

According to the researcher's analysis, the highest proportion consisted of non-smoking employees. This occurred because the majority of employees were female and because smoking restrictions had been implemented within the workplace environment. The company's smoking cessation efforts include a Smoking Cessation Program (UBM), which provides health talks and educational sessions regarding the dangers of smoking.

Bivariate Analysis

Analysis of the Relationship Between Age and the Incidence of Hypertension among Employees of PT. X

Based on the statistical test results, there was a significant relationship between age and the incidence of hypertension among employees of PT. X in South Jakarta in 2025. This finding is consistent with the study conducted by Erma et al. (2025), which stated that there was a relationship between age and the incidence of hypertension among workers at PT. X in 2024.

Age is a unit of time that measures the existence of a living being or object from birth until the most recent birthday. Blood pressure increases with advancing age, meaning that the older a person becomes, the greater the chance of developing hypertension (Adriana et al., 2022). According to Tindangen et al. (2020), age is one of the main factors influencing hypertension, due to natural changes occurring in the heart, blood vessels, and hormones. After the age of 40 years, the natural degenerative process of large blood vessels causes structural changes that make blood vessels narrow and stiff. This condition causes an increase in average systolic and diastolic blood pressure because the heart, blood vessels, and hormones are all affected by the body's natural aging process (Riniasih & Makmun, 2025). Age is associated with endothelial dysfunction and increased arterial stiffness in hypertension, especially systolic hypertension in older adulthood. Furthermore, hypertension treatment generally becomes more difficult in older adults because of increased medication use (Ekarini et al., 2020). As age increases, the regulation of calcium metabolism becomes disrupted, causing the blood to become denser and blood pressure to increase due to the large amount of calcium circulating in the bloodstream (Adriana et al., 2022).

The study results showed that employees in the at-risk age category ≥ 45 years had the highest proportion of hypertension cases, and the bivariate analysis demonstrated a significant relationship between age and the incidence of hypertension. This occurs because the risk of hypertension increases with advancing age. It is associated with structural changes in arteries, especially stiffness in large arteries. In humans, aging is a continuous process that may reduce the overall function of organ systems (Lamangida et al., 2022).

PT. X has implemented efforts such as routine annual medical check-ups (MCU) and workplace health promotion programs related to health problems experienced by employees. However, these efforts are not sufficiently effective in preventing and controlling hypertension among employees. Therefore, to prevent or control hypertension cases caused by non-modifiable age factors, the researcher recommends that the company conduct daily blood pressure checks every morning before work activities for employees at high risk of hypertension, such as employees aged ≥ 45 years.

Analysis of the Relationship Between Physical Activity and the Incidence of Hypertension among Employees of PT. X

Based on the statistical test results, there was no significant relationship between physical activity and the incidence of hypertension among employees of PT. X in South Jakarta in 2025. This finding is consistent with the study conducted by Putri et al. (2023), which showed that there was no relationship between

physical activity and the incidence of hypertension among employees of the Aceh Governor's Office in Banda Aceh in 2022.

Physical activity refers to every body movement that stimulates skeletal muscle activity and increases the use of energy and effort. Physical activity is very important in preventing health problems (Amraeni, 2021). Adequate and regular physical activity has been proven to reduce the risk of hypertension, coronary heart disease, stroke, diabetes, various types of cancer, and improve muscular and cardiorespiratory fitness. In addition, regular physical activity also plays a role in improving bone and functional health, reducing the risk of falls and injuries such as hip or spinal fractures, and helping maintain energy balance and body weight control (Khotimah & Wahjuni, 2021). Low physical activity reduces energy expenditure, causing the body to store excess energy in the form of fat. Physiologically, insufficient energy expenditure causes nutrients, especially carbohydrates, which were initially intended for cellular energy production, to instead become fat production stored in adipose tissue. Fat accumulation in the body may increase body weight. Especially when excessive food intake is accompanied by low physical activity, it becomes a risk factor for obesity (Sandi, 2019). Physical activity may reduce the risk of hypertension through several mechanisms, including reducing vascular resistance and regulating the sympathetic nervous system and renin-angiotensin system (Triana et al., 2024).

The study results showed that employees with heavy physical activity had the highest proportion of hypertension cases, and the bivariate analysis indicated that there was no significant relationship between physical activity and the incidence of hypertension. This occurs because hypertension is a multifactorial disease. Therefore, even if a person exercises or performs heavy physical activity, consuming high amounts of salt, smoking, or experiencing severe stress may prevent physical activity from showing a significant effect.

PT. X has provided fitness facilities and organized sports programs such as wellness programs and Friday fitness exercises. The researcher recommends that the company continue these ongoing programs by reducing sedentary lifestyles, improving physical health, and increasing productivity.

Analysis of the Relationship Between Body Mass Index (BMI) and the Incidence of Hypertension among Employees of PT. X

Based on the statistical test results, there was a significant relationship between Body Mass Index (BMI) and the incidence of hypertension among employees of PT. X in South Jakarta in 2025. This finding is consistent with the study conducted by Erma et al. (2025), which showed that there was a relationship between Body Mass Index (BMI) and the incidence of hypertension among workers at PT. X in 2024.

Body Mass Index (BMI) is a simple tool or method used to monitor the nutritional status of adults, especially those related to underweight and overweight conditions (Sari, 2023). BMI is calculated by dividing body weight (kg) by height squared (m^2), with overweight defined as $BMI \geq 25.00 \text{ kg/m}^2$ and obesity defined as $BMI \geq 30.00 \text{ kg/m}^2$ according to the criteria of the Ministry of Health of the Republic of Indonesia (Kemenkes RI, 2019). Body Mass Index (BMI) greatly influences the incidence of hypertension because BMI above normal or excessive BMI may trigger a higher risk of hypertension compared to individuals with normal BMI (Fitriani et al., 2022). The BMI value that affects hypertension risk is associated with excessive body weight that may lead to obesity. When a person experiences obesity, the supply process of oxygen and nutrients becomes disrupted. This condition may increase blood volume within blood vessels. The increase affects cardiac output, which ultimately causes increased blood pressure. If pressure within blood vessels rises, it increases the risk of hypertension (Yogeswara et al., 2023). The higher a person's BMI, the higher the increase in blood pressure. To manage individuals with higher BMI or overweight/obesity, healthy lifestyle

practices such as regular exercise, consuming balanced nutrition, and consuming beverages with adequate mineral content and without caffeine may help prevent hypertension (Jumara et al., 2025).

The study results showed that employees with obesity had the highest proportion of hypertension cases, and the bivariate analysis demonstrated a significant relationship between Body Mass Index (BMI) and the incidence of hypertension. This occurs because excess body weight may increase cardiac workload, blood volume, and trigger metabolic changes. A 15% increase in body weight may increase systolic blood pressure by 18%. Individuals with obese BMI often experience increased insulin resistance and sodium retention, which narrow blood vessels and cause increased blood pressure (Utami, 2020).

PT. X has implemented routine screening, provided fitness facilities, nutrition education, health counseling, and organized sports programs such as wellness programs and Friday fitness exercises. The researcher recommends that the company continue these ongoing programs by reducing sedentary lifestyles, improving physical health, productivity, and reducing the risk of degenerative diseases.

Analysis of the Relationship Between Smoking Habits and the Incidence of Hypertension among Employees of PT. X

Based on the statistical test results, there was a significant relationship between smoking habits and the incidence of hypertension among employees of PT. X in South Jakarta in 2025. This finding is consistent with the study conducted by Garwahasuda and Wirjatmadi (2020), which showed that there was a relationship between smoking behavior and hypertension among employees of the Central Java Provincial Health Office.

One factor that may cause hypertension is smoking. Smoking is a habit of inhaling cigarette smoke carried out in daily life and is difficult to avoid for individuals addicted to cigarettes (Wahyudi, 2019). Smoking may increase heart rate and the oxygen demand of heart muscles. Smoking also worsens atherosclerosis, or fat accumulation in blood vessels, in individuals who already experience the condition (Putri, 2025). Cigarettes and the substances contained in them have harmful effects on the human body, one of which is triggering hypertension caused by damage to the endothelial lining (Adriana et al., 2022). Nicotine contained in cigarettes disrupts the sympathetic nervous system, resulting in increased myocardial oxygen demand. Besides causing addiction, nicotine also stimulates adrenaline release, increases heart rate, blood pressure, and cardiac oxygen demand, and causes heart rhythm disturbances, thereby increasing the risk of hypertension compared to non-smokers (Efriandi, 2023).

The study results showed that employees who did not smoke had the highest proportion of hypertension cases, and the bivariate analysis demonstrated a significant relationship between smoking habits and the incidence of hypertension. This occurs because cigarettes contain nicotine. Nicotine is absorbed by small blood vessels in the lungs and circulated to the brain. In the brain, nicotine signals the adrenal glands to release epinephrine or adrenaline, which narrows blood vessels and forces the heart to work harder due to higher blood pressure (Muslimah et al., 2023).

PT. X has implemented a smoking cessation program (UBM), provided designated smoking areas, and established no-smoking regulations by placing warning signs in certain locations. These regulations prevent workers from smoking in random places. However, the designated smoking areas provided by the company do not reduce the number of smokers, but merely separate smoking employees from non-smoking employees, making the policy less effective in reducing cigarette consumption. The researcher recommends that the company continue the smoking cessation program (UBM) and implement health promotion programs regarding the harmful effects of smoking through health counseling, posters, and banners within the workplace environment.

Analysis of the Relationship Between Workload and the Incidence of Hypertension among Employees of PT. X

Based on the statistical test results, there was no significant relationship between workload and the incidence of hypertension among employees of PT. X in South Jakarta in 2025. This finding is consistent with the study conducted by Nurazizah et al. (2020), which showed no relationship between workload and hypertension.

Workload refers to a number of activities requiring expertise that must be completed within a certain period of time (Nurazizah et al., 2020). Workload is divided into mental workload and physical workload. Excessive workload may trigger overstress caused by excessive energy expenditure, potentially leading to health disorders or occupational diseases, including hypertension (Adriana et al., 2022). According to Widiharti et al. (2020), high workload may affect cardiac workload during pumping activities. Activities involving high workload stimulate the heart, increase heart rate, and enhance pumping capacity. When heart rate increases, blood pressure also changes. In addition, employees facing excessive work demands over a certain period and beyond their capabilities may experience stress, which is one of the risk factors for hypertension (Nurazizah et al., 2020).

The study results showed that employees with heavy workload had the highest proportion of hypertension cases, and the bivariate analysis demonstrated no significant relationship between workload and the incidence of hypertension. This occurs because high blood pressure is more strongly influenced by a combination of lifestyle factors such as diet, smoking, exercise, and chronic psychological stress rather than workload volume alone.

PT. X provides parks, coffee areas, sports facilities, places of worship, and basic facilities such as sick leave, annual leave, and maternity leave. Therefore, employees who feel overwhelmed by workload may utilize the facilities provided by the company. The researcher recommends that the company optimize human resources by distributing workload according to employees' expertise and maximum capacity while preventing excessive overtime work.

Analysis of the Relationship Between Work Stress and the Incidence of Hypertension among Employees of PT. X

Based on the statistical test results, there was no significant relationship between work stress and the incidence of hypertension among employees of PT. X in South Jakarta in 2025. This finding is consistent with the study conducted by Widodo et al. (2020), which showed that no significant relationship was found between work stress and blood pressure among respondents.

Stress is a condition within an individual caused by physical demands originating internally or externally, such as workplace and social environmental conditions (Atika & Wardani, 2021). Work stress is a harmful physical and emotional response that occurs when job demands do not match employees' abilities, resources, or needs. Work stress may worsen employees' health conditions and even lead to injury (Oktapiani & Susilawati, 2024). Stress is often associated as one of the risk factors triggering hypertension through activation of the sympathetic nervous system, resulting in unstable increases in blood pressure. If stress persists for a prolonged period, it may cause permanent increases in blood pressure, thereby triggering hypertension (Adriana et al., 2022). According to Rengganis et al. (2022), psychosocial stress, including work-related stress, may cause temporary increases in blood pressure that reflect short-term changes in the autonomic nervous system. Acute stress perception causes changes in the nervous, cardiovascular, endocrine, and renal systems. Acute stress may affect blood pressure through hormones such as epinephrine (adrenaline) and norepinephrine (noradrenaline), which influence heart rhythm. When

these hormone levels increase, the heart works faster and harder, blood vessels narrow, and blood pressure rises.

The study results showed that employees with low work stress had the highest proportion of hypertension cases, and the bivariate analysis demonstrated no significant relationship between work stress and the incidence of hypertension. This occurs because hypertension is a multifactorial disease more strongly influenced by dietary patterns, genetic factors, physical activity, and other factors than by work stress alone.

PT. X provides a company clinic to support preventive, promotive, curative, and rehabilitative health services for employees in order to improve productivity, reduce absenteeism due to illness, provide rapid emergency treatment (first aid/P3K), and manage occupational health and safety (K3) risks in the workplace, including doctor consultations related to stress problems. The researcher recommends that the company recruit psychiatrists and provide trainers and sports facilities focused on reducing psychological problems.

5. Conclusion

This study concludes that hypertension remains an important occupational health problem among employees of PT. X in South Jakarta. Most employees involved in this study were identified as experiencing hypertension, indicating that blood pressure disorders continue to be a serious concern within the workplace environment. The findings demonstrate that age, Body Mass Index, and smoking habits were associated with the incidence of hypertension among employees. Employees categorized within the at-risk age group, those experiencing obesity, and employees with smoking habits showed a greater tendency to develop hypertension. These findings indicate that both biological and lifestyle-related factors contribute to the occurrence of hypertension in the workplace.

Meanwhile, physical activity, workload, and work stress were not found to have a significant relationship with hypertension incidence among employees of PT. X. This finding suggests that hypertension among workers is multifactorial and may be influenced more strongly by long-term lifestyle patterns, metabolic conditions, and individual health behaviors than by occupational factors alone.

The company has implemented several preventive and promotive health programs, including routine medical check-ups, wellness programs, fitness facilities, smoking cessation initiatives, and workplace health promotion activities. However, strengthening these programs remains necessary to improve employee health outcomes and reduce hypertension risk. Therefore, continuous health monitoring, healthy lifestyle promotion, nutrition education, regular physical activity programs, and smoking reduction interventions are strongly recommended to support employee well-being, productivity, and occupational health sustainability.

6. Reference

- Adriana, E., Veronika, E., Vionalita, G., & Sangadji, N. W. (2022). Faktor-faktor yang berhubungan dengan kejadian hipertensi pada pegawai di Kantor Kesehatan Pelabuhan Kelas II Jayapura. *Health Publica Jurnal Kesehatan Masyarakat*, 3(2). <https://ejurnal.esaunggul.ac.id/index.php/HealthPublic/article/view/5371/pdf>
- Aisyah, S., Yuliati, & Mahmud, N. U. (2024). Faktor yang berhubungan dengan hipertensi pada pekerja PT. Industri Kapal Indonesia. *Peminatan Epidemiologi, Fakultas Kesehatan Masyarakat, Universitas Muslim Indonesia Article History*, 5(3), 359–370.
- Aisyah, I. S., Hidayanti, L., & Ghaffar, M. (2024). Pelatihan pengolahan nugget ikan lele untuk mencegah stunting pada balita. *Jurnal Abmas Negeri (JAGRI)*, 5(1), 115–124. <https://doi.org/10.36590/jagri.v5i1.905>

- Algharably, E., Meinert, F., Januszewicz, A., & Kreutz, R. (2024). Understanding the impact of alcohol on blood pressure and hypertension: From moderate to excessive drinking. *Polish Heart Journal (Kardiologia Polska)*, 82(1), 10–18. <https://doi.org/10.33963/v.kp.98704>
- Amelia, A., Fajrianti, G., & Murniani, M. (2024). Hubungan gaya hidup terhadap kejadian hipertensi. *Jurnal Penelitian Perawat Profesional*, 6(4), 1487–1498. <https://doi.org/10.37287/jppp.v6i4.2747>
- Auliani, B., Anggraini, R. B., & Faizal, M. (2024). Faktor-faktor yang berhubungan dengan kejadian hipertensi di wilayah kerja Puskesmas Melintang Tahun 2024. *Jurnal Kesehatan Tambusai*, 5(4), 11050–11061.
- Ayu, M. S. (2021). Analisis klasifikasi hipertensi dan gangguan fungsi kognitif pada lanjut usia. *JUMANTIK (Jurnal Ilmiah Penelitian Kesehatan)*, 6(2), 131. <https://doi.org/10.30829/jumantik.v6i2.8246>
- Christina, F. A., Aini, F., & Saparwati, M. (2019). Hubungan kebiasaan olahraga dengan tekanan darah pada penderita hipertensi usia produktif di Puskesmas Bergas. *Artikel*, 1–10. <http://repository2.unw.ac.id/id/eprint/255>
- Daryanti, Y., & Inayah, Z. (2023). Pengaruh beban kerja terhadap tekanan darah pada guru di SMK Assa'adah Bungah Gresik. *Journal of Public Health Science Research (JPHSR)*, 4(1). <https://doi.org/10.30587/jphsr.v1i1.1178>
- Dewi, S. M., Saputra, B., & Daniati, M. (2021). Hubungan konsumsi alkohol dan kualitas tidur terhadap kejadian hipertensi. *Jurnal Keperawatan Hang Tuah (Hang Tuah Nursing Journal)*, 2(1), 49–62.
- Dismiantoni, N., Anggunan, A., Triswanti, N., & Kriswiastiny, R. (2020). Hubungan merokok dan riwayat keturunan dengan kejadian hipertensi. *Jurnal Ilmiah Kesehatan Sandi Husada*, 9(1). <https://doi.org/10.35816/jiskh.v11i1.214>
- Djafar, T. (2021). Promosi kesehatan: Penyebab terjadinya hipertensi. <https://doi.org/10.31237/osf.io/knxwc>
- Efriandi, N. (2023). Hubungan perilaku merokok dengan kejadian hipertensi pada usia produktif di wilayah kerja Puskesmas Jekan Raya Tahun 2022. *Jurnal Surya Medika (JSM)*, 9(1), 112–118.
- Erma Kemalasari, Millah, I., Sangadji, N. W., & Putri, E. C. (2025). Faktor-faktor yang berhubungan dengan kejadian hipertensi pada pekerja bagian office di PT. X Tahun 2024. *Corona: Jurnal Ilmu Kesehatan Umum, Psikolog, Keperawatan dan Kebidanan*, 3(1), 291–305. <https://doi.org/10.61132/corona.v3i1.1179>
- Ervina, E. (2022). Faktor-faktor yang berhubungan dengan kejadian hipertensi pada pekerja sektor informal di wilayah kerja Puskesmas Kecamatan Jagakarsa Tahun 2022 (Skripsi).
- Falo, A., Ludiana, & Ayubbana, S. (2023). Implementation of deep breath relaxation on blood pressure of hypertension patients in the work area of UPTD Puskesmas Inspiring Banjarsari Metro City. *Jurnal Cendikia Muda*, 3(1), 32–40.
- Fernalia, F., Busjra, B., & Jumaiyah, W. (2019). Efektivitas metode edukasi audiovisual terhadap self management pada pasien hipertensi. *Jurnal Keperawatan Silampari*, 3, 221–233. <https://doi.org/10.31539/jks.v3i1.770>
- Health and Safety Executive. (2003). HSE management standards indicator tool.
- Ibnu, F., & Hidayati, R. N. (2025). Deteksi faktor risiko hipertensi yang dapat dimodifikasi dalam upaya perilaku pencegahan klien hipertensi. Penerbit Nuansa Fajar Cemerlang.
- Ibrahim, D., Marianingrum, & Tang, R. G. (2023). Hubungan jam kerja dengan tingkat kejadian hipertensi pada pegawai di PT X Kabupaten Berau Kalimantan Timur. *Zona Kedokteran*, 13(1), 306–311. <https://doi.org/10.37776/zked.v13i1.1150>
- Ida Suryati, Y. J. (2019). Penyuluhan bahaya merokok bagi kesehatan di Kenagarian Simpang Sugiran Kecamatan Guguk Kabupaten Lima Puluh Kota. *Jurnal Abdimas Kesehatan Perintis*, 15–18.
- Indri, M., Puji, A., Sugeng, M., & Aisyah Nur, A. (2023). Indeks massa tubuh sebagai prediktor hipertensi. *Amerta Nutrition*, 7(2SP), 247–251. <https://doi.org/10.20473/amnt.v7i2SP.2023.24>

- Indriani, H., & Djannah, S. (2023). Pengaruh konsumsi kopi terhadap kejadian hipertensi. *Jurnal Kesehatan Masyarakat Indonesia*, 18(2), 35–40. <https://jurnal.unimus.ac.id/index.php/jkmi>
- Iqbal Febrianto Lesar, Modjo, D., & Sudirman, A. A. (2023). Hubungan antara kadar kolesterol dalam darah dengan kejadian hipertensi pada lansia di Puskesmas Tabongo Kabupaten Gorontalo. *Jurnal Medika Nusantara*, 1(2), 1–14. <https://doi.org/10.59680/medika.v1i2.267>
- Ismayatun, S. D. (2020). Hubungan kebiasaan merokok dan beban kerja fisik dengan hipertensi pada pekerja laki-laki di area produksi PT Putra Bungsu Tegal. *Medical Technology and Public Health Journal*, 4(1), 101–107. <https://doi.org/10.33086/mtphj.v4i1.692>