The Correlation of Stress Level and Hypertension in Student of Nutrition Departmen of UIN Sunan Ampel Surabaya

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Abstract: One non-communicable disease that has grown to be a major cause of death and a global health concern is hypertension. This study aims to determine the relationship between stress levels and the incidence of hypertension among third- and fifth-semester students in the Nutrition Study Program, Faculty of Psychology and Health, UIN Sunan Ampel Surabaya. Simple random sampling was used to select 85 students for this quantitative investigation. Systolic and diastolic blood pressure readings as well as a stress level questionnaire were used to gather data. According to the findings, the majority of the respondents had high systolic and diastolic blood pressure (63.5% and 60.0%, respectively) and significant stress (81.2%). Statistical analysis using the phi coefficient found a significant relationship between stress levels and systolic (p=0.008) and diastolic (p=0.041) blood pressure. Stress triggers an increase in adrenaline hormones, which raises blood pressure, so effective stress management is necessary to prevent hypertension in students.

1 INTRODUCTION

According to data from the WHO (2018), the prevalence of hypertension worldwide in 2021 will reach 29.2%, an increase from 26.4% in 2018. In Indonesia, according to Riskesdas 2018, the prevalence of hypertension was 25.8%, with a significant increase occurring in the young age group, namely 18-24 years old, at 4.5% (Cristanto et al., 2021) . This indicates an increased risk of hypertension among the productive age group. It is estimated that there are 11,008,334 cases of hypertension among adults in East Java, with 48.83% being men and 51.17% being women (East Java Provincial Health Office; 2020). The prevalence of hypertension in the city of Surabaya reaches 22%, with 16.78% occurring in adults aged 18 years and above (Surabaya Health Office, 2025).

A non-communicable disease, hypertension is now a major cause of death and a global health concern. The World Health Organization (2013) states that systolic blood pressure over 140 mmHg and diastolic blood pressure above 90 mmHg are indicative of hypertension. (WHO, 2021). Based on data from the WHO 2020, one of the diseases that causes premature death is hypertension. Worldwide, there are 1,13 billion people with high blood pressure, which means that 1 in 3 people in the world have hypertension, mostly in countries with low and middle incomes. Indonesia is among the countries that experience a yearly increase in hypertension cases, with a recorded 9.4 million cases annually

caused by hypertension and its complications (WHO, 2021).

Hypertension is known as "the silent killer" since it generally presents no apparent symptoms, resulting in many people being unaware they have this condition. One of the main risk factors for cardiovascular conditions like heart disease and stroke is hypertension. Hypertension can be divided into two types, namely primary hypertension, whose exact cause is unknown, and secondary hypertension, which is caused by other diseases such as kidney, endocrine, or heart disorders (Susiani et al., 2019.) . According to research (Joffres et al.,) , the increase in the prevalence of hypertension among young people has become a problem in many countries, including Indonesia. According to (Daziah & Rahayu, 2020), the biggest challenge for Indonesia in treating hypertension in adolescents is that if it is not controlled, it will develop into a serious problem and cause dangerous complications such as stroke, coronary heart disease, and death (Firmansyah & Aprilianti, 2023) .

Various factors influence blood pressure, stress being one of them. When stress persists for an extended time, it can interfere with the body's normal functioning. Chronic hypertension can lead to the development of degenerative disease symptoms. If high blood pressure persists, it can harm the heart (causing coronary heart disease), the kidneys (causing renal failure), and the brain (causing stroke). Therefore, effective stress management is essential to avoid the potentially lethal effects of stress. One of the things that might change blood pressure is stress. The World Health Organization (WHO) claims that stress has spread like wildfire throughout the world.

Stress occurs due to transactional interactions between individuals and their environment, which are interrelated and influence each other, accompanied by an adjustment process. According to (Dewi, Lestari, & Dewi, 2020), Stress may be triggered by environments perceived as challenging and threatening or those that disturb a person's dynamic equilibrium. This creates environmental pressure that can provoke physical and psychological responses in individuals. Stress in students, especially that caused by academic pressure, can act as a trigger for hypertension in students (Febriana et al., 2022.) . Nutrition students, in particular, often experience academic stress due to high study loads, strict assignment requirements, and pressure to achieve good grades. The purpose of this study is to determine whether stress levels and the prevalence of hypertension among UIN Sunan Ampel Surabaya students in their third and fifth semesters are related.

2 METHOD

The nature of this investigation is quantitative. In October 2024, data was gathered at UIN Sunan Ampel Surabaya's Nutrition Study Program, Faculty of Psychology and Health. Of the 141 students in the Nutrition Study Program at the Faculty of Psychology and Health, 67 were in their third semester and 74 were in their fifth. These students made up the research population. *Simple random sampling* was used for the sampling process, and the participants had to be willing third- and fifth-semester students enrolled in the Nutrition Study Program at the Faculty of Psychology and Health. Students who did not attend class during the study or who were not on a leave of absence from their studies were excluded.

The sample size was 85 respondents. The dependent variable was hypertension and the independent variable was stress level. The data collection tools used were a respondent characteristic data sheet, an observation sheet, and a questionnaire consisting of 20 questions. These instruments had been tested for validity and reliability. The researcher collected data by distributing questionnaires to respondents and checking blood pressure using a tensiometer, recording the results on the observation sheet. The collected data underwent *editing, scoring, coding, data entry, tabulation,* and *cleaning.* Data analysis was performed using *the phi coefficient.*

3 RESULT

Table 1: Frequency Distribution of Respondent Characteristics Based on Age, Gender, Semester, Stress, Systolic Change, Diastolic Change

Responden Characteristic	Frequency	Percentage
Age		
18 years	4	4.7%
19 years	15	17.6%
20 years	43	50.6%
21 years	16	18.8%
22 years	7	8.2%
Gender		
Male	5	5.9%
Female	80	94.1%
Semester		
Semester 3	31	36.5%
Semester 5	54	63.5%
Stress		
Mild Stress	16	18.8%
Severe Stress	69	81.2%
Systolic Change		
Normal	31	36.5%
High	54	63.5%
Diastolic Change		
Normal	34	40.0%
High	51	60.0%
Total	**85**	**100%**

Based on Table 1 above, it is known that the age characteristics of respondents varied, namely 4 people aged 18 years (4.7%), 15 people aged 19 years (17.6%), then 43 people aged 20 years (50.6%), then 16 people (18.8%) aged 21, and 7 people (8.2%) aged 22. The majority of respondents were aged 20, with 43 people (50.6%). Based on gender, there were 5 males (5.9%) and 80 females (94.1%). The table shows that the majority of respondents were female, with 80 respondents (94.1%). Meanwhile, based on the semester, 31 respondents (36.5%) were in their third semester, and 54 respondents (63.5%) were in their fifth semester. The table shows that the majority of respondents were in their fifth semester, with 54 respondents (63.5%).

The results of the stress level measurement show that 16 respondents (18.8%) had mild stress, while 69 respondents (81.2%) had severe stress. Based on the above results, it shows that the majority of respondents had severe stress, namely 69 people (81.2%). Systolic blood pressure measurements showed that 31 respondents (36.5%) had normal blood pressure, while 54 respondents (63.5%) had high blood pressure. The table shows that most respondents had high systolic blood pressure, totaling 54 people (63.5%). Meanwhile, for diastolic blood pressure, 34 respondents (40.0%) had low blood

pressure, and 51 respondents (60.0%) had high blood pressure. The table shows that most respondents had high diastolic blood pressure, totaling 51 people (60.0%).

Table 2: Relationship Between Stress Levels and Systolic Blood Pressure.

Stress	Blood Pressure		Approx. Sig.
	Normal	High	
Mild	10	6	0.008
Heavy	19	50	

From Table 2, it can be seen that among respondents experiencing mild stress, there were 10 people with normal blood pressure and 6 people with hypertension. Then, among the 19 respondents with severe stress, had normal blood pressure and 50 had high blood pressure. Based on statistical tests, the p-value of 0.008 is smaller than the significance level of $\alpha = 0.05$, so H0 is rejected, meaning that there is a significant relationship between stress levels and systolic blood pressure.

Table 3: Relationship Between Stress Levels and Diastolic Blood Pressure.

Stress	Blood Pressure		Approx. Sig.
	Normal	High	
Mild	10	6	0.041
Heavy	24	45	

Based on Table 3 above, it is known that 10 respondents with mild stress had normal blood pressure and 6 had high blood pressure. Then, among the 24 respondents with severe stress, 24 had normal blood pressure and 45 had high blood pressure. Based on the statistical test, the p-value of 0.041 is less than the significance level of $\alpha = 0.05$, so H0 is rejected, indicating that there is a significant relationship between stress levels and diastolic blood pressure.

4 DISCUSSION

Stress is the body's reaction, both physically and psychologically, in an effort to adapt and control pressures that arise from within and outside a person. Mild stress can have positive effects, but when it reaches high levels, it can trigger various health problems such as cardiovascular disease, depression, cancer, and a weakened immune system (Lumbantobing & Rahtriawati, 2021.) . If it continues without proper management, stress can cause disturbances in the hormonal system and lead to nutritional and vitamin deficiencies in the body. In students, stress usually arises when facing important challenges, such as writing a thesis, carrying out practical tasks, facing certain threats, or when trying to meet unrealistic environmental demands (Febriana et al., 2022.) . Based on their age, the majority of the 43 students who participated in this study were in their 20 years, which was larger than the number of students who were in their 19 years. Symptoms of stress can arise in various age groups, depending on the factors that trigger stress symptoms in a person. Age can affect a person's psychology, which means that the older a person is, the better their ability to deal with various problems, thereby reducing their stress levels.

The characteristics of the respondents in this study were based on gender, with the majority of respondents being female, totaling 80 students. This shows that female students at FPK are more stressed than male students. Corticotropin-releasing factor (CRF) hormone affects the development of stress, which is a polypeptide hormone and acts as a neurotransmitter with a peptide chain of 41 amino

acids, the result of a 191-amino acid prohormone secreted by the paraventricular nucleus of the hypothalamus when the body experiences stress. This hormone affects stress in women. CRF hormones have a stronger bond with stress proteins in female brain cells, making them more susceptible to the effects of hormonal changes. The characteristics of the stress response are the result of an integrated neuroendocrine response, and there are individual differences in responding to the same stressors. The level of stressors faced by each individual is not the same, so each individual will experience different levels of stress (Nurrahmah et al., 2023) .

Based on the results of research conducted at UIN Sunan Ampel Surabaya, it was found that there is a relationship between stress levels and systolic blood pressure with a p-value of 0,008 < α = 0,05. At a low stress level, 10 people had normal blood pressure and 6 people had high blood pressure. At the severe stress level, 19 people had normal blood pressure and 50 people had high blood pressure. Then, the relationship between stress levels and diastolic blood pressure had a p-value of 0,041 < α = 0,05. 10 people had normal blood pressure and 6 people had high blood pressure. At the severe stress level, 24 people had normal blood pressure and 45 people had high blood pressure. It can be concluded that there is a relationship between stress levels and systolic and diastolic blood pressure. Blood pressure elevation results from increased blood volume or vascular elasticity, while conversely, reduced blood volume leads to decreased blood pressure (Subrata & Wulandari, 2020) .

Systolic pressure represents the maximum pressure as blood enters the arterial vessels during cardiac contraction, whereas diastolic pressure is the minimum pressure when blood exits the arterial vessels during cardiac relaxation (Kawi & Dwiana, 2019). Systolic blood pressure will increase when a person experiences stress due to the activation of the adrenergic system, which will result in the release of catecholamines and adrenaline or epinephrine, which will increase systolic blood pressure, while diastolic blood pressure will remain at a normal level both in stressful and non-stressful situations.

It is believed that sympathetic nerve activity, which triggers the production of adrenaline, is the link between stress and hypertension. This hormone has been linked to peripheral blood capillary constriction and an accelerated heartbeat. An increase in blood pressure may result from this. The sympathetic nerves in the nerve center of people who are stressed or experiencing mental pressure work hard. It is commonly understood why people who are stressed or experiencing mental pressure have a racing heart and increased blood pressure. Hypertension is more likely to occur in people who are often stressed and experience prolonged mental tension (Faridah et al., 2022) .

Previous research has also shown that the statistical test result p = 0.001 (< 0.05 at a 5% significance level). This relationship indicates that individuals experiencing stress are at risk of hypertension, where higher levels of stress lead to an increase in the degree of hypertension (Pujiastuti et al., 2022) . Setyawan's 2017 study at the Samarinda Islamic Center Clinic found a strong statistical

association between stress and hypertension (p=0.000). Stress responses activate adrenaline production in the body, which consequently raises blood pressure by causing blood vessel constriction or dilation and increasing cardiac rhythm (Sari et al., 2025). Research by Saleh (2014) revealed a statistically significant relationship between stress levels and the severity of hypertension progression, showing a p-value of 0.000. Stressful conditions can increase sympathetic nerve activity, which then gradually increases blood pressure, meaning that the more severe an individual's stress is, the higher their blood pressure will be (Pebriyani et al., 2022.) . Based on the study, many respondents were sometimes unable to control important things in their lives. This is because stress can cause the body to produce the hormone cortisol, which makes the heart beat faster and blood vessels constrict, a condition that then increases blood pressure (Sari et al., 2025) .

5 CONCLUSIONS

Stress levels and the prevalence of hypertension among third- and fifth-semester Nutrition Study Program students at the Faculty of Psychology and Health, UIN Sunan Ampel Surabaya, are significantly correlated, according to this study. Most respondents reported high levels of stress, which was linked to elevated systolic and diastolic blood pressure. Stress sets off the sympathetic nervous system, which causes the body to release more adrenaline, which raises blood pressure. The study's findings also show that because of biological variations in the body, women are more likely than man to experience stress.Prolonged stress without management has the potential to cause hypertension and increase the risk of cardiovascular disease. Therefore, effective stress management is necessary as a preventive measure against hypertension in students.

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