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Research Article

THE RELATIONSHIP BETWEEN NUTRITIONAL STATUS AND HYPERTENSION LEVELS IN THE WORKING AREA OF THE PUSKESMAS TANAH TINGGI TANGERANG CITY

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ABSTRACT

Hypertension is a non-communicable disease (NCD) characterized by blood pressure that exceeds normal limits. It is one of the major risk factors contributing to the global burden of disease. If left untreated, hypertension may lead to serious complications, including stroke, myocardial infarction, kidney failure, heart failure, coronary artery disease, aneurysm, vision loss, and sexual dysfunction. One of the factors associated with hypertension is nutritional status. To determine the relationship between nutritional status and the level of hypertension at Tanah Tinggi Health Center, Tangerang City. This study employed a cross-sectional design with a purposive sampling technique. The sample consisted of 94 respondents. The instruments used included blood pressure measurement to assess hypertension level and body mass index (BMI) measurement to assess nutritional status. The majority of respondents had obese nutritional status, accounting for 50 respondents (53.2%), followed by normal nutritional status in 29 respondents (30.9%) and underweight nutritional status in 15 respondents (16.0%). Most respondents had uncontrolled hypertension, total 54 respondents (57.4%), while 40 respondents (42.6%) had controlled hypertension. The Chi-square test showed a p-value of 0.016, which was less than 0.05. There was a significant relationship between nutritional status and the level of hypertension.

Kata Kunci
Hipertensi
Status gizi
Puskesmas

ABSTRAK

Hipertensi termasuk dalam penyakit tidak menular (PTM) ditandai dengan tekanan darah melebihi batas normal. Hipertensi menjadi salah satu faktor resiko utama beban penyakit global. Hipertensi jika dibiarkan akan menyebabkan komplikasi seperti stroke, infark miokard, gagal ginjal, gagal jantung, penyakit arteri koronaria, aneurisme, kehilangan penglihatan, dan disfungsi seksual. Salah satu faktor terjadinya hipertensi ini adalah status gizi. Mengetahui hubungan status gizi dengan tingkat hipertensi di wilayah kerja Puskesmas Tanah Tinggi Kota Tangerang. Metode yang digunakan yaitu *cross sectional* dengan teknik sampel menggunakan *purposive sampling.* Sampel dalam penelitian ini berjumlah 94 responden. Instrumen yang digunakan yaitu pengukuran tekanan darah untuk tingkat hipertensi, dan pengukuran Indeks Massa Tubuh (IMT) untuk status gizi. Mayoritas responden status gizi gemuk dengan 50 responden (53,2%), status gizi normal sebanyak 29 responden (30,9%), dan status gizi kurus 15 responden (16%). Mayoritas responden hipertensi tidak terkontrol sebanyak 54 responden (57,4%), dilanjut dengan hipertensi yang terkontrol sebanyak 40 responden (42,6%). Hasil uji *Chi Square* didapatkan hasil *P Value* 0,016<0,05. Terdapat hubungan signifikan antara status gizi dengan tingkat hipertensi.

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INTRODUCTION

Non-communicable diseases (NCDs) have become a persistent public health problem both in Indonesia and globally. These diseases are not transmitted from one person to another, yet they occur frequently in developing countries and pose a serious threat to the Indonesian population. According to the World Health Organization (WHO), as cited in Monica et al. (2024), deaths caused by NCDs account for 70% of global mortality. These diseases are not caused by infectious agents but are instead associated with genetic factors, lifestyle, and environmental influences. Common types of NCDs found in the Indonesian population include diabetes mellitus, cancer, chronic respiratory diseases, mental health disorders, and cardiovascular diseases, including hypertension.

Hypertension is a condition characterized by an increase in blood pressure, marked by systolic and diastolic blood pressure levels exceeding the normal range. According to Sarfika et al., (2024), if hypertension is not properly managed, it may lead to complications such as myocardial infarction, heart failure, stroke, kidney failure, coronary artery disease, aneurysm, vision loss, and sexual dysfunction. Hypertension is also one of the major risk factors contributing to the global burden of disease, accounting for 7% of disability-adjusted life years worldwide (Sarfika et al., 2024).

The World Health Organization (WHO, 2021) reported that 22% of people worldwide have hypertension, with 36% of cases occurring in Southeast Asia, and that hypertension accounted for 23.7% of the 1.7 million deaths reported in 2016. In Indonesia, the prevalence of hypertension based on Riskesdas (2018) was 34.11%. By age group, the prevalence was 16.1% among individuals aged 18–44 years, 43.4% among those aged 45–54 years, and 66.1% among those aged over 55 years. According to the Banten Provincial Health Office (2023), the total number of individuals with hypertension in Banten Province in 2023 was 2,333,621, of whom 94.1% had received health services. The regency/city with the highest percentage of hypertension cases was Tangerang Regency, with 729,628 cases, followed by Tangerang City with 390,112 cases and Serang Regency with 323,557 cases. According to the Tangerang City Health Office (2023), based on population screening among individuals aged ≥15 years in 2023, the estimated number of people with hypertension in Tangerang City was 166,750, consisting of 66,523 males and 100,227 females. A preliminary study conducted at Tanah Tinggi Community Health Center, Tangerang City, found that there were more than 1,000 patients with hypertension, while the number of visits by hypertensive patients in January reached 579.

One of the factors that may trigger hypertension is imbalanced nutritional status. Nutritional status is important because it is one of the risk factors for morbidity and mortality, and both overnutrition and undernutrition may pose health risks (Hidayati et al., 2019). According to Hidayat (2022), nutritional status is closely associated with hypertension, particularly overweight and obesity. Cardiac output and blood circulation volume in obese individuals are higher than in those with normal body weight, which increases the risk of hypertension. Meilani et al. (2022) explained that obesity may lead to hypertension through several mechanisms. Directly, obesity increases cardiac output because greater body mass requires a larger circulating blood volume, which in turn increases cardiac workload. According to the Framingham study, as cited in Nurrahmani (2018), 78% of hypertension cases are attributable to obesity, with a prevalence of 78% in men and 54% in women.

Several studies have examined the relationship between nutritional status and hypertension. A study by Permatasari et al. (2024) on the relationship between nutritional status and the degree of hypertension among participants in the Prolanis program in September 2024 at Jatirejo Community Health Center, involving 25 respondents, found that 16 respondents (64%) were obese and 9 respondents (36%) had normal nutritional status. Regarding blood pressure status, 10 respondents (40%) had hypertension and 15 respondents (60%) were normotensive. Statistical analysis showed a p-value of 0.0034, indicating a significant relationship between nutritional status and hypertension. Another study by Tarigan et al., (2024), which investigated the relationship between nutritional status and the incidence of hypertension in the working area of Sunggal Community Health Center, Medan City, involving 77 respondents, found that 53.2% had hypertension and 46.8% did not have hypertension, while 36.4% had good nutritional status and 63.6% were undernourished. This study also found a significant relationship, with a p-value of 0.001. In contrast, a study by Ilham et al. (2019) on the relationship between nutritional status, nutritional intake, and family history with the incidence of hypertension among older adults at Lubuk Buaya Community Health Center, Padang, found that 62.7% of respondents had hypertension and 47.5% had overnutrition, while the majority of respondents had overnutrition (76.3%). However, statistical analysis showed a p-value of 0.172, indicating no significant relationship between nutritional status and the incidence of hypertension. Another study by Waluyani et al. (2023), which examined the relationship between nutritional status and the incidence of hypertension among residents of Rantau Panjang Village involving 52 respondents, found that 11 respondents (91.7%) with obesity

class I and 9 respondents (90%) with obesity class II had hypertension. This study found a significant relationship between nutritional status and hypertension, with a p-value of 0.000.

Based on these problems and supported by previous studies, this study aimed to determine the relationship between nutritional status and the level of hypertension in the working area of Tanah Tinggi Community Health Center, Tangerang City.

MATERIALS AND METHODS

Instruments, Materials, and Samples

This study used a quantitative method with a correlational design and a cross-sectional approach. The study population comprised 579 patients with hypertension, and the sample size was determined using the Slovin formula, yielding 94 respondents. Participants were selected through purposive sampling. The research was conducted at Tanah Tinggi Community Health Center, Tangerang City, from February to March 2025. Both primary and secondary data were collected. Nutritional status was assessed using Body Mass Index (BMI), while hypertension level was determined by blood pressure measurement. Data analysis included univariate and bivariate analyses using the Chi-square test. This study received ethical approval under number 018/LPPM-UYM/II/2025.

RESULT AND DISCUSSION

Table 1.1. Distribution of Respondents by by Demographic Characteristics

	Demographic Characteristics	Frequency (f)	Percentage (%)
1)	**Age**		
	18 – 25 years	5	5,3
	26 – 35 years	9	9,6
	36 – 45 years	16	17
	46 – 55 years	16	17
	56 –59 years	48	51,1
	Total	94	100
2)	**Sex**		
	Male	32	34
	Female	62	66
	Total	94	100
3)	**Educational Level**		
	No Formal Education	2	2,1
	Primary Education	44	46,8
	Secondary Education	42	44,7
	Higher Education	6	6,4
	Total	94	100
4)	**Employment Status**		
	Employed	27	28,7
	Unemployed	67	71,3
	Total	94	100

Table 1.2. Frequency Distribution of Respondents According to Nutritional Status

Nutritional Status	Frequency (f)	Percentage (%)
Underweight	15	16
Normal	29	30,9
Overweight	50	53,2
Total	**94**	**100**

Table 1.3. Frequency Distribution of Respondents According to Hypertension Status

Hypertension Status	Frequency (f)	Percentage (%)
Controlled	40	42,6
Uncontrolled	54	57,4
Total	94	100

Table 1.4. Bivariate Analysis Results

Nutritional Status	Hypertension Status						*P Value*
	Controlled		Uncontrolled		Total		
	F	%	F	%	F	%	
Underweight	8	53,3	7	46,7	15	100	
Normal	6	20,7	23	79,3	29	100	0,016
Overweight	26	52	24	48	50	100	
Total	40	42,6	54	57,4	94	100	

Based on the results of the statistical test (Table 1.4), a p-value of 0.016 (<0.05) was obtained, indicating a significant relationship between nutritional status and hypertension. This finding is consistent with the study conducted by Waluyani et al. (2023) on the relationship between nutritional status and the incidence of hypertension among residents of Rantau Panjang Village. In that study, which involved 52 respondents, 11 individuals with obesity class I (91.7%) and 9 individuals with obesity class II (90%) were found to have hypertension. Statistical analysis yielded a p-value of 0.000, indicating a significant relationship between nutritional status and the incidence of hypertension. Similarly, Tarigan et al., (2024), in a study conducted in the working area of Sunggal Community Health Center, Medan City, involving 77 respondents, reported that the prevalence of hypertension was 53.2%, while 46.8% of respondents were non-hypertensive. Regarding nutritional status, 36.4% had good nutritional status and 63.6% were undernourished. Their study also found a significant relationship, with a p-value of 0.001.

According to Par'i et al. (2017), nutritional status is a condition that reflects the balance between nutrient intake from food and the body's needs for metabolic processes. Each individual has different nutritional requirements depending on factors such as age, sex, daily activity level, body weight, and other conditions. Indicators of nutritional status are signs used to describe an individual's nutritional condition. Nutritional status is one of the factors that may contribute to hypertension. Based on the results of this study (Table 1.2), the majority of respondents were classified as overweight, with 50 respondents (53.2%). Meanwhile, the distribution of hypertension status (Table 1.3) showed that the majority had uncontrolled hypertension, accounting for 54 respondents (57.4%). As shown in Table 1.4, most respondents with hypertension, whether controlled or uncontrolled, were in the overweight category. This finding is consistent with the study conducted by Al-Fariqi (2021) on the relationship between nutritional status and the incidence of hypertension at Narmada Community Health Center, West Lombok, which found that the highest proportion of respondents had overnutrition, at 40.7%. This result is also in line with the study by Ilham et al. (2019), which reported that the higher a person's nutritional status, the greater the likelihood of developing hypertension. The Framingham Heart Study, as cited in Hastuti (2018), also revealed that 75% of hypertension cases are directly associated with overweight and obesity, and that 65% of hypertension cases occur in both men and women.

According to Hidayat (2022), overweight and obesity are closely associated with hypertension. Body weight is one of the determinant factors for hypertension. This is because blood volume circulation and cardiac output in obese individuals are higher than in those with normal body weight. Sarfika et al., (2024) further explained that overweight can trigger hypertension due to impaired blood flow. Individuals with overweight nutritional status generally experience increased blood lipid levels (hyperlipidemia), which may lead to narrowing of the blood vessels (atherosclerosis). This narrowing occurs as a result of the accumulation of atheromatous plaques derived from fat. Consequently, the heart must work harder to pump blood in order to meet the body's oxygen and nutrient demands, which ultimately increases blood pressure. Hastuti (2018) noted three important mechanisms underlying obesity-related hypertension, namely increased sympathetic nervous system activity, activation of the renin–angiotensin–aldosterone system, and pressure on the kidneys due to fat accumulation around the kidneys and abdominal area.

Based on the demographic characteristics of the respondents, there are several other factors that may influence both nutritional status and hypertension, as indicated by the univariate analysis, including age, sex,

employment status, and educational level. Based on the results of this study (Table 1.1), the majority of respondents were aged 56–59 years, totaling 48 respondents (51.1%). This finding is consistent with the study by Waluyani et al. (2023), which found that hypertension was more common among older adults, with 22 respondents experiencing hypertension, and that 11 respondents (91.7%) with obesity class I also had hypertension. Changes in nutritional intake and the decline in organ function with advancing age may affect the body's ability to consume and absorb nutrients from food.

According to Christy et al., (2020), several nutritional problems commonly found with increasing age include overnutrition and undernutrition. Overnutrition may result from excessive eating habits combined with reduced physical activity. Although many people are aware of the importance of reducing food intake, such habits are often difficult to change. This condition is generally caused by an unbalanced dietary pattern, especially the excessive consumption of foods high in protein, fat, and carbohydrates that exceed caloric needs. As age increases, the decline in muscle mass also contributes to increased body fat, thereby worsening overweight conditions. In contrast, undernutrition may be caused by various factors, such as economic problems and underlying diseases. Insufficient caloric intake may lead to body weight falling below the normal range. If this is accompanied by protein deficiency, the body's cell repair processes are disrupted, resulting in hair loss, reduced immune resistance, and increased susceptibility to infection. Undernutrition is also characterized by weight loss due to decreased appetite, resulting in inadequate caloric intake. In addition, undernutrition in older adults may be influenced by reduced digestive function, such as damaged or missing teeth, which can cause difficulty in chewing and swallowing food. Furthermore, reduced production of ptyalin by the salivary glands may affect the conversion of complex carbohydrates into disaccharides and reduce the lubricating function of saliva, thereby making swallowing more difficult.

Advancing age is also a risk factor for hypertension. Increased age may alter the structure of large blood vessels, causing the lumen to narrow and the vessels to become stiffer, which leads to elevated systolic blood pressure (Hidayat, 2022). According to Anies (2018), as people grow older, blood vessels become less elastic, resulting in increased blood pressure that may exceed normal limits. The increasing prevalence of hypertension with age is caused by natural physiological changes that affect the heart, blood vessels, and hormones. In older adults, the sensitivity of the baroreceptor reflex that regulates blood pressure begins to decline, thereby increasing the risk of elevated blood pressure (Sarfika et al., 2024).

Based on the results of this study (Table 1.1), the majority of respondents were female, accounting for 62 respondents (66%). This finding is consistent with the study by Putri (2023), in which most respondents were also female, total 18 individuals (56.3%). One of the factors that may influence nutritional status is sex, as nutritional requirements differ between males and females. According to Christy et al., (2020), men generally require a higher nutrient intake than women because they typically have a larger body surface area and body posture. Overweight is also more common among women, as women have a greater number of fat cells and a lower basal metabolic rate (BMR) than men. Sex may also influence hypertension. The predominance of female respondents in this study is consistent with Waluyani et al. (2023), who reported that most respondents in their study were female, totaling 38 respondents (73.1%). Men are generally more vulnerable to hypertension than women, particularly with regard to systolic blood pressure, which is often attributed to lifestyle factors that increase blood pressure. However, after menopause, the prevalence of hypertension in women tends to increase. Women aged 65 years and older are more susceptible to hypertension due to hormonal factors (Hidayat, 2022).

Based on the findings of this study (Table 1.1), the majority of respondents were unemployed, with 67 respondents (71.3%). Employment status may directly or indirectly influence nutritional status, particularly because of differences in physical activity. This finding is consistent with the study by Bahriyah (2024), which reported that 45 respondents (72.6%) were unemployed. According to Christy et al., (2020), occupation plays an important role in fulfilling various aspects of human needs, including social, economic, and psychological needs. Adult activities are generally classified into three levels: light, moderate, and heavy activity. The heavier the activity, the greater the energy required. Therefore, physical activity is often used to estimate an individual's energy requirements. Employment status may also be associated with hypertension. The predominance of unemployed respondents in this study is consistent with the findings of Maulidina et al. (2019), who reported that hypertension was more common among unemployed respondents (67.2%) than among those who were employed (36.7%). Individuals who are unemployed may be at greater risk of hypertension due to lower levels of physical activity. According to Hidayat (2022), lack of physical activity or exercise may increase the risk of obesity and, consequently, high blood pressure. Individuals who rarely engage in physical activity tend to have a faster heart rate, and their heart muscles must work harder with each contraction. The harder and more frequently the heart must pump, the greater the pressure exerted on the

arteries. Regular exercise can help lower blood pressure and is beneficial for individuals with mild hypertension.

Based on the findings of this study (Table 1.1), the highest proportion of respondents had primary education, total 44 respondents (46.8%). Education greatly influences an individual's health because knowledge is essential for preventive efforts and for reducing complications. This enables individuals to maintain their health and improve their quality of life. Education may also influence nutritional status. This finding is consistent with the study by Sri et al., (2018), which reported that 51 respondents (70.8%) had only elementary school education. According to Christy et al., (2020), knowledge related to nutrition and health is a type of knowledge that can be acquired through education. Nutritional and health knowledge influences food consumption patterns. The greater a person's knowledge of nutrition and health, the more diverse the types of food consumed, thereby supporting nutritional adequacy and maintaining individual health.

Educational level may also influence hypertension. In this study, the majority of respondents had only primary education, which is consistent with Maulidina et al. (2019), who reported that 88 respondents (61.5%) had low educational attainment. Education strongly influences health because knowledge is important for prevention and for reducing complications, thereby enabling individuals to maintain their health and improve their quality of life. Other factors that may influence nutritional status, according to Christy et al., (2020), include smoking habits, marital status, physical activity, social activity, living arrangements, mood, history of illness, dietary patterns, and nutritional intake. Meanwhile, other factors that may influence hypertension, according to Hidayat (2022), include heredity, stress, smoking habits, physical activity, alcohol consumption, excessive salt intake, and elevated cholesterol levels.

CONCLUSION

Based on the findings of this study, it can be concluded that the majority of respondents were classified as overweight, accounting for 50 respondents (53.2%), followed by those with normal nutritional status, total 29 respondents (30.9%), and underweight respondents, total 15 respondents (16.0%). The majority of respondents had uncontrolled hypertension, with 54 respondents (57.4%), followed by controlled hypertension in 40 respondents (42.6%). There was a significant relationship between nutritional status and the level of hypertension, with a p-value of 0.016.

Future researchers are recommended to conduct studies using longitudinal or cohort designs in order to examine the relationship between nutritional status and the level of hypertension more comprehensively. Additional variables may also be included, such as salt intake patterns, physical activity, medication adherence, stress, genetic factors, sex, age, and other relevant factors. It is also recommended to expand the sample size and research area so that the findings may be more representative.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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