

THE RELATIONSHIP BETWEEN LIFESTYLE AND THE INCIDENCE OF HYPERTENSION IN THE COMMUNITY IN ROKAN HULU REGENCY

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Abstract

Hypertension occurs when a person's blood pressure exceeds the normal limit, which can lead to health problems and even death. When measuring blood pressure of 140/90 mmHg, 140 represents the blood pressure when the heart pumps blood (systolic), while 90 represents the blood pressure when the heart is at rest and blood is returning to the heart (diastolic). The objective of this study was to identify variables associated with the relationship between lifestyle and hypertension incidence in the Rokan IV Koto I Community Health Center working area in 2025. This study used a quantitative, observational analytical cross-sectional design. The study was conducted in the Rokan IV Koto Community Health Center working area with 100 respondents selected using simple random sampling. Data were collected by distributing questionnaires and analyzed univariately and bivariate using the chi-square test. The results showed a significant association between hypertension incidence and physical activity (p-value = 0.012), diet (p-value = 0.40), and smoking (p-value = 0.023). It can be concluded that there is a relationship between physical activity, diet, and smoking with hypertension incidence in hypertensive patients in the Rokan IV Koto I Community Health Center working area, Rokan IV Koto District, Rokan Hulu Regency. It is recommended that the community health center develop an early detection program for hypertension by conducting routine blood pressure screening.

Keyword : Physical Activity, Hypertension, Smoking, Diet

INTRODUCTION

Hypertension, a condition in which a person's blood pressure exceeds the normal limit, poses a serious risk of health complications and even death. A person is classified as hypertensive when their blood pressure exceeds 140/90 mmHg. Blood pressure increases when the systolic value rises, with the rate of increase varying among individuals. It is estimated that around one billion people worldwide suffer from hypertension, with two-thirds living in developing countries. This number continues to rise alarmingly, with approximately 972 million adults (26%) globally affected by hypertension, and it is predicted that by 2025, around 29% of adults worldwide will suffer from this condition (WHO, 2022). Blood pressure can fluctuate within a certain range, influenced by factors such as body position, age, and stress levels (Nopitasari et al., 2021).

Generally, hypertension is more common among the elderly, although it can also occur in younger individuals, including teenagers and young adults. Among those aged 15–25 years, the prevalence of hypertension is about 1 in 10 individuals (Kini, 2022). Hypertension is often called a —silent killer‖ because it frequently shows no clear symptoms. If left unmanaged or

untreated, it can lead to life-threatening complications such as stroke, caused by structural changes in cerebral blood vessels, disrupted blood flow to the brain, oxidative stress, inflammation, and arterial dysfunction (Adhiatma et al., 2021).

According to the Indonesian Health Survey (SKI, 2023), the prevalence of hypertension in Indonesia is alarmingly high, affecting 34.1% of adults nearly one-third of the adult population posing a serious long-term public health concern. Data from the Riau Provincial Health Office (2023) reported 1,374,504 hypertension cases, consisting of 699,591 male and 674,913 female patients, with an overall prevalence rate of 30.7%. The city of Pekanbaru recorded the highest number of cases (218,483), likely due to its urban density and less healthy lifestyle patterns. Meanwhile, Rokan Hulu Regency ranked tenth, with 106,299 cases, showing a continuous increase over the years. Although slightly below the national rate, hypertension remains a major health concern, with higher prevalence among women especially post-menopause due to hormonal changes and lifestyle factors.

In Rokan Hulu Regency, data from 2023 recorded 107,323 hypertension cases— 54,778 in men and 52,546 in women—an increase from 105,310 cases in 2022 and 106,299 in 2021. Among 23 community health centers in the regency, the Rokan IV Koto I Public Health Center reported the highest number of hypertension cases, highlighting the growing trend of this disease each year. The increasing prevalence is strongly associated with lifestyle factors such as obesity, excessive salt intake, lack of physical activity, smoking, and frequent coffee consumption. An unhealthy lifestyle—characterized by smoking, physical inactivity, high-fat diets, and chronic stress—contributes significantly to hypertension. Additional risk factors include poor diet, medication non-compliance, infrequent health checkups, and poor stress management, all of which increase hypertension recurrence (Fadhli, 2023).

Some risk factors for hypertension are non-modifiable, such as family history, race, gender, and age, while others are modifiable, including exercise habits, smoking, stress levels, and diet (Hamria et al., 2020). Regular physical activity plays a vital role in reducing metabolic syndrome risk, lowering systolic and diastolic pressure, improving insulin sensitivity, and maintaining ideal body weight (Dhaniang et al., 2023). Dietary patterns also contribute greatly, as maintaining balanced nutrition supports good health and prevents disease (Rajawali, 2024). Smoking is another major risk factor, as nicotine and carbon monoxide accelerate arteriosclerosis, elevate blood pressure, and increase heart workload, thus raising the risk of cardiovascular events (Umbas et al., 2019). Other contributing factors include stress and high-fat diets, particularly in young to middle-aged adults (Pratiwi et al., 2020). Previous research conducted at Sabutung Health Center, Pangkep Regency, found a significant relationship between hypertension and diet as well as physical activity ($p = 0.024$) (Arifin et al., 2020). Similarly, another study revealed that healthy lifestyles contributed 52.5% to hypertension occurrence, with a significant correlation ($p = 0.00$) between lifestyle and hypertension in adults (Liawati & Sidik, 2021).

Based on 2024 data from Rokan IV Koto Health Center, hypertension ranks as the second most common disease, with 1,572 recorded cases, showing an increasing trend annually. A preliminary study conducted in February 2025 among 10 respondents revealed that 8 out of 10 individuals suffered from hypertension, associated with poor lifestyle habits such as irregular diet, lack of exercise, frequent coffee consumption, and smoking. This evidence emphasizes that lifestyle factors play a crucial role in the rising incidence of hypertension within the Rokan IV Koto community.

RESEARCH METHODS

This study is an analytical quantitative research, which aims to generate findings through the use of statistical or quantitative methods (data measurement). The quantitative approach applies objective theories and statistical testing to examine the correlation between variables (Notoadmodjo, 2017). The research employs a cross-sectional design, which observes the relationship between variables simultaneously (Sahir, 2022). This study investigates the relationship between lifestyle and the incidence of hypertension. The research was conducted at Rokan IV Koto Public Health Center, located in Rokan Subdistrict, from July to August 2025. The population included all hypertension patients who received health services in 2024, totaling 1,572 individuals. Using the Slovin formula with a 10% significance level, a sample size of 100 respondents was determined. Sampling was carried out using simple random sampling, ensuring that every member of the population had an equal chance of being selected, thereby reducing bias. The independent variable (X) was lifestyle, while the dependent variable (Y) was the incidence of hypertension. Data were collected through questionnaires and interviews. Primary data were obtained directly from respondents, while secondary data came from the health center's 2024 medical records. Data processing involved editing, coding, entry, processing, and cleaning, followed by univariate and bivariate analysis to determine the relationship between lifestyle and hypertension incidence.

RESEARCH RESULTS

1. Respondent Characteristics

The following tables present the numerical and categorical characteristics of the respondents.

Table 1. Frequency Distribution of Age Among Hypertensive Patients in the Working Area of Rokan IV Koto I Public Health Center, Rokan IV Koto District, Rokan Hulu Regency, 2025

Characteristic	Mean	Median	Min	Max	Std. Deviation
Age	54.63	54	27	89	15.238

Based on Table 1, the average age of respondents was 54 years, with the youngest being 27 years and the oldest 89 years. This shows that most patients with hypertension were in the middle-to-older age group.

Table 2. Frequency Distribution of Respondent Characteristics Among Hypertensive Patient in the Working Area of Rokan IV Koto I Public Health Center, Rokan IV Koto District, Rokan Hulu Regency, 2025

Characteristic	Category	F	%
Gender	Male	46	46.0
	Female	54	54.0
Education	Elementary School	0	0
	Junior High School	24	24.0
	Senior High School	46	46.0
	Bachelor's Degree (S1)	30	30.0
Occupation	Housewife	44	44.0
	Farmer	43	43.0
	Civil Servant	10	10.0
	Contract Worker	1	1.0
	Trader	2	2.0
Total		100	100

Based on Table 2, most respondents were female (54.0%), while males accounted for 46.0%. Regarding education level, 46% of respondents were Senior High School graduates, 30% had completed a Bachelor's degree, and 24% had completed Junior High School, while none had only an elementary-level education.

In terms of occupation, the majority were housewives (44.0%), followed by farmers (43.0%), civil servants (10.0%), contract workers (1.0%), and traders (2.0%). This indicates that the hypertensive population in the area is dominated by individuals engaged in household and agricultural work, suggesting limited physical activity and lifestyle factors that may influence blood pressure.

2. Univariate Analysis

Table 3. Frequency Distribution Based on Hypertension

Dependent Variable	Category	F	%
Hypertension	Hypertension	72	72.0
	Normal	28	28.0
Total		100	100

Table 3 shows that 72 respondents (72.0%) were diagnosed with hypertension, while 28 respondents (28.0%) had normal blood pressure. This suggests a high prevalence of hypertension among the study participants.

Table 4. Frequency Distribution Based on Physical Activity, Diet Pattern, and Smoking

Independent Variable	Category	F	%
Physical Activity	Light Activity	62	62.0
	Moderate Activity	38	38.0
Diet Pattern	Poor	64	64.0
	Good	36	36.0
Smoking	Smoker	59	59.0
	Non-Smoker	41	41.0
Total		100	100

Table 4 indicates that nearly half of the respondents (48.0%) had light physical activity, 34.0% engaged in moderate activity, and only 18.0% performed heavy physical activity. Regarding diet, 64 respondents (64.0%) had poor dietary patterns, while only 36 (36.0%) practiced healthy eating habits. In terms of smoking behavior, 59 respondents (59.0%) were smokers, whereas 41 respondents (41.0%) were non-smokers. These findings suggest that the majority of respondents live sedentary lifestyles, have poor dietary habits, and engage in smoking factors that are strongly linked to hypertension.

3. Bivariate Analysis

a. Relationship Between Physical Activity and Hypertension

Table 5. Relationship Between Physical Activity and Hypertension Among the Community in the Working Area of Rokan IV Koto I Public Health Center, Rokan IV Koto District, Rokan Hulu Regency, 2025

Physical Activity	The Incidence of Hypertension						P-Value	OR
	<u>Hipertension</u>		<u>Not Hipertension</u>		Total			
	n	%	n	%	n	%		
Light	52	79,8	15	20,2	67	100	0,012	2,901 (1,128
Moderate	20	58,2	13	41,8	33	100		— 6,891)
Total	72	72,0	28	28,0	100	100		

From Table 5, it is observed that among the 52 respondents with light activity, 52 (79.8%) experienced hypertension. Meanwhile, 25 out of 20 respondents (58.2%) with moderate activity. The Chi-square test resulted in a p-value of 0.012, indicating a significant relationship between physical activity and hypertension. Statistically, individuals engaging in light physical activity are more likely to experience hypertension compared to those involved in moderate or heavy physical activities

b. Relationship Between Diet Pattern and Hypertension

Table 6. Relationship Between Diet Pattern and Hypertension Among the Community in the Working Area of Rokan IV Koto I Public Health Center, Rokan IV Koto District, Rokan Hulu Regency, 2025

Diet	The Incidence of Hypertension						P-Value	OR
	<u>Hipertension</u>		<u>Not Hipertension</u>		Total			
	n	%	n	%	n	%		
Bad Diet	51	79,7	13	20,3	64	100	0,040	2,802 (1,139
Good Diet	21	58,3	15	41,7	36	100		– 6,892)
Total	72	72.0	28	28.0	100	100		

Table 6 reveals that out of 64 respondents with poor diets, 51 (79.7%) were hypertensive, whereas among 36 respondents with good diets, only 21 (58.3%) were hypertensive. The Chi-square test produced a p-value of 0.040, showing a statistically significant relationship between diet and hypertension. The Odds Ratio (OR) was 2.802 (95% CI: 1.139–6.892), indicating that individuals with poor dietary habits were 2.8 times more likely to experience hypertension compared to those who practiced healthy eating.

c. Relationship Between Smoking and Hypertension

Table 7. Relationship Between Smoking and Hypertension Among the Community in the Working Area of Rokan IV Koto I Public Health Center, Rokan IV Koto District, Rokan Hulu Regency, 2025

Smoking	The Incidence of Hypertension						P-Value	OR
	<u>Hipertension</u>		<u>Not Hipertension</u>		Total			
	f	%	f	%	f	%		
Smoke	48	81,4	11	18,6	59	100	0,023	3,091
Not Smoke	24	58,5	17	41,5	41	100		(1,253
								–
Total	72	72.0	28	28.0	100	100		7,625)

Based on Table 7, among 59 respondents who smoked, 48 (81.4%) suffered from hypertension, while among 41 non-smokers, 24 (58.5%) had hypertension. The Chi-square test yielded a p-value of 0.023, indicating a significant relationship between smoking and hypertension. The Odds Ratio (OR) of 3.091 (95% CI: 1.253–7.625) means that smokers are approximately three times more likely to develop hypertension compared to non-smokers.

DISCUSSION

1. The Relationship Between Physical Activity and the Incidence of Hypertension Among Hypertensive Patients

Based on the results presented in Table 7, there is a significant relationship between physical activity and the incidence of hypertension among hypertensive patients in the

working area of Rokan IV Koto I Community Health Center, Rokan IV Koto Subdistrict, Rokan Hulu Regency, in 2025. Statistical analysis using the chi-square test revealed a p-value of 0.012. This finding indicates that individuals with light physical activity are at a higher risk of hypertension compared to those engaging in moderate or vigorous physical activity. Thus, physical activity plays a crucial role in influencing the incidence of hypertension.

This finding aligns with the study by Pescatello et al. (2015), which demonstrated that individuals with low levels of physical activity tend to have higher blood pressure than those who exercise regularly. Physical activity helps lower blood pressure through various physiological mechanisms. This is in accordance with the Physiological Adaptation Theory, which states that the human body adapts to exercise by increasing cardiac efficiency, improving vascular elasticity, and reducing peripheral vascular resistance. These adaptations contribute significantly to lowering blood pressure. Moreover, physical activity helps in weight reduction and stress management, both of which are known risk factors for hypertension.

The current finding also corresponds with a study conducted by Wiguna at the Tresna Werdha Jara Marpati Social Institution, which showed a significant relationship between physical activity and the incidence of hypertension ($p = 0.011$, $r = -0.394$). Elderly individuals tend to have low or light levels of physical activity due to aging processes, decreased physical health, and chronic illnesses such as osteoporosis, diabetes mellitus, and hypertension, as well as a generally lower quality of life.

According to the researcher's analysis, physical activity is one of the most important factors in the prevention and control of hypertension. Regular physical activity reduces the risk of developing high blood pressure and promotes overall cardiovascular health. Observations revealed that many hypertensive patients who reported light physical activity (e.g., sitting, standing, washing dishes, watching television, cooking) experienced more frequent hypertension episodes than those who engaged in vigorous activities (e.g., carrying heavy loads, gardening, cycling 16–22 km/h, running, drawing water). This finding is consistent with previous studies showing that light physical activity contributes more significantly to the incidence of hypertension. Therefore, prevention efforts should focus on promoting physical activity such as cycling, walking, and light jogging. Community health centers are encouraged to organize weekly exercise programs to improve physical fitness and reduce hypertension risk.

2. The Relationship Between Dietary Patterns and the Incidence of Hypertension Among Hypertensive Patients

Based on the data presented in Table 10, there is a significant relationship between dietary patterns and the incidence of hypertension among hypertensive patients in the working area of Rokan IV Koto I Community Health Center, Rokan Hulu Regency, in 2025. The chi-square test yielded a p-value of 0.040 and an Odds Ratio (OR) of 2.802. This means that individuals with poor dietary habits are 2.8 times more likely to experience hypertension compared to those with healthy eating habits.

According to Astrup (2019), diets high in fat and salt can have addictive effects, influencing eating behavior and leading to unhealthy dietary patterns. An unhealthy diet, characterized by frequent consumption of high-fat and high-sodium foods, can lead to obesity and vascular constriction, which increases cardiac workload and consequently raises blood pressure. Furthermore, a sedentary lifestyle exacerbates vascular rigidity, leading to impaired circulation and higher blood pressure during physical exertion.

This result supports the findings of Dungga (2020), who reported a significant relationship between dietary patterns and hypertension ($p = 0.000$). One of the main factors

influencing dietary behavior is sodium intake, as many respondents tend to prioritize taste preference over nutritional value. Foods that are palatable are not always nutritious, and individual differences in taste preferences may result in different blood pressure outcomes. People who favor salty or savory foods—particularly fast food high in saturated fat and sodium—are at greater risk of hypertension.

Similarly, Mardianto et al. (2021) found a significant association between dietary patterns and hypertension ($p = 0.000$). In addition, Mirna et al. (2024) reported a statistically significant relationship between dietary habits and hypertension ($p = 0.002 < \alpha = 0.05$) among patients at UPTD Muara Satu Health Center, Lhokseumawe City.

Based on the researcher's analysis, dietary patterns play a pivotal role in the incidence of hypertension. Observations revealed that poor dietary habits—such as excessive intake of sodium (e.g., salted fish, soy sauce, MSG, anchovies) and high levels of fat and carbohydrates—are prevalent among residents of Rokan IV Koto. These habits significantly contribute to increased blood pressure. Therefore, implementing dietary modifications is essential. Health workers should provide regular counseling on healthy eating, nutrition, and calorie management, while also encouraging reductions in high-fat and high-sodium food consumption.

3. The Relationship Between Smoking and the Incidence of Hypertension Among Hypertensive Patients

The study also found a significant relationship between smoking behavior and the incidence of hypertension among hypertensive patients in the working area of Rokan IV Koto I Community Health Center, Rokan Hulu Regency, in 2025. Statistical testing using the chi-square test produced a p-value of 0.006 and an Odds Ratio (OR) of 3.091 (95% CI: 1.253–7.625). This indicates that hypertensive patients who smoke have a 3.09 times higher risk of experiencing hypertension compared to non-smokers.

These findings are consistent with studies showing that smoking behavior significantly correlates with hypertension among individuals of productive age ($p = 0.001 < 0.05$). This implies that smoking substantially increases the risk of hypertension, emphasizing the need for public health interventions to reduce smoking prevalence and its associated health risks.

Smoking behavior refers to the act of inhaling tobacco smoke. According to Sukmana (2008), there are two types of smokers: active smokers, who directly inhale cigarette smoke, and passive smokers, who indirectly inhale secondhand smoke. Both forms of exposure are harmful. Smoking represents a behavioral response that can be observed externally and is a major modifiable risk factor for hypertension. Individuals who smoke are more likely to experience elevated blood pressure due to nicotine-induced vasoconstriction and oxidative stress.

Anisa et al. (2024) also found a significant relationship between smoking behavior and hypertension ($p = 0.018$, $p < 0.05$), suggesting that smoking contributes to hypertension incidence in Alassumur Lor Village, Probolinggo Regency.

From the researcher's perspective, smoking is strongly associated with increased blood pressure, both through acute nicotine effects and long-term vascular damage. The toxic substances in cigarettes cause endothelial dysfunction, reduce nitric oxide availability, and increase oxidative stress, all of which contribute to sustained hypertension. Therefore, smoking cessation is an essential step in hypertension prevention and control programs.

CONCLUSION

1. There is a significant relationship between physical activity and the incidence of

- hypertension among hypertensive patients in the working area of Rokan IV Koto I Community Health Center, Rokan IV Koto Subdistrict, Rokan Hulu Regency, in 2025 (p-value = 0.012)
2. There is a significant relationship between dietary patterns and the incidence of hypertension in the working area of Rokan IV Koto I Community Health Center, Rokan IV Koto Subdistrict, Rokan Hulu Regency (p-value = 0.040).
 3. There is a significant relationship between smoking and the incidence of hypertension in the working area of Rokan IV Koto I Community Health Center, Rokan IV Koto Subdistrict, Rokan Hulu Regency (p-value = 0.023).

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