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Analysis of Factors Related to the Incidence of Hypertension in Karawang Regency

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ABSTRACT

Hypertension is one of the non-communicable diseases (NCDs), which is a leading cause of mortality and is often referred to as the silent killer. Based on the results of screening for risk factors of priority NCDs in Kabupaten Karawang (Posbindu PTM and Puskesmas), the incidence of hypertension ranks first among five other diseases: diabetes mellitus, asthma, COPD, heart disease, and obesity. Therefore, the purpose of this study—to analyze factors related to the incidence of hypertension in the Kabupaten Karawang area—is outlined in Analysis of Factors Related to the Incidence of Hypertension in Karawang Regency. This research employed quantitative analysis with a cross-sectional approach. From a total population of 14,239 hypertensive patients at the Tirtajaya Health Center, Rengasdengklok Health Center, and Teluk Jambe Health Center, the Slovin formula yielded a sample of 120 hypertensive patients selected via proportional random sampling. Primary data were collected using validated and reliable instruments: the Food Frequency Questionnaire (FFQ) for dietary patterns and the Physical Activity Scale for the Elderly (PASE) questionnaire for physical activity. Data analysis included univariate, bivariate, and multivariate techniques using logistic regression. The most dominant and significant variables ($p < 0.05$) related to hypertension incidence in the Kabupaten Karawang area were physical activity, meat consumption patterns, and alcohol consumption. This study is expected to provide analytical results that inform program development, particularly for hypertension control, thereby contributing to improved public health and strategic efforts in managing hypertension in Kabupaten Karawang.

KEYWORDS *Hypertension Factors, Hypertension Control, Hypertension Incidence*

INTRODUCTION

Hypertension is one of the main problems in public health in Indonesia and the world. Hypertension is one of the Non-Communicable Diseases (NCDs) which is one of the causes of the death rate to continue to increase and hypertension is often also referred to as the silent killer, because most people who suffer from hypertension do not cause symptoms directly at the beginning of suffering, thus making sufferers slow to realize their disease and late in treatment (Hamzah, 2021). Hypertension is a concomitant where systolic blood pressure is >149 mmHg and/or diastolic >90 mmHg. In addition, the global target of non-communicable diseases is to reduce the prevalence of hypertension between 2010 and 2030, because hypertension is one of the most common and most common cardiovascular diseases suffered by the community (Susetyowati & Hiruati, 2019).

According to World Health Organization (WHO) data from 2023, the global adult hypertension burden has nearly doubled over the past three decades, with approximately 1.3 billion adults currently affected. Globally, one in three adults suffers from hypertension, with prevalence showing 51% higher rates among men compared to women in age groups below 50 years (WHO, 2024). Within Asia, the hypertension burden is substantial, with more than 245 million individuals over age 30 estimated to have elevated blood pressure. Nearly one-third of

hypertensive individuals remain unaware of their condition, and only approximately one-third receive treatment, substantially increasing risks of myocardial infarction, stroke, renal failure, and other organ damage (WHO, 2020). These statistics underscore the urgent need for comprehensive hypertension prevention and control strategies, particularly in developing nations like Indonesia where healthcare infrastructure and disease awareness programs continue evolving.

In Indonesia, according to the 2023 Indonesian Health Survey (SKI) and the 2011-2021 Non-Communicable Disease (NCD) cohort study, hypertension is the fourth highest risk factor for death with a percentage of 10.2%. The 2023 SKI data also shows that 59.1% of the causes of disability (seeing, hearing, walking) in the population aged 18-59 years are obtained, of which 53.5% of these diseases are NCDs, especially hypertension at 22.2% (Kemenkes RI, 2024). Based on the Central Statistics Agency of West Java Province in 2016-2018, the prevalence of high blood pressure by province was 39.6% (Badan Pusat Statistik, 2018). Based on the West Java Provincial Health Profile, it was stated that in Karawang Regency in 2019 the prevalence of hypertension was 19.2% (Dinas Kesehatan Kabupaten Karawang, 2024). In addition, at the Tirtajaya Health Center, data in 2024 there will be 5,538 patients with hypertension, the Rengasdengklok Health Center in 2024 as many as 5,479 hypertension patients, and the Teluk Jambe Karawang Health Center in 2024 as many as 3,222 hypertension patients who will be examined.

The cause of the high incidence of hypertension occurs due to various triggering factors, namely there are factors that can be controlled and cannot be controlled. Factors that can be controlled or changed such as smoking behavior, alcohol consumption behavior, diet/nutrition including obesity, physical activity, lifestyle. In addition, there are factors that cannot be controlled or cannot be changed, such as age, gender and genetic or heredity factors (PH, 2018). These factors have an impact on uncontrolled hypertension which can cause various complications such as: increased blood pressure in the heart, stroke, kidney disease, retinopathy, peripheral vascular disease and neurological disorders and even death. The higher the blood pressure, the higher the risk of damage to the heart and blood vessels in major organs such as the brain and kidneys, in addition to that if not handled and controlled, it will cause death (Hamzah, 2021).

Uncontrolled hypertension can lead to premature death and result in the loss of productive years or Disabillity Adjusted Life Years (DALY) (Feby Intan Dwi Artika, 2023). There are several efforts to prevent complications and control hypertension can be done, namely by changing lifestyle, including regulating diet, doing physical activity, avoiding smoking habits and consuming alcoholic beverages and regularly consuming hypertension medications. The government has also made efforts by implementing the PATUH program, the PATUH movement is a movement that is very useful for hypertension sufferers in controlling blood pressure. In accordance with the Regulation of the Minister of Health (PMK) of the Republic of Indonesia Number 71 of 2015 concerning Non-Communicable Disease Control and the Strategy of the Ministry of Health of the Republic of Indonesia, namely with "Control Hypertension with Obedient Movements" as follows: Check your health regularly and follow the recommendations of your doctor, Overcome diseases with appropriate and regular treatment, Maintain a diet with balanced nutrition, Strive for safe physical activity, and Avoid

cigarette smoke, alcohol, and other carcinogenic substances. Based on the background and in accordance with the strategy of the "OBEY" movement (Hajri, 2022).

In addition to the PATUH program, which has been explained, there are other efforts made by the government, through the Health Social Security Administration Agency (BPJS Kesehatan) has launched the Chronic Disease Management Program (Prolanis). The goal of Prolanis is to prevent or slow down serious complications and improve the quality of life for people with hypertension. This program is an integral part of the national health insurance benefit package set by the first-tier health care facility (Meghan Shiffa, 2023). In addition to PATUH and PROLANIS, there is also the Healthy Living Community Movement (Germas) program as an effort to control the increase in the prevalence of hypertension. This program aims to increase public knowledge and awareness about the importance of maintaining health as a preventive measure to prevent diseases. Currently, the Indonesian Ministry of Health is implementing the Healthy Living Community Movement (GERMAS) program which consists of six main activities, namely improving physical activity, hygiene and healthy lifestyles, providing healthy food and improving nutrition, prevention and early detection of diseases, increasing environmental excellence and improving education about healthy living (Furqani et al., 2020).

Based on a preliminary study at one of the Puskesmas in the Karawang Regency Area, namely at the UPTD Tirtajaya Health Center and based on data from the Non-Communicable Disease Report (NCD) of the Tirtajaya Health Center in 2022, there were 4,680 until the latest data in 2024, an increase of 5,538 hypertensive patients. In addition, at the Tirtajaya Health Center, Karawang Regency, after data obtained based on the results of screening of Priority Non-Communicable Diseases (NCDs), community-based (Posbindu PTM and Puskesmas), the incidence of hypertension is number 1 among 5 other diseases such as diabetes mellitus, asthma, COPD, heart and obesity. There are several programs or efforts carried out by the Tirtajaya Health Center for hypertension control, including promotive, preventive, curative and rehabilitative efforts that have been carried out over the past 3 years, including conducting counseling both directly to the community and using social media, forming PROLANIS groups, the PATUHI movement, conducting screening or early detection of hypertension diseases, conducting treatment and observation through evaluation cards blood pressure in patients with hypertension, and for the advanced stage, if a case is found that cannot be treated at the health center, a referral will be made to the hospital level. However, from the efforts that have been made, the incidence of hypertension is still increasing.

Furthermore, direct observations and interviews with the Chronic Disease Management Program (PROLANIS) coordinator at Tirtajaya Health Center General Polyclinic identified several problems related to hypertension management: suboptimal blood pressure control in hypertensive patients, low Posbindu participation rates relative to total hypertensive patient numbers, incomplete and inadequate medication stocks, lost-to-follow-up patients, patients failing to maintain dietary recommendations with active smoking history and alcohol consumption habits. Additional medication adherence problems included forgetting medication doses, non-compliance with prescribed regimens, discontinuation of long-term therapy or control visits, failure to consume prescribed medications, medication saturation, and medication consumption only when symptoms manifest. These multifaceted challenges

suggest the necessity for comprehensive, multidisciplinary intervention strategies addressing both systemic healthcare delivery issues and individual patient behavior factors.

This research addresses critical knowledge gaps in understanding hypertension determinants within the Karawang Regency context, where despite existing government programs and health center efforts, hypertension incidence continues escalating. Previous studies have examined individual risk factors in isolation, but comprehensive analyses integrating multiple modifiable and non-modifiable factors specifically within Indonesian local government health center settings remain limited. This study's novelty lies in its systematic examination of seven key factors (age, gender, genetic history, smoking, alcohol consumption, meat consumption patterns, and physical activity) using validated instruments within a representative sample across multiple health centers, providing evidence-based foundations for tailored local interventions. The findings will contribute to filling existing research gaps regarding hypertension determinants in Indonesian regional contexts, particularly in areas experiencing rapid urbanization and lifestyle transitions characteristic of Karawang Regency. Moreover, this research provides actionable data that local health policymakers can utilize to refine existing hypertension control strategies, optimize resource allocation, and develop targeted interventions addressing the most dominant risk factors identified through rigorous multivariate analysis.

Therefore, this study aims to analyze factors related to hypertension incidence in the Karawang Regency area, specifically to: (1) identify the prevalence of hypertension across different stages in the study population; (2) examine associations between demographic, behavioral, and dietary factors with hypertension occurrence; (3) determine the most dominant factors contributing to hypertension incidence using multivariate analysis; and (4) provide evidence-based recommendations for hypertension control program enhancement in Karawang Regency.

METHOD

This study employed quantitative analytical research, in which data in numerical form were subjected to statistical analysis for hypothesis testing (Sugiyono, 2020). The research design was cross-sectional, examining the correlation between risk factors and outcomes through simultaneous observation or data collection at a single point in time (Notoatmodjo, 2018). The study was conducted at three *UPTD Puskesmas* in *Kabupaten Karawang*: Tirtajaya Health Center (Jl. Pisangsambo, Sabajaya Village, Tirtajaya District), Rengasdengklok Health Center (Jl. Tugu Proklamasi RT 22 RW 12, Rengasdengklok Selatan), and Teluk Jambe Health Center (Jl. Jalitri, Pinayung, Teluk Jambe Timur). Data collection occurred from March to June 2025.

Site selection was based on differences in demographic characteristics, data and medical record availability, variations in health services, demographic and social conditions, *Puskesmas* commitment to hypertension management, and epidemiological factors. These criteria ensured the study provided in-depth insights into hypertension incidence in *Kabupaten Karawang*.

The population comprised 14,239 hypertension patients registered in 2024 at Tirtajaya, Rengasdengklok, and Teluk Jambe Health Centers. Sample size was calculated using the

Slovin formula Sugiyono, (2020), yielding 120 hypertensive respondents selected via proportional random sampling to ensure representativeness. Samples met inclusion criteria: hypertension treatment for >3 months, *compos mentis* awareness, age 12–65 years Abdi Tenri, (2021), and willingness to participate. Exclusion criteria included hearing/vision impairments (deafness or blindness) and loss to follow-up.

The dependent variable was hypertension incidence; independent variables were age, sex, genetic hypertension history, smoking behavior, alcohol consumption, meat consumption patterns, and physical activity. Primary data were collected via interviews Notoatmodjo, (2018) using validated questionnaires on respondent characteristics (age, gender, genetic hypertension history, smoking, alcohol consumption, meat patterns, and physical activity). Meat consumption was measured with the Food Frequency Questionnaire (FFQ), and physical activity with the Physical Activity Scale for the Elderly (PASE). Data collection involved interviews and questionnaire distribution to patients at the three health centers.

Research assistants—three NCD (*Penyakit Tidak Menular*, PTM) officers from the respective *Puskesmas*—assisted implementation. Assistants met criteria: official PTM status at study sites, strong hypertension knowledge, and training on procedures, timelines, sample size, inclusion/exclusion criteria, interview techniques, questionnaire completion, and verification. Post-collection, data underwent processing and analysis.

Quantitative analysis included univariate, bivariate, and multivariate approaches. Univariate analysis described frequency distributions for age, gender, genetic hypertension history, smoking, alcohol consumption, meat patterns, and physical activity. Bivariate analysis examined relationships between independent and dependent variables. Multivariate analysis, using logistic regression, identified the most dominant variables influencing hypertension incidence.

RESULT AND DISCUSSION

Table 1 presents the distribution of the frequency characteristics of hypertension patients based on age, sex, history of hypertension (heredity), smoking behavior, alcohol consumption, meat consumption patterns and physical activity at the Karawang Regency Regional Health Center.

Table 1. Distribution of Frequency of Age, Sex, History of Hypertension (Heredity), Smoking Behavior, Alcohol Consumption, Meat Consumption Patterns and Physical Activity of Hypertension Patients in the Karawang Regency Area

	Hypertensive Patients (n=120)	
	n	**%**
Age		
Teenagers (12-25 years)	37	30.8
Adults and seniors (≥26 years)	83	69.2
Gender		
Man	76	63.3
Woman	44	36.7
History of Hypertension		
Ya	59	49.2
No	61	50.8

Smoking Behavior		
Ya	63	52.5
No	57	47.5
Alcohol Consumption		
Ya	40	33.3
No	80	66.7
Meat Consumption Patterns		
Bad	68	56.7
Good	52	43.3
Physical Activity		
Bad Activity	84	70.0
Good Activity	36	30.0
Total	**120**	**100.0**

Based on Table 1. Hypertension patients showed that the majority of hypertensive patients were ≥26 years old (69.2%), male (63.3%), had no history of hypertension/hereditary (50.8%), with a history of smoking (52.5%), did not consume alcohol (66.7%), poor meat consumption patterns (56.7%) and poor physical activity (70.0%).

Table 2. Distribution of Hypertension Incidence Frequency in Karawang Regency

Variable	Hypertensive Patients (n=120)	
	n	%
Incidence of Hypertension		
Stage II Hypertension	45	37.5
Hypertension Stage I	75	62.5
Total	**120**	**100,0**

Based on table 2, it shows the distribution of the frequency of hypertension events in the Karawang Regency Area, the majority of patients with stage I hypertension.

Table 3. Relationship of Age, Gender, History of Hypertension, Smoking Behavior, Alcohol Consumption, Meat Consumption Patterns and Physical Activity with the Incidence of Hypertension in the Karawang Regency Area

Variabel	Category	Incidence of Hypertension				Sum		P-*Value*
		Hypertension Stage I		Stage II Hypertension				
		n	%	n	%	n	%	
Age	Adolescent	21	56.8	16	43.2	37	100	**0.007**
	Adults and Elderly	24	28.9	59	71.1	83	100	
Gender	Man	36	47.4	40	52.6	76	100	**0.006**
	Woman	9	20.5	35	79.5	44	100	
History of Hypertension (Hereditary)	Ya	28	47.5	31	52.5	59	100	**0.043**
	No	17	27.9	44	72.1	61	100	
Smoking Behavior	Ya	34	54.0	29	46.0	63	100	**0.000**

	No	11	19.3	46	80.7	57	100	
Alcohol Consumption	Ya	22	55.0	18	45.0	40	100	**0.009**
	No	23	28.7	57	71.3	80	100	
Meat Consumption Patterns	Bad	37	54.4	31	45.6	68	100	**0.000**
	Good	8	15.4	44	84.6	52	100	
Physical Activity	Bad Activity	43	51.2	41	48.8	84	100	**0.000**
	Good Activity	2	5.6	34	94.4	36	100	

Table 3, chi-square test, shows age p-value (P-value = 0.007), sex (P-value = 0.006), history of hypertension/heredity (P-value = 0.043), smoking behavior (P-value = 0.000), alcohol consumption (P-value = 0.009), meat consumption pattern (P- *value* = 0.000) and physical activity (P-value = 0.000) namely (P<α 0.05), then Ho was rejected which means that there was a relationship between age, sex, history of hypertension (heredity), smoking behavior, alcohol consumption, meat consumption patterns and physical activity with the incidence of hypertension in the Karawang Regency Area.

Table 4. Results of Multivariate Logistic Regression Test Analysis of Age, Sex, History of Hypertension, Smoking Behavior, Alcohol Consumption, Meat Consumption Patterns and Physical Activity with the Incidence of Hypertension in the Karawang Regency Area

				95% C.I.for EXP(B)	
		Itself.	**Exp(B)**	**Lower**	**Upper**
Step 1a	Age(1)	.330	1.676	.593	4.741
	Gender(1)	.064	2.675	.946	7.569
	History_of_Hereditary_Hypertension(1)	.219	1.840	.696	4.861
	Smoking_Behavior(1)	.708	.673	.085	5.344
	Alcohol_Behavior(1)	.032	3.078	1.103	8.590
	Meat_Consumption_Patterns(1)	.063	7.407	.899	60.994
	Physical_Activities(1)	.002	13.752	2.586	73.141
	Constant	.000	.104		
Step 2a	Age(1)	.358	1.616	.581	4.497
	Gender(1)	.059	2.717	.961	7.680
	History_of_Hereditary_Hypertension(1)	.219	1.837	.696	4.846
	Alcohol_Behavior(1)	.031	3.089	1.106	8.623
	Meat_Consumption_Patterns(1)	.002	5.224	1.881	14.510
	Physical_Activities(1)	.002	13.860	2.585	74.306
	Constant	.000	.103		
Step 3a	Gender(1)	.059	2.706	.963	7.601
	History_of_Hereditary_Hypertension(1)	.241	1.779	.680	4.654
	Alcohol_Behavior(1)	.033	3.051	1.097	8.482
	Meat_Consumption_Patterns(1)	.001	5.568	2.020	15.352
	Physical_Activities(1)	.001	16.915	3.291	86.939
	Constant	.000	.136		

Step 4a	Gender(1)	.062	2.643	.954	7.324
	Alcohol_Behavior(1)	**.030**	**3.059**	1.111	8.419
	Meat_Consumption_Patterns(1)	**.000**	**6.023**	2.195	16.525
	Physical_Activities(1)	**.000**	**19.223**	3.809	96.999
	Constant	.001	.173		

In table 4. Based on the results of the Multivariate Logistic Regression analysis using the Backward LR method, it was shown that the variables of physical activity, meat consumption patterns and alcohol consumption ($p<0.05$) were the most dominant in relation to the incidence of hypertension in the Karawang Regency Area. In the physical activity variable, hypertensive patients with poor physical activity were 19 times more likely to experience hypertension compared to patients with good physical activity, controlled by gender variables, alcohol consumption and meat consumption patterns. In the meat consumption pattern variable, hypertensive patients with poor meat consumption patterns were 6 times more likely to experience hypertension compared to patients whose meat consumption patterns were well controlled by the variables of gender, alcohol consumption and physical activity. In the alcohol consumption variable, hypertensive patients who consume alcohol have a 3 times greater chance of experiencing hypertension compared to patients who do not consume alcohol, controlled by gender variables, meat consumption patterns and physical activity.

Based on the results of this study, it shows that the majority of hypertension patients are ≥26 years old (69.2%), male (63.3%), have no history of hypertension/heredity (50.8%), with a history of smoking (52.5%), do not consume alcohol (66.7%), poor meat consumption patterns (56.7%) and poor physical activity (70.0%). The results of this study are supported by another study, conducted in Hamlet I, Jiwan Village, Jiwan District, Madiun Regency, which states that hypertension patients are dominated by patients who are on average 56 years old or elderly and male (62.7%) (Wan Az Liza Trisnawaty, 2022). In another study in the work area of the Sidorejo Lor Health Center, Salatiga City, it was also shown that patients were dominated by hypertensive patients who did not have a history of hypertension (62.4%), with a history of smoking (74.6%), had poor consumption patterns (66.8%) and with poor physical activity (68.8%) (Jein Mayasari Rumondor, 2018).

According to data from the National Basic Health, the largest hypertension prevalence survey in Indonesia based on age is found at the age of 56-64 years (45.9%), at the age of 40 years old will experience a condition, namely the walls of the blood vessels lose elasticity and such a condition will result in an increase in blood pressure that continues to pump without the dilatation of the blood vessels (Riskesdas, 2018). In addition, the prevalence of hypertension in men is greater when compared to women, this is because the resting heart rate and cardiac index in men are lower and the peripheral blood pressure is higher when compared to women. Cases of hypertension in men are easier to find, because they are supported by other factors such as hereditary history of hypertension, smoking behavior, drinking alcohol and poor physical activity which is more dominated by hypertensive patients who are male (Adawiyah, 2021).

The results of this study also show the distribution of the frequency of hypertension incidence in the Karawang Regency Area, the majority of patients with stage I hypertension. Hypertension is one of the chronic diseases that requires proper and good treatment. This

treatment is closely related to health management which aims to control hypertension so that it can prevent the occurrence of complications that can be caused by hypertension. Where the management of hypertension is expected to encourage individuals to monitor their condition through regular contact with the health care provider team and also control, consume medications, maintain diet, physical activity and other good behaviors, both for pre-hypertension, stage I hypertension and stage II20 hypertension patients (Nade & Rantung, 2020).

Based on the results of the chi-square test, showing the p-value of age (P-value = 0.007), gender (P-value = 0.006), history of hypertension/heredity (P-value = 0.043), smoking behavior (P-value = 0.000), alcohol consumption (P-value = 0.009), meat consumption pattern (P-value = 0.000) and physical activity (P-value = 0.000) which is (P<α 0.05), then Ho is rejected which means that there is a relationship between age, sex, history of hypertension (heredity), smoking behavior, alcohol consumption, meat consumption patterns and physical activity with the incidence of hypertension in the Karawang Regency Area. The results of this study are in line with a study conducted in Hamlet I, Jiwan Village, Jiwan District, Madiun Regency, which stated that there was a relationship between age (p=0.001) and sex (p=0.026) with the incidence of hypertension (Wan Az Liza Trisnawaty, 2022). Another study showed a relationship between hereditary history (p=0.023) and smoking behavior (p=0.016) with the incidence of hypertension at the Simbarwaringin Health Center, Trimurjo District, Central Lampung Regency (Nanang et al., 2020). And supported by other studies in the working area of the Sidorejo Lor Health Center, Salatiga City, it also showed that there was a relationship between alcohol consumption (p=0.002), meat consumption patterns (p=0.046) and physical activity (p=0.000) with the incidence of hypertension (Hamzah, 2021).

In accordance with the results of multivariate logistic regression analysis using the Backward LR method, after bivariate analysis of each variable was carried out, it was shown that the variables of physical activity, meat consumption patterns and alcohol consumption (p<0.05) were the most dominant in relation to the incidence of hypertension in the Karawang Regency Area. In the physical activity variable, hypertensive patients with poor physical activity are 19 times more likely to experience hypertension compared to patients with good physical activity. Physical activity is body movement that can increase energy and energy expenditure (calorie burning). Hence, physical activity is the movement of the limbs that can make an important expenditure of energy and beneficial for physical and mental health, to create a healthy quality of life (Lugo-Mata & Urich-Landeta, 2019). One of the activities that can be done is by exercising, exercise plays an important role in the treatment process for hypertension patients. Regular exercise can reduce problems in the changes in the function of the body's organ mechanisms, especially in the blood circulation and heart. There are various benefits obtained from exercise including benefits for physical health, can make the heart work optimally, burn calories, reduce stress and can lower blood pressure (Saputra, 2020).

In the meat consumption pattern variable, hypertensive patients with poor meat consumption patterns have a 6 times greater chance of experiencing hypertension compared to patients with good meat consumption patterns. Consumption of meat foods that contain a lot of fat can cause hypertension. In addition, long-term intake from meat and poultry is associated with an increased risk of hypertension. Other research shows that to prevent cardiovascular disease the consumption of red meat should be limited and those that contain a lot of saturated

fatty acids, excessive consumption of meat will lead to fat deposits in the body (Munawan, 2022).

In the alcohol consumption variable, hypertensive patients who consume alcohol have a 3 times greater chance of experiencing hypertension compared to patients who do not consume alcohol, controlled by gender variables, meat consumption patterns and physical activity. Alcoholic beverages are drinks that contain ethyl alcohol or ethanol (C2H5OH) which is processed from agricultural products by fermentation and distillation. Alcoholic beverages are one of the triggers or risk factors for a person to develop hypertension because alcohol has the same effect as carbon dioxide which can increase the acidity of the blood so that the blood becomes thick and the blood is forced to pump, and can increase cortisol in the blood so that the activity of the rennin-angiotensis aldosterone system (RAAS) increases and results in increased blood pressure or hypertension (Buranakitjaroen et al., 2020).

Because of this, people with hypertension must adjust their lifestyle such as quitting smoking, reducing alcohol consumption, controlling weight, paying attention to diet, such as reducing salty foods, and exercising regularly. Body activity is good for people with hypertension. Physical activity factors, intake of foods containing saturated fat from meat and alcohol consumption are high risk factors for hypertension in the Karawang Regency area.

Based on the explanation above, it shows that there are three (3) variables of physical activity, meat consumption patterns and alcohol consumption, the most dominant of which are related to the incidence of hypertension in the Karawang Regency area. Therefore, blood pressure control for hypertensive patients at the Health Center is one of the main focuses of primary health services because hypertension is one of the Non-Communicable Diseases (NCDs) that needs to be treated and needs to be controlled to prevent the impact caused by hypertension. The impact of uncontrolled blood pressure can cause mortality in hypertensive patients. If the disease is uncontrolled and can cause complications to several vital organs, one of the complications is heart disease with or without stroke and kidney failure and this is a common cause of death (Siti Juariyah, 2021).

The management and control of the incidence of hypertension can be done with non-pharmacological therapy and pharmacological therapy. The non-pharmacological therapies in question include stopping smoking habits, losing excess weight, excessive alcohol consumption, salt intake and fat intake, physical exercise and increasing fruit and vegetable consumption. And pharmacological therapy includes the administration of antihypertensive drugs recommended by JNC VII, namely diuretics, especially thiazide (Thiaz) or aldosterone antagonists, beta blockers, calcium channel blockers or calcium antagonists, Angiotensin Converting Enzyme Inhibitors (ACEI), Angiotensin II Receptor Blockers or AT1 receptor antagonists/blockers (ARBs) (Saputra, 2020).

In addition, there are several efforts to prevent complications in controlling the incidence of hypertension that can be done by patients, namely by changing lifestyle, including physical activity, diet, lifestyle and adherence to consuming hypertension medications. The Ministry of Health of the Republic of Indonesia has implemented the Healthy Living Community Movement (Germas) program as an effort to control the increase in the prevalence of hypertension, which consists of six main activities, namely improving physical activity, hygiene and healthy lifestyle, providing healthy food and improving nutrition, prevention and

early detection of diseases, increasing environmental excellence and increasing education about healthy living (Hajri, 2022).

In addition, based on the Regulation of the Minister of Health (PMK) of the Republic of Indonesia Number 71 of 2015 concerning Non-Communicable Disease Control and the Strategy of the Ministry of Health of the Republic of Indonesia, namely with "Control Hypertension with Obedient Movements" as follows: Check your health regularly and follow the recommendations of doctors, Overcome diseases with proper and regular treatment, Maintain a diet with balanced nutrition, Strive for safe physical activity, and Avoid cigarette smoke, alcohol, and other carcinogenic substances. The PATUH movement is a movement that is very useful for hypertension patients in controlling blood pressure (Hamzah, 2021).

From the two above efforts made by the government and Puskesmas, the Health Social Security Administration Agency (BPJS Kesehatan) has launched the Chronic Disease Management Program (Prolanis). The goal of Prolanis is to prevent or slow down serious complications and improve the quality of life for people with hypertension. This program is an integral part of the national health insurance benefit package set by the first-tier health care facility (Meghan Shiffa, 2023). Based on the efforts that have been described above, which is useful for controlling the incidence of hypertension. Therefore, from the Puskesmas as a Public Health Center managed by the Government, its involvement in pursuing and optimizing the program is urgently needed. Thus, it can contribute to reducing the incidence of hypertension and reducing the mortality and mortality rates caused by hypertension.

For the continuation of blood pressure control based on the results of this study and the efforts made by the government, the first input is to identify and evaluate several programs and efforts that have been carried out by the Health Center, such as the implementation of NCD screening with health checks to detect hypertension early, the evaluation of the Chronic Disease Management Program (PROLANIS) and the PATUHI movement. After identifying problems and evaluating, then intervene that has been evaluated with several efforts that can be made by the Puskesmas, such as optimizing early detection programs for patients, improving health education programs for patients related to hypertension in a more effective way such as the use of audiovisual that can be disseminated through WhatsApp media, so that it can be widely reached both by the general public and especially for patients. This is useful for increasing patient knowledge. So that it can have an impact on changes in health behaviors such as regulating diet, doing activities and adhering to medication. In addition, monitoring and follow-up of patients suffering from hypertension motivates patients to follow programs available at Puskesmas such as (Posbindu and Prolanis), takes a holistic approach, and conducts multidisciplinary collaboration.

In this study, there are weaknesses and limitations of the research, namely, the data collected in this study depends on the honesty of the respondents, so that sensitivity to measurement and response biases is important. Another limitation in the research variables, namely not measuring and analyzing the adherence of taking hypertension drugs to the incidence of hypertension, so it is hoped that future researchers can conduct research with these variables and other variables that are more varied than the variables in this study, and develop further research with other methods.

CONCLUSION

This study concludes that physical activity, meat consumption patterns, and alcohol consumption were the most dominant and significant factors ($p < 0.05$) associated with hypertension incidence in Karawang Residence. These findings provide empirical evidence to advance scientific understanding, inform program needs, shape policy discourse, enhance clinical practices for hypertension control, and guide policymakers in developing more effective management strategies. For future research, longitudinal studies could explore causal pathways and intervention efficacy among diverse subgroups, incorporating additional confounders like socioeconomic status and stress to strengthen generalizability beyond cross-sectional designs.

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