



Determinants of Hypertension Incidence Among Adult Men in the Working Area of Limboto Health Center, Gorontalo Regency

Yeni Paramata*, Safrudin Tolinggi, Rahmawati, Marselia Sandalayuk, Nabila H. Gani

Faculty of Public Health, Gorontalo University, Indonesia

*Correspondence Address: yeniparamata20@gmail.com

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ABSTRACT

Hypertension is estimated to affect 1.13 billion people in the world. The purpose of this study was to analyze the determinants of hypertension in adult men in the Limboto Health Center working area. This type of analytic observational research uses a cross-sectional study design. The population is the entire population of adult males aged 25-45 years. Sampling was conducted using purposive sampling with a total of 108 participants. Research data were obtained through questionnaires, measuring blood pressure, measuring height, weight, and abdominal circumference. Univariate analysis showed that 48.1% of respondents had hypertension. The results of the chi-square test showed that age (p value $0.037 < 0.05$), central obesity (p value $0.010 < 0.05$) and physical activity (p value $0.015 < 0.05$) had a relationship with the incidence of hypertension. However, smoking behavior (p value $0.204 > 0.05$), alcohol consumption behavior (p value $0.189 > 0.05$), and sodium consumption patterns (p value $0.062 > 0.05$) have no relationship with the incidence of hypertension. The variables of age, central obesity, and physical activity are factors associated with the incidence of hypertension in the working area of the Limboto Community Health Center, Gorontalo Regency.

INTRODUCTION

Hypertension, referred to as high blood pressure in English, is no longer an uncommon condition; however, the number of sufferers generally increases year by year. Hypertension occurs when an individual's blood pressure is higher than normal. One can recognize hypertension if they regularly monitor their blood pressure. This condition affects both the young and adults, and if left untreated, it can lead to death due to complications such as heart disease, stroke, kidney disease, retinopathy (damage to the retina), peripheral vascular disease, nerve disorders, and conditions that affect the brain, which is why hypertension is often called the "silent killer" (Maulidiyah, 2018).

The main contributors to the higher prevalence of hypertension in low- and middle-income countries compared to high-income countries are excessive alcohol consumption, unhealthy diets high in sodium and potassium, and lack of physical activity (WHO, 2020).

According to the 2018 Basic Health Research (Riskesdas), the prevalence of hypertension in Indonesia increased by 34.1% compared to the 25.8% prevalence in the 2013

Riskesdas. It is estimated that only one-third of hypertension cases in Indonesia are diagnosed, with the remainder being undiagnosed. The highest prevalence of hypertension was found in South Kalimantan Province at 44.1%, while the lowest was in Papua Province at 22.2%. The highest prevalence of hypertension occurs in the 55-64 age group, with 55.2% affected (Ministry of Health, Republic of Indonesia, 2023).

A study conducted by Purnawinadi and Pontoh (2021) identified three factors related to the incidence of hypertension: age, with an odds ratio (OR) of 12.5, indicating that respondents aged 40 years and older have a 12.5 times higher risk of developing hypertension compared to those under 40 years; obesity, with respondents who are obese having a 3.2 times higher risk of developing hypertension compared to non-obese respondents. Previous research has shown that males have a higher risk of hypertension (Aryantiningih and Silaen, 2018), influenced by male lifestyle habits such as alcohol consumption, which can impact long-term health. Alcohol has a similar effect to carbon monoxide, increasing blood acidity and raising blood pressure (Sukma et al., 2019). In addition to alcohol consumption, smoking habits can also lead to hypertension due to the release of norepinephrine from adrenergic nerve endings caused by nicotine (Memah et al., 2019). Another risk factor for hypertension is central obesity. Several chronic diseases are closely associated with central obesity because the heart is located closer to the abdominal area than the hips, which contributes to this condition (Hadiputra and Nugroho, 2020).

According to data from the Gorontalo Provincial Health Office in 2022, there was an increase of 13,346 cases by June, with the highest hypertension prevalence region in 2021-2022 being Gorontalo District. Data from the Gorontalo District Health Office in 2021 showed that 1,039 individuals aged 20-44 years, primarily males, had primary hypertension. According to initial data from the Limboto Health Center in 2021, there were 587 male hypertension cases. This study aims to analyze the determinants of hypertension in adult males within the working area of the Limboto Health Center.

METHODS

The research was conducted using an analytical observational design with a cross-sectional study approach. The population for this study consisted of adult male residents aged 25-45 years in the working area of Limboto Health Center, totaling 8,478 individuals. A sample of 108 respondents was selected. The sampling technique used was purposive sampling. The sample criteria for this study included males aged 26-45 years, respondents who could communicate effectively, and those residing in Limboto District.

Data for this study were obtained through interviews and measurements of blood pressure and waist circumference. Blood pressure was measured using a sphygmomanometer, with normal blood pressure categorized as <120/80 mmHg and hypertension as >140/90 mmHg. Physical activity was measured using the International Physical Activity Questionnaire-Short Form (IPAQ-SF). Physical activity was categorized as light physical activity if <600 MET-minutes per week, moderate physical activity if 600-1499 MET-minutes per week, and vigorous physical activity if >1500 MET-minutes per week (IPAQ, 2005). Central obesity was defined with a cut-off point of ≥ 90 cm for males. Smoking behavior was categorized as light smoker (1-10 cigarettes per day), moderate smoker (11-20 cigarettes per day), and heavy smoker (more

than 20 cigarettes per day). Sodium consumption patterns were measured using a food frequency questionnaire with categories of frequent (average score > 0.43) and infrequent (average score < 0.43). Alcohol consumption habits were categorized as frequent (1-4 times per week) or infrequent (<1 time per week) (Souza et al., 2023). Data were processed and analyzed using SPSS, with bivariate analysis using the chi-square test.

RESULTS

Respondent Characteristics

The results of the study showed that out of 108 respondents, 85 respondents (78.7%) were in the early adulthood category, and 23 respondents (21.3%) were in the late adulthood category. When categorized by occupation, it was found that 66 respondents (61.1%) out of 108 were self-employed, while the smallest number, 3 respondents (2.8%), worked as farmers and civil servants (Table 1).

Table 1. Distribution of Respondent Characteristics

Respondent Characteristics		n	%
Age (Years)	Early Adulthood (25-35)	85	78,7
	Late Adulthood (36-45)	23	21,3
Occupation	Laborer	6	5,6
	Honorary Employee	5	4,6
	Employee	11	10,2
	Farmer	3	2,8
	Civil Servant (PNS)	3	2,8
	Entrepreneur	66	61,1
	Others	14	13,0
	Total	108	100,0

Source: Primary Data, 2023

Analysis of Determinants of Hypertension Incidence

Table 2 shows that there are 52 individuals with hypertension, with 36 individuals (42.4%) in the early adulthood age group and 16 individuals (69.6%) in the late adulthood age group. Data analysis using the chi-square test yielded a p-value of $0.037 < 0.05$, indicating a relationship between age factors and the incidence of hypertension in adult men. There were 45 respondents (51.7%) with central obesity who had high blood pressure or hypertension. Data analysis using the chi-square test yielded a p-value of $0.010 < 0.05$, indicating a relationship between central obesity and the incidence of hypertension in adult men.

Meanwhile, 45 respondents (51.7%) who smoked had high blood pressure or hypertension. Data analysis using the chi-square test yielded a p-value of $0.204 > 0.05$, indicating no relationship between smoking behavior and the incidence of hypertension in adult men. There were 27 respondents (56.3%) who consumed alcohol and had high blood pressure or hypertension. Data analysis using the chi-square test yielded a p-value of $0.189 >$

0.05, indicating no relationship between alcohol consumption and the incidence of hypertension in adult men.

Regarding physical activity, 16 respondents (76.2%) who engaged in light physical activity had high blood pressure or hypertension. Data analysis using the chi-square test yielded a p-value of $0.015 < 0.05$, indicating a relationship between physical activity and the incidence of hypertension in adult men. Table 2 also shows that 15 respondents (68.2%) who frequently consumed sodium had high blood pressure or hypertension. Data analysis using the chi-square test yielded a p-value of $0.062 > 0.05$, indicating no relationship between sodium consumption patterns and the incidence of hypertension in adult men.

Table 2. Determinants of Hypertension Incidence in Adult Men

Variables		Hypertension Incidence				p-Value
		Normal		Hypertension		
		n	%	n	%	
Age (years)	25 – 35	49	57,6	36	42,4	0,037
	36 – 45	7	30,4	16	69,6	
Central Obesity	Normal	46	60,5	30	39,5	0,010
	Central Obesity	10	31,3	22	68,8	
Smoking Behavior	Non-Smoker	14	66,7	7	33,3	0,204
	Smoker	42	48,3	45	51,7	
Alcohol Consumption	Non-Consumer	35	66,7	25	41,7	0,189
	Consumer	21	48,3	27	56,3	
Physical Activity	Light	5	23,8	16	76,2	0,015
	Moderate	30	56,6	23	43,4	
	Heavy	21	61,8	13	38,2	
Sodium Consumption Pattern	Rarely	49	57,0	37	43,0	0,062
	Frequently	7	31,8	15	68,2	

Source: Primary Data, 2023

DISCUSSION

The Relationship Between Age and Hypertension in Adult Men

Based on the results of the chi-square test, it was found that there is a relationship between age and the incidence of hypertension in adult men in the working area of the Limboto Health Center. This study's findings are consistent with research conducted by Aryantiningasih and Silaen (2018), which showed a significant relationship between age and hypertension, with the risk of hypertension increasing with age. Other research conducted in Tangerang District also showed similar results, indicating a relationship between age and the incidence of hypertension with a p-value of 0.00 (Widjaya et al., 2018).

According to the theory, the incidence of hypertension is more common in adults over the age of 40. This is due to the increasing risk of hypertension with age, related to the decline in organ and blood vessel function as well as hormonal changes that occur as people get older. However, it is also possible for individuals under 40 years old, including adolescents, to develop

hypertension, as seen in this study, where the majority of respondents with hypertension were in early adulthood (25-35 years old). The occurrence of hypertension in individuals under 40 is often attributed to the modern lifestyle, where many individuals under 40 do not engage in regular physical activity and have unhealthy lifestyles, contributing to the development of hypertension at younger ages.

To prevent and help younger individuals lower high blood pressure, it is recommended to engage in balanced and regular exercise, maintain a healthy weight, gradually reduce smoking and alcohol consumption, drink plenty of water, and limit the intake of fast food (Asri et al., 2022).

The Relationship Between Central Obesity and Hypertension in Adult Men

Based on the analysis, it was found that there is a relationship between central obesity and the occurrence of hypertension in adult men in the Limboto Health Center area. This study aligns with research by Hadiputra & Nugroho (2020), which shows a relationship between central obesity and the incidence of hypertension, with an odds ratio (OR) of 2.3, meaning individuals with central obesity are 2.3 times more likely to develop hypertension than those without central obesity. The same result was found in the study by Rahma and Gusrianti (2019), which stated that central obesity is significantly associated with the occurrence of hypertension.

The relationship between central obesity and hypertension is linked to individuals with large abdominal circumferences (high intra-abdominal fat), leading to a decrease in adiponectin levels, an anti-atherogenic protein. As these specific protein levels decrease, an increase in blood pressure can occur. Increased food intake and decreased energy expenditure are the main factors contributing to central obesity (Zahra & Siregar, 2023). Obesity leads to an increase in visceral fat, particularly in the abdomen. When lipolysis of visceral fat occurs, it increases free fatty acids, which can lead to hyperinsulinemia, affecting sodium retention and vascular hypertrophy, ultimately contributing to hypertension (Mafaza, Bambang, & Adriani, 2016).

The Relationship Between Smoking Behavior and Hypertension in Adult Men

Chi-square test results in this study indicate that there is no relationship between smoking status and the occurrence of hypertension in adult men in the Limboto Health Center area. This finding is consistent with research by Darmansyah (2018), which also shows no significant relationship between smoking status and hypertension. Similar results were obtained in the study by Sukma et al. (2019), which found no relationship between smoking status and hypertension, with a p-value of 0.359.

The lack of evidence for the relationship between smoking and hypertension in this study is due to the fact that certain chemicals in cigarettes are cumulative, meaning their toxic dose will eventually reach a threshold at which symptoms begin to appear. Cigarettes contain nicotine, which is a toxic chemical. Nicotine increases adrenaline levels, causing the heart to beat faster and work harder, which results in an increased heart rate and elevated blood pressure (S & Simbolon, 2020).

The Relationship Between Alcohol Consumption Behavior and Hypertension Incidence in Adult Men

According to the chi-square test results in this study, no significant relationship was found between alcohol consumption behavior and the incidence of hypertension in adult men in the Limboto subdistrict. This finding is consistent with studies conducted by Arum (2019) and Sukma et al. (2019), which stated that alcohol consumption does not have a significant relationship with hypertension occurrence.

The absence of a relationship between alcohol consumption and hypertension is due to strong interactions with other factors such as physical activity, central obesity, and age. Prolonged alcohol consumption can affect the increase in cortisol levels in the blood, thereby activating the renin-angiotensin-aldosterone system, which regulates blood pressure and fluid balance in the body. This can lead to an increase in blood pressure (Jayanti, Wiradnyani, and Ariyasa, 2017).

The Relationship Between Physical Activity and Hypertension Incidence in Adult Men

The chi-square test results in this study revealed a relationship between physical activity and the incidence of hypertension in adult men in the Limboto subdistrict. The relationship between physical activity and hypertension incidence arises because individuals who engage in light physical activity tend to have higher heart rates, which causes the heart muscles to work harder with each contraction. The more frequently one engages in physical activity, the lower the risk of developing hypertension or high blood pressure (Lestari, Yudanari, and Saparwati, 2020).

The Relationship Between Sodium Consumption Patterns and Hypertension Incidence in Adult Men

Sodium consumption patterns were categorized into two groups: frequent consumption, with an average dietary score > 0.43 , and infrequent consumption, with an average dietary score < 0.43 . The chi-square test results in this study revealed no significant relationship between sodium consumption patterns and the incidence of hypertension in adult men in the Limboto subdistrict.

The lack of a relationship between sodium consumption patterns and hypertension incidence is due to the fact that respondents were asked to recall the foods they frequently consumed, which could lead to information bias. In this study, researchers often encountered difficulties when asking respondents about their eating habits, which led to answers that were not fully representative of the daily foods typically consumed by the community.

CONCLUSION

The variables of age, central obesity, and physical activity are factors associated with the incidence of hypertension in the working area of Limboto Health Center, Gorontalo Regency. Therefore, it is recommended that the community replace sedentary lifestyle activities with at least 15 minutes of physical exercise per day and reduce the intake of imbalanced foods to help prevent the occurrence of hypertension.

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