
The Relationship Physical Activity And Smoking Behavior With The Incidence Of Hypertension In The Community In The Work Area Of The Rantang Health Center

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Abstract

Hypertension is the leading cause of premature death worldwide. One of the global targets for non-communicable diseases is to reduce the incidence of hypertension by 33% in the period between 2010 and 2030. The purpose of this study is to determine the relationship between physical activity and smoking and hypertension in the community in the working area of the Rantang Health Center. The population in this study is all hypertension patients at the Rantang Health Center as many as 1106 people with a sample of 92 respondents using the purposive sampling technique. This research method uses a cross sectional design with a chi square test resulting in a value ($p = 0.05$). The research instrument is in the form of a questionnaire sheet and a tool to check blood pressure, namely a sphygmomanometer. Based on the results of this study, it is shown that the variable of physical activity with the incidence of hypertension has a value ($p=0.062$). In the smoking behavior variable, the results of this study show that the number of smoking with the incidence of hypertension has a value ($p = 0.003$), the variable of the length of smoking with the incidence of hypertension has a value ($p = 0.018$), the variable of the type of smoking with the incidence of hypertension has a value ($p = 0.003$). The conclusion of this study is that there is no relationship between physical activity and the incidence of hypertension in the Rantang Puskesmas community, and The results of this study prove that smoking behavior, which is measured based on the number of cigarettes smoked, the length of smoking, and the type of cigarette is related to the incidence of hypertension in the Rantang Puskesmas community.

Keywords: Hypertension, Physical Activity, Smoking

INTRODUCTION

Hypertension refers to a long-term condition whose symptom is an increase in blood pressure in the walls of the arteries. This condition requires the heart to do its extra job of pumping blood throughout the body through the vascular system. Hypertension is one of the leading causes of premature death globally. The global goal related to NCDs (non-communicable diseases) is to minimize the prevalence of hypertension by 33 percent in the period 2010 to 2030. Hypertension comes when the pressure inside the blood vessels is 140/90 mmHg even higher.

The World Health Organization (WHO) identifies that currently, 22% of the global population suffers from hypertension. Of the people who have this problem, only 20% fewer try to manage their hypertension. In the African region, hypertension rates peak at 27%, followed by the Eastern Mediterranean with 26%, while Southeast Asia is third with 25%. Europe accounts for 23%, the Western Pacific 19%, and America 18% of the total population. The WHO also estimates that 1 in 5 women globally suffer from hypertension. This figure is higher among men, where 1 in 4 men aged 65-74 years experience the same condition, with a percentage of 18.07%. When viewed by gender, the rate of hypertension in women is higher than in men, with percentages of 7.2% and 3.79%, respectively.

Hypertension is the leading cause of death globally, with between 90-95% of cases occurring through primary hypertension. In Indonesia, data shows that according to the results of the 2023 Indonesian Health Survey (SKI) and NCD cohorts conducted between 2011 and 2021, hypertension is the main risk factor that places it as the number 4 cause of death, with a percentage of 10.2%. The 2023 SKI report reveals that 59.1% of the causes of disability (such as difficulty hearing, seeing, and walking) in individuals over the age of 15 are caused by acquired diseases, namely 53.5% of these diseases are NCDs, through hypertension as the largest cause, which is 22.2%. The proportion of

individuals with hypertension between the ages of 18 and 59 who have central obesity, i.e. excess fat in the abdominal area, is 3.4 times greater when compared to those with hypertension without the central obesity condition. Meanwhile, for individuals over the age of 60, the proportion of hypertensive people to central obesity is equivalent to the proportion of those who do not have central obesity (Ministry of Health, 2024).

The prevalence of high blood pressure in North Sumatra Province, based on information from the research and development institute of the Ministry of Health, reaches 5.52% of the total population. The hypertension rate in the population aged ≥ 18 years per district/city shows the highest rate in Karo Regency at 8.21%, followed by Sibolga City at 7.85%. Meanwhile, Medan City recorded a prevalence of hypertension of 4.97%. When viewed by age group, the highest prevalence of hypertension occurs in the age range of 65–74 years, which is 18.07%. From a gender perspective, the incidence of hypertension in women is more dominant than in men, with percentages of 7.2% and 3.79%, respectively. In addition, the location factor revealed that the rate of hypertension in urban areas was higher than in rural areas, with values of 5.84% and 5.14%, respectively.

Smoking can trigger an increased risk of high blood pressure. The habit of smoking can damage the heart directly by shrinking blood vessels and speeding up the heart rate, so the heart has to work harder and causes hypertension to increase. The nicotine found in cigarettes is able to bind oxygen to the heart and damage blood cells, potentially triggering the formation of blood clots. In addition, nicotine has the potential to cause damage to blood vessels. This damage is the first step that leads to the process of atherosclerosis .

From the information obtained from the GATS (global adult tobacco survey) survey report, Indonesia noted that 34.5% of the adult population participates in the habit of smoking, which is equivalent to about 70.2 million individuals. The data shows that this figure uses tobacco products. The percentage of tobacco use in men is 65.5%, while for women it is only 3.3%. E-cigarette use has jumped 10-fold in the last decade, from 0.3% in 2011 when the GATS was first held, to 3% in 2021. In addition, this study also revealed that the level of exposure to cigarette smoke in public areas is still quite significant. About 74.2% of the adult population is exposed to cigarette smoke in restaurants, and 44.8% in the work environment. At least 78% of those who smoke are aware of the medical warnings printed on cigarette packs (WHO, 2024).

Lack of physical activity is one of the independent risk factors for conditions such as hypertension. This condition results in blood and oxygen circulation to blocked organs, resulting in an increase in blood pressure. People who rarely do physical activity often feel an increase in heart rate which makes the body need more oxygen in its cells. This condition causes a decrease in calorie burning by the body, so that excess energy is stored as fat. This buildup of fat can lead to high blood pressure.

The risk of death increases by 20-30% in people who are less active than those who are moderately active. Lack of adequate physical activity is the fourth leading cause of death globally, with 2 million people dying each year due to sedentary lifestyles. The impact of such conditions on the body's immunity can increase the likelihood of various diseases, including heart disease, hypertension, depression, obesity, and anxiety. This condition can even contribute to an increased risk of premature death (Ministry of Health, 2023).

Previous research was conducted [10] The findings of the study showed a p score of 0.000 that is less than 0.05, showing the relationship between physical activity and the number of hypertension cases among the elderly in Cibogor Village. Individuals who participated in minimal physical activity had a 28.1% chance of developing hypertension when compared to those who engaged in strenuous physical activity. However, the following study did not find a link between smoking habits and the number of hypertension cases among the elderly in Cibogor Village. Meanwhile, other research conducted [11] It shows that smoking habits have a strong association with hypertension in the elderly, characterized by a p value of 0.047 (<0.05). In addition, the study also showed a significant

relationship between physical activity levels and the appearance of hypertension in the elderly, through a p score of 0.041 (<0.05).

According to data at the Rantang Health Center, the number of hypertensive patients in 2024 will reach 1,106 people. In 2025 there will be an increase, where the number of hypertension patients is recorded at 1,611 people. In 2025 The number of people with hypertension increased in July by 214, and in the report on the 10 most common diseases in 2024-2025, hypertension ranks first.

Based on the findings of the previous two studies, there are differences in results that create uncertainty about whether smoking has an impact on the occurrence of hypertension, and the extent to which physical activity plays a role in increasing the risk of hypertension, these two studies also only focus on the elderly.coupled with the fact that there are still many people who smoke and do minimal physical activity in Indonesia, This is also supported by hypertension data at the Rantang Health Center Therefore, The researcher is interested in conducting research on the relationship between physical activity and smoking in the incidence of hypertension, especially in the working area of the Ranteng Health Center.

RESEARCH METHODS

The type of research used is an analytical survey. By using the Cross sectional approach. The location of this research was carried out in the working area of the Rantang Health Center in Medan City which was carried out in March-April 2026, the research population was 1106 people with hypertension. The sample amounted to 92 respondents with the criteria of hypertensive patients aged 35-65 years and consumed cigarettes. The sampling technique uses Purposive sampling. Data were collected by distributing questionnaires and sphymomanometer documentation. Data analysis using chi-square test with a p-value significance level of > 0.05

RESULTS AND DISCUSSION

Respondent Characteristics

Table 1.1 Respondent Characteristics

Features	Quantity	
	f	%
Age		
30-41	16	17,4
42-53	30	32,6
54-65	46	50,0
Quantity	92	100,0
Gender		
Male	78	84,8
Women	14	15,2
Quantity	92	100,0
Education		
SD	5	5,4
SMP	11	12,0
SMA	52	56,5
S1	24	26,1
Quantity	92	100,0

Based on table 1.1, it shows that the respondents based on the most widespread age at the age of 54-65 years are 46 people (50.0%), and the age of the least spread at the age of 30-41 years is 16 people (17.4%), then by gender shows that male respondents are more dominant as many as 78 people

(84.8%), while based on education level shows that respondents are more dominant with high school education as many as 52 people (56.5%) and education level is at least 5 people (5,4%).

The Relationship of Physical Activity with the Incidence of Hypertension

Table 1.2 The Relationship of Physical Activity with the Incidence of Hypertension

	Hypertension						
Physical Activity	Normal		TD >130-139/85-89		Quantity		P Value
	n	%	n	%	n	%	
Lightweight	7	21,9	25	78,1	32	100	0,062
Medium	22	47,8	24	52,2	46	100	
Weight	6	42,9	8	57,1	14	100	

The results of the Chi square test from the following study showed that physical activity had no relation to the incidence of hypertension, having a score value of $p = 0.062$

The Relationship between Smoking Amount and Hypertension Incidence

Table 1.3 The Relationship between Smoking Amount and Hypertension Incidence

	Hypertension						
Number of Cigarettes	Normal		TD >130-139/85-89		Quantity		P Value
	n	%	n	%	n	%	
< 10 Bars	15	68,2	7	31,8	22	100	0,003
11-21 Rods	12	30,8	27	69,2	39	100	
21-30 Rods	8	25,8	23	74,2	31	100	

The findings of the chi square test in the following study showed that the number of smokers had a relationship with the incidence of hypertension, having a score value of $p = 0.003$ ($p < 0.05$).

The Long-Term Relationship of Smoking with the Incidence of Hypertension

Table 1.4 The Long-Term Relationship of Smoking with the Incidence of Hypertension

	Hypertension						
Long Cigarettes	Normal		TD >130-139/85-89		Quantity		P Value
	n	%	n	%	n	%	
10-20 Years	15	57,7	11	42,3	26	100	0,018
> 20 Years	20	30,3	46	69,7	66	100	

The findings of the chi square test in the following study showed that the length of time smoking had a relationship with the incidence of hypertension, having a score of $p = 0.018$ ($p < 0.05$).

Discussion

The Relationship of Physical Activity with the Incidence of Hypertension

Based on table 1.2, it shows that of the 32 hypertensive patients who had mild activity, 7 people (21.9%) had normal blood pressure and 25 people (78.1%) had a TD > 130-139/85-89. Meanwhile, of the 46 people with hypertension with moderate activity, 22 people (47.8%) had normal blood pressure, then 24 people (52.2%) had a TD > 130-139/85-89. And furthermore, of the 14 people with hypertension who had strenuous activity, 6 people (42.9%) had normal blood pressure and 8 people (57.1%) had blood pressure > 130-139/85-89. Having a score of $p = 0.062$ means that there is no relationship between activities in hypertension cases.

Physical activity plays a role in reducing the risk of hypertension. This happens due to a decrease in sympathetic nerve activity, which helps lower blood pressure. Individuals with light physical activity, such as a sedentary lifestyle, may experience increased resistance to their peripheral blood vessels. This condition causes the heart muscle to work harder, which can then lead to hypertension.

This research is in line with the research conducted. The results of the study using cross-analysis showed a p-value score of 0.135 ($> \alpha = 0.05$) for the Kuta Alam District area. The conclusion is that the hypothesis has no relationship between physical activity and cases of hypertension.

Based on this study, the level of physical activity in hypertensive patients at the Rantang Health Center is very good, even though if measured they still have high blood pressure. This condition indicates that physical activity is not a factor causing hypertension in the Rante health center community. Based on the researchers' assumptions, several factors that are known to be related to the occurrence of hypertension include family history of hypertension, high-salt diet, obesity, stress levels, smoking habits, alcohol consumption, sleep quality, and adherence to treatment. These factors can have a greater influence on blood pressure, so the relationship between physical activity and the incidence of hypertension is not significant.

The Relationship of Smoking Amount and the Incidence of Hypertension

Based on table 1.3, it shows that of the 22 hypertensive patients who consumed < 10 cigarettes daily, 15 people (68.2%) had normal blood pressure and 7 people (31.8%) had a TD > 130-139/85-89. Meanwhile, of the 39 hypertensive patients who consumed 11-21 cigarettes daily, 12 people (30.8%) had normal blood pressure, then 27 people (69.2%) had a TD > 130-139/85-89. And furthermore, 31 people with hypertension consumed 21-30 cigarettes every day, there were 15 people (68.2%) who had normal blood pressure and 7 people (31.8%) had blood pressure > 130-139/85-89. Having a score of $p = 0.003$ shows a correlation between the number of cigarettes in hypertension cases.

Consuming one cigarette per day can cause an increase in systolic blood pressure of between 10 to 25 mmHg and make the heart rate faster by about 5 to 20 beats per minute. People who smoke more than 1 pack per day have a greater risk of developing hypertension, as the buildup of chemicals in cigarettes can be harmful and spur an increase in blood pressure.

This research is in line with research conducted by The findings of the study using Mann-Whitney analysis, the score $p =$ the value obtained was 0.037 (< 0.05), meaning that there was a correlation between the number of smokers in hypertension cases.

Based on the researchers' results, smoking is not just a habit, but can be a serious risk factor for increased blood pressure. The more cigarettes consumed on a daily basis, the more likely a person is to develop hypertension. This condition can occur due to the presence of harmful substances in cigarettes, especially carbon monoxide and nicotine, which can damage blood vessels. With these findings, it is important to be a warning for people, especially those who smoke, to pay more attention to the number of cigarettes consumed per day. Reducing cigarette use or even quitting smoking can be a powerful method to reduce the chances of developing hypertension.

Long Relationship of Smoking with the Incidence of Hypertension

Based on table 1.4, of the 26 hypertensive patients who smoked for 10-20 years, 15 people (57.7%) had normal blood pressure and 11 people (42.3%) had a TD > 130-139/85-89. Furthermore,

of the 66 people with hypertension who smoked for > 20 years, 20 people (30.3%) had normal blood pressure and 46 people (69.7%) had a TD > 130-139/85-89. and has a score of $p = 0.018$ which means that there is a relationship between the length of cigarettes in the case of hypertension.

The findings of this study show that in the field most of the respondents are smokers, with the majority of them being men. In addition, they have high blood pressure. One of the causes that affects this is their habit in youth until now of consuming cigarettes. The more people who smoke, the higher their risk of exposure to risky substances in tobacco including nicotine, tar, and carbon monoxide. These substances are included in these substances, which can cause a spike in systolic blood pressure of about 10-25 mmHg and can also increase the heart rate by 5-20 times per minute.

This research is in line with research conducted by The findings of the study using correlation analysis had a score of $p = 0.027$ ($p < 0.05$) so that it can be concluded that there is a significant relationship between smoking time in hypertension cases.

Based on the results of the researchers that the habit of smoking carried out for a long time can lead to gradual but continuous damage to blood vessels, which leads to an increased likelihood of hypertension. Those who smoke in the long term are more likely to suffer from an increase in blood pressure than non-smokers in a shorter period of time. Thus, the length of smoking is one of the significant risk factors for hypertension.

The Relationship of Cigarette Type to the Incidence of Hypertension

Based on table 1.5, it shows that of the 48 hypertensive people who consumed filtered cigarettes, there were 11 people (22.9%) who had normal blood pressure and 37 people (77.1%) who had a TD > 130-139/85-89. Meanwhile, of the 44 people with hypertension who consumed a type of clove cigarette, about 24 people (54.5%) had normal blood pressure and 20 people (45.5%) had a TD > 130-139/85-89. By having a score value $p = 0.003$ which means that there is a relationship between the types of cigarettes in the case of hypertension.

The type of cigarette can affect or relate to the content of filters and clove cigarettes, which contain nicotine and tar, which contain addictive substances and harmful toxins. People smoke to get nicotine, but deaths from smoking are more often caused by tar. This condition is caused by the buildup of harmful substances in the bloodstream that can trigger a number of health conditions, including cardiovascular disease and a number of other complications. Nicotine and tar substances that infiltrate the blood can disrupt the lining of the arterial walls and spur hypertension and atherosclerosis.

The following study findings show that respondents consume more filter cigarettes than clove cigarettes. Some studies state that Kretek cigarettes contain more harmful substances than filtered cigarettes, so the chances of nicotine, tar, and carbon monoxide entering the lungs are much greater than filtered cigarettes.

This research is in line with research conducted by [14] The results of the study using Mann-Whitney analysis, the p-value score obtained was $p = 0.015$ (< 0.05), meaning that there was a relationship between the types of smoking in hypertension.

Based on the results of the researcher, the type of cigarettes consumed has a relationship with the onset of high blood pressure, because each type of cigarette contains different variations of nicotine, tar, and other harmful substances, which can have an impact on increasing blood pressure in different ways. Whether it's the type of filter cigarette or the chemicals it contains, it can affect the extent of the risk of hypertension in the smoker himself. Therefore, the type of cigarette is one of the factors that can affect the emergence of hypertension at the Rantang Health Center.

CONCLUSION

The conclusions that can be drawn from this study are as follows: The findings of this study show that physical activity is not related to the incidence of hypertension in the community in the Rantang Medan work area through a significance score of $p = .062$ ($p > 0.05$), in addition to the findings of this study also prove that smoking behavior shows that there is a significant relationship between the number of cigarettes and the incidence of hypertension in the community in the Rantang Medan work area, with a score value $P(\text{Value}) = 0.003$ ($P < 0.05$). Then the findings of this study show that there is a long-term relationship between smoking and the incidence of hypertension in people in the Rantang Medan work area with a score of $P(\text{Value}) = 0.018$ ($p < 0.05$). And The findings of this study show that there is a relationship between the type of smoking in hypertension cases in the community in the work area of the Rantang Medan Health Center with a score of $P(\text{Value}) = 0.003$ ($p < 0.05$).

The researcher hopes that this study will provide information to the public, especially men who are more dominant in consuming cigarettes, it is expected to reduce or quit smoking because smoking is a risk factor for hypertension at Rantang Health Center, although the following research findings show that physical activity is not associated with the onset of hypertension. Because physical activity is still useful for minimizing blood pressure in hypertensive patients. In addition, the health center is also expected to increase educational efforts by distributing leaflets when hypertensive patients undergo routine control to the Rantang Health Center and share short educational videos, then send daily tips to hypertensive people about the dangers of smoking, because the number of cigarettes that have been smoked, the type of cigarettes, and the length of smoking habits have been proven to be related to the incidence of hypertension.

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