

**THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND  
THE INCIDENCE OF HYPERTENSION IN THE ELDERLY  
IN LAMME VILLAGE, JAYA DISTRICT,  
ACEH JAYA REGENCY**

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***Abstract***

*Hypertension is a condition where there is an increase in systolic blood pressure  $\geq 130$  mmHg and diastolic pressure  $\geq 80$  mmHg. Hypertension is a worldwide health problem that continues to increase. Physical activity is any body movement produced by skeletal muscles and requires energy expenditure. The purpose of this study was to determine the relationship between physical activity and the degree of hypertension in residents of Lamme village, Jaya sub-district. The research design is using analytical observations, using a Cross Sectional approach. The sample was 44 respondents who were taken with purposive sampling technique. Data was collected from respondents using the NCD questionnaire sheet. The results showed that there was a relationship between history of hypertension, age, and physical activity. However, there is no relationship between gender, indicating that gender has a risk of developing hypertension, it's just that its occurrence depends on age.*

**Keywords:** Knowledge Level, Hypertension, Physical Activity

**1. INTRODUCTION**

Hypertension or often called high blood pressure is one of the non-communicable diseases that is a problem in Indonesia. Hypertension has become a public health problem and will become a bigger problem if not addressed early on (Ariani et al., 2022). Hypertensive disease causes high morbidity (morbidity) and mortality (mortality) rates. Hypertensive disease is a disease that arises due to the interaction of various risk factors that a person has (Azhari, 2017). Hypertension or better known as high blood pressure disease is a condition where a person is declared to have increased blood pressure above normal limits. A person is declared to have hypertension if the systolic pressure reaches above 140 mmHG and diastolic pressure above 90 mmHG (Hasanudin et al., 2018).

There are several factors that cause hypertension, including individual characteristics (age, gender, genetic factors), diet, stress, lifestyle (lack of physical activity) and smoking habits (Rihiantoro & Widodo, 2018). Physical activity is one of the factors that influence the incidence of hypertension. Physical activity is defined as any body movement produced by skeletal muscle contraction that increases energy expenditure above resting levels and consists of routine daily tasks such as travel, work tasks, or household activities, as well as movements or activities aimed at improving health (Lay et al., 2019).

Lack of physical activity increases the risk of suffering from hypertension. Inactive people tend to have a higher heart rate frequency so that the heart muscle has to work harder at each contraction, the bigger and more often the heart muscle pumps, the greater the pressure placed on the arteries so that blood pressure will increase (Karim et al., 2018).

According to data from the Basic Health Research report in 2021, the prevalence of hypertension in Indonesia was 25.8%. The prevalence rate of hypertension in Indonesia has increased from 2021 by 34.1%. These results are the incidence of hypertension based on blood pressure measurements in Indonesian people age > 18 years (Kemenkes, 2021). The majority of respondents who experience hypertension are at the age of > 40 years. According to the Riskesdas of Bangka Belitung Province in 2020, the number of people with hypertension reached 39.2%. Meanwhile, in 2021 the number of people with hypertension was 35.1%. From the results obtained, there is an increase in the number of people with hypertension in Bangka Belitung Province (Ariani et al., 2022).

Another factor that also affects the incidence of hypertension is age. Old age is an age that is very risky for hypertension. Old age is classified into middle age or pre elderly (pralansia), elderly (elderly), old elderly, and very old age. Pre-elderly is someone who is between 45-59 years old, elderly is someone who is between 60-64 years old, elderly is someone who is between 65-90 years old, and very old is someone who is > 90 years old. If a person has a family history of hypertension, then before the age of 55 years the risk of hypertension becomes about four times higher compared to people who do not have a family history of hypertension and at the age after 50 years everyone will become hypertensive (90%). With increasing age, the incidence of hypertension increases. This is supported by research conducted by Wang in 2014 which shows the prevalence of hypertension is higher in people aged 45-59 years (Lay et al., 2019).

Studies have shown that people with low fitness levels are sedentary. If every day an average of 25 to 30 stairs, 5 times a week within 12 to 30 weeks can significantly improve cardio-respiratory fitness. Regular and measurable exercise can absorb or remove cholesterol deposits in the arteries (Hasanudin et al., 2018).

Therefore, there is a need for serious treatment of hypertension, one of the countermeasures for hypertension is the use of antihypertensives to lower blood pressure and prevent complications (Tedjakusuma, 2014). The selection of antihypertensives is determined by the clinical condition of the patient, the degree of hypertension and the nature of the antihypertensive drug. Factors that need to be considered in the administration of antihypertensive drugs in terms of clinical patients are urgency or not urgency, patient age, degree of hypertension, renal insufficiency, impaired liver function and comorbidities (Hasanudin et al., 2018). The purpose of this study was to determine the relationship between physical activity and blood pressure in the community in Lamme Village, Jaya District, Aceh Jaya Regency.

## **2. RESEARCH METHODS**

This research is quantitative with a cross sectional research design, the sample in this study amounted to 46 people using non-random sampling techniques. The results of the study were analyzed by univariate and bivariate analysis using the Chi-Square test. Data collection was carried out, namely with Primary data through interviews and observations of residential homes in Lamme village, Jaya sub-district.

The location and time of data collection through questionnaires about non-communicable diseases were carried out in the Lamme area of Jaya District. The survey was conducted for approximately 3 weeks starting from December 18 - January 10, 2024.

Measurement and observation of research variables using a questionnaire in the form of a list of questions used as a tool to guide interviews and collect research data consisting of respondent characteristics based on age, gender, disease history, and physical activity. The location and time of data collection through questionnaires about non-communicable diseases were carried out in the Lamme area of Jaya District. The survey was conducted for approximately 3 weeks starting from December 18 - January 10, 2024. Measurement and observation of research variables using a questionnaire in the form of a list of questions used as a tool to guide interviews and collect research data consisting of respondent characteristics based on age, gender, disease history, and physical activity.

### 3. RESULTS AND DISCUSSION

#### 3.1. Research Results

Table 1 shows the distribution of each variable, respondents who suffered from hypertension amounted to 46 respondents (50.0%), respondents who experienced prehypertension amounted to 3 respondents (6.5%) and those who did not suffer from hypertension amounted to 20 respondents (43.5%). Respondents who were male totaled 14 (30.4%) and female gender totaled 32 respondents (69.6%). Respondents aged 20-35 years totaled 4 respondents (8.7%), aged 46-50 years totaled 12 respondents (26.1%) and aged 51-85 totaled 30 respondents (65.2%). Respondents who did physical activity amounted to 12 people (26.1%) and those who did sedentary physical activity or activities that refer to any type of activity carried out outside of sleep time, with very little calorie output characteristics amounted to 34 respondents (73.9%). Respondents with a history of hypertension amounted to 25 people (45.7%) and respondents who did not have a history of hypertension amounted to 21 people (54.3%).

**Table 1. Frequency Distribution Based on Incidence of Hypertension, Gender, Age, Physical Activity and History of Hypertension**

No	Variable	Status	Frequency	Percentage (%)
1.	Incidence of Hypertension	Not hypertensive	20	43,5%
		Prahypertension	3	6,5%
		Hypertension	46	50,0%
2.	Gender	Male	14	30,4%
		Female	32	69,6%
3.	Age	20-35 Years	4	8,7%
		36-50 Years	12	26,1%
		51-85 Years	30	65,2%
4.	Physical Activity	Yes	12	26,1%
		Sedentary	34	73,9%
5.	History of Hypertension	Has a history	25	45,7%
		No history	21	54,3%
<b>Total</b>			<b>46</b>	<b>100%</b>

Source: Data processed, 2024

Table 2 presents the analysis conducted to determine the relationship between the dependent variable (incidence of hypertension) and the independent variables (family history, age, gender, and physical activity). The results of this analysis were performed by cross tabulation with the Chi Square test with a confidence level of  $\alpha = 0.05$ .

**Table 2. Relationship between Dependent and Independent Variables**

No.	Variable	Status	Incidence of Hypertension				Total	P value	
			Hypertension		Not Hypertension				
			N	%	N	%			N
1	History	Available	20	80,0	5	20,0	25	100	0,000
		None	3	14,3	18	85,7	21	100	
2	Gender	Male	7	50,0	7	50,0	14	100	1,000
		Female	16	50,0	16	50,0	32	100	
3	Age	20-35 Tahun	1	25,0	3	75,0	4	100	0,368
		36-50 Tahun	6	50,0	6	50,0	12	100	
		51-85 Tahun	16	53,3	14	46,7	23	100	
4	Physical Activity	Active	3	25,0	9	75,0	12	100	0,045
		Sedenter	20	58,8	14	41,2	34	100	

Source: Data processed, 2024

## 3.2. Discussion

### 3.2.1. Relationship between Family History Factors and Hypertension

The results of univariate analysis showed that respondents with a history of hypertension were 25 people (45.7%) and respondents who did not have a history of hypertension were 21 people (54.3%). From the results of bivariate analysis, it shows the relationship between the history of hypertension and the incidence of hypertension obtained p value = 0.000, this means that the history of hypertension is related to hypertension because the p value is smaller than 0.05.

A history of hypertension is obtained from parents, so the suspicion of primary hypertension in a person will be quite large. This happens because of the inheritance of traits through genes. Hereditary factors do have a big role in the emergence of hypertension. This is evidenced by the discovery that out of 10 people with hypertension, 90 percent of them occur because they have a talent or gene that brings the appearance of hypertension. However, genes can make a person hypertensive because there are other external triggering factors (Heriziana, 2017).

The results of this study are in line with the results of research at the Bangkinang Health Center, Kampar Regency with a case control design. These results were analyzed with the Spearman's rho correlation test, with a moderate correlation value (0.462) with p value = 0.00, which means that there is a statistically significant relationship between family history of hypertension and the incidence of hypertension in patients seeking treatment at the Bangkinang Health Center polyclinic. The PAR value obtained is 0.56,

which means that about 56% of hypertension incidence can be prevented by eliminating the risk factor of family history of hypertension (Heriziana, 2017).

### 3.2.2. Relationship between Age and Hypertension

The results of univariate analysis showed that respondents who were vulnerable aged 20-35 years amounted to 4 respondents (8.7%), aged 46-50 years amounted to 12 respondents (26.1%) and aged 51-85 amounted to 30 respondents (65.2%). From the results of bivariate analysis of the relationship between age and the incidence of hypertension obtained the result of p value = 0.368, indicating a value greater than 0.05, meaning that there is no relationship between age and the incidence of hypertension.

This is supported by the opinion (Tonstad et al., 2015) which says that the age of a person at risk of hypertension is over 45 years of age and new high blood pressure attacks appear around the age of 40 although they can occur at a young age. Research conducted by (Budi et al., 2015) states that there is a significant relationship between the age of the elderly (60-90 years) with blood pressure (Hasanudin et al., 2018)

As we age, the arteries in the body become wider and stiffer, resulting in reduced capacity and recoil of blood accommodated through the blood vessels. This reduction causes the systole pressure to increase. Aging also causes disruption of neurohormonal mechanisms such as the reninangiotensin-aldosterone system and also causes increased peripheral plasma concentrations and also the presence of glomerulosclerosis due to aging and intestinal fibrosis resulting in increased vasoconstriction and vascular resistance, resulting in increased blood pressure (hypertension) (Sofyan et al., 2014).

Based on the results of existing research and theory, the researcher argues that there is a relationship between age and the incidence of hypertension, the older a person is, the higher the blood pressure will be.

### 3.2.3. Relationship between Gender Factors and Hypertension Incidence

The results of univariate analysis showed that respondents whose gender (%) had greater hypertension than men who totaled 14 (30.4%). From the bivariate results, it shows the relationship between gender and hypertension obtained p value = 1.000, this means that there is no relationship between gender and hypertension because the p value result is greater than 0.05.

This study is in line with research (Yunus et al., 2021) entitled the relationship between age and gender with the incidence of hypertension at the Haji Pemanggilan Health Center, Anak Tuha District, Central Lampung where the p value for gender is 0.84. This study is not in line with research (Jannah et al., 2019) in Tamansari Village, Tasikmalaya City with the results of statistical tests showing p value = 0.035 in other words the p value is smaller than  $\alpha = 0.05$ , it can be concluded that there is a significant relationship between gender and the incidence of hypertension, with an OR value = 0.407 meaning that female respondents have 0.4 times the chance of experiencing hypertension compared to men.

Men often develop signs of hypertension in their late thirties while women are slower to develop hypertension after menopause. Women's blood pressure, especially systolic, increases more with age. After the age of 55, women do have a higher risk of developing hypertension. One of the reasons for this pattern is the difference in hormones

between the two sexes. Estrogen production decreases during menopause, women lose the effects of estrogen, resulting in increased blood pressure (Hayati & Irianty, 2023).

Based on this theory, all genders are at risk of developing hypertension, but the incidence depends on age.

#### 3.2.4. Relationship between Physical Activity Factors and Hypertension Incidence

The results of univariate analysis showed that respondents who did physical activity were 12 people (26.1%) and those who did sedentary physical activity or activities that referred to all types of activities carried out outside of sleep time, with very few calorie output characteristics were 34 respondents (73.9%). The results of bivariate analysis of the relationship between physical activity and the incidence of hypertension obtained the results of  $p$  value = 0.045, indicating a value smaller than 0.05, meaning that there is a relationship between physical activity and the incidence of hypertension.

Physical activity affects blood pressure stability. People who are not physically active tend to have a higher heart rate frequency. This causes the heart muscle to work harder with each contraction. The harder the heart muscle tries to pump blood, the greater the pressure placed on the arterial wall, increasing peripheral resistance which causes an increase in blood pressure. WHO recommends doing physical activity with moderate intensity for 30 minutes / day in 1 week or 20 minutes / day for 5 days in one week with heavy intensity to get optimal results from physical activity or exercise. Epidemiologists divide physical activity into 2 categories, namely structured physical activity (sports activities) and unstructured physical activity (daily activities such as walking, cycling and working). (Fauzi, 2014 in Rihiantoro & Widodo, 2018).

In addition to the above research, several studies have stated that physical activity is associated with the incidence of hypertension. Research (Akbar, 2018) on the epidemiological determinants of the incidence of hypertension in the elderly in the Jatisawit health center work area from the results of the chi-square test obtained a  $p$  value = 0.049 because the  $p$  value  $< \alpha$  (0.05) so it can be concluded that there is a significant relationship between physical activity and the incidence of hypertension in the elderly in the Jatisawit Health Center work area. (Wirakhmi, 2023)

The results of this study are similar to the results of a study conducted in Karanganyar Regency using a case control design<sup>13</sup>. Unusual exercise compared with ideal exercise habits, then unusual exercise is proven as a risk factor for hypertension, with ( $p=0.001$ ; OR = 4.73; 95% CI = 1.03-2.58). This means that respondents who do not usually exercise have a risk of developing hypertension by 4.73 times compared to respondents who have ideal exercise habits (Ahmad, 2011 in Heriziana, 2017).

Based on the results of research and existing theories, researchers argue that there is a relationship between physical activity and the incidence of hypertension, people who have no physical activity or lack of movement often have high blood pressure.

## 4. CONCLUSION

Based on research on factors associated with the incidence of hypertension at Basuki Rahmat Palembang Health Center in 2014, it can be concluded that there is a relationship between family history factors and the incidence of hypertension obtained

with p value = 0.000 because the p value is smaller than 0.05. There is a relationship between age and the incidence of hypertension obtained with p value = 0.000 because the p value is smaller than 0.05. There is also a relationship in physical activity obtained with p value = 0.045 because the p value is smaller than 0.05. However, there is no relationship in gender with a p value = 1.000 because the p value is greater than 0.05, indicating that gender has a risk of developing hypertension, it's just that its occurrence depends on age.

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