The Influencing Factors of Hypertension In Posbindu PTM Participants in Aceh Besar District

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Abstract— Introduction: Background: Hypertension is a silent killer, proven to often appear without symptoms and cause serious disease complications, such as stroke and coronary heart disease. The prevalence of hypertension continues to increase from year to year. Aceh is a province with a high rate of hypertension. The incidence of hypertension is the result of a long process of many factors related to the occurrence of hypertension. Research Objective: To determine the factors associated with hypertension among participants of Posbindu Non-Communicable Diseases (PTM) in Aceh Besar District. Methods: Quantitative research of observational analysis type with Cross- Sectional study design. This study was conducted at three Posbindu PTM Puskesmas in Aceh Besar Regency, specifically Posbindu PTM Ingin Jaya, Darul Imarah, and Suka Makmur with 330 research respondents with the incidental sampling method. Results: The results showed that there was a significant relationship between the presence of family history, obesity, diabetes, high cholesterol levels, low physical activity, low knowledge, and negative attitudes toward the incidence of hypertension (p<0,05). In contrast, there is no significant relationship between smoking and healthy dietary patterns on the incidence of hypertension (p<0,05). Conclusion: The results of this study indicate that the factor that most influences hypertension is the attitude towards hypertension.

Keywords: Hypertension, Risk Factors, Posbindu PTM, Attitude

I. INTRODUCTION

The problem currently faced in health development is the double disease burden, where there are still many infectious diseases that must be treated, and at the same time, non-communicable diseases (NCDs) continue to increase (Ministry of Health of the Republic of Indonesia, 2012). In Indonesia, there has been an epidemiological transition that has led to a shift from infectious diseases to non-communicable diseases. According to WHO (2014), the incidence of NCDs in Indonesia has continued to increase over the last 25 years, from 37% (1990) to 57% (2015) (Siswati et al., 2021)

Hypertension generally refers to the condition of the blood supply to the arterial walls. larger so that it can cause several health problems such as stroke, coronary heart disease, and right ventricular hypertrophy for the heart muscle (Ministry of Health, 2013). Hypertension is blood pressure of 140/90 mmHg and above, commonly known as the silent killer, proven to often appear without symptoms, meaning that symptoms are not a sign of early diagnosis (Khairani et al., 2020).

According to data from the World Health Organization (WHO), around 972 million people, or 24.4% of the world's population suffer from high blood pressure, 26.6% of which occurs in men and 26% in women (Septianingsih, 2018). The prevalence of hypertension is expected to increase to 29.2% in 2025. Of the 972 million hypertension sufferers, 333 of them are in developed countries and the remaining 639 are in developing countries, namely Indonesia (Septianingsih, 2018).

In Indonesia, data from Riskesdas (2018) shows that the prevalence of hypertension is 34.1%, an increase from the results of Riskesdas (2013), namely 25.8% (Ministry of Health of the Republic of Indonesia, 2018). Aceh is included in the top 10 provinces with a hypertension rate of up to 9.2% (RI Ministry of Health, 2018). Based on data from the Aceh Besar Health Service, hypertension is ranked fifth among the top diseases, with a total of 11,232 cases of hypertension, 5,018 cases of hypertension in men and 6,214 cases of hypertension in women (Khairani et al., 2020).

Hypertension is the result of a lifelong process. The incidence of hypertension in adults and the elderly cannot be separated from interactions that take place from childhood to adolescence with several possible risk factors for hypertension which also continue to increase (Nurhidayat, 2014). Several factors associated with high levels of hypertension are smoking (36.9%), lack of fruit and vegetable consumption (90.8%), lack of physical activity (28.1%), obesity (21.8%), drinking alcohol 33 % (RI Ministry of Health, 2018). The risk of hypertension can be avoided by taking various steps to control factors that worsen the disease (Nurhidayat, 2014).

In Indonesia, a community NCD control model has been developed through Posbindu PTM. The government has carried out the Posbindu PTM program breakthrough since 2012. To accelerate the reduction of PTM, the government established regulations for the Healthy Living Community Movement (Germas) through Presidential Instruction Number 1 of 2017 (Siswati et al., 2021). Posbindu PTM aims to increase community participation in the prevention and early discovery of NCD risk factors (Ministry of Health of the Republic of Indonesia, 2012).

Posbindu PTM is a form of community participation in efforts to control risk factors independently and sustainably so that the incidence of PTM in the community can be reduced. Aceh Besar is the district that has the 3rd largest number of PTM Posbindu in Aceh Province. In Aceh Besar District there are 25 active Posbindu. This research focuses on 3 Posbindu with the highest number of participants, namely Posbindu Want Jaya, Posbindu Darul Imarah, and Posbindu Suka Makmur with a total of 100 participants per Posbindu PTM (Aceh Health Service, 2022).

However, there is no data regarding factors that influence hypertension in Posbindu PTM participants in Aceh Besar Regency. This research was conducted to provide data regarding factors that influence hypertension in Posbindu PTM participants in Aceh Besar Regency

II. METHOD

This research is a quantitative research type of observational analysis with a cross-sectional study design. Research to study factors that influence hypertension by approaching or collecting data at one time only. This study aims to look at the relationship between factors that influence hypertension in Posbindu PTM, Aceh Besar Regency.

A. Location

The research locations were carried out at three Posbindu PTM Aceh Besar Regency, namely Posbindu PTM Want Jaya, Darul Imarah, and Suka Makmur.

B. Time of Research

The research time was carried out in November 2023 - February 2024

C. The Sample In This Research

The number of samples was set at 323 people. Sampling using incidental sampling means that samples are sought based on chance, that is, anyone who is present at Posbindu PTM can be used as a sample if the person they happen to encounter is thought to be a good source of data.

III. RESEARCH RESULT

Data analysis using Smart PLS is a multivariate analysis technique that allows testing the influence between complex variables (both direct and alternating influences) to obtain a comprehensive picture of the entire model. Smart PLS analysis requires 2 testing stages, namely the measurement model (outer model) and the structural model (inner model) (Ghozali, 2016). PLS is used to see the magnitude of the influence of smoking, diet patterns, physical activity, knowledge, attitudes, and actions on hypertension.

Measurement Model (Outer Model)

Measurement model or outer model to see the influence of loading values between indicators on latent constructs. Outer model to see the convergent validity test. The convergent validity test aims to prove that each indicator is acceptable and able to explain the latent variable. According to Hair et al (2010) and (Ghozali, 2016b), a sub-variable value of 0.5 or more is considered to have fairly strong validation. In this study, a loading factor limit of 0.5 was used. The results of the convergent validity test can be seen in Table 1 below.

Based on the results of Table 1, it shows that all outer loadings have passed the test because the value has reached 0.5 or more and all indicators are accepted and able to explain the latent variable.

Reliability Test

The reliability test according to Hair et al (2010) is considered to meet the requirements if the Cronbach Alpha value is > 0.6, the Composite Reliability value is > 0.7 and the

Average Variance Extracted (AVE) value is > 0.5. The reliability test yielded the following findings.

Table 1. Convergent Validity Test Results (Outer Loading)

Variablee	Outer Loading	Description
M1	0.910	Smoke (X1)
M2	0.914	
M3	0.944	
M4	0.927	
M5	0.917	
PD1	0.947	Diet Patterns (X2)
PD2	0.939	
PD3	0.946	
PD4	0.818	
PD5	0.651	
AF1	0.969	Physical Activity (X3)
AF2	0.963	
AF3	0.961	
AF4	0.901	
AF5	0.947	
AF6	0.949	
AF7	0.969	
P1	0.949	Knowledge (X4)
P2	0.900	
P3	0.947	
P4	0.952	
P5	0.892	
S1	0.658	Attitude (X5)
S2	0.787	
S3	0.735	
S4	0.655	
S5	0.777	
S6	0.742	
T1	0.656	Hypertension (Y1)
T2	0.536	
T3	0.855	
T4	0.666	
T5	0.854	
T6	0.852	
T7	0.517	

Table 2. Reliability Test

Variable	Cronbach's Alpha	Composite Reliability	AVE
Smoke	0.978	0.978	0.900
Diet Patterns	0.838	0.865	0.516
Physical Activity	0.957	0.970	0.851
Knowledge	0.960	0.960	0.862
Attitude	0.916	1.021	0.753
Hypertension	0.823	0.830	0.529

Based on Table 2, it can be concluded that all constructs meet the reliability criteria, this can be seen from the Cronbach Alpha value > 0.6, the Composite Reliability value > 0.7 and the Average Variance Extracted (AVE) value > 0.5 as the recommended criteria.

R Square

The structural model or inner model is evaluated by looking at the percentage of variance explained, namely by looking at the amount of variation in the construct explained by the model. The condition for the R-Square value is low> 0.1; moderate>0.3 and high>0.6.

According to the findings, the hypertension variable's R-Square value is 0.817. This result is included in the good criteria because the R-Square value is> 0.6. This research uses five

variables influencing the hypertension variable (Y), namely smoking (X1), diet pattern (X2), physical activity (X3), knowledge (X4), and attitude (X5). These results show that smoking, diet patterns, physical activity, knowledge and attitudes can explain hypertension by 88.1.7%, the remaining 11.9% is influenced by other factors..

The results also show that the R-Square value for the diet pattern variable is 0.103. This result falls into the low criteria >0.1. These results show that physical activity explains diet patterns by 10.3%, the remaining 89.7% is influenced by other factors. Furthermore, the results show that the R-Square value for the knowledge variable is 0.614. This result falls into the high criteria>0.6. These results show that knowledge explains attitudes by 61.4%, and the remaining 38.6% is influenced by other factors. The R-Square results can be seen in Table 3. below:

Table 3. R-Square Value

Variable	R-Square
Hypertension	0,881
Diet Patterns	0,103
Attitude	0,614

F-Square

The f-square value shows the magnitude of the influence of endogenous variables on exogenous variables. The f-square assessment criteria according to Henseler (2009) are as follows: $0.02 \leq f \leq 0.15$ = small effect, $0.15 \leq f \leq 0.35$ = medium effect, $f \geq 0.35$ = large effect. The f-Square results can be seen in Table 4. below:

Table 4. F-*Square Value*

Exogenous Variables	Endogenous Variables (Hypertension)
Physical Activity	0,029
Smoke	0,001
Diet Patterns	0,001
Knowledge	0,495
Attitude	3.278

Table 4. shows that the physical activity variable shows a value of 0.029, this value shows that there is a small effect between physical activity and hypertension. Meanwhile, the knowledge and attitude variables show values of 0.495 and 3,278, these values indicate a large effect between knowledge and attitudes towards hypertension. On the other hand, the smoking and diet pattern variables show a value of 0.001, this value shows that there is no effect between smoking and diet pattern on hypertension.

Inner Model/Hypothesis Testing

Testing on the structural model or inner model was carried out to test the influence between latent constructs and test research hypotheses, seen based on the significance value of the Smart PLS processing results with the criteria of positive standard deviation (+), t-statistic > 1.96 and p < 0.05. The results of the hypothesis test can be seen in table 5 below.

The results of the hypothesis test showed that there was a significant relationship between physical activity (p=0.003, t=2.966), knowledge (p=0.000, t=10.787), and attitude (p=0.000, t=39.993) on the incidence of hypertension. On the other hand, there was no significant relationship between

smoking (p=0.563, t=0.579) and dietary patterns (p=0.742, t=0.330) on the incidence of hypertension.

Table 5. Hypothesis Test Results

	Standard deviation	t-statistics	p-value
Physical Activity -> Hypertension	0.025	2.966	0.003
Physical Activity -> Diet Pattern	0.049	6.597	0.000
Smoking -> Hypertension	0.020	0.579	0.563
Knowledge -> Hypertension	0.037	10.787	0.000
Knowledge -> Attitude	0.023	33.753	0.000
Diet Pattern -> Hypertension	0.023	0.330	0.742
Attitude -> Hypertension	0.029	39.993	0.000

Another thing, the results of hypothesis testing show that there is a significant relationship between knowledge and attitudes (p=0.000, t=33.753). The results of the hypothesis test also showed that there was a significant relationship between physical activity and diet patterns (p=0.000, t=6.597).

IV. DISCUSSION

Effect of Smoking on Hypertension

The results of the study showed that there was no significant relationship between smoking and hypertension with p=0.563, t=0.579. This is the same as research conducted by (Efriandi et al., 2023) where there was no significant influence between smoking behavior and the incidence of hypertension, with a value of p=0.643.

In theory, smoking is a risk factor for hypertension. Nicotine in cigarettes is the cause of increased blood pressure immediately after the first puff. Like other chemicals in cigarette smoke, nicotine is absorbed by tiny blood vessels in the lungs and circulated into the bloodstream.

From the research results, there is a gap between theory and the facts obtained. Numerous factors, particularly the traits of the respondents, have an impact on this. The majority of respondents in this study were women with a total of 317 people (96.1%) and 322 respondents who did not smoke (97.8%) so there was no influence of smoking on the incidence of hypertension in this study. This is also in accordance with research (Feronika Prang et al., 2021) where there was no influence between smoking and the incidence of hypertension with the analysis result of p=0.83. In this study, based on gender, the majority were women at 53% and respondents who did not smoke (98.91%) were more dominant than respondents who smoked (1.09%). Even though the research results are inconsistent, we should still reduce smoking behavior because it is very dangerous and has an adverse impact on health.

The Effect of Diet Patterns on Hypertension

The results of the study showed that there was no significant relationship between dietary patterns and the incidence of hypertension with p=0.742, t=0.330. In theory, a diet that consumes foods high in sodium more often will increase the volume of fluid in the blood vessels, as a result the heart will try to increase its pressure to pump blood throughout the body, as a result, this will increase a person's blood pressure. Hypertension can occur in someone who consumes more than 1.4 grams of salt per day. The American Heart Association

(AHA) recommends consuming less than 1.5 grams of salt per day (Mardianto et al., 2021).

From the research results, there is a gap between theory and the facts obtained. This is influenced by various factors, especially the respondent's diet or eating patterns. From the research results, it is known that respondents with a healthy diet pattern were more dominant, namely 167 people (50.6%). A healthy diet pattern here includes consuming foods that contain fiber and avoiding using excessive salt and foods that contain high salt such as salted fish, salted eggs and other processed salt ingredients (Sepsina & Wahyuningrum, 2023).

This is in line with research conducted by (Harun, 2019) with a cross sectional approach where there was no relationship between diet and the incidence of hypertension with a statistical test value of p=0.516. The results obtained were that 65 respondents (95.6%) consumed vegetable protein foods. Tofu, tempeh, and green beans are examples of common vegetable proteins. In theory, vegetable protein contains essential amino acids that have an effect on the cardiovascular system, namely it can increase peripheral blood flow and reduce peripheral resistance, resulting in an increase in cardiac output which has an effect on reducing blood pressure. So it can be concluded from this study that diet has no significant relationship with the incidence of hypertension.

The Effect of Physical Activity on Hypertension

Research shows that the majority of respondents are less active in physical activity, as many as 174 people (52.73%). From the hypothesis test, it was found that there was a significant relationship between inactive physical activity and the incidence of hypertension with p=0.003, t=2.966.

This research is in line with research conducted by (Makawekes et al., 2020) which found p=0.000 so there is a significant relationship between less physical activity and the incidence of hypertension. This is also in line with research (Ramdhika et al., 2023) where the result was p=0.046, so it can be concluded that there is a significant relationship between lack of physical activity and hypertension.

Physical activity greatly influences blood pressure stability. Individuals who do not engage in physical activity typically have elevated heart rates. The heart muscle has to exert more effort throughout each contraction as a result. The harder the heart muscle tries to pump blood, the greater the blood pressure imposed on the artery walls, resulting in peripheral resistance which causes an increase in blood pressure. Lack of physical activity can also increase the risk of being overweight which will increase the risk of hypertension (Ramdhika et al., 2023). This is in line with research, namely that the majority of respondents lack physical activity (52.7%).

The higher the physical activity, the lower the risk of developing hypertension. Someone with light activity has a 30-50% tendency to develop hypertension compared to someone with moderate or heavy activity. Physical activity carried out regularly for the right duration can reduce hypertension. Physical activity can strengthen the heart so that it can pump blood better without having to expend a lot of energy. The lighter the heart's work, the lower the blood pressure in the arteries, resulting in decreased hypertension.

Physical activity that can reduce hypertension depends on the type of activity, duration, and frequency. Physical activity of at least 15-30 minutes/day can reduce the impact of increasing hypertension in the body and produce good movement that can maintain balance in the body (Indriani et al., 2022).

The Effect of Physical Activity on Diet Patterns

The research results show that there is a significant relationship between physical activity and diet patterns with a value of p=0.000, t=6.597. Research on physical activity on dietary patterns and the incidence of hypertension was carried out by (Zhu & Wang, 2024). The results showed that respondents who had unhealthy eating patterns and individuals who were not physically active had a significant effect on hypertension. Furthermore, respondents who had a healthy diet and were physically active had no significant effect on hypertension, and also for respondents who had a healthy diet but who were not physically active, there was no significant effect on hypertension.

The results of this study show that physical activity influences diet patterns. If someone does active physical activity, the risk of hypertension is lower than those who have an unhealthy diet or are less active in physical activity. And also the benefits of reducing the risk of hypertension cannot be achieved if one of the two things above is not fulfilled. This is in line with research on respondents' physical activity being predominantly inactive and respondents' eating patterns being predominantly healthy eating patterns. So, this cannot reduce the risk of hypertension in respondents.

The Effect of Knowledge on Hypertension

This research shows that the majority of respondents have insufficient knowledge, 184 people (55.93%). Hypothesis test results show that there is a significant relationship between lack of knowledge and the incidence of hypertension with p=0.000, t=10.787. This is the same as research conducted by (Limbong et al., 2018), analytical survey research with a cross-sectional approach. From statistical analysis, the relationship between knowledge and the incidence of hypertension was found to be p=0.000. Similarly, in research conducted by (Kondoj & Kolesy, 2018), from 45 hypertensive respondents, statistical test results showed that there was an influence of knowledge on the incidence of hypertension in hypertensive patients, the result was p = 0.000.

Knowledge about hypertension influences the incidence of hypertension. This is related to good knowledge that will be able to change your lifestyle for the better by not smoking, exercising regularly, improving your diet, avoiding stress, and avoiding unhealthy lifestyles. The better the knowledge about hypertension, the better the efforts to control the hypertension one suffers from. So on the contrary, if there is less knowledge about hypertension, it will be worse for controlling hypertension (Septianingsih, 2018).

In this study, respondents predominantly had less knowledge about hypertension (55.93%) with the background of most respondents having low education. This causes the risk of hypertension in respondents to be high because they do not know what a good lifestyle is for hypertension sufferers. So education about hypertension needs to be carried out to increase

respondents' knowledge.

Influence of Attitude on Hypertension

This research shows that the majority of respondents have a negative attitude, 182 people (55.15%). Hypothesis test results show that there is a significant relationship between negative attitudes and the incidence of hypertension with p=0.000, t=39.993. This is in line with research conducted by (Limbong et al., 2018) research using a cross-sectional approach with 90 hypertensive respondents, 68 of whom had a negative attitude (84.9%). From statistical analysis, it was found that the influence between attitude and the incidence of hypertension was found to be p=0.003.

The same thing was in research conducted by (Kondoj & Kolesy, 2018) of 45 hypertensive respondents, 23 (51.1%) of them had a negative attitude towards hypertension. The statistical test results showed that there was an influence of attitude on the incidence of hypertension in hypertensive patients with p=0.000.

Attitude is a person's reaction or response that is still closed to a stimulus or object. Manifestations of attitudes cannot be seen directly, but can only be interpreted first from closed behavior. In everyday life, attitudes are emotional reactions to social stimuli.

From this understanding, behavior is still closed, so it is called an attitude, whereas if it is open, that is the actual behavior that a person shows (Puetri & Yasir, 2018). In this study, respondents predominantly had fewer attitudes about hypertension (55.15%). This causes the risk of hypertension in respondents to be high because they do not know how to respond to hypertension sufferers.

The Influence of Knowledge on Attitudes

The research results show that there is a significant relationship between knowledge and attitude with p=0.000, t=33.753. Knowing comes from sensing, and sensing happens after people perceive a certain item. Sensing occurs through the five human senses. Most of the knowledge obtained through the eyes, ears, knowledge or cognition is a very important domain for the formation of a person's actions. And attitude is not yet an action or activity, but is a predisposition to a behavior (Septianingsih, 2018).

Knowledge is a factor that influences the formation of a person's attitude. If someone has good knowledge, they will also have good behavior. The research results showed that respondents still did not know how to prevent hypertension, and did not know the general symptoms of hypertension. Also, the majority of respondents have low education. Community knowledge regarding hypertension influences their attitudes and actions in taking measures to prevent hypertension (Wibowo et al., 2023)

V. CONCLUSION

The conclusions of this research are:

1. There is no significant relationship between not smoking and the incidence of hypertension with p=0.563 and an OR value of 0.579, which means that respondents who do not smoke are at 0.5 times the risk of developing hypertension compared to those who smoke.

2. There is no significant relationship between a healthy diet pattern and the incidence of hypertension with p=0.745 and an OR value of 0.330, which means that respondents who follow a healthy diet pattern have a 0.3 times risk of developing hypertension compared to those who smoke.

3. There is a significant relationship between less physical activity and the incidence of hypertension with p=0.003 and t-statistic value=2.966, which means that respondents with less physical activity have twice the risk of developing hypertension compared to respondents with active physical activity.

4. There is a significant relationship between physical activity and diet patterns with p=0.000.

5. There is a significant relationship between poor knowledge and the incidence of hypertension with p = 0.000 and t-statistic value = 10.787, which means that respondents with poor knowledge are 10 times more likely to develop hypertension compared to respondents with good knowledge.

6. There is a significant relationship between negative attitudes and the incidence of hypertension with p = 0.000 and t-statistic value = 39.993, which means that respondents with poor attitudes are 39 times less likely to develop hypertension compared to respondents with good attitudes.

7. There is a significant relationship between knowledge and attitude with p=0.000.

8. Attitude is the factor that most influences the incidence of hypertension with p=0.000 with t-statistic=39.993.

VI. RESEARCH ETHICS

Research ethics have been issued by the Chair of the Health Research Ethics Committee (KEPPKN) of the Faculty of Medical Sciences, Syiah Kuala University (USK) with registration number: 1171012P. Ethical Exempted with letter number: 189/EA/FK/2023.

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