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# Analysis of Factors for Increased Blood Pressure in Hypertensive Clients at the Panarukan Community Health Center, Situbondo Regency

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**Abstract**
*Background : The prevalence of hypertension or blood pressure in Indonesia is quite high. In addition, the consequences it causes a public health problem. Hypertension is a disease whose number continues to increase every year. It is estimated that the number of hypertension sufferers in the world currently reaches 970 million. Data from the World Health Organization (WHO) in 2015 showed that 1.13 billion people in the world have hypertension. Meanwhile, cases of hypertension in Indonesia in 2018 amounted to 31.4%. The average person who experiences or suffers from hypertension is around 30 to 65 years old and over. In addition, there are many factors that cause patients to develop hypertension. Purpose : to find out the factors that cause increased pressure in hypertensive clients. Methods: This study used a cross-sectional design with a population of 401 hypertensive clients at the Panarukan Health Center, Situbondo Regency. The sampling technique used the slovin formula and obtained a sample of 200 people. Data collection was carried out by means of observation, interviews and questionnaires. The data analysis used was bivariate test with Spearman's rank and multivariate test using logistic regression. This research was conducted at the Panarukan Health Center in Situbondo Regency in June – July 2023. Results: Age has an effect on blood pressure in hypertensive clients with a P Value = 0.000, genetics has an effect on blood pressure in hypertensive clients with a P Value = 0.000), Physical activity has an effect on blood pressure in hypertensive clients with P Value = 0.000, and diet affects blood pressure in hypertensive clients with P Value = 0.000). Age is the most dominant factor related to blood pressure in hypertensive clients.* ***Conclusion****: there are 4 influential variables and diet is the most dominant factor on blood pressure in hypertensive clients.*



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## 1. INTRODUCTION

Blood pressure is the most important factor in the circulatory system. Not all blood pressure is within normal limits, so it can cause blood pressure disorders known as hypertension or high blood pressure and hypotension or low blood pressure. Hypertension is a disease whose number continues to increase every year. It is estimated that the number of hypertension sufferers in the world currently reaches 970 million. Hypertension is often referred to as *silent killer* (silent killer) because sufferers often experience hypertension for years without experiencing any problems or symptoms. the patient experiences unwanted complications in vital organs such as the heart, brain or kidneys. However, hypertension is a disease that can cause high morbidity, resulting in the supply of oxygen and nutrients below the blood being prevented from reaching the body's tissues. And currently hypertension has become a global problem because of its high prevalence every year (Abdi Iswahyudi & Widya Rahmadani, 2020).

Data from the World Health Organization (WHO) in 2015 shows that around 1.13 billion people in the world have hypertension, meaning that 1 in 3 people in the world are diagnosed with hypertension. The number of people with hypertension continues to increase every year, it is estimated that by 2025 there will be 1.5 billion people affected by hypertension,

and it is estimated that every year 10.44 million people die from hypertension and its complications (WHO, 2015). Based on Riskedas data in 2018, hypertension cases in Indonesia were 31.4%, with estimates that in Indonesia there were 63,309,620 cases. And there were 427,218 deaths. Hypertension can occur in people over 18 years of age. 31.6% occurred in the 31-to-44-year age group, 45.3% occurred in the 45-to-56-year age group, and 55.2% occurred in the 55–64-year age group, the highest value was 30.9% and the lowest was 20% (Indonesian Ministry of Health, 2018). Meanwhile, according to the 2017 East Java Province Health Profile, blood pressure measurements were carried out on residents ≥ 18 years of age, out of 28,558,493 residents, only 8,952,418 had blood pressure measurements and 1,828,669 people suffered from hypertension or 20.43% of people being examined (East Java Provincial Health Service, 2017).

Based on Situbondo health profile data, it is known that the estimated cases of hypertension in Situbondo Regency in 2021 is 147,164 people (26.24% aged ≥15 years). The results of health services for hypertension sufferers in Situbondo Regency in 2021 reached 79.8% (117,494 people) of the 100% target set. The achievements in 2021 have increased compared to the achievements in 2020 after previously experiencing a decline due to the emergency situation of the Covid19 outbreak which had an impact on reducing visits by chronic disease sufferers to health service facilities as well as service activities that collect chronic disease sufferers) were also hampered, thus having an impact on results of chronic disease service coverage.

If we look at the achievements of hypertension services at community health centers, there are already 5 community health centers that have achieved the target of 100% health services for hypertension sufferers in 2021, namely Bungatan Community Health Center (108.1%), Wonorejo (105.6%), Panji (102.9%), Klampokan (100.3%), Asembagus (100%) and Banyuputih (99.9%). Meanwhile, the lowest health service achievements for hypertension sufferers were below 100%, namely Jatibanteng (96.7%), Kendit (94.7%), Anchor (90.6%), Suboh (90.1%), Arjasa (87.1%) , Widoropayung (85.2%), Banyuglugur (77.8%), Mangaran (73.1%), Panarukan (69.4%), Besuki (64.4%), Mlandingan (60.3), Situbondo ( 51.9%) and still below 50% occurred at the Kapongan Community Health Center (31.7%) and Sumbermalang (36.3%) (Situbondo District Health Profile, 2021).

According to theory (Black & Hawks, 2014), hypertension risk factors are divided into two, namely: factors that cannot be changed and factors that can be changed. Factors of hypertension that cannot be changed are age and genetics. Meanwhile, factors that can be changed are physical activity and diet. These factors are used to measure the level of relationship between the incidence of increased cases of hypertension. Based on a preliminary study on February 24 2023, there were 401 patients at the Panarukan Community Health Center who experienced or suffered from hypertension from January to February. The average person who experiences or suffers from hypertension is around 30 to 65 years old and over. Apart from that, there are many factors that cause patients to develop hypertension. data from the Panarukan Community Health Center in 2022, hypertension cases reached 9062 people and the Situbondo Community Health Profile as well as several references related to cases of increasing hypertension in the Situbondo district area.

Efforts to prevent and treat recurrence of hypertension require a method to prevent complications from hypertension. Changing the lifestyle of a hypertension sufferer which includes a healthy diet such as limiting the intake of fatty and sweet foods, increasing physical activity, namely doing regular exercise, reducing stress levels, reducing or avoiding the use of cigarettes and alcohol are important factors for maintaining the sufferer's blood pressure. By modifying a healthy lifestyle, complications from hypertension such as heart attacks, strokes, chronic kidney failure and heart failure will be minimized (Lockhart Anita and Saputra Lyndon, 2014). After the researchers conducted a preliminary study, namely by

observation and interviews, they found 25 hypertensive patients. Based on records of routine patient examinations at the Panarukan Community Health Center and the results of interviews, patients who suffer from hypertension are caused by various factors. This poses a risk to the patient's health and will have a huge impact on increasing the blood pressure of hypertensive clients in Panarukan District.

Based on the problems above, researchers are interested in conducting research on these problems, especially in the Panarukan area. Therefore, researchers are interested in taking the title "Analysis of Factors for Increasing Blood Pressure in Hypertensive Clients at the Panarukan Community Health Center, Situbondo Regency".

## 2. METHOD

Research design is a research design that consists of several components that combine with each other to obtain data and facts in order to answer research questions or problems. The type of research used is quantitative research and using a correlational design with an approach *cross sectional*.

Approach *cross sectional* namely research by studying objects over a certain period of time (not continuously over a long period of time). In research that uses this method, information from a portion of the population is collected directly from empirical events with the aim of finding out the opinion of a portion of the population regarding the object being studied in the field (Aunurrahman , 2016). This approach emphasizes measuring or observing data on independent and dependent variables only once, at one time this research was intended to determine the factors associated with an increase in systolic blood pressure in hypertensive patients at the Panarukan Community Health Center.

Population is a generalization area consisting of objects or subjects that have certain qualities and characteristics determined by researchers to study and then draw conclusions (Aunurrahman, 2016). The population of this study were all people with hypertension Which is at the Panarukan Community Health Center in January - February 2023 with a total of 401 including Outpatients, Emergency Rooms and Inpatients.

The sample is part of the number and characteristics of the population. Meanwhile, sample size is a step to determine the size of the sample taken in carrying out research (Sugiyono, 2018). This sampling was carried out with the consideration that the number of samples was sufficient to calculate the sample size and the research time allowed all to be taken. The number of samples in this study was 200 respondents. The location of this research was carried out in the Panarukan Community Health Center Working Area and the research was carried out in June – July 2023.

This research uses univariate analysis with percentages used to estimate population parameters, namely age, genetics, physical activity and diet. Bivariate analysis is an analysis used on two variables that are thought to be related or correlated. This bivariate analysis is used to identify Factor Analysis of Increased Blood Pressure in Hypertensive Clients. The bivariate analysis carried out in this study used the test:

1) The relationship between age as a factor in increasing blood pressure in hypertensive clients at the Panarukan Community Health Center which was analyzed using the Spearman's Rank Test.
2) The relationship between physical activity as a factor in increasing blood pressure in hypertensive clients at the Panarukan Community Health Center which was analyzed using the Spearman's Rank Test.
3) Genetic Relationship as a Factor for Increasing Blood Pressure in Hypertensive Clients at the Panarukan Community Health Center Analyzed Using the Spearman's Rank Test.

4) The Relationship between Dietary Patterns as a Factor for Increasing Blood Pressure in Hypertensive Clients at the Panarukan Community Health Center, Analyzed Using the Spearman's Rank Test.

Multivariate analysis is a type of statistical analysis used to analyze data consisting of many variables, both independent variables (independent variables) and many dependent variables (dependent variables). Multivariate data is data collected from two or more observations by measuring these observations with several characteristics (Wijaya, T & Budiman, S. 2016). Multivariate analysis was carried out to determine the independent and founding variables that were most related to the dependent variable. The statistical test used in this research is the Logistic Regression Test (Hastono, Sutanto Priyo. 2016).

The validity test is an index that shows that the measuring instrument really measures what needs to be measured to test research data so that it is valid. Validity or error testing is carried out to determine to what extent a proposed questionnaire can extract the required data or information. In this research, a validity test of the questionnaire was carried out. This test used a sample of 25 respondents. a 10-item dietary pattern questionnaire/questionnaire using previous research from Andini Putri Prasasti (2022) and a 10-item physical activity questionnaire from Lina Dwi Yoga Pramana (2016) which is valid and reliable as well as additional questions from researchers which were then tested again with the same results. valid.

Based on the validity test of the age factor, genetics, physical activity and diet on blood pressure, a correlation is visible, it is known that all items have a calculated r> 0.413, so it can be said that the measuring instrument items are valid and can be used in collecting research data (Romauli, 2014).

Reliability is an index that shows the extent to which a tool is reliable. A reliable instrument can produce reliable data if the data is correct and matches reality. Whatever numbers are taken, the results remain the same. To determine Reliability, it can be done by carrying out the Cronbach's Alpha test, with the test results:

a) Cronbach's *Alpha* ≥ 0.60 means the variable is reliable.
b) Cronbach's *Alpha* ≤ 0.60 means the variable is not reliable.

Based on the results of the reliability test for age, genetic factors, physical activity and diet on blood pressure, it can be seen that the Cronbach's Alpha value > Constant (0.6), then the questionnaire is said to be reliable. The questionnaire in this study was retested using a reliability test. This research is a questionnaire for the variables Blood Pressure, Age, Genetics, Physical Activity and Diet which is valid and reliable with a Cronbach's Alpha value ≥ 0.60 (Romauli, 2014).

## 3. RESULT AND DISCUSSION

This chapter contains a description of the results of research that was carried out in June - July 2023 at the Panarukan Community Health Center, Situbondo Regency, with a sample size of 200 respondents. The type of research used is quantitative research and uses a correlational design with a cross-sectional study approach. The data taken in this research is primary data, using a research instrument in the form of a questionnaire that has been distributed and filled in by clients at the Panarukan Community Health Center. This description includes an overview of the results and the location of the research which will be discussed in detail according to the variables studied.

The UPT (Technical Implementation Unit) of the Panarukan Community Health Center is a development of the Polyclinic which was established in 1973, and in 1980 the Panarukan Community Health Center was established which is the UPTD of the Situbondo District Health Service with inpatient status and PONED (Basic Emergency Neonatal Obstetric Services) with a capacity of 20 beds. . Panarukan Health Center is one of the large health

centers in Situbondo. Panarukan Health Center is located in WringinAnom Village, Panarukan District, Situbondo Regency.

In this section, the characteristics of the 200 respondents will be described based on gender.

**Table 1.** Characteristics of hypertensive clients at Panarukan Community Health Center based on gender.

| | Kategori | Frekuensi | Presentase(%) |
|---|---|---|---|
| Jenis kelamin | Laki-laki | 91 | 45,5 |
| | Perempuan | 109 | 54,5 |
| Total | | 200 | 100,0 |

From **table 1.** It can be explained that hypertension clients at the Panarukan Community Health Center, Situbondo Regency suffer more from women, numbering 109 respondents (54.5%) than male respondents, numbering 91 respondents (54.5%).

**Table 2.** Age of hypertensive client respondents at the Panarukan Community Health Center, Situbondo Regency based on age factors.

| | Kategori | Frekuensi | Presentase(%) |
|---|---|---|---|
| Usia | Dewasa (19- 44 tahun) | 45 | 22,5 |
| | Pra lansia (45 – 59 tahun) | 96 | 48,0 |
| | Lansia (> 60 tahun) | 59 | 29,5 |
| Total | | 200 | 100,0 |

From **table 2.** It can be explained that the most hypertensive clients at the Panarukan Community Health Center, Situbondo Regency, based on the age factor, are the pre-elderly category aged 45 - 59 years with a total of 96 respondents with a percentage of (48.0%). Then there were 59 respondents in the elderly category aged more than 60 years with a percentage of (29.5%) and the adult category aged 19 - 44 years with a total of 45 respondents with a frequency of (22.5%).

**Table 3.** Physical activity of hypertensive client respondents at the Panarukan Community Health Center, Situbondo Regency based on physical activity.

| | Kategori | Frekuensi | Presentase(%) |
|---|---|---|---|
| Aktivitas Fisik | Rendah | 74 | 37,0 |
| | Sedang | 104 | 52,0 |
| | Tinggi | 22 | 11,0 |
| Total | | 200 | 100,0 |

From **table 3.** It can be explained that the highest number of hypertensive clients at the Panarukan Community Health Center, Situbondo Regency were in the moderate physical activity category with 104 respondents with a percentage of (52.0%). The low physical activity category had 74 respondents with a percentage of (37.0%) and the high activity category had the lowest number, namely 22 respondents with a percentage of (11.0%).

**Table 4.** Genetics of hypertensive client respondents at the Panarukan Community Health Center, Situbondo Regency based on genetic factors.

| | Kategori | Frekuensi | Presentase(%) |
|---|---|---|---|
| Genetik | ada | 101 | 50,5 |
| | Tidak ada | 99 | 49,5 |
| **Total** | | 200 | 100,0 |

From **table 4.** It can be explained that hypertension clients at the Panarukan Community Health Center, Situbondo Regency are based on genetic factors, namely the category of having genetic factors with a percentage of 101 respondents with a percentage of (50.5%) and the category of no genetic factors with a total of 99 respondents with a percentage of (49.5%).

**Table 5.** The eating patterns of hypertensive client respondents at the Panarukan Health Center, Situbondo Regency are based on dietary factors.

| | Kategori | Frekuensi | Presentase(%) |
|---|---|---|---|
| Pola Makan | Buruk | 106 | 53,0 |
| | Baik | 94 | 47,0 |
| **Total** | | 200 | 100,0 |

From **table 5.** It can be explained that hypertension clients at the Panarukan Community Health Center, Situbondo Regency, based on dietary factors, with a bad diet category were 106 respondents with a percentage of (53.%) and for the good eating category there were 94 respondents with a percentage of (47.0%).

**Table 6.** The blood pressure of hypertensive client respondents at the Panarukan Community Health Center, Situbondo Regency is based on blood pressure.

| Kategori | Frekuensi | Presentase(%) |
|---|---|---|
| Normal (Tekanan Darah Sistolik <120 dan Diastolik <90) | 3 | 1,5 |
| Prehipertensi (Tekanan Darah Sistolik 120-139 dan Diastolik 80-90) | 77 | 38,5 |
| Hipertensi Stadium 1 (Tekanan Darah Sistolik 140-159 dan Diastolik 90-99) | 78 | 39,0 |
| Hipertensi Stadium 2 (Tekanan Darah Sistolik >160 dan Diastolik >100) | 42 | 21,0 |
| Hipertensi Sistolik Terisolasi (Tekanan Darah Sistolik >160 dan Diastolik <90) | 0 | 0 |
| **Total** | 200 | 100,0 |

From **table 6.** can be explained that the client hypertension at the Panarukan Community Health Center, Situbondo Regency based on blood pressure with the highest category, namely Stage 1 Hypertension (Systolic Blood Pressure 140-159 and Diastolic 90-99) as many as 78 respondents with a percentage of (39.0). Prehypertension category (Systolic Blood Pressure 120-139 and Diastolic 80-90) with a total of 77 respondents with a percentage of (38.5%). Hypertension Stage 2 category (Systolic Blood Pressure >160 and Diastolic >100) with a total of 42 respondents with a percentage (21.0%) and the least category is the Normal category (Systolic Blood Pressure <120 and Diastolic <90) with a total of 3 respondents with percentage (1.5%) as well as the Isolated Systolic Hypertension category (Systolic Blood Pressure >160 and Diastolic <90) with 0 respondents.

Age Relationship as a Factor for Increasing Blood Pressure in Hypertensive Clients at Panarukan Community Health Center

**Table 7.** Relationship between age as a factor in increasing blood pressure in hypertensive clients at the Panarukan Community Health Center.

| Uji Korelasi | Tekanan Darah | Usia | | | Koefisien Korelasi | P *Value* |
|---|---|---|---|---|---|---|
| | | Dewasa (19-44 Tahun) | Pra Lansia (45 - 59 Tahun) | Lansia ( > 60 tahun) | | |
| Rank Spearman | Normal | 0 | 2 | 1 | 0,270 | 0,000 |
| | Prehipertensi | 21 | 45 | 11 | | |
| | Hipertensi Stadium 1 | 22 | 30 | 26 | | |
| | Hipertensi Stadium 2 | 2 | 19 | 21 | | |
| Total | | 45 | 96 | 59 | 200 | |

Based on **table 7**. It can be explained that the results of the analysis between the age factor and blood pressure showed that blood pressure was normal in the adult age category with 0 respondents, pre-elderly with 2 respondents and elderly with 1 respondent. There were 21 respondents in the prehypertension blood pressure category, 45 respondents in the pre-elderly category and 11 respondents in the elderly category. Stage 1 hypertension blood pressure in the adult age category amounted to 22 respondents, pre-elderly totaling 30 respondents and elderly totaling 26 respondents. Obtained P Value (0.000) < 0.05, which means there is a significant relationship between age as a factor in increasing blood pressure in hypertensive clients at the Panarukan Health Center, Situbondo Regency. And the Correlation Coefficient value was obtained (0.270), which means a weak level of correlation between the age factor and blood pressure in hypertensive clients at the Situbondo District Health Center.

Genetic Relationship as a Factor for Increasing Blood Pressure in Hypertensive Clients in Health Center Panarukan Analyzed Using the Spearman Rank Test)

**Table 8**. Genetic Relationship as a factor in increasing blood pressure in hypertensive clients at the Panarukan Community Health Center.

| Uji Korelasi | Tekanan Darah | Genetik | | Koefisien Korelasi | P *Value* |
|---|---|---|---|---|---|
| | | Ada | Tidak Ada | | |
| Rank Spearman | Normal | 0 | 3 | - 0,314 | 0,000 |
| | Prehipertensi | 15 | 62 | | |
| | Hipertensi Stadium 1 | 54 | 24 | | |
| | Hipertensi Stadium 2 | 32 | 10 | | |
| Total | | 101 | 99 | 200 | |

Based on **table 8.** It can be explained that normal blood pressure in the genetic presence category has 0 respondents and the genetic absence category has 3 respondents. Prehypertension blood pressure in the category of genetic factors is 15 respondents and the absence of genetics amounted to 62 respondents. Stage 1 hypertension blood pressure in the category of genetic presence was 54 respondents and genetic absence was 24 respondents. Stage 2 hypertension blood pressure in the presence of genetics category was 32 respondents and there were 10 respondents in the absence of genetics. results of analysis between genetic factors and blood pressure. Obtained P Value (0.000) < 0.05, which means there is a significant relationship between genetic factors as a factor in increasing blood pressure in hypertensive clients at the Panarukan Health Center, Situbondo Regency. And the Correlation Coefficient value was obtained (-0.314), which means the level of correlation is very weak between genetic factors and blood pressure in hypertensive clients at the Situbondo District Health Center.

The relationship between physical activity as a factor in increasing blood pressure in hypertensive clients at the Panarukan Community Health Center which was analyzed using the Spearman's Rank Test.

**Table 9.** The relationship between physical activity as a factor in increasing blood pressure in hypertensive clients at the Panarukan Community Health Center.

| Uji Korelasi | Tekanan Darah | Usia | | | Koefisien Korelasi | P *Value* |
|---|---|---|---|---|---|---|
| | | Rendah | Sedang | Tinggi | | |
| Rank Spearman | Normal | 1 | 2 | 0 | - 0,496 | 0,000 |
| | Prehipertensi | 17 | 50 | 10 | | |
| | Hipertensi Stadium 1 | 24 | 48 | 8 | | |
| | Hipertensi Stadium 2 | 32 | 6 | 4 | | |
| Total | | 74 | 104 | 22 | 200 | |

Based on **table 9.** It can be explained that normal blood pressure in the low physical activity category was 1 respondent, 2 respondents were medium and 0 respondents were high. Prehypertension blood pressure in the low physical activity category was 17 respondents, medium was 50 respondents and high was 10 respondents. Stage 1 hypertension blood pressure in the low physical activity category was 24 respondents, 48 respondents were medium and 10 respondents were high. Stage 2 hypertension blood pressure in the low physical activity category was 32 respondents, 6 respondents were medium and 4 respondents were high. The results of the analysis between the physical activity factor and blood pressure showed a P value (0.000) < 0.05, which means there is a significant relationship between the physical activity factor as a factor in increasing blood pressure in hypertensive clients at the Panarukan Health Center, Situbondo Regency. And the Correlation Coefficient value was obtained (-0.496), which means the level of correlation is very weak between physical activity factors and blood pressure in hypertensive clients at the Situbondo District Health Center.

The Relationship between Dietary Patterns as a Factor for Increasing Blood Pressure in Hypertensive Clients at the Panarukan Community Health Center, Analyzed Using the Spearman's Rank Test.

**Table 10.** The relationship between diet as a factor in increasing blood pressure in hypertensive clients at the Panarukan Community Health Center.

| Uji Korelasi | Tekanan Darah | Pola Makan | | Koefisien Korelasi | P *Value* |
|---|---|---|---|---|---|
| | | Buruk | Baik | | |
| Rank Spearman | Normal | 0 | 3 | - 0,377 | 0,000 |
| | Prehipertensi | 23 | 54 | | |
| | Hipertensi Stadium 1 | 53 | 25 | | |
| | Hipertensi Stadium 2 | 30 | 12 | | |
| Total | | 106 | 94 | 200 | |

Based on **table 10.** It can be explained that the results of the analysis between genetic factors and blood pressure obtained a P value (0.000) < 0.05, which means there is a significant relationship between dietary factors as a factor in increasing blood pressure in hypertensive clients at the Panarukan Community Health Center, Situbondo Regency. And the Correlation Coefficient value was obtained (-0.377), which means the level of correlation is very weak between dietary factors and blood pressure in hypertensive clients at the Situbondo District Health Center.

Model Fit Test Analysis

Tabel 11. Hosmer and Lemeshow Test

| *Step* | *Chi-square* | *df* | *Sig.* |
|---|---|---|---|
| 1 | 10,059 | 8 | 0,261 |

H0: Suitable model

H1: The model is not suitable

H0 is rejected if p < α. Based on the output results in table 5.11, the values can be seen *spend*-square = 10.059. Because the p value (0.261) is greater than the significance level α = 0.05 (p>0.05), it can be concluded that the model is appropriate (H0 is accepted). This means that age, physical activity, genetics and diet factors contribute significantly to *odds ratio* blood pressure. So, it can be concluded that this model is suitable to be used to predict the probability of factors influencing blood pressure in hypertensive clients.

Coefficient of Determination Test

**Table 12.** Model *Summary*

| *Step* | *-2 Log likelihood* | *Cox & Snell R Square* | *Nagelkerke R Square* |
|---|---|---|---|
| 1 | 214,981[a] | 0,237 | 0,321 |

Based on the output results on **table 12.** it can be seen that the value of G is 214.981. Then the Nagelkerke R Square value was obtained at 0.321, which means that the independent variables (age, physical activity, genetics and diet) were able to explain 32.1% of the dependent variable of blood pressure in hypertensive clients, and the remaining 67.9% was explained by other factors that did not exist. in this research.

According to Ghozali (2018), to test the influence of independent variables simultaneously or together on the dependent variable, by looking at the significance value of the Omnibus Test of Model Coefficients table.

Table 13. *Omnibus Tests of Model Coefficients*

| | | *Chi-square* | *Df* | *Sig.* |
|---|---|---|---|---|
| *Step 1* | *Step* | 54,224 | 4 | 0,000 |
| | *Block* | 54,224 | 4 | 0,000 |
| | *Model* | 54,224 | 4 | 0,000 |

Based on the output results on **Table 13.** it can be seen that the value *chi-square* The result obtained is 54.224 with degrees of freedom = 4, p value = 0.000. Because the p value = 0.000 < α = 0.05, H0 is rejected and H1 is accepted, meaning that the factors age, physical activity, genetics and diet influence jointly on blood pressure in hypertensive clients.

According to Ghozali (2018) to test the influence of the independent variable partially on the dependent variable is to look at the table *Variables in the Equation*.

**Table 14.** *Variables in the Equation*

| | | *B* | *S.E.* | *Wald* | *Df* | *Sig.* | *Exp(B)* |
|---|---|---|---|---|---|---|---|
| *Step 1[a]* | USIA | ,049 | ,240 | ,041 | 1 | 0,839 | 1,050 |
| | GEN | -1,630 | ,351 | 21,593 | 1 | 0,000 | 0,196 |
| | AF | -,399 | ,273 | 2,138 | 1 | 0,144 | 0,671 |
| | PM | -1,118 | ,336 | 11,063 | 1 | 0,000 | 0,327 |
| | *Constant* | 5,202 | 1,026 | 25,715 | 1 | 0,000 | 181,614 |

From **table 14** It can be seen that there are 2 independent variables that influence the dependent variable, namely genetics with a sig value of 0.000 < 0.05, diet with a sig value of 0.000 < 0.05 and age has no influence on blood pressure with a sig value of 0.839 > 0.05 , and physical activity also has no influence on the dependent variable because the sig value is 0.144 > 0.05. Meanwhile, of the 2 independent variables that meet the criteria, the only variables are genetics and diet. With a sig value of 0.000 and an Exp (B) value of 0.196 for the genetic variable, while the diet variable has a sig value of 0.000 and an Exp (B) value of 0.327. So it can be concluded that the variable that has the most dominant influence on the dependent variable blood pressure is diet, this can be seen from the Exp (B) value of 0.327

which is greater than the genetic Exp (B) value, meaning that 32.7% of diet influences blood pressure in hypertensive clients.

Classification Accuracy

Table 15. *Classification Table*

| | | | *Predicted* | | |
|---|---|---|---|---|---|
| | | | Tekanan Darah | | |
| | *Observed* | | Tidak Hipertensi | Hipertensi | *Percentage Correct* |
| *Step 1* | Tekanan Darah | Tidak Hipertensi | 46 | 34 | 57,5 |
| | | Hipertensi | 17 | 103 | 85,8 |
| | *Overall Percentage* | | | | 74,5 |

Based on **table 15.** It is known that the number of respondents in the non-hypertensive category was 80 respondents, 34 of whom were predicted to have a chance of having hypertension with a prediction correctness level of 57.5%. Meanwhile, the number of respondents who had hypertension was 120 respondents, 17 of whom were predicted to have a chance of not having hypertension with a prediction correctness level of 85.8%, so the percentage accuracy of the model that could predict correctly was 74.5%.

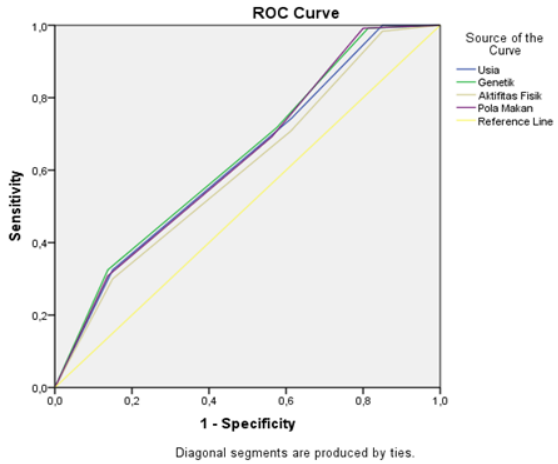


Image 1. Kurva ROC

**Table 16.** *Area Under the Curve*

| *Test Result Variable(s)* | *Area* | *Std. Error*[a] | *Asymptotic Sig.*[b] | *Asymptotic 95% Confidence Interval* | |
|---|---|---|---|---|---|
| | | | | *Lower Bound* | *Upper Bound* |
| Usia | 0,628 | 0,040 | 0,002 | 0,549 | 0,707 |
| Genetik | 0,640 | 0,040 | 0,001 | 0,562 | 0,718 |
| Aktivitas Fisik | 0,605 | 0,041 | 0,012 | 0,526 | 0,685 |
| Pola Makan | 0,633 | 0,040 | 0,001 | 0,554 | 0,712 |

etation of AUC Values

| Nilai AUC | Interpretasi |
|---|---|
| >50% - 60% | Sangat lemah |
| >60% - 70% | Lemah |
| >70% - 80% | Sedang |
| >80% - 90% | Kuat |
| >90% - 100% | Sangat Kuat |

(Sumber : Dahlan, 2014)



From table 5.17 it can be explained that the AUC value for the age variable (0.628), genetic variables (0.640), physical activity (0.605) and diet (0.633) means a weak level of accuracy.

**Discussion**

Age Relationship as a Factor for Increasing Blood Pressure in Hypertensive Clients at the Panarukan Community Health Center, Situbondo Regency.

Based on table 7, it can be explained that the results of the research and analysis between the age factor and blood pressure obtained a P Value (0.000) < 0.05, which means there is a significant relationship between the age factor and the increase in blood pressure in hypertensive clients at the Panarukan Community Health Center, Situbondo Regency. This is in line with research by Febby Haendra Dwi Anggara and Nanang Prayitno (2015) with research results that there is a relationship between age and blood pressure with the P value (0.000 < 0.05). The research results showed that respondents who suffered from hypertension were (30.7%) while respondents whose blood pressure was normal were (69.3%). The research results of Putri Ramarinda & Kamsiah (2015) explain that there is a relationship between age and blood pressure. The proportion of hypertensive patients aged > 40 years is greater than that of hypertensive patients aged ≤ 40 years. This is in accordance with the fact that signs of aging and the emergence of degenerative diseases begin to appear at the age of 40 years and over.

Based on research by Eni Nuraeni (2019), it is explained that there is a relationship between age and hypertension with a P value = 0.000. As you get older, changes occur in the arteries in the body, becoming wider and stiffer, which results in the capacity and recoil of blood accommodated through the blood vessels becoming reduced. This reduction causes systolic pressure to increase. The results of the study showed that those with an older age (≥ 45 years) were 8.4 times more at risk (C.I 95%: OR 2.9-24.2) of suffering from hypertension when compared with those with a younger age (< 45 years). According to research by Muhammad Yunus (2020), it is explained that there is a relationship between age and the incidence of hypertension with a P value = 0.000. The results of this study show that in 2020 the patients who were respondents in this study were mostly patients aged 51-60. The results of this research are possible because at that age the body has experienced a decline in the function of the body's organs due to the aging process, the immune system as the body's protector does not work as hard as when it was young, which is the reason why people who enter old age are susceptible to various diseases, and visit a health facility such as a community health center to have the disease checked. Therefore, it can be concluded that age is related to increasing blood pressure.

Genetic Relationship as a Factor for Increasing Blood Pressure in Hypertensive Clients at the Panarukan Community Health Center, Situbondo Regency.

Based on table 8, it can be explained that the results of research and analysis between genetic factors and blood pressure obtained a P value (0.000) < 0.05, which means there is a significant relationship between genetic factors and increased blood pressure in hypertensive clients at the Panarukan Community Health Center, Situbondo Regency. This is in line with research by Bertalina and Suryani (2017) with statistical test results showing that there is a significant relationship between the genetic factors of hypertension and blood pressure and the P value (0.001 < 0.05). Based on research results, Riza Fikriana (2016) explains that there is a relationship between family history (genetic) factors and increased systolic blood pressure in hypertension sufferers. A family history of hypertension has a significant influence on the incidence of hypertension. Often people with hypertension do not know that they have a family history of hypertension. It was reported that someone who was identified as not having a family history of hypertension actually had higher systolic blood pressure compared to those who did not have a family history. Based on research by Widiharti and Widya (2020), it is explained that there is a relationship between family history (genetics) and blood pressure with P Value = (0.000). According to research by Avelia Gustia, Anastasya Adam (2018) explained that based on the results of the Chi Square

test, a p value was obtained of 0.005 (P Value < 0.05). Based on these values, the Null Hypothesis (Ho) is rejected, meaning that there is a relationship between a history of hypertension in the family and the incidence of hypertension at the Paceda Health Center, Bitung City. This does not mean that everyone who has hypertension will definitely suffer from hypertension. Of course, this genetic factor is also influenced by other factors that can cause a person to suffer from hypertension. It can be concluded that people who have a family history of hypertension are twice as susceptible to developing hypertension.

The Relationship between Physical Activity as a Factor for Increasing Blood Pressure in Hypertensive Clients at the Panarukan Community Health Center, Situbondo Regency.

Based on **table 9** It can be explained that the results of the analysis between the physical activity factor and blood pressure obtained a P value (0.000) < 0.05, which means there is a significant relationship between the physical activity factor and the increase in blood pressure in hypertensive clients at the Panarukan Community Health Center, Situbondo Regency. This is in line with research by I Made Sukarja and Noviyanti (2015) with the results of a significant relationship between physical activity factors and blood pressure with P Value (0.000 < 0.05). where the lower a person's physical activity, the greater the risk of increasing blood pressure which will also influence the incidence of hypertension.

Based on research by Febby Haendra and Prayitno, it is explained that there is a relationship between physical activity and blood pressure with the P Value (0.000 < 0.05). High activity can help relieve and prevent increases in blood pressure. This can be done using various methods, both sports and daily activities. Lina Dwi Prayoga (2016) explains that there is a significant relationship between physical activity and hypertension levels with P Value = 0.013 < 0.05. Based on research conducted by Bertalina and Suryani, it is explained that there is a relationship between physical activity and blood pressure with a P Value of 0.000 < 0.05. Setting a healthy lifestyle such as carrying out regular physical activity or doing light exercise such as jogging can be done to avoid stress which will result in an increase in blood pressure. Based on research by Siti Maskanah (2019), the results of this study show that there is a relationship between physical activity and blood pressure (systole and diastole) with p value = 0.003 and p value = 0.013 respectively. From the analysis test results, it was found that 56 respondents with moderate activity experienced stage 1 systolic hypertension, 50 respondents (74.6%). Based on the results of the questionnaire answers, respondents also interpreted that there was a relationship between physical activity and blood pressure, this can be seen in question items no. 4, 5, 6, and 7 where most respondents answered no. This means that if you do little or no physical activity at all, it can increase the risk of developing hypertension.

The Relationship between Dietary Patterns as a Factor for Increasing Blood Pressure in Hypertensive Clients at the Panarukan Community Health Center, Situbondo Regency.

Based on **table 10** It can be explained that the results of the analysis between dietary factors and blood pressure obtained P Value (0.000) < 0.05, which means there is a significant relationship between dietary factors and increased blood pressure in hypertensive clients at the Panarukan Community Health Center, Situbondo Regency. This is in line with research by Prasasti A.P (2013) with the results of a significant influence between diet and the incidence of hypertension. The diet in the bad category was 117 people (72.7%). while 89 respondents experienced hypertension (55.3%). Analysis: Using the Spearman rank test, a p-value of 0.001 < 0.05 was obtained, which means that there is a strong correlation coefficient with a value of 0.345, a moderate correlation between diet and the incidence of hypertension in middle age at the Tempeh Community Health Center in 2013.

According to research by Andamsari (2015), there is a relationship between fat consumption and systolic blood pressure (p<0.05). Meanwhile, fat consumption and diastolic blood pressure showed no relationship (p>0.05). Calorie, vitamin C and calcium

consumption also did not show a relationship with blood pressure (p>0.05). The conclusion of this study is that although there is no significant relationship between dietary fat, calories, vitamin C and calcium and blood pressure, there is a tendency for a negative correlation. Further research is needed taking into account other risk factors that influence blood pressure.

Based on the results of the questionnaire answers, respondents also interpreted that there was a relationship between diet and blood pressure, this can be seen in question items no. 3, 4, and 6, where most respondents answered often, and in question no. 8, the average respondent answered rarely. and never. So the researchers concluded that the average number of respondents who had hypertension was caused by poor eating patterns, such as eating foods that contain a lot of salt over a long period of time or repeatedly. This can result in the emergence of various diseases, especially hypertension.

The most dominant relationship between diet and increased blood pressure in hypertensive clients.

Based on **table 14** It can be seen that age has no influence on blood pressure with a sig value of 0.839 > 0.05, and physical activity also has no influence on the dependent variable because a sig value of 0.144 > 0.05 influences the dependent variable, while there are 2 independent variables that influence on the dependent variable, namely genetics with a sig value of 0.000 < 0.05 and diet with a sig value of 0.000 < 0.05. Of the 4 independent variables that meet the criteria, only genetic variables and diet variables. The criteria for the most dominant variable influence can be seen at the sig value < 0.05 and the highest Exp (B) value. With a sig value of 0.000 and an Exp (B) value of 0.196 for the genetic variable, while the diet variable has a sig value of 0.000 and an Exp (B) value of 0.327. So it can be concluded that the variable that has the most dominant influence on the dependent variable blood pressure is diet, this can be seen from the Exp (B) value of 0.327 which is greater than the genetic Exp (B) value, meaning that 32.7% of diet influences blood pressure in hypertensive clients.

According to Prasasti (2013) an unhealthy diet will put you at risk of suffering from dangerous diseases for the body such as obesity, diabetes, heart disease and hypertension. Implementing a healthy diet in everyday life is very important in protecting the body and preventing various diseases, especially hypertension.

## 4. CONCLUSION

Based on the results of the research "Analysis of Factors for Increased Blood Pressure in Hypertensive Clients at the Panarukan Health Center, Situbondo Regency". In August 2023 it can be concluded as follows:

1) There is a significant relationship between age and blood pressure as a factor in increasing blood pressure in hypertensive clients at the Panarukan Community Health Center, Situbondo Regency with P Value (0.000) < 0.05.
2) There is a significant relationship between genetic factors and blood pressure as a factor in increasing blood pressure in hypertensive clients at the Panarukan Community Health Center, Situbondo Regency with P Value (0.000) < 0.05.
3) There is a significant relationship between physical activity factors and blood pressure as a factor in increasing blood pressure in hypertensive clients at the Panarukan Community Health Center, Situbondo Regency with P Value (0.000) < 0.05.
4) There is a significant relationship between dietary factors and blood pressure as a factor in increasing blood pressure in hypertensive clients at the Panarukan Community Health Center, Situbondo Regency with P Value (0.000) < 0.05.
5) Diet is the most dominant factor influencing blood pressure in hypertensive clients at the Panarukan Community Health Center, Situbondo Regency.

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