



## Determinants of Hypertension in the Elderly at Tangkahan Durian Health Center, Langkat, North Sumatra

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| <p>Accepted: 21 July 2023<br/>Revised: 24 October 2023<br/>Published: 23 December 2023</p> <p><b>How to cite :</b><br/>Arrazy, S., Fajriani, A., Mursyid, P. A., Sumiati, &amp; Azuba, M. (2023). Determinants of Hypertension in the Elderly at Tangkahan Durian Health Center, Langkat, North Sumatra. <i>Contagion : Scientific Periodical of Public Health and Coastal Health</i>, 5(4), 1612–1622.</p> | <p><i>Hypertension is the number one cause of death in the world every year and the most patients diagnosed with hypertension in Indonesia are the elderly, with 56.5% men and 43.5% women. The purpose of this study was to determine the risk factors associated with the incidence of hypertension in the elderly at Tangkahan Durian, Community Health Center Langkat. This research is a quantitative study with a cross-sectional approach. The study population consisted of elderly people aged 60 years and over and had visited the health center in the past year. The sample in this study were 81 elderly people in the work area of the health center. Bivariate analysis using the chi square test. The results showed that 56 people (74.4%) of the elderly suffered from hypertension. Bivariate analysis showed that there was an association between the variables of routine examination of hypertension (hypertension control), routine consumption of hypertension drugs and smoking status with p-values of 0.004, 0.001, and 0.0043 respectively. Furthermore, there was no association between genetic factors, nutritional status, stress levels and socioeconomic status with p-values of 0.143, 1.000, 0.969 and 0.973 respectively. It is important to remind and raise public awareness about the importance of regular check-ups and taking medication regularly and avoiding smoking. Furthermore, the government and the health sector can provide media campaigns on clean and healthy living behaviors. This study suggests the local government to increase public awareness especially in routine examination, regular medication consumption and prevent smoking.</i></p> <p><b>Keywords:</b> <i>Determinants, Hypertension, Elderly, Indonesia</i></p> |

## INTRODUCTION

Hypertension, also known as high blood pressure, is a condition in which the blood vessels experience a continuous increase in pressure. The higher the pressure, the harder the heart must pump, so hypertension can increase the risk of heart, brain, kidney and other diseases (WHO, 2023). Heart and vascular (cardiovascular) disease are a major health problem in both developed and developing countries. Hypertension is the number one cause of death in the world every year (Mills, 2020).

Hypertension is one of the most common and most common cardiovascular diseases in society, especially the elderly (Ciumărnean, 2021). This is because older age groups are more likely to suffer from multiple comorbidities. The accumulation of cardiovascular risk factors over a lifetime has a detrimental effect on the health status of older adults (Ciumărnean, 2021; Kadambi, 2020).

According to WHO data in 2015, approximately 1.13 billion people worldwide suffer from hypertension, which means that one in three people are diagnosed with the condition, but only 36.8% are undergoing treatment. The number of people with hypertension in the world

continues to increase every year, and it is estimated that by 2025 there will be 1.5 billion people affected by hypertension, with 9.4 million deaths each year due to hypertension and its complications (WHO, 2015).

Hypertension or high blood pressure is becoming a global problem. According to the World Health Organization (WHO) report in 2021, around 1.28 billion people aged 30-79 years worldwide have hypertension (WHO, 2021). The data also shows that 46% of people with hypertension are unaware of their condition and only 42% of hypertension cases are diagnosed and treated (WHO, 2021). In Southeast Asia, there are an estimated 1.5 million deaths each year due to hypertension, with a prevalence of 33.98% (WHO, 2013).

The prevalence of hypertension in 2018 showed a significant increase from 2013 of 34.1% in the population aged 18 years and over. The prevalence of hypertension in the elderly age group experienced a high increase in cases. The age group 55-64 years was 55.2%, the age group 65-74 years was 63.2%, the age group 75 and over was 69.5% (Kemenkes RI, 2019a).

In most cases, hypertension is detected during a physical examination due to certain disease reasons, so it is often referred to as a silent killer. The occurrence of hypertension can be influenced by unhealthy lifestyles such as smoking, high fat consumption, lack of fiber, excessive salt consumption, alcoholism, obesity, high blood sugar, high blood fat and stress (Susanti, 2020; Imelda, 2020; Siregar, 2022)

Tangkahan Durian Health Center, Langkat, North Sumatra, as one of the health service centers that plays an important role in the detection, treatment, and prevention of hypertension among the elderly. However, despite prevention and treatment efforts, the prevalence of hypertension among the elderly in Tangkahan Durian Health Center is still the highest. Therefore, more in-depth research is needed to understand the factors that contribute to the incidence of hypertension in the neighborhood.

Previous studies have shown that factors such as diet, physical activity level, family history of disease, and environmental factors can play a role in the occurrence of hypertension in the elderly. However, there has been no research specifically exploring the determinants of hypertension in Tangkahan Durian Health Center, Langkat. Therefore, this study aims to evaluate the factors associated with the incidence of hypertension in the elderly who visit the Tangkahan Durian Health Center, Langkat, North Sumatra.

## METHODS

This study is a quantitative study with a cross-sectional approach to assess the factors associated with the incidence of hypertension in the elderly at Tangkahan Durian Community Health Center, Langkat, North Sumatra. The study population consisted of elderly people aged 60 years and over and had visited the health center in the past year. From this population, 81 people were randomly selected as research samples. The sample was selected based on the inclusion criteria, namely conducting routine checks for the past 1 year at the Tangkahan Durian Health Center, Langkat, residing at the research location, willing to be a respondent and able to communicate well. The exclusion criteria were the elderly who suffered from comorbidities or complications, unclear addresses or respondents could not be found. The sample size was calculated using a statistical formula with a 95% confidence level and a 5% margin of error.

Within the framework of this study, the variables studied included predetermined risk factors, including genetic factors, routine hypertension check-ups (hypertension control), routine hypertension medication consumption, smoking status, stress level, nutritional status, and socioeconomic status. Assessment of subjective stress level will be conducted using the Perceived Stress Scale 10 (PPS-10) questionnaire. For data analysis, the researcher used SPSS Version 29 software. Bivariate analysis used chi square test with  $\alpha = 0.05$  and 95% confidence level.

## RESULTS

The study was conducted on a sample of 81 respondents who met the criteria for Elderly Age according to the Ministry of Health, namely Pre-Elderly aged between 60-69 years, Middle-Elderly aged 70-79 years and Late Elderly aged 80 years and over. Table 1 shows that the majority of respondents in this study belonged to the Pre-Elderly category (aged 60-69 years), consisting of 71 respondents or 87.7%, followed by 8 respondents or 9.9% Middle-Elderly aged 70-79 years. The least represented category is the Late Elderly category (age 80 years and above), with only 2 respondents or 2.5%.

The data also indicate that the study's respondents are predominantly female, with 45 respondents or 55.6%, while males constitute 36 respondents or 44.4%. Additionally, the data reveal that the most common occupation among respondents is housewife, with 40 respondents or 49.4%. The highest level of education among respondents is primary school, with 48 respondents or 59.3%.

**Table 1. Characteristics of Respondents (n=81)**

|                   | Category           | Frequency (n) | Percentage (%) |
|-------------------|--------------------|---------------|----------------|
| <b>Age</b>        | Pre-Elderly        | 71            | 87.7           |
|                   | Middle Elderly     | 8             | 9.9            |
|                   | Late Elderly       | 2             | 2.5            |
| <b>Gender</b>     | Male               | 36            | 44.4           |
|                   | Female             | 45            | 55.6           |
|                   | Civil Servant      | 2             | 2.5            |
| <b>Occupation</b> | Self-employed      | 13            | 16.0           |
|                   | Laborer            | 25            | 30.9           |
|                   | Housewife          | 40            | 49.4           |
|                   | Farmer             | 1             | 1.2            |
| <b>Education</b>  | Elementary School  | 48            | 59.3           |
|                   | Junior High School | 18            | 22.2           |
|                   | Senior High School | 13            | 16.0           |
|                   | College            | 2             | 2.5            |

The data also shows that the respondents of this study were dominated by women, with 45 respondents or 55.6%, while men amounted to 36 respondents or 44.4%. In addition, the data also shows that the most common occupation among respondents is housewife, with 40 respondents or 49.4%. The highest level of education among respondents was elementary school, with 48 respondents or 59.3%. These results provide a demographic overview of the elderly respondents in Tangkahan Durian Health Center, Langkat, highlighting the dominance of certain age groups, genders, occupations, and educational levels.

Table 2. shows that the prevalence of hypertension is notably high, with 56 respondents (74.4%) diagnosed with the condition, highlighting a significant health concern in this population. Genetic predisposition playing a significant role, as indicated by 58.0% of respondents having a family history of hypertension. Moreover, hypertension control and medication adherence are poor, with 54.3% not engaging in regular hypertension control practices and 51.9% not taking their prescribed medications. Smoking habits are prevalent, affecting 50.6% of respondents, while nutritional status shows that 64.2% have normal weight, but a significant 33.3% are overweight. Stress levels are relatively well-managed, with 54.3% of respondents not experiencing stress.

Socioeconomic factors also play a crucial role in hypertension management. A significant majority of respondents (61.7%) belong to a low socioeconomic status or income below 1 million rupiah per month, which may hinder their access to healthcare resources and healthy lifestyle options. In contrast, 38.3% of respondents are of high socioeconomic status, potentially providing them with better means to manage their health.

**Table 2. Distribution of Elderly Hypertension Determinants(n=81)**

|  | Variable        | Frequency (n) | Percentage (%) |
|--|-----------------|---------------|----------------|
| <b>Hypertension</b>                        | Yes             | 56            | 74.4           |
|  | No              | 25            | 25.6           |
| <b>Genetic Factors</b>                     | Available       | 47            | 58.0           |
|  | Absent          | 34            | 42.0           |
| <b>Hypertension Control</b>                | No              | 44            | 54.3           |
|  | Rarely          | 32            | 39.5           |
|  | Yes             | 5             | 6.2            |
| <b>Hypertension Medication Consumption</b> | No              | 42            | 51.9           |
|  | Rarely          | 39            | 35.8           |
|  | Yes             | 10            | 12.3           |
| <b>Smoking Habit</b>                       | Yes             | 41            | 50.6           |
|  | No              | 40            | 49.4           |
| <b>Nutritional Status</b>                  | Underweight     | 1             | 1.2            |
|  | Normal          | 52            | 64.2           |
|  | Overweight      | 27            | 33.3           |
|  | Obesity         | 1             | 1.2            |
| <b>Stress Level</b>                        | Mild Stress     | 31            | 38.3           |
|  | Moderate Stress | 6             | 7.4            |
|  | No Stress       | 44            | 54.3           |
| <b>Socioeconomic</b>                       | Low             | 50            | 61.7           |
|  | High            | 31            | 38.3           |

Bivariate analysis in the study was used to determine whether there was a significant relationship between the independent variables, namely genetic factors, hypertension control, hypertension drug consumption, smoking habits, stress levels, nutritional and socioeconomic status. With the dependent variable which is the incidence of hypertension.

Based on table 3, it was found that of the 81 elderly samples there were 36 (76.6%) who had genetic factors with hypertension, based on the results of the statistical test (Chi-Square) obtained a p-value = 0.143 ( $p > 0.05$ ), it means that there is no relationship between genetic factors and the incidence of hypertension. The results of the analysis of the relationship between hypertension control and the incidence of hypertension found that there were 24 (54.5%) who rarely checked their health, especially blood pressure control once every 10 days. Based on the results of the Chi-Square test obtained  $p = 0.004$  ( $p < 0.05$ ), this indicates that there is a relationship between tension control and the incidence of hypertension.

**Table 3. Association between Various Factors and Hypertension among Elderly Respondents**

| Variable                                   | Hypertension |      |    |      |       |     | P-value |
|--|--------------|------|----|------|-------|-----|---------|
|  | Yes          |      | No |      | Total |     |         |
|  | n            | %    | n  | %    | n     | %   |         |
| <b>Genetic Factors</b>                     |              |      |    |      |       |     |         |
| - Available                                | 36           | 76.6 | 11 | 23.4 | 47    | 100 | 0.143   |
| - Absent                                   | 20           | 58.8 | 14 | 41.2 | 34    | 100 |         |
| <b>Hypertension Control</b>                |              |      |    |      |       |     |         |
| - No                                       | 24           | 54.5 | 20 | 45.5 | 44    | 100 | 0.004*  |
| - Yes                                      | 32           | 86.5 | 5  | 13.5 | 37    | 100 |         |
| <b>Hypertension Medication Consumption</b> |              |      |    |      |       |     |         |
| - No                                       | 17           | 40.5 | 25 | 59.5 | 42    | 100 | <0.001* |
| - Yes                                      | 39           | 100  | 0  | 0.0  | 39    | 100 |         |
| <b>Smoking Habit</b>                       |              |      |    |      |       |     |         |
| - Yes                                      | 35           | 85.4 | 6  | 14.6 | 41    | 100 | 0.003*  |
| - No                                       | 21           | 52.5 | 19 | 47.5 | 40    | 100 |         |
| <b>Nutritional Status</b>                  |              |      |    |      |       |     |         |
| - Abnormal                                 | 20           | 69.0 | 9  | 31.0 | 29    | 100 | 1.000   |
| - Normal                                   | 36           | 69.2 | 16 | 30.8 | 52    | 100 |         |
| <b>Stress Level</b>                        |              |      |    |      |       |     |         |
| - Stress                                   | 25           | 67.6 | 12 | 32.4 | 37    | 100 | 0.969   |
| - No stress                                | 31           | 70.5 | 13 | 29.5 | 44    | 100 |         |
| <b>Socioeconomic</b>                       |              |      |    |      |       |     |         |
| - Low                                      | 34           | 68.0 | 16 | 32.0 | 50    | 100 | 0.973   |
| - High                                     | 22           | 71.0 | 9  | 29.0 | 31    | 100 |         |

\*Significant  $p\text{-value} < 0,05$

Furthermore, the results of data analysis on the relationship between drug consumption and the incidence of hypertension found that 17 (40.5%) rarely took hypertension medication  $p=0.000$  ( $p<0.05$ ), it can be concluded that there is a relationship between drug consumption and the incidence of hypertension. The results of data analysis of the relationship between smoking habits and the incidence of hypertension were found 34 (85.4%) with smoking habit. Based on the results of the Chi-Square test obtained  $p=0.003$  ( $p<0.05$ ), it can be concluded that there is relationship between smoking habits and the incidence of hypertension.

The results of the data analysis above show the relationship between stress levels and the incidence of hypertension, 31 (70.5%) elderly people do not experience stress. The results of the chi-square test obtained  $p=0.969$  ( $p>0.05$ ) indicate that there is no relationship between stress levels and the incidence of hypertension. The results of the analysis of the relationship between nutritional status and the incidence of hypertension found 36 (69.2%) elderly people have normal weight. Based on the results of the chi-square test obtained  $p=1.000$  ( $p>0.05$ ), it shows that there is no relationship between nutritional status and the incidence of hypertension, then from the results of data analysis showing the relationship between socioeconomic and the incidence of hypertension, 34 (68.0%) were found as low socioeconomics with income below

1 million rupiah per month. Based on the results of the chi-square test obtained  $p = 0.973$  ( $p > 0.05$ ) This shows that there is no relationship between socioeconomic and the incidence of hypertension in the elderly at the Tangkahan Durian Health Center, Langkat.

Based on the interpretation of the data above, the results of the bivariate analysis, there are 3 variables that are significantly associated with hypertension, namely hypertension control variables ( $p = 0.004$ ), drug consumption variables ( $p = 0.001$ ) and smoking status ( $p = 0.003$ ).

The table evaluates the relationship between various factors and the incidence of hypertension among elderly respondents, using the Chi-square test to determine the statistical significance of these associations. For genetic factors, 76.6% of respondents with hypertension had a family history of the condition, while 58.8% without hypertension also had a genetic predisposition. However, the association between genetic factors and hypertension was not statistically significant ( $p = 0.143$ ), indicating that genetic predisposition alone does not strongly influence hypertension in this population.

## DISCUSSION

Based on the results of this study, it is known that the prevalence of elderly people in this study showed 56 people (74.4%). The genetic factor category is known from this study to have no statistical relationship with the incidence of hypertension in the elderly with the results of statistical tests obtained  $p\text{-value} = 0.087$  ( $p > 0.05$ ). However, the results of this research contradict Setiani's scoping review research (2023) which states that the relationship between genetic factors and the incidence of hypertension is found in four factors, namely heredity, DNA, genetic factors, and body mass index. The results of the scoping review show that there is an association between genetic factors and the incidence of hypertension. The impact of uncontrolled hypertension poses a risk of cardiovascular mortality and morbidity worldwide; therefore, it is very important to assess the prevalence of hypertension among ethnic groups related to genetic history, control blood pressure, and administration of anti-hypertension (Marni, 2023; Sentiani & Wulandari, 2023).

Hypertension control, on the other hand, showed a significant association with hypertension ( $p = 0.004$ ). Among those with hypertension, 86.5% practiced hypertension control compared to only 13.5% among those without hypertension. The results of this study are in line with the research of Harianja, et al. (2021) the incidence of hypertension is related to conducting routine examinations in the Cikampak Health Center Working Area, South Labuhan Regency. Then supported by research by Idrus, et al (2021) showing that routine

hypertension checks at the Masengga Health Center, Molewali Mandar Regency, are related to education level ( $p=0.004$ ), knowledge ( $p=0.000$ ), access to health services ( $p=0.000$ ) and family support ( $p=0.000$ ). This suggests that individuals who monitor and manage their blood pressure are more likely to have hypertension, possibly due to their awareness and diagnosis.

Furthermore, hypertension medication consumption was also highly significant ( $p < 0.001$ ), with all respondents who consumed medication having hypertension, highlighting the importance of medication adherence in managing this condition. These results show research that is in line with Anwar (2019) that there is a significant relationship between adherence to taking antihypertensive drugs and blood pressure in elderly people with hypertension in the working area of the Air Putih Samarinda Health Center ( $p=0.000$ ). According to the results of basic health research for North Sumatra Province (2019), some of the reasons why people with hypertension do not take medication include because people with hypertension feel that they are in good health (64.4%), then irregular visits to health facilities (24.0%), taking alternative medicines or traditional medicines (16.7%), using other therapies (12.1%), forgetting to take medicine (15.7%), not being able to buy medicine (10.3%), there are side effects of drugs (7.7%), and hypertension drugs are not available at health facilities (1.7%) (Kemenkes RI, 2019b). There is a need for government efforts to increase public awareness because hypertension must routinely take medication for life.

Smoking habits were another significant factor, with 85.4% of hypertensive respondents being smokers compared to 52.5% among non-hypertensive respondents ( $p = 0.003$ ). This indicates a strong association between smoking and hypertension, emphasizing the need for smoking cessation programs in managing hypertension. This is in line with several other studies which state that smoking has a relationship with the incidence of hypertension, such as Memah's research (2019) at Kombi Health Center, Minahasa Regency ( $p=0.000$ ,  $r=0.726$ ) and Erman's research (2021) at Pukesmas Kampus Palembang ( $p=0.005$ ). Nicotine from cigarettes can impact a person's blood pressure in three ways: by causing the development of atherosclerotic plaques, by directly influencing the release of the hormones norepinephrine and adrenaline, or by causing carbon monoxide to increase red blood cells. (Rahmatika, 2021).

In contrast, nutritional status did not show a significant relationship with hypertension ( $p = 1.000$ ). Both hypertensive and non-hypertensive groups had similar distributions of normal and abnormal nutritional statuses, suggesting that other factors might be more influential in determining hypertension risk. This is with several studies by Sari (2023) that there is no relationship between nutritional status and hypertension at the Tamalate Health Center ( $p=0.063$ ) However, research by Safitri (2023) at the Bahagia Health Center, hypertension is



influenced by nutritional status ( $p=0.004$ ) and diet ( $p=0.000$ ). According to the Indonesian Ministry of Health (2019) explains that excess nutrition is related to lifestyle and excessive consumption patterns from a young age or even from childhood so that weight increases and fat increases.

Lastly, stress levels and socioeconomic status did not show significant associations with hypertension. Stress levels were almost equally distributed among those with and without hypertension ( $p = 0.969$ ), and socioeconomic status also showed no significant difference ( $p = 0.973$ ). Contrary to Angelina's research (2020) at the Biha Pesisir Barat Health Center, that stress is the most dominant variable with a  $p$ -value of 0.00 and OR 3.376. Also research by Sutarjana (2021) that there is a relationship between hypertension and caffeine consumption ( $p<0.05$ ) and stress in patients ( $p<0.05$ ). Physiologically, constant and persistent stress can cause an increase in heart rate as a result of the release of neurotransmitters from the adrenal glands, leading to high blood pressure or hypertension (Zafar, 2021).

This suggests that although stress and socioeconomic factors may affect overall health, their direct impact on hypertension in this population was not significant. These findings highlight the multifaceted nature of hypertension, where lifestyle factors such as hypertension control, medication adherence, and smoking play an important role, whereas genetic predisposition, stress, and socioeconomic status may not have a direct impact.

## CONCLUSIONS

The findings of this study showed that regular check-ups (hypertension control), hypertension medication consumption and smoking habit had a significant association with the incidence of hypertension in the community with  $p$  values of 0.004,  $<0.001$  and 0.003, respectively. It is important to remind and raise public awareness about the importance of regular check-ups and taking medication regularly and avoiding smoking. Furthermore, the government and the health sector can provide media campaigns on clean and healthy living behaviors.

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