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Article

The Effect of Family History of Hypertension, Dietary Patterns, and Smoking History on Hypertension among Older Adults in the Working Area of Kisol Community Health Center, East Manggarai

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Abstract

Background: Hypertension is one of the major health problems in the elderly that increases the risk of cardiovascular disease and mortality. **Objectives :**This study aims to analyze the effect of family history of hypertension, dietary patterns, and smoking history on the incidence of hypertension in the elderly in the working area of the Kisol Community Health Center, East Manggarai Regency. This study used a quantitative approach with a case-control design. The study sample consisted of 161 elderly respondents aged ≥60 years, determined using the Slovin formula through random sampling. **Method**: Data were collected using questionnaires, interviews, and blood pressure measurements, then analyzed using the chi-square test at a significance level of 5%. **Results:** The results showed a significant association between family history of hypertension and the incidence of hypertension (p=0.000) as well as dietary patterns and the incidence of hypertension (p=0.000). Conversely, smoking history was not significantly associated with the incidence of hypertension (p=0.287). It is recommended that the Community Health Center strengthen nutrition education and routine screening.

Keywords: Hypertension, Elderly, Family History, Dietary Patterns, Smoking History

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1. Introduction

Hypertension is one of the most common non-communicable diseases worldwide, especially among the elderly population. Hypertension is a manifestation of hemodynamic imbalance in the cardiovascular system, the pathophysiology of which is multifactorial and therefore cannot be explained by a single mechanism [1]. According to the latest data from the World Health Organization 2023, hypertension contributes to approximately 10.8 million deaths worldwide each year. This condition is one of the leading causes of death from cardiovascular diseases such as stroke and heart attack. The increasing number of elderly people in the world, especially in developing countries such as Indonesia, has also triggered an increase in the prevalence of hypertension, making it a serious public health issue [2].

Riskesdas, 2018 states that the prevalence of hypertension in Indonesia reaches 34.1%. Specifically for the elderly population, the prevalence is much higher, reaching 63.4%. East Nusa Tenggara Province (NTT) also faces the same problem, with a fairly high

prevalence of hypertension among the elderly [3]. The NTT Provincial Health Office, 2023 reports that around 55% of the elderly population in NTT has hypertension. East Manggarai Regency, particularly the Kisol Community Health Center working area, faces similar challenges with the incidence of hypertension continuing to increase, especially in the over-60 age group [4].

The Kisol Community Health Center, as one of the primary health care services in East Manggarai Regency, has the task of providing health services to the community, including the prevention and treatment of hypertension. Data from the Kisol Community Health Center in 2023 shows that 48% of elderly people who came for treatment at the facility were diagnosed with hypertension, and most cases were not well controlled [5].

The 2022 report from the East Manggarai Central Statistics Agency (BPS) shows that many elderly people in rural areas still face limited access to health information and health care facilities. This condition prevents them from receiving education about the importance of a healthy lifestyle, which is an important factor in preventing hypertension. In addition, access to medicines and routine health check-ups is often difficult to obtain due to distance and cost, especially in rural areas such as East Manggarai. Furthermore, elderly people in the Kisol Community Health Center (Puskesmas) working area tend to have traditional diets that are high in salt, which is exacerbated by low levels of physical activity. Based on the above explanation, the researchers were interested in conducting research focusing on the influence of family history of hypertension, dietary patterns, and smoking history on the incidence of hypertension among elderly people in the Kisol Community Health Center working area in East Manggarai [6].

2. Materials and Methods

2.1 Study Design and Setting

This study applies a quantitative approach using analytical surveys. Analytical surveys are a type of research that aims to understand how and why a health phenomenon occurs. This study uses a case control design. Case control studies are observational analytical epidemiological studies that examine the relationship between an effect (disease or health condition) and certain risk factors. The case-control research design can be used to assess the extent to which risk factors play a role in the occurrence of disease. In a case-control study, the research begins with the identification of patients with the effect (cases) and a group without the effect (controls), then retrospectively traces the risk factors that may explain why the cases were affected while the controls were not [7].

2.2 Population and Sampling

The population in this study consisted of 100 elderly individuals aged 60 years and above who were registered at the Kisol Manggarai Timur Community Health Center and suffered from hypertension. Random sampling techniques were used in this study. This means that researchers randomly selected respondents from the elderly population in the region so that every elderly person who met the criteria had an equal chance of being selected as a research sample.

The required sample size was approximately 81 elderly people with hypertension and 81 elderly people without hypertension, bringing the total sample size in this study to 161 elderly people.

2.3 Data Collection

The data collection method in this study uses a questionnaire. The researcher will interview respondents using the questionnaire. The data source used is primary data, obtained directly from respondents.

2.4 Variables and Operational Definitions

Hypertension in the elderly is measured based on systolic blood pressure ≥ 140 mmHg and diastolic blood pressure ≥ 90 mmHg. Family history of hypertension, family members with a family history. Dietary patterns are a model or description of eating habits in children, including types of food: staple foods, consumed foods, side dishes,

vegetables, fruits, milk, and snacks. Frequency of consumption, how often a food is consumed daily and weekly. The amount of food consumed by each person per day.

2.5 Data Analysis

Data analysis techniques are carried out in two ways, namely univariate analysis and bivariate analysis:

1. Univariate analysis aims to describe the characteristics of each variable observed in the study. In this analysis, researchers usually only present the distribution and percentage of each variable without comparing it with other variables. This method is useful for providing a clearer picture of the data observed [8]. By using univariate analysis and presenting the results in the form of a frequency distribution table, researchers can provide a comprehensive picture of the characteristics of the respondents and the distribution of the variables observed in the study.

2. Bivariate analysis is used to identify the relationship between independent and dependent variables. The selection of statistical tests used is based on the type of data and the number of variables studied. The chi-square test is used for independent variables in the form of categorical data (family history of hypertension, food consumption patterns, history of smoking) and dependent variables of hypertension in the elderly in the working area of the Kisol Manggarai Timur Community Health Center.

With a significance level of 0.05, then:

1. If the p-value ≤0.05, there is an effect of the variable

Therefore, a p-value ≤ 0.05 indicates that there is a significant effect between the variables being studied, and the alternative hypothesis can be accepted.

2. If the p-value ≤ 0.05, there is no effect between the dependent variable and the independent variable.

Therefore, a p-value ≥ 0.05 indicates that there is no significant effect between the dependent variable and the independent variable.

2.6 Ethical Considerations

This study has undergone an ethical feasibility test which has been declared feasible in the research ethics issued by the Research Ethics Committee through an ethical feasibility letter dated March 24, 2025 with number: 000813/KEPK FKM UNDANA/2025 based on 7 standards and guidelines of WHO 2011, with reference to compliance with the 2016 CIOMS guidelines.

3. Results

3.1. Respondent Characteristics

Table 1. Percentage Distribution Based on Respondent Characteristics

No	Age (Year)	n	%
1	>65	47	29.2
2	60-62	114	70.8
No	**Education**	**n**	**%**
1	Completed elementary school and	148	91.9
2	junior high school	13	8.1
	Completed high school and university		
No	**Work**	**n**	**%**
1	Farmers	150	93.2
2	Non-farmers	11	6.8
No	**Gender**	**n**	**%**
1	Women	95	59.0
2	Men	66	41.0
	Total	**161**	**100%**

Table 1. Table 4.1 shows that the distribution of respondents based on age indicates that most (70.8%) are aged 60-62 years and a small proportion (29.2%) are aged >65 years.

The distribution of respondents based on education shows that the majority (91.9%) graduated from elementary school to junior high school and a small portion (8.1%) graduated from high school to university. The distribution of respondents based on occupation shows that the majority (93.2%) work as farmers and a small portion (6.8%) work in non-farming occupations. The distribution of respondents based on gender shows that the majority (59.0%) are female and a small portion (6.8%) are male.

3.2. Univariate Analysis

Table 2. Percentage Distribution of Respondents Based on Univariate Analysis

No	Hypertension Incident	n	%
1	Hypertension	80	49.7
2	No Hypertension	81	50.3
	Total	**161**	**100%**
No	**Family Hypertension Incidence**	**n**	**%**
1	There is a history	117	72.7
2	There is no history	44	27.3
	Total	**161**	**100%**
No	**Consumption Patterns**	**n**	**%**
1	Poor, if >2 indicators of food consumption patterns are poor	90	55.9
2	Good, if 2-3 indicators of food consumption patterns are good	70	44.1
	Total	**161**	**100%**
No	**Smoking History**	**n**	**%**
1	Active Smoker	52	32.3
2	Non-Smoker	109	67.7
	Total	**161**	**100%**

Table 2. The distribution of respondents based on hypertension shows that most (50.3%) do not have hypertension and a small proportion (49.7%) have hypertension. The distribution of respondents based on hypertension shows that most (72.7%) have a family history of hypertension and a small proportion (23.3%) do not have a family history of hypertension. The distribution of respondents based on dietary patterns shows that the majority (55.9%) have poor dietary patterns and a small proportion (44.1%) have good dietary patterns. The distribution of respondents based on smoking history shows that the majority (67.7%) do not smoke and a small proportion (32.3%) are active smokers.

3.3 Bivariate Analysis

Table 3. Percentage Distribution of Respondents Based on Bivariate Analysis

History Family Hypertension	Hypertension Status				Number		*p*	OR
	Yes		**No**					
	n	**%**	**n**	**%**	**n**	**%**		**95%CI**
Having a History of Hypertension	77	65,8	40	34,2	117	100	0,000	26,308
No History of Hypertension	3	6,8	41	93,2	44	100		(7,667-90,271)

Food Consumption Patterns	Hypertension Status				Number		*p*	OR
	Yes		**No**					
	n	**%**	**n**	**%**	**n**	**%**		**95%CI**
Bad	62	68,9	28	31,1	90	100	0,000	6.520
Good	18	25,4	53	74,6	71	100		(3,249-13.083)

	Hypertension Status	Number

Smoking History	Yes		No				*P*	OR
	n	%	n	%	n	%		95%CI
Smoking	29	55,8	23	44,2	52	100	0,287	1,434
No Smoking	51	46,8	58	53,2	109	100		(0,738-2,786)

Table 3 shows that 117 respondents (100%) had a family history of hypertension. Of these, 77 (65.8%) were hypertensive and 40 (34.2%) were not hypertensive. Meanwhile, among respondents without a family history of hypertension, there were 44 people (100%), with 3 people (6.8%) having hypertension and 44 people (93.2%) not having hypertension. The analysis results showed that a family history of hypertension was associated with hypertension status (p-value 0.000 < 0.05) in the Kisol Manggarai Timur Community Health Center Working Area. Based on further analysis, an odds ratio of 26.308 (OR value > 1) was obtained, meaning that those with a family history of hypertension are 26 times more likely to develop hypertension compared to respondents who do not have a family history of hypertension, with a confidence interval (CI = 7.667 - 90.271).

Table 3 shows that 90 respondents (100%) had poor consumption patterns. There were 62 people (68.9%) with hypertension and 28 people (31.1%) without hypertension. Meanwhile, 71 respondents (100%) had good consumption patterns, with 18 (25.4%) having hypertension and 53 (74.6%) not having hypertension. The analysis results showed that dietary patterns were associated with hypertension status (p-value 0.000 < 0.05) in the Kisol Manggarai Timur Community Health Center Working Area. Based on further analysis, an odds ratio of 6.520 (OR value > 1) was obtained, meaning that those with poor dietary patterns are 6 times more likely to experience hypertension compared to respondents with good dietary patterns, with a confidence interval (CI = 3.249 – 13.083).

Table 3 shows that 52 respondents (100%) had a history of active smoking. There were 29 respondents (55.8%) with hypertension and 23 respondents (44.2%) without hypertension. Meanwhile, among the 109 respondents (100%) who did not smoke, 51 (46.8%) had hypertension and 58 (53.2%) did not have hypertension. The analysis results showed that smoking history was not associated with hypertension status (p-value 0.287 > 0.05) in the Kisol Manggarai Timur Community Health Center Working Area. Based on further analysis, an odds ratio of 1.434 (OR value > 1) was obtained, meaning that those with a history of active smoking are 1 times more likely to experience hypertension compared to non-smoking respondents with a confidence interval (CI = 0.738-2.786).

4. Discussion

4.1. Relationship between Family History of Hypertension and Hypertension Status

The relationship between family history of hypertension and hypertension status is a phenomenon that has been widely discussed in epidemiological literature. Family history plays an important role because it can affect an individual's risk of developing hypertension through both genetic factors and lifestyle habits passed down from previous generations. Several studies have shown that individuals with a family history of hypertension are more likely to develop hypertension than those without such a history [9].

Research has found that individuals with a family history of hypertension tend to experience an increase in blood pressure at a younger age compared to those without a family history. This indicates the need for screening from a productive age to reduce long-term complications [10].

Epigenetic modifications such as DNA methylation can affect blood pressure gene expression, which is then passed on to the next generation. This explains why, even

though genetic factors are dominant, the family environment still has a significant influence [11].

Preventive measures for hypertension in groups with a family history should be implemented early through a promotive and preventive approach. Regular blood pressure checks, nutrition education, and sodium intake restriction should be the main focus. Recent studies show that lifestyle modifications from a young age can reduce the risk of hypertension even in the presence of genetic predisposition [12]

In conclusion, the relationship between family history of hypertension and hypertension status is multifactorial, involving interactions between genetic, behavioral, environmental, and psychosocial factors. Individuals with a family history of hypertension have a higher risk and earlier onset, thus requiring more comprehensive health interventions. With a family-based approach, hypertension prevention can be carried out more effectively to break the chain of intergenerational risk [13]

4.2. The Relationship Between Food Consumption Patterns and Hypertension Status

Dietary patterns are one of the dominant factors associated with hypertension. A diet high in salt, low in fiber, and low in fruit and vegetable consumption has been shown to increase the risk of hypertension. Research shows that individuals with unhealthy eating patterns are more likely to experience an increase in blood pressure than individuals who follow a balanced diet [14].

Sodium intake is the most influential factor in the development of hypertension. Excess sodium can cause fluid retention and increase blood volume, thereby raising blood pressure. A global study found that high sodium consumption contributes to nearly 30% of hypertension cases worldwide Therefore, reducing salt intake is a key strategy in preventing hypertension. Fruit and vegetable consumption plays a protective role against hypertension. The potassium, magnesium, fiber, and antioxidant content in fruits and vegetables can help lower blood pressure. A large study on Dietary Approaches to Stop Hypertension (DASH) proved that a diet rich in fruits, vegetables, and low-fat products can significantly lower blood pressure [15].

The habit of consuming fast food also contributes to the high prevalence of hypertension. Fast food generally contains high levels of salt, saturated fat, and calories but is low in fiber. Research in Indonesia shows a strong association between the frequency of fast food consumption and an increased risk of hypertension in productive age groups [16]. In addition, consumption of sweetened beverages has also been shown to increase the risk of hypertension.

A Mediterranean-based diet has been shown to be effective in preventing hypertension. This diet emphasizes the consumption of olive oil, nuts, fish, fruits, vegetables, and whole grains. Prospective studies show that the Mediterranean diet can significantly lower systolic and diastolic blood pressure in adults [17]

Conversely, a Western-style diet high in processed meat, added sugar, and processed foods is associated with an increased risk of hypertension. Cohort studies report that individuals who follow a Western-style diet have a higher risk of hypertension than those who consume a traditional or plant-based diet [18].

In conclusion, the relationship between dietary patterns and hypertension status is very close and multifactorial. High intake of sodium, saturated fat, sugar, and alcohol, as well as low consumption of fiber, potassium, and antioxidants, has been shown to increase the risk of hypertension. Therefore, dietary modification is key to the prevention and control of hypertension, particularly through the implementation of a balanced diet such as the DASH or Mediterranean diet [19]

4.3 The Relationship Between Smoking History and Hypertension Status

Research by Abdullah conducted on the community in Makassar City shows that smoking history is not significantly related to the nutritional status of respondents. The

results show that although smokers tend to have lower levels of vitamin C and iron, overall nutritional status as measured by body mass index is not significantly different from that of non-smokers. The researchers explained that dietary patterns, such as low consumption of vegetables and fruits among the general population, had a more dominant influence on nutritional status than smoking habits themselves [20].

Research by Santoso and Dewi on factory workers in Central Java also showed similar results. Although the majority of respondents were active smokers, their nutritional status was mostly still in the normal category. Statistical test results showed no significant difference between the nutritional status of smokers and non-smokers. The researchers emphasized that the main factor affecting the nutritional status of workers was the availability of canteens with high-calorie menus, making both smokers and non-smokers equally vulnerable to unhealthy eating patterns. Therefore, smoking cannot be used as the main indicator of nutritional status in this group [21].

Research by Hidayat on adult men in Makassar also showed that smoking habits were not significantly related to nutritional status. Body mass index measurements showed an almost identical distribution between smokers and non-smokers. The researchers argued that the high level of physical activity among the local community, especially those working in the informal sector, was a balancing factor that made the effect of smoking on nutritional status not clearly visible. Thus, nutritional status was more influenced by employment and other lifestyle factors than by smoking history [22].

Research by Rahmadani on urban communities in Medan found that although smoking is often associated with unhealthy eating patterns, statistical analysis showed no significant relationship between smoking history and nutritional status. The researchers found that most respondents, both smokers and non-smokers, consumed foods high in fat and simple carbohydrates. Therefore, the nutritional status of respondents was more influenced by their general daily consumption patterns than by their smoking habits [23].

Research by Ahsan on low-income families in Jakarta shows that spending on cigarettes is indeed quite high, but it does not always correlate with the nutritional status of the family. Despite the crowding out phenomenon, where part of the income is allocated to cigarettes, the nutritional status of family members still varies. The researchers stated that the availability of cheap food in urban areas and the support of government food assistance programs have a greater impact on family nutritional status than smoking behavior [24].

5. Conclusions

Conclusions from the results of research on the influence of family history of hypertension, dietary patterns, and smoking history on the incidence of hypertension among the elderly in the working area of the Kisol Community Health Center, East Manggarai

1. There is an influence between family history of hypertension and the incidence of hypertension among the elderly in the working area of the Kisol Community Health Center, East Manggarai.
2. There is an influence of dietary patterns on the incidence of hypertension among the elderly in the working area of the Kisol Community Health Center, East Manggarai.
3. There is no influence of smoking history on the incidence of hypertension among the elderly in the working area of the Kisol Community Health Center, East Manggarai.

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7. Conflicts of Interest

The authors declare no conflict of interest.

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