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Analysis of factors related to the incidence of hypertension in the elderly

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ABSTRACT

Introduction: Hypertension or high blood pressure is one of the main health problems in the elderly population in various parts of the world. The elderly are more susceptible to hypertension due to the aging process that affects the elasticity of blood vessels, as well as increased peripheral resistance. In addition, various risk factors, such as an unhealthy lifestyle, poor diet, and certain medical conditions, can worsen the condition of hypertension in the elderly.

Objective: This study aims to analyze factors related to the incidence of hypertension in the elderly.

Methods: This research uses a cross-sectional design, an analytical study that studies the causes of incidents or incidents. Data collection uses a questionnaire. The sample in this study was 64 elderly hypertensive patients in the working—data analysis using the chi-square test.

Result: The results of this study indicate that there is a relationship between physical activity (p=0.000), obesity (p=0.000), diet (p= 0.029), smoking habits (p=0.000), and work (p=0.020) with the incidence of hypertension in the elderly in working.

Conclusion: The incidence of hypertension in the elderly with the variables studied shows that there is a relationship, and the most related variable is obesity. So, it is hoped that the elderly, especially those who are obese, should be given intervention to maintain their diet so that complications do not occur and can reduce the risk of hypertension.

Keywords: elderly, hypertension, physical.

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INTRODUCTION

Hypertension is one of the non-communicable diseases that is currently a priority in the world of health. Hypertension is a condition in which a person's blood pressure is≥ 140 mmHg (systolic) or ≥ 90 mmHg. Hypertension is one of the factors that is closely related to cardiovascular diseases and mortality or the cause of death in the elderly. An older adult is 60 or older (Suprapto, Mulat and Norma Lalla, 2021). The elderly are more at risk of experiencing various diseases, especially degenerative diseases, compared to young people. One of the most common degenerative diseases suffered by the elderly is hypertension. The elderly are part of family members and community members, which is increasing in line with the increase in the life expectancy of the elderly in Indonesia, which increased to 15.1 million people in 2000 or 7.2% of the total population with a life expectancy of 64.5%. In 2006, life expectancy increased to 66.2% and the number of elderly people to 19 million; by 2020, it will be 29 million or 11.4%. This shows that consistently, the number of elderly people increases from time to time. The prevalence of hypertension in the elderly (elderly) is 36-65%. Hypertension in the elderly is very important because the pathogenesis, course of the disease, and its management are not all the same as hypertension in adults of easy age. In elderly patients, the diagnostic aspects must be more oriented toward hypertension and its complications and the introduction of various comorbid diseases (Muthiyah A. AM *et al.*, 2023). Hypertension or high blood pressure is one of the chronic diseases that occurs in the elderly (elderly). The prevalence of hypertension increases with age, so the elderly group becomes one of the most vulnerable to complications of this disease. Uncontrolled hypertension can trigger various complications, such as heart disease, stroke, and kidney failure (Mao *et al.*, 2024). Therefore, understanding the factors associated with the incidence of hypertension in the elderly is essential to prevent further adverse effects. Various factors can affect the incidence of hypertension in the elderly, such as age, gender, diet, lifestyle, obesity, and family history. The prevalence of hypertension in 2021 Central Sulawesi Province was 384,072 (2.33%). Hypertension cases are more common in people aged 60 years and older. One of the world's targets is to reduce the prevalence of hypertension cases by 30% from 2010 to 2030 (WHO, 2023). The population of Palu City is 108,042 people, and 6,647 people are receiving hypertension treatment. If hypertension is not treated early, it will have an impact on dangerous complications, such as stroke, kidney disease, heart disease, and visual impairment (Murwani *et al.*, 2024).

Therefore, hypertension can be prevented by avoiding the factors that cause it. Hypertension can be prevented by avoiding the factors that cause hypertension by regulating diet, maintaining a correct lifestyle, avoiding coffee, smoking, and alcohol, reducing excessive salt consumption, and engaging in moderate physical activity such as regular exercise. Some of the factors that can cause hypertension are life habits or behaviors of high sodium consumption habits, obesity, stress, smoking, and drinking alcohol, work (Xie *et al.*, 2024). The high prevalence is due to an unhealthy lifestyle, such as lack of exercise/physical activity, smoking habits, and consuming foods that are high in fat. Age variables control obesity and hypertension (Cunha *et al.*, 2023). This means that the elderly who are obese have a chance to develop hypertension six times compared to the elderly who are not obese. This is in line with a study conducted in Australia that showed that obesity in the elderly is 2.0 times more likely to suffer from hypertension (Wu *et al.*, 2024). Likewise, in a study in China, obese elderly people are 4.06 times more likely to experience hypertension in women and 3.63 times in men. Obesity is a growing global health problem, with a rapid increase observed in unhealthy obesity. Being overweight is associated with an increased cardiovascular risk and the onset of previous cardiovascular morbidity (Liu *et al.*, 2024).

Diet affects the incidence of hypertension. Respondents with poor diets were likelier to have high salt consumption, alcohol consumption, coffee drinking habits, and many other influences (S. Li *et al.*, 2024). The habit of frequent consumption of saturated fat (≥3 times) in a week is proven. Based on the study's results, not a few elderly people have problems with poor

diets. For the elderly, the diet needs to be considered because the needs of the elderly are very different from those of a young age due to reduced physical activity. In this case, it is necessary to control the diet of the elderly and make them into a good diet, including the amount of food, meal schedule, and type of food that meets the needs of the elderly (Poli *et al.*, 2024). In this case, there needs to be attention from the elderly family in providing a good diet for the elderly. Heavy smoking can be associated with an increased incidence of malignant hypertension and the risk of developing renal artery stenosis that develops atherosclerosis (Yan *et al.*, 2024). There is a relationship between smoking habits and hypertension, with a p-value of 0.000 and an OR value showing that the risk of suffering from hypertension for people who smoke cigarettes is 8.1 times greater than for people who do not smoke cigarettes. Working for the elderly can not only support the household economy, but the elderly also feel beneficial for their families and society while maintaining their physical condition to remain active. If they do not work, they do not have money, so they cannot meet their living needs.

Based on the results of the author's observations in the Bulili Health Center work area, it is known that the lifestyle of the people in the Bulili Health Center work area, in general, is that some people seem to have an unbalanced proportion of weight and height and tend to be obese. People rarely seem to make time specifically to exercise regularly. Most of the people who are male seem to have a habit of smoking, and some elderly people are no longer working. In addition, almost every food stall the author finds in the community sells salted fish; this condition illustrates that people often consume salty and saturated fat food. This study aims to analyze factors related to the incidence of hypertension in the elderly.

RESEARCH METHODOLOGY

The method in this study is a quantitative analytical survey. Because it aims to determine the risk factors for causing disease to a disease event, this study uses a cross-sectional design where an analytical study studies the causes of events or events. The number of hypertension patients in the elderly (≥ 60 years) recorded in hypertension case data from January to June 2024 in the work area of the Bulili Health Center, Palu City, Central Sulawesi Province, is 77 people. Based on the calculation of the sample formula above, the number of samples in the study was 64 people. In this study, the research sampling used purposive sampling, which is based on the criteria using the Slovin formula so that the number of respondents who are elderly and have hypertension is obtained. The data collection of the results of the study uses the International Physical Activity Questionnaire (IPAQ), which is an instrument used to measure the physical activity of respondents over the past week, then categorizes it into low, moderate, and high physical activity based on the MET-minute/week value and uses a questionnaire that has been tested for validity and reliability. The data analysis used was univariate, bivariate, and multivariate analysis.

RESULTS

Table 1. Distribution of respondent frequency by age group in elderly, gender, education, occupation, physical activity, obesity, diet, smoking habits, and incidence of hypertension

Characteristic	Sum (n)	Percent (%)
Age		
≤ 65 year	47	73.4
66-70 year	14	21.9
> 71 year	3	4.7
Gender		
Female	33	51.6
Male	31	48.4
Education		
Elementary school	6	9.4
Junior high school	12	18.8
Senior high school	20	31.3

Bachelor's Degree	26	40.6
Work		
Retired Civil Servants/TNI/Polri	17	26.6
Housewives	24	37.5
Self-employed	18	28.1
Farmers/Workers	5	7.8
Physical Activity		
Low	20	31.3
Keep	15	23.4
Tall	29	45.3
Obesity		
Fat	39	60.9
Not fat	25	39.1
Diet		
Often	35	54.7
Infrequently	29	45.3
Smoking Habits		
Heavy	34	53.1
Light	22	34.4
No Smoking	8	12.5
Incidence of Hypertension		
Hypertension	36	56.3
No Hypertension	28	43.8

Table 2. Bivariate test results for each independent variable

Independent Variable	Sig (p)	Included
Physical Activity	0,000	Yes
Obesity	0,000	Yes
Diet	0,029	Yes
Smoking Habits	0,000	Yes
Work	0,020	Yes

Table 3. Results of Logistic Regression Test Between Hypertension Incidence in the Elderly

Variable	B	S.E.	Beta	t	Sig
Physical Activity	.102	.052	.178	1.988	.052
Obesity	.751	.118	.738	6.338	.000
Diet	.096	.089	.096	1.077	.286
Smoking Habits	-.121	.077	-.171	-1.570	.122
Work	.043	.106	.037	.402	.689

Physical activity is one of the risk factors for hypertension that can be controlled. Based on the table above shows that the most dominant respondents have high physical activity and experience hypertension events, namely 15 people (23.4%) and those who do not experience hypertension as many as 14 people (21.9%). In comparison, those who have moderate activity and experience hypertension events are 2 (3.1%) and non-hypertension as many as 13 people (20.3%) and respondents who have low physical activity and experience hypertension, namely 19 people (29.7%) and do not hypertension as many as one person (1.6%). The results of the statistical test obtained a p-value = 0.000 < an alpha value (α = 0.05), so Ho was rejected with the interpretation that there was a significant relationship between physical activity and the incidence of hypertension in the elderly in the working area of the Bulili Health Center, Palu City, Central Sulawesi Province in 2024. Based on the data obtained, low activity in the elderly who experience hypertension is as many as 19 people (29.7%) and one person without hypertension (1.6%), which means that the elderly with less physical activity have a greater potential to experience hypertension than the elderly with good physical activity. The incidence of hypertension in the elderly with the variables studied showed a relationship; the most related variable was obesity. Therefore, it is hoped that the elderly, especially those who are obese, will be given interventions

to maintain their diet so that complications do not occur and can reduce the risk of hypertension.

DISCUSSION

The results of this study show that obesity is the most related factor to the incidence of hypertension in the elderly. Obesity causes an increased workload on the heart, as the body needs more oxygen and nutrients, so the heart must pump more blood. This increases the pressure on the walls of blood vessels, which ultimately leads to hypertension. In addition, obesity is often associated with insulin resistance and chronic inflammation that can also worsen blood pressure. This link has been widely supported by other studies that show that individuals with a high body mass index (BMI) tend to have higher blood pressure. In the elderly, the accumulation of body fat, especially visceral fat, is a significant risk factor because this fat increases intra-abdominal pressure and affects vascular resistance.

Older adults who lack exercise tend to have a higher risk of developing hypertension. Regular physical activity plays a role in maintaining an ideal body weight, improving blood circulation, and maintaining the elasticity of blood vessels (Palatini *et al.*, 2024). However, although physical activity was related to hypertension in this study, the effect was not as strong as the obesity variable. Excessive salt consumption has long been known as one of the factors causing hypertension. In older people, salt sensitivity tends to increase with age. However, in this study, the relationship between salt intake and hypertension was not as significant as with obesity. This may be due to various factors, including individual salt sensitivity differences or respondents' diets (Fucile *et al.*, 2024). Genetic factors also influence hypertension. A family history of hypertension can increase a person's risk of experiencing it, including in the elderly.

Nonetheless, obesity remains a more robust variable than hereditary factors in this study. The effect of alcohol on hypertension varies, depending on the amount and frequency of consumption. Consumption of large amounts of alcohol can increase blood pressure. However, in the elderly who consume only small or moderate amounts of alcohol, the impact on hypertension is not as strong as the effect of obesity (X. Huang *et al.*, 2024).

Obesity has a direct effect on increasing blood pressure through several physiological mechanisms. One of the mechanisms is an increase in blood volume and cardiac output due to weight gain. In addition, obesity also increases the activity of the sympathetic nervous system and the renin-angiotensin-aldosterone system (RAAS), which plays a role in regulating blood pressure (Fascetti *et al.*, 2024). Activating these two systems leads to vasoconstriction and sodium retention, ultimately increasing blood pressure. In the elderly, obesity is often accompanied by decreased physical activity and changes in body composition, such as reduced muscle mass and increased fat mass (Kaleta *et al.*, 2023). Combining these factors worsens the overall health condition and affects blood pressure. Epidemiologically, the prevalence of obesity in the elderly population continues to increase, and this contributes directly to the increasing prevalence of hypertension in this age group. Therefore, weight control through a balanced diet and regular exercise is one of the main strategies for preventing and controlling hypertension in the elderly (Y. Huang *et al.*, 2024).

Central obesity (the accumulation of fat in the abdominal area) has been shown to increase the risk of hypertension because this fat causes inflammation and dysfunction in the body's metabolic system (Xin *et al.*, 2024). Weight loss in obese elderly can be one of the essential strategies to reduce the risk of hypertension. Interventions such as a balanced diet, increased physical activity, and stress management are also recommended to prevent increased blood pressure. Obesity is the variable most associated with the incidence of hypertension in the elderly (Bian *et al.*, 2023). Therefore, weight control through a healthy diet and sufficient physical activity is essential in preventing hypertension, especially in the elderly (Zhang *et al.*, 2024). Obesity has long been known to be a significant risk factor for hypertension. Excess body fat can increase blood pressure through several mechanisms, such as increased blood vessel resistance and sympathetic nervous system activity. However, in addition to obesity, various other factors

also contribute to the incidence of hypertension in the elderly, such as smoking habits, physical activity, diet, family history, and psychosocial factors (Zou *et al.*, 2024).

Obesity is a significant risk factor for hypertension. Increased body weight increases blood pressure through various mechanisms, such as increased blood volume, peripheral vascular resistance, and increased renin-angiotensin-aldosterone system activity (Agraib *et al.*, 2023). In addition, obesity is also associated with insulin resistance and chronic inflammation, which can worsen blood pressure. Smoking habits and low physical activity are also essential factors in blood pressure control. Although the effects are not as strong as obesity, smoking can cause damage to the walls of blood vessels, which can contribute to hypertension (Liao *et al.*, 2024).

Meanwhile, low physical activity causes the body's metabolism to slow and tends to trigger fat accumulation, increasing the risk of hypertension. The association between psychosocial factors, such as stress and hypertension, highlights the importance of mental health in the elderly (Suprapto *et al.*, 2023). Chronic stress can increase sympathetic nervous system activity, significantly increasing blood pressure (L. Li *et al.*, 2024). Obesity is the most dominant factor and most associated with hypertension in the elderly group. Public health interventions to reduce the prevalence of obesity in the elderly are essential in efforts to prevent hypertension and its accompanying complications. Promotive and preventive efforts, such as education about healthy diets, weight loss programs, and increased physical activity, must be a priority in handling the elderly at risk of hypertension (Suprapto, Mulat and Lalla, 2021). In addition, attention to psychosocial factors is also needed to create healthier elderly people overall.

CONCLUSION

This study shows that there is a significant relationship between obesity and the incidence of hypertension in the elderly, where obesity is the most related factor to hypertension compared to other variables such as physical activity, salt intake, family history, and alcohol consumption. Weight control through diet and exercise is the main step in preventing and managing hypertension in the elderly. Collaborative efforts between individuals, families, and health workers are urgently needed to reduce the prevalence of obesity and hypertension in the elderly to improve their quality of life. There needs to be education for the elderly about the importance of maintaining an ideal weight and a healthy lifestyle to prevent hypertension. The government and health service providers are also expected to be more proactive in conducting health screening and providing early intervention for the elderly at high risk of hypertension.

Conflicts of Interest:

The authors declare no conflict of interest.

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