

Does BMI or Age Cause Hypertension in The Elderly in The Bergas Public Health Center in Indonesia?

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Abstract

Hypertension has been identified as one of the main risk factors for cardiovascular diseases, such as heart disease, peripheral blood vessels, stroke, and kidney disease. Several factors have been identified as factors associated with the incidence of hypertension. There are no studies that identify the factors that cause hypertension in Bergas Primary Health Care. This study aimed to determine the relationship between BMI and age with hypertension in the elderly in the Bergas Public Health Center in Indonesia. The design of this study was descriptive correlative with a cross-sectional approach. The population is 138 elderly, and the sample is 58 using an accidental sampling technique. The instruments used are the BMI calculator application and medical records at the Bergas Public Health Center. The statistical test used is the Spearman-Rank. The results showed the average BMI of the elderly (mean = 22.5), and most of the BMI of the elderly were in the normal category. The elderly mainly were aged 60-69 as many as 42 people (72.4%). There was no significant relationship between BMI (Body Mass Index) and the incidence of hypertension; there was a significant relationship between age and hypertension in the elderly in Bergas Public Health Center. It is expected that the elderly can maintain a healthy active lifestyle to maintain BMI within normal limits so that the cell age is expected to be younger.

Introduction

Cardiovascular disease (CVD) as the leading cause of death in adults is becoming increasingly apparent. One of the main reasons for this trend is the changing blood pressure pattern and the increasing prevalence of hypertension with age (about 1 billion people worldwide). According to The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC-

7), hypertension occurs in more than two-thirds of individuals after 65 years.

According to Muli(2020), the prevalence of hypertension in Germany in adults aged 65-94 years is 73.8%, which means 3 out of 4 older adults have high blood pressure. The prevalence of hypertension sufferers in Indonesia's population aged 18 years is 34.1%. The majority of hypertension aged 18 years in each province is relatively high. According to World Health Organization, 15% of the

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Indonesian population suffers from hypertension. Central Kalimantan Province occupies the highest prevalence at 44.1%, West Java at 39.6%, and East Kalimantan at 39.3%. The estimated number of hypertension cases in Indonesia is 63,309,620 people, while the death rate in Indonesia due to hypertension is 427,218 deaths (Riskesmas, 2018).

According to (Riskesmas, 2018) , hypertension is included in ten diseases that occur in the elderly in Indonesia.. In Central Java Province, the prevalence of hypertension sufferers is 37.57%. In Semarang Regency, the estimated number of patients aged 15 years who suffer from hypertension is 34,322 people. Bergas Public Health Center ranks 3rd with 2,935 people after Getasan Public Health Center (3,385 people) and Tenganan Public Health Center with 3,000 people (DKK Semarang, 2020). The Bergas Public Health Center has implemented a treatment strategy for the elderly population with hypertension in its working area, but they are still facing obstacles.

Goals and strategies for treating hypertension in the elderly population are more challenging than for other age groups. Lifestyle modifications are effective in this elderly population, but they are not accessible. The use of drugs also needs careful consideration and monitoring from the medical side. Before these efforts are made, understanding the factors associated with hypertension in the elderly is crucial to understand.

Factors related to the incidence of hypertension are unhealthy diet, smoking or drinking excessively, genetics, age, gender, pre-hypertension and diabetes (Rice, 2020). According to World Health Organization, the precipitating factors associated with hypertension are smoking, lack of exercise, obesity, gender, genetics and age. According to (Azzam, 2021), the factors related to hypertension are knowledge, physical

activity, diet, health facilities, alcohol consumption and stress.

Body Mass Index(BMI) is a value derived from the mass and height of a person. BMI is a measure of body fat based on height and weight that applies to adult men and women with diabetes (NHLBI,2021). Age is defined as the length of time that a person has lived or a thing has existed.

Based on research by (Azzam,2021), obesity (BMI) is associated with hypertension. According to (Rice, 2020), age is also related to the incidence of hypertension. The first factor related to the incidence of hypertension is BMI. Suppose a person's BMI is within normal limits. In that case, there will be no risk for hypertension in the elderly, and the younger a person's age will also reduce the person's risk of developing hypertension. The elderly with a normal BMI can reduce the risk of hypertension. If the elderly have a normal BMI, hypertension will also be less, and the higher a person's BMI, the higher the risk for hypertension. Meanwhile, a person also has a higher risk of developing hypertension with increasing age.

Based on a preliminary study conducted at the Bergas Public Health Center in September 2021, data on the elderly who had hypertension were obtained as many as 175 people; this is based on cases of hypertension diagnosed by doctors at the Public Health Center. Most of the interviews with ten elderly people did not previously know that they had high blood pressure. Most of them only found out when they accidentally checked at the Public Health Center and only found out that they had hypertension.

Based on the previous studies, there are gaps in results. According to the finding of prior studies (Herdiani, 2019) there was a relationship between BMI and hypertension in the elderly. In comparison, the study results (Dien et al,



2014) stated no significant relationship between BMI and hypertension.

Based on this background and the gaps that the researchers found, the researchers were interested in investigating the "Relationship between BMI and age with the incidence of hypertension on elderly at Bergas Public Health Center, Indonesia".

Method

This study was descriptive correlation research design with a cross-sectional approach. This research was conducted at Bergas Public Health Center area on

October 2021. The population in this study were 138 elderly people with hypertension who had been diagnosed by a doctor. The BMI was collected from the medical record and computed by using the BMI's application. The inclusion criteria for this study were: 1) Willing to be a respondent, 2) Respondent with hypertension, 3) elderly aged 60 years above, 4) Living in the working area of the Public Health Center. Univariate analysis was carried out on each variable to see each research variable's frequency distribution and percentage, while the bivariate analysis used Spearman-Rank test.

Results and Discussion

Table1. Distribution of the frequency of BMI, age and incidence of hypertension among elderly at Bergas Public Health Center in Indonesia (n= 58)

Category	Frequency(f)	Percentage (%)
BMI		
Underweight	2	3,4
Normal	42	72,4
Overweight	14	24,1
Age (years)		
60-69	42	72,4
70-80	16	27,6
Incidence of hypertension		
Hipertension stage 1	1	1,7
Hipertension stage 2	50	86,2
Crisis hipertension	7	12,1

Based on table 1, it is shown that the majority of elderly BMI were in normal category for 42 respondents (72.4%), most of them aged 60-69 years old as many as 42 (72%), and as many as 50 elderly (86.2%) had hypertension stage 2.

Based on the BMI of the elderly, it shows that the majority of the elderly are in the normal category as many as 42 elderly (72.4%).

The reason that can be attributed to most of the elderly in the normal BMI category is the respondent's work background. The majority of the elderly work as farmers who are still active. The physical work

carried out by the elderly certainly makes the elderly remain active and spend a fairly high calorie. This will make the condition of the elderly body in a balanced condition between intake and daily calorie expenditure. This is supported by the Indonesian Ministry of Health statement that physical activity carried out for at least 30 minutes every day can burn calories and prevent excess weight, reduce stress/calm the mind, increase blood circulation, improve digestive function, and balance hormones. It is supported by (Biddle et al,2020) which states that physical activity is at least 150-300 minutes for a moderate-intensity activity or 75-150



minutes/week for vigorous physical activity. Some physical activity is better than none. More physical activity is better for optimal health outcomes and reducing sedentary lifestyles. Physical activity for adults and older adults can maintain a healthy weight (GOV.UK, 2016). This condition will certainly greatly affect the smooth metabolism of the elderly. Good metabolism will help in maintaining ideal body weight. In addition to the majority working as farmers, at the same time, several older women are also active in completing their household work independently without any household assistants. This will maintain the fulfillment of the elderly's daily active activities. The natural conditions carried out by the elderly also play a role in maintaining ideal body weight or maintaining the BMI of the elderly within normal limits.

In addition, BMI of the elderly in the overweight category was as many as 14 elderly (24.1%). This can be associated with a history of comorbidities namely diabetes mellitus, stroke, and other diseases. Those conditions experienced by the elderly will make the elderly tend to be less active. As a result, it will increasingly make the elderly smaller in spending calories every day. The behavior of the sedentary lifestyle of the elderly will increase the BMI value of the elderly. This is following the statement from (RS JIH,2021), which states that a lack of activity or a sedentary lifestyle will increase the risk of obesity characterized by a person's BMI of more than 30, which is characterized by high levels of obesity or excessive body fat. Individuals who practice a sedentary lifestyle more than 5 hours/day will have a 2.9 times greater risk of obesity (Mandriyani, 2017). Park at al, (2020) stated that sedentary behaviors have

wide-ranging adverse impacts on the human body, including increased all-cause mortality, cancer risk, and risks of metabolic disorder such as diabetes mellitus, hypertension, and dyslipidemia, musculoskeletal disorder.


Table 1 showed that most of the respondents aged 60-69 years as many as 42 elderly (72.4%). Health conditions tend to be better than those in the above age category in this age range. The death rate increases as age increases. In this study, all respondents were hypertensive patients, where the elderly with hypertension, if not handled properly, will accelerate the death rate due to disease complications (BPS, 2021).

Table 1 showed that most older adults have hypertension in the category of stage 2 hypertension as many as 50 elderly (86.2%). According to the American Heart Association, the classification of blood pressure is for the category of stage 2 hypertension with a systolic of 180 mmHg and or a diastolic of 120 mmHg. This is indicated by the elderly with systolic 188-193 mmHg as many as eight elderly, and diastolic 120 as many as six elderly. As mentioned by a statement (RSUD Ungaran, 2021) which states that hypertension is a silent killer disease. This condition is supported by the statement (CNN Indonesia,2021) that hypertension is a silent killer disease. It is a disease that does not have visible symptoms. It can lead to severe and fatal situations and risk coronary heart disease, heart disease, and heart attack. The results also show that respondents are included in the stage 1 hypertension category because the elderly have carried out routine controls at the Primary Health Care and have begun to adopt better lifestyle changes.

Table2. Correlation of BMI and age with the incidence of hypertension among elderly at Bergas Public Health Center in Indonesia

	r	p-value
BMI x incidence of hypertension	+ 0,026	0,846
Age x incidence of hypertension	- 0,330	0,012

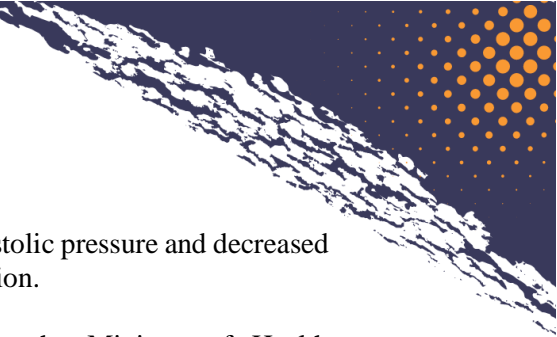




Based on Table 2, there was no significant relationship regarding the relationship between BMI and the incidence of hypertension in older adults at Bergas Public Health Center (p-value = 0.846) with an r-value of +0.026. In addition, there was a significant relationship between age and the incidence of hypertension (p-value = 0.012) with an r-value of -0.330.

Based on this study, BMI was not associated with the incidence of hypertension. This is because the majority of respondents' (42 elderly) BMI is within normal limits. Although there were 2 elderly in the underweight category and 14 elderly in the overweight category, this situation did not cause a significant relationship between BMI and the incidence of hypertension. This was supported by the correlation coefficient value of +0.026. Other possible reasons, some factors cause the incidence of hypertension in respondents. According to (Rice, 2020) and (Azzam,2021), the factors contributing to the incidence of hypertension are quite a lot, such as genetics, physical activity, diet, alcohol consumption, smoking, and others, even though there is obesity.

The study results explain the relationship between age and the incidence of hypertension. When aging, the cardiovascular system undergoes anatomical and functional changes. Changes in the heart and vascular system structure cause decreased ability to function efficiently. Valve thickened and stiffened heart and decreased elasticity of the arteries and lost elasticity. Presence of calcium and fat deposits on the walls of arteries and veins become very tortuous twist so that the ability in its function also decreases up to 50%. Capillary blood vessels have decreased elasticity and permeability. As the result, an increase in vascular resistance leads to



increased systolic pressure and decreased tissue perfusion.

According to the Ministry of Health Indonesia (2013), the prevalence of hypertension among adults aged 45-64 and > 65 years was 51% and 65%, respectively. Compared to age 55-59 years, at the age of 60-64 years there are two times increase risk of hypertension; at age 65-69 years 2.45 times and age > 70 years 2.97. Older adults also experience a decrease in metabolism. This condition is associated with an increased risk of high blood pressure. Increasing age causes blood pressure to increase because the arterial walls in the elderly will experience thickening, resulting in the accumulation of collagen in the muscle layer. The blood vessels will gradually narrow and become stiff.

The finding of this study was supported by Widjaya's study (2018) that there is a relationship between age and the incidence of hypertension in Tegal City. Furthermore, according to Nuraeni (2019), the results of multivariate analysis showed that the factors associated with hypertension were age (p=0.000; OR=8,431). According to Ekarini et al. (2020), the analysis results obtained OR from the age variable is 2.9, meaning that patients in the middle to upper adult age will experience hypertension 2.9 times higher than young adult patients after controlling obesity and physical activity variables.

Conclusion and Suggestions

This study proves that BMI has no significant correlation to hypertension in the elderly at Bergas Public Health Center, but the incidence of hypertension is related to age. The clinical practitioners should be considering the others factors. In addition, the strategy of hypertension management among the elderly should be considered about the

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aging process. The future researcher recommends conducting a study to predict the other factors as the cause of hypertension in the elderly, especially in the Bergas Public Health Center in Indonesia.

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