

The Correlation Between Body Mass Index and Blood Pressure Among Acehnese and Javanese Elderly in West Aceh

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Abstract: Elderly is a condition of someone who has aged 60 years and over. In the elderly group there has been an aging process that can result in decreased organ function and deterioration in health conditions. This situation can affect the emergence of various kinds of disease problems, including instability of systolic and diastolic blood pressure. The purpose of this study was to determine the relationship of body mass index with blood pressure in the elderly. This type of research is observational analytic with cross sectional design. The number of samples in this study were 78 people aged ≥ 60 years. Data analysis was performed using correlation tests. The analysis showed that body mass index was associated with systolic blood pressure ($r = 0.302$, $p = 0.007$) and diastolic blood pressure ($r = 0.315$, $p = 0.005$) in the form of moderate and positive patterned relationships, meaning that the higher the body mass index the older the higher the systolic blood pressure and diastolic blood pressure. The conclusion from this study there is a significant relationship between body mass index with systolic and diastolic blood pressure in the elderly.

Keywords: Elderly, body mass index, blood pressure

Introduction

Body Mass Index (BMI) is positively related to morbidity and mortality due to hypertension, cardiovascular disease, type II diabetes, and other chronic disease.¹ Body Mass Index (BMI) is a measurement that is often done to determine the condition of fat in the body.² Body Mass Index (BMI) is calculated as body weight in kilograms per height in meters squares and is widely used to estimate the prevalence of obesity or underweight in a population.³ Body Mass Index (BMI) is used to classify overweight and obesity in order to estimate the relative risk of disease compared to normal weight.⁴ Overweight is indicated by a body mass index of 25.0 to 29.9 kg/m², and obesity with a body mass index of 30.0 kg/m² or more.⁵

Body Mass Index (BMI) is related to systolic and diastolic blood pressure which shows a direct linear relationship with the risk of hypertension.^{6, 7} Obesity is one of the main risk factor for hypertension.^{8, 9} People who are overweight or obese have a tendency to have high blood pressure compared to people who are normal or thin.¹⁰ The prevalence of hypertension is increased in people who overweight or obese compared to non-obese.³

Some of the factors that cause overweight and obesity such as consuming less nutritious foods with high levels of sugar and fat, coupled with lack of physical activity and exercise. The situation has been able to increase the incidence of obesity threefold or more in some areas of North America, England, Eastern Europe, the Middle East, Pasific Island, Australia and Asia.¹¹ Weight loss is recommended to reduce high blood pressure in people who are overweight and obese with high blood pressure. High blood pressure causes 7.1 million deaths in the world and is one of the risk factors for cardiovascular disease in several developing countries.¹²

Overweight and obese can increase the risk of high blood pressure, coronary heart disease, ischemic stroke, type II diabetes.¹² A study conducted in the elderly in Greece, the

prevalence of hypertension is higher in individuals with a body mass index of 25.0 or more and continues to increase with increasing age.¹³ This shows a change in body weight when body mass index increases high blood pressure, especially in elderly. Overweight and obese is a condition where is excess body fat. The operational definition of overweight and obesity is based on measurements of body mass index which is correlated with body fatness.² The purpose of this study was to determine the relationship of body mass index with blood pressure in the elderly.

Research Methods

This type of research is an analitic survey by cross sectional design. Sampling was done by random sampling with the number of samples in this study as many as 78 people aged 60 years or more. The research instruments used to view measurements of body weight, height, abdominal circumference and blood pressure are scales, centimeters, tensimeters and questionnaire. Data analysis was using correlation tests.

Results and Discussion

Results

Table 1. Characteristics of Respondents

Characteristics of Respondents	N	%
Sex		
Men	30	38,5
Women	48	61,5
Total	78	100
Education		
No school	41	52,6
Elementary school	29	37,2
Junior high school	6	7,7
Senior high school	2	2,6
Total	78	100,0
Race		
Aceh	50	64,1
Javanese	28	35,9
Total	78	100,0

Based on table 1, it shows the characteristics of respondents by sex, education and race. The table shows the number of women subjects more than men, with a percentage of women of 61.5% and men of 38.5%. Based on education, the highest number of subjects is in the non-school category at 52.6%. While based on race, the number of subjects in the Acehnese was 64.1% and Javanese was 35.9%.

Table 2. Correlation between Body Mass Index (BMI) with Systolic and Diastolic Blood Pressure

	Body Mass Index	
	Correlation Coefficient (r) ^a	p value
Systolic Blood Pressure	0,302**	0,007
Diastolic Blood Pressure	0,315**	0,005

**Correlation is significant at the 0,01 level (2-tailed)

Based on table 2, it shows that there is a significant correlation between body mass index with systolic blood pressure (p value = 0.007) and diastolic blood pressure (p value = 0.005). The strength of the correlation between the two is in moderate condition with the direction of a positive relationship which means that the higher the body mass index of elderly, then the higher systolic blood pressure ($r = 0.302$) and diastolic blood pressure ($r = 0.315$)

Discussion

The result of this study showed a significant relationship between body mass index with systolic blood pressure and diastolic blood pressure, both of which have moderate and positive patterned strengths, meaning that the higher the body mass index of elderly, then the higher systolic blood pressure and diastolic blood pressure. This study is in line with the study with the study of Kumar et al, who stated that body mass index has a significant relationship with systolic and diastolic blood pressure. The role of body mass index can increase blood pressure, especially in elderly.¹⁴

The relationship between body mass index and blood pressure is also shown in the national population in China. The relationship of body mass index and blood pressure is very strong, where the increase in body mass index will be associated with the prevalence of hypertension which also has an important role on cardiovascular risk. One effort that needs to be done to reduce the health effects of increasing body mass index for people with hypertension is by providing hypertension treatment.¹⁵

The same result were also shown in the study of Masaki et al, conducted on 1378 Japanese American men aged 60 to 80 years in which there was a significant relationship between body mass index with systolic and diastolic blood pressure.¹⁶ Hypertension is one of the most chronic condition commonly seen in the elderly population. When blood pressure is evaluated against body mass index, systolic and diastolic blood pressure is found to be influenced by an increase in body mass index. A positive correlation between body mass index and blood pressure has also been reported in the Indian population.¹⁷

High body mass index causes overweight and obesity so it plays a role in increasing blood pressure or hypertension, where systolic and diastolic blood pressure will be high in groups with high body mass index.¹⁸ Obesity is one the criteria in metabolic syndrome which also includes insulin resistance, type II diabetes, dyslipidemia, and hyperleptinemia. All the criteria for metabolic syndrome are known to have an effect on blood pressure.¹⁹ Some factors that allow body mass index to increase due to consuming lots of foods that are high in fat and carbohydrates, and not doing physical activity or exercising. Efforts to control body weight in the elderly need to be done to help reduce rising blood pressure. Diligent exercise and a healthy diet are effective steps in improving the quality of live for the elderly.

Conclusion

The correlation of body mass index with systolic and diastolic blood pressure in the elderly population of Acehnese and Javanese in West Aceh shows a moderate and positive patterned relationship, meaning that the higher the body mass index the higher the elderly blood pressure. Statistical test result obtained have a significant relationship between body mass index with systolic and diastolic blood pressure.

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