Original Article:

The relationship between income and nutritional status with the incidence of hypertension in elderly

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Abstract:

Background:Blood pressure is a disease that is often found in the elderly. Many studies show that socioeconomic status is closely related to the incidence of hypertension especially in the elderly. In addition, since hypertension is generally associated with being overweight and obese, nutritional status can also be a factor for experiencing hypertension in the elderly. ***Objective:***To analyze the relationship between income and nutritional status with the incidence of hypertension in the elderly. ***Method:*** This study used a cross-sectional study design involving 133 elderly respondents in the area of the Klaten Community Health Center. Income data were obtained using the respondents' basic characteristic questionnaire. Nutritional status was obtained based on anthropometric measurements of body weight and height which were calculated using the Body Mass Index (BMI). While blood pressure data were obtained from Sphygmomanometer measurements. The data obtained were analyzed using the Spearman test with a p-value <0.05. This study was approved by Ethics Commission UniversitasSebelasMaret. ***Results:*** The results of this study indicate there is a relationship between income and the incidence of hypertension in the elderly (p=0.046) while the nutritional status has no relationship with the incidence of hypertension (p=0.640). ***Conclusion:*** High income has a low risk of the elderly experiencing hypertension, while nutritional status good or not they do not have a risk of hypertension.

Keywords: Nutritional status, hypertension, income, elderly.

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Introduction

Hypertension or high blood pressure is defined as abnormally high arterial blood pressure. According to the Joint National Committee 7 (JNC7), normal blood pressure is systolic blood pressure <120 mmHg and diastolic blood pressure <80 mm Hg. Hypertension is defined as a systolic blood pressure level of ≥140 mmHg and/or a diastolic blood pressure level ≥ 90 mmHg. Vulnerable blood pressure between 120-139 mmHg systolic blood pressure and 80-89 mmHg diastolic blood pressure is defined as "prehypertension"[1]. Aging is an independent risk factor for non-communicable diseases, including systemic arterial hypertension, the leading cause of preventable death in the world[2]. About 7.5 million deaths or 12.8% of all annual deaths worldwide occur due to high blood pressure[3]. Increased blood pressure is a major risk factor for chronic heart disease, stroke, and coronary heart disease. Increased blood pressure is positively correlated with the risk of stroke and coronary heart disease[4]. Treatment and prevention are key to reducing the incidence of cardiovascular complications, such as acute myocardial infarction and stroke[5].

The incidence and severity of hypertension is influenced by nutritional status and nutritional intake. Excessive energy intake such as sodium consumption and increased alcohol consumption acutely can increase blood pressure[6]. Lots of evidence that directly links obesity with high blood pressure. Obesity increases blood

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pressure and obese individuals are more likely to experience an increase in blood pressure than non-obese people. Even in older adults, a higher BMI is associated with an increased risk of hypertension[7,8]. In addition, it has been studied in many studies on socioeconomic status closely related to hypertension[9]. However, various studies present some of the results supported mostly by seniors[10,11]. Therefore the authors are interested in knowing the relationship between income and nutritional status with the incidence of hypertension in the elderly.

Material and Method

This study uses a cross-sectional research design. The population in this study was the elderly > 60 years old who lived in the health center area of Klaten Regency, Central Java. The sample in this study amounted to 133 respondents. The inclusion criteria in this study are the elderly who are ≥ 60 years old, who can still stand upright, who can still do their daily activities,are not illiterate. Whereas the exclusion criteria in this study are the elderly who are sick. This research was conducted from December 2019 to January 2020. The subjects agreed to participate as respondents until the study ended and signed informed consent.

Income data were obtained using the respondents' basic characteristics questionnaire and nutritional status data were obtained from anthropometric measurements of height and weight and were calculated using the Body Mass Index (BMI). As for the blood pressure data obtained from the Sphygmomanometer measurement results, the criteria and classification of variables used can be seen in Table 1. The data obtained were analyzed bivariate using the Spearman rank test (α = 0.05).

Table 1. Classification of variables.

Variables	Criteria	Classification
Income	IDR > 2.500.000	• High
	IDR 1.500.000 – 2.500.000	• Medium
	IDR < 1.500.000	• Low
Nutritional Status	> 27	• Obesity
	25 – 27	• Overweight
	18,5 – 25	• Normal
	<18,5	• Low
Blood pressure	<120 mmHg	A. Normal
	120-139 mmHg	B. Prehypertension
	>140 mmHg	C. Hypertension

Results

Based on the characteristics of respondents (Table 2), the sex of the respondents was dominated by elderly women with a percentage of 84.2% and men as much as 15.8%.Education level of most of the respondents are primary schools with a percentage of 50.4%, while 63.9% of respondents work as housewives / unemployed. Observations in this study also showed that 90.4% of respondents' income was very low. In addition, most of the respondents' nutritional status had a normal category with a percentage of 37.6%, but most of the respondents' blood pressure showed 53.4% included in the hypertension criteria.

Table 2. Characteristics of respondents.

Variables	Jumlah (%)
Sex	
3. Male	15.8
4. Female	84.2
Education	
• College	1.5
• Senior high school	2.3
• junior high school	8.3
• primary school	50.4
• No school	37.6
Work	
• Housewife / Unemployment	63.9
• Farmer	5.3
• Entrepreneur	12.8
• Enterpriser	18
Income	
• High	2.3
• Medium	2.3
• Low	95.4
Nutritional Status	
• Obesity	22.6
• Overweight	18.8
• Normal	37.6
• Low	21.1
Blood pressure	
D. Normal	32.2
E. Prehypertension	14.3
F. Hypertension	53.4

Table 3 shows that respondents in this study tended to have low incomes with normal nutritional status and were prone to hypertension. Based on bivariate analysis using Spearman rank, it is known that there is a relationship between income and blood pressure in the elderly with a value< 0.05 (p = 0.046), this shows that the elderly who have higher income tend to have normal blood pressure compared to the low-income elderly. In addition, bivariate analysis of nutritional status showed no relationship with blood pressure with values> 0.05 (p = 0.641).This shows elderly people have a tendency to experience hypertension.

Table 3. The relationship between income and nutritional status with the incidence of hypertension.

	TekananDarah			p*
	Normal	Prehypertension	Hypertension	
Income				
• High	3	0	0	
• Medium	1	1	1	0.046
• Low	39	18	70	
Nutritional Status				
• Obesity	10	5	15	
• Overweight	8	3	14	0.641
• Normal	14	5	31	
• Low	11	6	11	

*p Value Rank Spearman

Discussion

Statistical analysis showed that there was a relationship between income and the incidence of hypertension (P = 0.046). This can be interpreted that the elderly who have a high income have a lower risk of experiencing hypertension. The data in Table 3 also shows that older people who have a higher income tend to have a lower risk of hypertension than those who have a lower income. Income is also associated with work which is one of the factors causing hypertension. People who do not work tend to have lower incomes and are generally more prone to hypertension[9]. This is associated with physical activity carried out by people who work, will have higher physical activity.So that it can reduce body fat and reduce the risk of hypertension[12,13]. The results of the analysis at Riskesdas also showed that low socioeconomic factors could be a risk factor for hypertension. In addition, respondents who are not in school and do not work also have a higher risk of experiencing hypertension[14].In general, the risk of hypertension in the elderly tends to increase[15]. This is associated with decreased organ function due to the aging process, especially the decrease in heart's ability to pump blood results hypertension[4,16,17].

Statistical analysis between nutritional status and the incidence of hypertension also showed no relationship (P = 0.460). This shows thatwhether the elderly have good nutritional status ornot have the same risk of experiencing hypertension.One of the factors of a person suffering from hypertension is an unbalanced nutritional status[18,19]. The greater the body mass, the more blood is needed to supply oxygen and food. Increased blood volume can be at risk of putting more pressure on the arterial wall, so that there is a risk of developing hypertension[20]. In some countries, hypertension is a disease associated with being overweight and obese.[21] Other research also suggests that elderly people who are overweight or obese increase hypertension[22]. Hypertension in the elderly is difficult to cure but can be controlled by changing lifestyles. Medication for hypertension itself is already present, but some studies discuss a simple lifestyle and changing diet to prevent or restore high blood pressure[23]. The WHO also determined that good intake and consistency of physical activity affect health, and reduce the incidence of morbidity in chronic diseases such as cardiovascular disease, diabetes, obesity, and hypertension [24].

Conclusion

Our study suggests that, there is a relationship between income and the occurrence of hypertension. Older people who have a higher income have a lower risk of hypertension. While nutritional status has no relationship with the incidence of hypertension, this study shows that elderly people tend to experience hypertension more.

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Ethical Approval Issue: This research was approved by the Ethics Committee of Faculty of Medicine, SebelasMaret University, Surakarta, Indonesia No.002 / UN27.06 / KEPK / EC / 2020.

Conflict of interest: None declared

Author's Contribution: Emi Nur Sariyanti principal investigor, conceptualized and designed the study, prepared the draft of the manuscript and reviewed the manuscript.DiffahHanim conducted the study, data analysis and interpretation, assisted in drafting of the manuscript, reviewed the manuscript. SapjaAnantanyu assisted in drafting of the manuscript, reviewed the manuscript.

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