

Associations between nutrition attitudes, socioeconomic status, and vitamin E intake on blood pressure among elderly with hypertension in Klaten, Central Java-Indonesia



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ABSTRACT

Background: Hypertension is a health problem which affects many elderly patients. Indirectly, the attitude of elderly patients influences food selection. With a better attitude, elderly individuals will have a better understanding of the type and amount of food to be consumed. Good nutrition attitudes can reduce or prevent malnutrition, control hypertension and reduce cardiovascular complications. The mechanism of hypertension has been associated with oxidative stress, which is related with the intake of high antioxidant foods, such as vitamin E. Antioxidants, when consumed in an adequate amount, can help the adaptation or adjustment to the changes that occur in the body. Antioxidants also increase body cells turnover that has the potential to extend the life of elderly patients.

Method: This study is a descriptive, observational, cross-sectional research. The study was conducted in May 2017. The sample size was

125 elderly patients with hypertension, taken with purposive random sampling method. Vitamin E intake was measured with 2 × 24 hour Food Recall and Qualitative Food Frequency Questionnaires (FFQ). Other data were collected through a questionnaire, then analyzed using multiple logistic regression.

Results: Correlation test showed chi-square test results that there was a correlation between nutritional attitude ($p = 0,026$, $OR = 6,650$, $CI\ 95\% = 1,319-33,517$) and vitamin E intake ($p = 0,043$, $OR = 2,147$, $CI\ 95\% = 1,015-4,542$) with blood pressure in elderly hypertension patients, but not on socioeconomic status ($p = 0,230$, $OR = 0,583$, $CI\ 95\% = 0,241-1,141$).

Conclusions: The multivariate analysis showed that nutritional attitude was dominant factors with statistically significant $p = 0,023$, $OR = 1,50$, $CI\ 95\% = 2,14-17,21$.

Keywords: Nutrition attitudes, socioeconomic status, vitamin E intake, blood pressure, hypertension, elderly

Cite This Article: Yuliyana, T., Kusnandar, Hanim, D. 2018. Associations between nutrition attitudes, socioeconomic status, and vitamin E intake on blood pressure among elderly with hypertension in Klaten, Central Java-Indonesia. *Bali Medical Journal* 7(3): 607-611. DOI: [10.15562/bmj.v7i3.882](https://doi.org/10.15562/bmj.v7i3.882)

INTRODUCTION

Higher life expectancy has led to an increasing number of elderly population, especially in developing countries. Based on the World Health Organization (WHO) data in 2012, the global elderly population in 2013 reached 13.4%. Indonesia was among the top five countries with the highest number of elderly. In 2000, 7.18% of the population in Indonesia was elderly people. This number was increased to 9.77% in 2010 and is predicted to rise to 11.34% in 2020.¹

One example of the physical deterioration of the elderly is vulnerability to illness, especially degenerative diseases. A common degenerative disease which affects elderly people is hypertension.² According to a community study conducted by WHO in Central Java, hypertension and cardiovascular diseases were the second most prevalent diseases in elderly people following arthritis, amounting to 15.2% of 1203 subjects.³ Currently, hypertension, along with other cardiovascular diseases, are emerging in communities with low socioeconomic status. A research in

Ponorogo in 2009 showed a significant relationship between hypertension and poverty ($OR = 2.16$; $CI\ 95\% = 1.08$ to 4.35).

Nutritional problems in elderly increases due to multiple factors, such as lack of knowledge and food-processing techniques. These factors directly affect the nutrition status, psychological effects, errors diet and lack of economic factors / limited family economy also led to a lack of nutrition in the elderly.⁴ Thus, proper health behaviors are required, by changing the discordant or negative behaviors into positive habits.⁵ In the district of Klaten, low socioeconomic communities obtain less nutritional information. Most of the population in this district have a low level of physical activity and unhealthy eating habits, which increase the risk of hypertension.

Acker, et al. (2003) found that vitamin E consumption can lower the superoxide radical production because of its potential as an antioxidant chain breaker of the membrane. Thus, vitamin E intake can prevent cell damage caused by lipids

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Received: 2017-10-11

Accepted: 2018-6-25

Published: 2018-8-1

Table 1 Characteristics of the study sample (n = 125)

Variable	Category	N	%	P	OR	CI 95%
Hypertension Category	Grade 1	78	62.4	0.201	0.572	0.242-1.355
	Grade 2	47	37.6			
Age	60-74 years	100	80	0.895	1.066	0.410-2.773
	75-90 years	25	20			
Gender	Male	17	13.6	0.315	0.688	0.332-1.428
	Female	108	86.4			
Occupation	Unemployed	20	16	0.201	0.476	0.150-1.514
	Employed	105	84			
Education	≤ High school	117	93.6	0.230	0.583	0.241-1.414
	≥ High school	8	6.4			
Family expenses	≤ MW	105	84	0.026*	6.650	1.319-33.517
	≥ MW	20	16			
Nutritional attitude	High	9	7.2	0.043*	0.466	0.220-0.985
	Enough	116	92.8			
Vitamin E	Less	57	45.6	0.043*	0.466	0.220-0.985
	Low	68	54.4			

Description:

MW = Minimum Wage

CI = confidence interval

(*) significant relationship = (p < 0.05)

Table 2 Characteristics of subjects based on food intake in Klaten District, Regional Health Center Juwiring

Subject Characteristics	Energy Sufficiency Score		Total		n	Mean±SD	Min	Max
	Male	Female	n	%				
Energy (calories/day)								
Enough		1900	1550	46	36.8	1122.72 ± 523.32	367.45	1941.30
Less				79	63.2			
Protein (gr/day)								
Enough		59	59	56	44.8	25.31 ± 9.58	9.15	59.35
Less				69	55.2			
Fat (gr/day)								
Enough		53	53	52	41.6	25.10 ± 10.47	6.60	58.55
Less				73	58.4			
Carbohydrate (gr/day)								
Enough		285	252	49	39.2	6.84 ± 5.20	50.00	285.15
Less				76	60.8			
Vitamin E (mg/day)								
Enough		15	15	57	45.6	116.19 ± 45.99	1.00	15.60
Less				68	54.4			

peroxidation and inhibit free radicals formation, which can significantly lower the risk of hypertension. It is associated with significant changes in endothelial function and cardiovascular disorders. The addition of fruit and vegetable servings in the

daily meal may improve blood flow response to acetylcholine.

Thus, healthier nutritional attitudes in elderly people are expected. The purpose of this study was to determine the relationship between nutritional

Table 3 Multivariate test results

Variable	B Coefficient	SE	df	Sig	Exp(B)
Education	-0.874	0.635	1	0.169	0.417
Nutritional attitudes	1.387	0.844	1	0.023*	1.152
Family expenses	-0.248	0.505	1	0.623	0.780
Vitamin E	0.052	1.254	1	0.018*	0.039
Occupation	0.436	0.276	1	0.448	0.625
Sex	0.460	0.598	1	0.441	1.585
Age	-0.564	0.497	1	0.257	0.569

(*) significant relationship = ($p < 0.05$)

attitude, socioeconomic status, and vitamin E intake on blood pressure in elderly hypertensive patients in Klaten. Which is expected to be input for program managers control of non-communicable disease risk factors, especially hypertension

METHODS

This study used a descriptive cross-sectional design and was conducted at community health centers in Juwiring, Klaten regency, Central Java. Data collection was done in May-June, 2017 and was approved by the Dr. Moewardi Hospital Ethical Clearance Committee. Data were analyzed using contingency correlation coefficient to independent variables (nutritional, socioeconomic status, and vitamin E intake) and dependent variables (blood pressure). The analysis was followed by multiple logistic regression to determine the variables with the strongest relation.

The target participants of this study were > 60 years old men and women with hypertension who came to community health centers in Juwiring, Klaten regency. All of the data of the patients who lived in 19 villages were recorded in the medical records. The sample size was calculated with 95% confidence interval. The proportion of hypertension in the population was 12%. Hence, the sample obtained was 125 elderly hypertensive patients. The sampling method used was purposive random sampling. Inclusion criteria were men and women who had identity cards, > 60 years, had systolic blood pressure > 140 mmHg, were able to hear, read, write and communicate well. Exclusion criteria were elderly suffering from chronic kidney disease, diabetes, and stroke; moved to another location during the study; and consumed antihypertensive drugs.

Height measurement was performed utilizing microtoises, while weight measurement used digital scales. Blood pressure was measured using mercury sphygmomanometers. Interviews were done using the 2 × 24 hour recall questionnaire

which has been validated beforehand. The recall data were processed with the Nutrisurvey program in the Indonesian language, accompanied by a recording of the nutrient content in various food packaging. The data were then categorized based on the Nutrition Adequacy Score by the Indonesian Ministry of Health, 2013.

RESULTS

Of all the subjects, most were aged 60-74 years (80%), female (86.4%), had education levels below high school (93.6%), were unemployed (16%), had family expenditure below regional minimum wage (84%), had poor attitude (7.2%), and were classified as grade I hypertension (62.4%). Hypertension was significantly correlated with family expenses, nutrition attitude, and vitamin E intake ($p < 0.05$).

Based on the 2 × 24 hour's recall questionnaire, most daily intakes were less than the standard energy sufficiency score recommended by the Indonesian Ministry of Health in 2013. It was observed that the energy, protein, fat, carbohydrate, and vitamin E intake was classified as "less" in 63.2%, 55.2%, 58.4%, 60.8%, and 54.4% subjects, respectively.

All independent and confounding variables affected blood pressure in elderly hypertensive patients. Nutrition attitudes influenced blood pressure the most with p-value 0.023 and Exp value (B) 1.152.

DISCUSSION

Chi-square test results indicated a significant relationship between nutrition attitudes and blood pressure ($p = 0.026$). Questionnaire results show that the nutrition attitudes positively affected the degree of hypertension in hypertensive elderly patients. The results were consistent with other studies which found a significant association between that nutrition attitudes and blood pressure ($p = 0.018$). While a good attitude can prevent hypertension complication; the maintenance of this attitude and routine blood pressure monitoring can anticipate blood pressure rise.⁷

Food selection, which the information was obtained from local medical personnel, more than half of the elderly to avoid foods high in fat/high cholesterol, reduced the rise in blood pressure.⁸ Health is determined by the intention or the person's attitude towards health services (behavior intention), social support from the local community, and the availability of health information and facilities.⁹ Furthermore, better health attitudes will increase the health level.¹⁰ The basic steps in

controlling hypertension are patient education and lifestyle modification through promoting healthy behaviors. Another method is by providing new information to change a person's attitude, therefore also changing behavior and lifestyle.²²

Chi-square test results demonstrated a significant relationship between vitamin E intake and lowering of blood pressure ($p = 0.043$). Based on the 2×24 hours food recall interviews, vitamin E intake in elderly patients affected the degree of hypertension. In this study, patients' vitamin E intakes were classified as less, leading to higher degrees of hypertension. This result is consistent with previous findings, which stated that vitamin E intake was significantly associated with blood pressure ($p = 0.047$). Low vitamin E intake diminishes its role as an antioxidant in cells and to prevent the occurrence of lipid peroxides which cause oxidative stress and lowers the action of the GPx enzyme. The actions of lipid peroxides results in increased blood pressure, depending on the severity of arterial damage caused by endothelium vasodilator system interference, especially the degradation of nitric oxide by oxygen free radicals.¹¹

Results of other studies also support the significant association between vitamin E intake and blood pressure ($p = 0.009$). If the vitamin E requirement is fulfilled, its antioxidant function reduces high blood pressure it affects the savings were a little on the nitric oxide in the body.¹² Nitric oxide keeps blood vessel pressure low and prevents leukocytes and platelets adhesion to the blood vessel wall. The failure to break down nitric oxide decreases vasodilatation in blood vessels, causing increased blood pressure. Antioxidants may help to improve the ability of platelets to release nitric oxide and inhibit thrombus formation. Increased nitric oxide results in vasodilation that eventually causes a drop in blood pressure.¹³

Free radical molecules will attack unsaturated fats in the cell membranes, and results in a process known as lipid peroxidation. Subsequent lipid peroxidation will generate a highly toxic compound, fat peroxide. Increased fat peroxide causes higher consumption of vitamin E. Vitamin E can reduce and neutralize free radicals more effectively than other antioxidants. Vitamin E supplementation aims to prevent lipid peroxidation, to protect fatty tissues from free radical attacks, and to stabilize the membrane.¹⁴ Endothelial function improvement by administering antioxidant therapy is not yet known. Vitamin E is the first line defense against peroxide process polyunsaturated fatty acids General Adaptation Syndrome (GAS) contained in the cell membrane phospholipids. Tocopherol acts as an antioxidant chain breaker on the membrane, which

is one of a wide range of antioxidants. The effectiveness of vitamin E to prevent oxidative stress or lipid peroxidation still needs to be researched. The latest researches have shown the ability of vitamin E to reduce creatine kinase, which is an indicator of oxidative stress in muscle damage. Vitamin E can also reduce malondialdehyde (MDA), decrease the DNA damage in white blood cells, and can reduce the production of pentane and lipid peroxidation products in the mitochondria.⁶ Several studies confirmed the results of this present study. Long-term vitamin E consumption can reduce blood pressure in patients with mild hypertension. Enhancement of antioxidants by supplementing vitamin C and E in patients with essential hypertension is associated with decreased blood pressure.²³

Based on the demographic characteristics in this study, the largest age group is 60-74 years (80%). With aging, almost every person will experience an increase in blood pressure, systolic pressure continued to rise until age 80, and diastolic pressure continue until the age of 55-60 years.¹⁷ Gender roles are part of the social role and not only determined by the sex of the person concerned, but by environmental and other factors. Generally, women's blood pressure increases after menopause. Postmenopausal women have a higher risk of hypertension compared to premenopausal women. So far, studies show that hormonal and biochemical changes after menopause are major causes of blood pressure rise. Hormonal changes induce increased sensitivity to salt and weight gain, and can potentially lead to higher blood pressure.¹⁸ With aging, arteries become more rigid and less flexible, resulting in increased systolic pressure.¹⁹

The majority of the population in this study are housewives, whether working or just at home have a stressor in life. The backlog of household work, financial problems, and lack of support become stressors for housewives. Stressors that were not handled properly can cause high blood pressure, in the long term, because a lack of physical activities leads to hypertension.²⁰ In general, respondents in this study had low socioeconomic status, not well-educated and unemployed (housewife). Low socioeconomic may be a risk factor for blood pressure rise. Results from the National Basic Health Survey show that respondents are not in school and unemployed have a higher risk of hypertension. Some sociodemographic factors were significantly associated with hypertension.

Most people with hypertension have family expenses below minimum wage and low education levels. In this study, a significant association between the incidence of hypertension and family expenses was obtained. These results are consistent

with research in Kebumen in 2006, in which the proportion of respondents with hypertension and family expenses under the minimum wage was 96.08%, much higher compared to respondents with family expenses more or equal to the minimum wage (3.92%).²¹

CONCLUSION

The incidence of hypertension is associated significantly with nutritional attitude, intake of vitamin E, and socioeconomic factors such as employment status and family expenses. Other variables, although made differences, did not show significant associations.

SUGGESTION

We suggest for elderly patients to regularly check blood pressure and undergo a healthier lifestyle, such as diet modification by adding food with high antioxidants levels in the daily meal.

ACKNOWLEDGMENTS

The author would like to thank the head of Puskesmas Juwiring UPTD Klaten district, who facilitated the data collection, as well as other parties, including all friends who helped with the completion of the study.

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