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Effect of Stress on Hypertension in Individuals Older than 45 Years of Age in the Salted Fish Industry Area of Palembang in 2016

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Abstract

Stress can affect a variety of diseases, including hypertension. This study aimed to evaluate the stress factor as a determinant of hypertension in individuals > 45 years of age. A cross-sectional design was used with 37 respondents, and the measured variables included the level of stress, blood pressure, and other factors by interview. A multiple logistic regression was used for the data analysis. The results showed that stress was not related to hypertension (OR: 0.02, 95% CI: 0.001 to 0.419) after controlling for smoking, fatty food consumption, physical activity, salted fish consumption, the body mass index, and sex. In conclusion, there was no relationship between stress and hypertension in those individuals older than 45 years of age in the salted fish industry area of Palembang.

Keywords: hypertension, older than 45 years, salted fish, stress

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1. INTRODUCTION

Hypertension has contributed to 45% of the deaths due to coronary heart disease and 51% of the diseases causing strokes [15]. Hypertension, or high blood pressure, is caused by an increase in the systolic blood pressure of over 140 mmHg and in the diastolic blood pressure of over 90 mmHg on two occasions, with an interval of five minutes of rest/quiet (Ministry of Health 2015). It is a silent killer with varying symptoms in each individual, and it can resemble the symptoms of other diseases (Ministry of Health 2015). It is usually diagnosed through a health care professional or based on complaints and specific symptoms (Ministry of Health 2013).

Hypertension is a common public health problem in Indonesia that are often found in primary health care (Ministry of Health 2015). The various causes of hypertension have been determined by previous studies, and include age, sex, family history, and genetics (factors that cannot be controlled) as well as smoking habits, consumption of salt, saturated fat consumption, the use of waste cooking, drinking alcoholic beverages, obesity, lack of physical activity, stress, and the use of estrogen (Ministry of Health 2015; [9, 15, 16]).

Many people with high blood pressure in developing countries are unaware of their disease and do not have access to treatment that could control their blood pressure, which would significantly reduce the risk of death and disability from heart disease and stroke. The detection, treatment, and control of hypertension are important health priorities throughout the world [1].

The prevalence of hypertension in many countries has increased, especially in the African region, which has a higher prevalence than the averages in other countries, with more than 30% of adults having high blood pressure [16]. The prevalence of hypertension in Indonesia has decreased since 2007, from 31.7% to 25.8% in 2013, with the assumption of tension measuring tool, until their visits to health care facilities for treatment. However, the prevalence of hypertension is different based on different interviews, and has increased from 7.6% in 2007 to 9.5% in 2013. The five regions that have the highest prevalence of hypertension are Bangka Belitung (30.9%), South Kalimantan (30.8%), East Kalimantan (29.6%), West Java (29.4%), and Gorontalo (29.4%). South Sumatra has a high prevalence of 26.1%, which is more than that of the national average (Ministry of Health 2013).

The capital city of South Sumatra (Palembang) has one of the highest fish commodities in Indonesia. This is supported by the Musi River, which flows through Palembang City. This also means that the Palembang residents do intensive fish farming. Due to the high fishery production and fresh consumption, most of the catch is preserved and processed into salted fish, including smoked or fermented fish. In order to accommodate the production, some household industries manufacture salted fish, with the largest locations in the rural areas of 5 Ulu [3].

The salted fish production has exposed this area of Palembang and Indonesia to the possibility of a high prevalence of hypertension. Based on the report from the Palembang City Health Department in 2015, as many as 2,900 men and 4,292 women had hypertension [4].

Hypertension is a condition in which the blood vessels have persistently raised pressure [16]. A wide variety of events that occur every day in individuals can cause

stress and lead to hypertension [14]. Stress is the result of unpleasant physical and psychological pressure [11], especially in adulthood. With increasing age, there is a setback in various body organs; therefore, as a person ages they become more susceptible to illnesses such as hypertension. This study was intended to evaluate the stress factor as a determinant of hypertension in a group of individuals older than 45 years of age.

2. METHODS

This study used a cross-sectional design with total sample size of 53 people. The area selection was done by designating one area with the largest salted fish production in Palembang: 5 Ulu village.

The variables measured for this study included the level of stress and blood pressure. The stress assessment was conducted by interview using a special stress questionnaire developed by the WHO (2013). The blood pressure was measured using a sphygmomanometer, and the data analysis used a multiple logistic regression. The hypertension categories were normal (110/70 mmHg and 120/80 mmHg) and having hypertension (>130/80), while the stress categories were scored as low (0–13) and high (14–25). The other risk factor variables were measured simultaneously in the interview. The education variable used the categories lower (no school/elementary/junior high school) and higher (high school/college), the smoking categories were yes and no, and the consumption of fatty foods categories were yes (consumed fatty foods) and no (did not consume fatty foods). In addition, the family history of hypertension was either yes or no, the physical activity categories were high (physical activity often) and low (physical activity rarely), the salted fish consumption was either high sodium or low sodium, and the body mass index (BMI) categories were < 24 and ≥ 24 kg/m^2.

3. RESULTS

It can be seen in the initial model (Table 2) that the highest p value was used to eliminate the confounding variables, which were the variables selected as possible confounders. The variable selection was done by looking at the changes in the odds ratio (OR). If the difference between the first variable change OR was > 10%, then that variable was eliminated, and regarded as confounding. However, if the change was < 10%, then the variable was not a confounder. There were no confounding variables found in this study.

TABLE 1: Distribution of respondents' characteristics and bivariate relationships with hypertension.

Variable	Hypertension Hypertension n = 38 (%)	No hypertension n = 15	p value	OR	95% CI
Stress					
High	10 (58.8)	7 (41.2)	0.158	0.41	0.12 - 1.42
Low	28 (77.8)	8 (22.2)			
Education					
Low	36 (73.5)	13 (26.5)	0.97	2.77	0.35 - 21.73
High	2 (50)	2 (50)			
Smoking					
Yes	7 (58.3)	5 (41.7)	0.249	0.45	0.12 - 1.74
No	31 (75.6)	10 (24.4)			
Fatty food consumption					
Yes	7 (46.7)	8 (53.3)	0.015*	0.2	0.05 - 0.73
No	31 (81.6)	7 (18.4)			
Family history of hypertension					
Yes	18 (75)	6 (25)	0.628	1.35	0.40 - 5.54
No	20 (69)	9 (31)			
Physical activity					
Low	14 (93.3)	1 (6.7)	0.054	8.17	0.97 - 68.94
High	24 (63.2)	14 (36.8)			
Salted fish consumption					
High sodium	27 (77.1)	8 (22.9)	0.224	2.14	0.23 - 7.37
Low sodium	11 (61.1)	7 (38.9)			
BMI (body mass index)					
≥ 24	16 (84.2)	3 (15.8)	0.14	2.91	0.70 - 12.03
< 24	22 (64.7)	12 (35.3)			
Sex					
Male	7 (77.8)	2 (22.2)	0.658	0.68	0.12 - 3.73
Female	31 (70.5)	13 (29.5)			

TABLE 2: Well-formulated hierarchical model.

Variable	OR	95% CI	SE	p value
High stress*	0.0	0.001 - 0.44	0.29	0.01
Low education	12.3	0.001 - 140652.7	58.78	0.60
Smoking	0.7	0.04 - 12.89	1.06	0.82
Fatty food consumption*	0.1	0.001 - 0.21	0.02	0.00
Family history of hypertension	1.2	0.13 - 10.61	1.32	0.88
Low physical activity	17.6	0.98 - 314.69	25.88	0.05
High salted fish consumption	7.0	0.46 – 106.28	9.72	0.16
BMI ≥ 24	15.8	0.89 - 279.97	23.21	0.06
Male	0.1	0.00 - 3.71	0.13	0.19
OR: odds ratio, CI: confidence interval, SE: standard error, BMI: body mass index				

TABLE 3: The final model of the multivariate analysis between stress and hypertension in individuals older than 45 years of age.

Variable	OR	95% CI	SE	p value
High stress	0.02	0.001 - 0.42	0.03	0.01
Smoking	0.60	0.04 - 8.25	0.80	0.70
Fatty food consumption*	0.01	0.001 - 0.17	0.01	0.00
Low physical activity	19.85	1.28 - 307.38	27.75	0.03
High salted fish consumption	6.92	0.48 - 99.44	9.41	0.16
BMI index $\geq$ 24	17.54	1.17 - 262.02	24.20	0.04
Male	0.06	0.001 - 2.90	0.11	0.15
OR: odds ratio, CI: confidence interval, SE: standard error, BMI: body mass index				

It can be seen in Table 3 that stress did not have an effect on hypertension. This could be seen in the OR value of 0.02. Those who had high stress had 0.02 times the risk of hypertension when compared to those with low stress, after controlling for the variables of smoking, fatty food consumption, physical activity, salted fish consumption, BMI, and sex.

4. DISCUSSION

Several previous studies have stated that stress had an effect on hypertension [1, 5, 10–12], in addition to socioeconomic factors (Economic and Members 2007). However, the results were different in this study, which found that the factors most affecting hypertension were physical activity, the BMI, and salted fish consumption.

5. CONCLUSIONS

Based on the results of this study, promoting physical activities to reduce hypertension and supervising the salted fish industry to reduce the sodium level consumed should be performed. Weight loss programs are recommended to prevent hypertension in the salted fish industry area communities of Palembang City.

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