EVALUATION OF THE ASSOCIATION BETWEEN HYPERTENSION AND THE FACTORS: GENDER, AGE, EDUCATION LEVEL AND WORK STATUS IN PANTAI LINUH, INDONESIA

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Abstract. Hypertension is a major public health problem in Indonesia. We aimed to determine any associations between hypertension and the following: gender, age, education level and work status in order to inform hypertension treatment and prevention programs. This study was conducted in Pantai Linuh Village, Indonesia during August 2015. Each subject was asked to complete a questionnaire asking about demographics and the desired study factors. Inclusion criteria were being aged ≥ 18 years, being a resident of Pantai Linuh Village and being willing to participate in the study. Exclusion criteria were not being registered as a resident of Pantai Linuh Village and not being willing to participate. A total of 300 subjects was determined as the minimum number of subjects needed for the study. A total of 325 subjects were included in this cross-sectional study. One hundred forty-three subjects were aged >45 years, 287 had a lower than high school education level, 90 were unemployed and 88 had hypertension. We found no significant association (p=0.981) between gender and hypertension. We found a significant association between hypertension and age >45 years (p=0.000), having a lower than high school education level (p=0.025) and being employed (p=0.000). Hypertension interventions need to be developed and tested, targeting these at risk groups in order to try to reduce the morbidity and mortality associated with hypertension in this study population.

Keywords: hypertension, gender, age, education, status of work

INTRODUCTION

Non-communicable diseases are common in Indonesia (Rinawang, 2011),

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including hypertension. Hypertension is the third leading cause of death in Indonesia (6.8%) after stroke (15.4%) and tuberculosis (7.5%) (Yogiantoro, 2006). The Joint National Committee (JNC) 7 (2003) defined hypertension as a systolic blood pressure ≥140 mmHg and/or a diastolic blood pressure ≥90 mmHg among people not taking antihypertensive drugs

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(Yogiantoro, 2006).

Hypertension, if uncontrolled, increases the risk for stroke, myocardial infarction, and cardiovascular disorders (Kusumastuty *et al* 2016). The Framingham study found blood pressure increases with increasing age and the systolic blood pressure increases in women more rapidly than in men (Franklin *et al*, 1999). The number of hypertensive patients is increasing yearly in Indonesia (Kusumastuty *et al* 2016). The number of cases of hypertension world-wide is estimated to increase from 639 million in 2000 to 1.15 billion by 2025 (Siregar *et al*, 2014). This estimated increase is based on the number of patients with hypertension and the population growth today (Saputri, 2010). In 2000, the World Health Organization (WHO) estimated there were 972 million adults with hypertension world-wide (WHO, 2002). The world-wide proportion is estimated to reach 29.2% by 2025 (WHO, 2002). Of the estimated 972 million adults world-wide with hypertension, 333 million are in developed countries and 639 million are in developing countries, such as Indonesia (Andra, 2005).

In Indonesia, the proportions of the population estimated to have hypertension in 2007 and 2013 were 41.7% and 25.8%, respectively. The province of Indonesia with highest proportion of the population estimated to have hypertension in 2007 was South Kalimantan (39.6%) (Kementerian Kesehatan Republik Indonesia, 2014). By 2013, South Kalimantan was estimated to have the second highest proportion of the population with hypertension (30.8%) (Kementerian Kesehatan Republik Indonesia, 2014). Pantai Linuh Village is located in Tanah Laut Distict, South Kalimantan, Indonesia. A community survey conducted there by researcher

community survey in Pantai Linuh Village that done by researecher (team in this research) found hypertension was the most common non-communicable disease, and 94.9% of 413 examined subjects had hypertension. Hypertension is rarely associated with symtoms and most people are unaware of the associated factors of hypertension (Pradono, 2010). Therefore, factors associated with hypertension must be identified in populations with a high prevalence of hypertension in order to inform hypertension control programs. Therefore, we aimed to determine associations between hypertension and the following factors: sex, age, education level and employment status among residents of Pantai Linuh Village, Tanah Laut Distict, South Kalimantan, Indonesia in order to inform hypertension prevention and treatment programs.

MATERIALS AND METHODS

We conducted a cross-sectional observational study to determine associations between hypertension and studied variables during August 2015 in Pantai Linuh Village, Tanah Laut District, South Kalimantan Province, Indonesia. The sample size was determine using the formula by Slovin (Setiawan *et al*, 2013):

$n=N/(1+N (d^2)) = 1202/195.65 = 300$, where N= the total population size in the study area, n= the sample size and d= the confidence level where the alpha= 5%.

To compensate for dropouts, 25 subjects were added to the total giving a total study population of 325 subjects. Inclusion criteria for subjects were age ≥18 years, being a resident of Pantai Linuh Village and being willing to participate in the study. Exclusion criteria were not being registered as a resident of Pantai

Linuh Village and not being willing to participate in the study. Data analysis was done using the Statistic Package for Social Science version 17.0 (IBM, Armonk, NY). Variables were analyzed using the chi-square test.

Etical clearance was obtained from The Ethics Committee of Medical Research, Medical Faculty, University of Lambung Mangkurat Banjarmasin, Indonesia (ref: No: 102/KEPK-FK UNLAM/EC/V/2016). This data collection begans with an explanation of the purpose and implementation of research by the researcher then written informed consent was obtained from study subjects.

RESULTS

The demographic characteristics of study subjects are summarized in Table 1. Of the 325 subjects, 50.5% were male. Fifty-six percent of subjects were aged

Table 1
Demographic characteristics of study subject (N=325).

Variable	Number (%)
Gender	
Male	164 (50.5)
Female	161 (49.5)
Age	
>45 years old	143 (44.0)
≤45 years old	182 (56.0)
Education	
Low education	287 (88.3)
Higher education	38 (11.7)
Status of working	
Unemployee	90 (27.7)
Employee	235 (72.3)
Hypertension	
Yes	88 (27.1)
No	237 (72.9)

Table 2
Association between hypertension and selected variables.

Variable	Hypertension, n (%)		Total, N (%)	p-value
	Yes	No		
Gender				
Male	45 (27.4)	119 (72.6)	164 (50.5)	0.981
Female	43 (26.7)	118 (73.3)	161 (49.5)	
Age				
>45 years old	76 (53.1)	67 (46.9)	143 (44.0)	0.000
≤45 years old	12 (6.6)	170 (93.4)	182 (56.0)	
Education				
Low education	84 (29.3)	203 (70.7)	287 (88.3)	0.025
Higher education	4 (10.5)	34 (89.5)	38 (11.7)	
Work status				
Unemployee	7 (7.8)	83 (92.2)	90 (27,7)	0.000
Employee	81 (34.5)	154 (65.5)	235 (72.3)	

≤45 years. Only 11.7% of subjects had an education level greater than high school. Twenty-seven point seven percent of subjects were unemployed. The overall prevalence of hypertension among study subjects was 27.1%. Of the 88 subjects with hypertension, 48 were males (Table 2).

Bivariate analysis revealed an increasing prevalence of hypertension with increasing age and a significant association between hypertension and age. Employed subjects were significantly (p=0.000) more likely to have hypertension than unemployed subjects. Those with a lower education were significantly (p=0.025) more likely to have hypertension than those with a higher education level. We found no significant association between gender and hypertension (p=0.981) (Table 2).

DISCUSSION

Hypertension is common cardiovascular disorder and a major public health problem (Kornelia, Meida, 2012). Hypertension is estimated to cause 7.1 million deaths annually, accounting for 13% of all deaths globally (WHO, 2002). Hypertension is an important public health problem in developing countries (Fuentes *et al*, 2000). There are few studies identifying factors associated with hypertension in rural areas in developing countries.

In our study, bivariate analysis showed significant association between hypertension and age, employment, and education level. However gender was not found to be associated with hypertension, similar to another study (Anggara *et al,* 2013). However, a study in Indonesia by Wahyuni and Eksanoto (2013) found significantly more women than men had hypertension. Postmenopausal women have lower estrogen levels and lower high density lipoprotein (HDL) and higher low density lipoprotein (LDL) levels increasing the risk for other atherosclerosis which can lead to hypertension (Anggraini *et al*, 2009).

In our study, we found a significant association between hypertension and age with increasing prevalence of hypertension with increasing age, similar to other studies (Shah *et al*, 2001; Cappuccio *et al*, 2004; Das *et al*, 2005; Sharma *et al*, 2006a; Sharma *et al*, 2006b; Anggara *et al*, 2013). Education may be an indicator of ability to understand and access information. In this case the willingness to be screened and treated for hypertension to prevent the complications. In our study we found no association between education level and hypertension, similar to a previous study (Adhitomo, 2014).

Jobs may affect the person's physical activity level. In our study, the unemployed had a lower prevalence of hypertension. Work may be stressful, increasing risk for developing hypertension as well as other health problems, such as headaches, insomnia, peptic ulcers, hypertension, heart disease, and stroke (Muhaimin, 2008). Our study showing an association between being employed and having hypertension is similar to that of Haendra and Prayito (2013).

In summary, in our study, the prevalence of hypertension in the study population was relatively high. Age and being employed were significantly associated with having hypertension. These groups should be screened for hypertension and treated. Preventive measures in these groups need to be explored and programs to prevent hypertension in these groups

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need to be developed and tested in order to reduce the risk for hypertension and its complications.

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