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Original Article

BLOOD PRESSURE PROFILES AMONG EAST BONGAS AND WEST BONGAS PEOPLE IN EFFORT AND SUPPORT FROM UNIVERSITAS PADJADJARAN AND THE REGENT OF MAJALENGKA REGENCY AND CHIEVES OF THE VILLAGES

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ABSTRACT

Objective: To support the people in East Bongas and West Bongas villages to prevent and treatment the hypertension disease.

Methods: This was a cross-sectional design while the subjects were taken by a simple random sampling. A total of 323 families were included, and blood pressure of the male and female subjects aged between 18 to 65 y was measured and had been given a question relating to their blood pressure.

Results: The blood pressure profile was classified based on the seventh report of the Joint National Committee (JNC 7). The youngest male and female participants of pre-hypertension were 18 and 22 y, respectively. The normal blood pressure, pre-hypertension, hypertension stage-1, and hypertension stage-2 were 34.3%, 49.5%, 12.1%, and 4.1%, respectively. Prevalence of patients with hypertension based on the age groups 30-39, 40-49, 50-59, and 60-69 y were 6.8%, 15.6%, 33.9%, and 37.3%, respectively. Prevalence of patients with hypertension in male was 16.8%, the female was 15.7%, and the total of both were 16.2%. Prevalence based on gender showed that those who had information about hypertension in male was 46.8%, the female was 47.9%, and the total of both were 47.4%. Prevalence of hypertension patient**s** increased, for a male was 8.9%, the female was 8.2%, and the total of both were 8.5% after the participants declared that they were not hypertension patients.

Conclusion: In both villages occurred an increase of hypertension prevalence. Based on this information, the people in two villages should be given the appropriate knowledge and awareness regarding hypertension.

Keywords: Hypertension, East Bongas, West Bongas, Majalengka Regency

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INTRODUCTION

Hypertension is one of the causes of global mortality, cardiovascular disease (CVD), also leading to heart attack and strokes. Hypertension barely causes symptoms. Therefore, it is called an invisible killer or a silent killer [1-5].

The result of sporadic research in 15 Regents/Cities in Indonesia in 2011-2012 showed the phenomena of 17.7% deaths caused by stroke and 10.0% deaths caused by ischemic heart disease [5].

Basic Health Research in 2013 resulted in the health problem's mapping, such as hypertension is one of the non-communicable diseases showed a decline in the percentage of 31.7 percent in 2007 to 25.8 percent in 2013. It may be the people have started the treatment. However, based on an interview the prevalence of hypertension, there was an increase from 7.6 percent in 2007 to 9.5 percent in 2013 [6].

Four priorities of National Health Development Policies by Minister of Health, the first priority is Healthy Living Society Movement (GERMAS). The aims of GERMAS are (1) reduce the burden of communicable and non-communicable diseases, death and disability, (2) protect the decline in the productivity of the population, and (3) decrease the burden of financing health services due to increased sickness and health spending. In 2014, heart disease patients spent the highest cost, and stroke is number six of 10 large claim fee disease hospitalisation [7]. A study which involved 385 subjects reported that hypertension subjected with comorbidity had spent higher treatment costs when compared to those without comorbidity [8].

Mortality can be caused by the increase of non-communicable disease. The arrangement of the diseases, in 2009 stroke was in the fourth position, and in 2010 and 2015 stroke was in the first position [9]. Based on of the data above, control of non-communicable disease was done by increasing the number, and competence of health professionals [9].

The Public Health Office of Majalengka Regency in 2013 reported that hypertension disease more than diabetes mellitus disease. This disease occurs due to the unfavourable lifestyle in young age. Abnormal metabolisms accumulated and ensure continuously [10].

Universitas Padjadjaran always carries out the Student Field Work (KKNM) Lecturer Engagement with Society Program (PPMD). Each student has to take this course to complete Graduate (S1) program. This program is initiated to provide direct and the real learning experience in public for students; to improve empathy, insight, sensitivity, attitudes and social behavior of the students in the community; to train students developing their potential both practical and theoretical skills in the community; and to ameliorate: (1) accessibility of Universitas Padjadjaran for community, (2) cooperation with stakeholders as a real implementation of the program Unpaid Nyaah Ka Jabar [11].

East Bongas and West Bongas villages are parts of Majalengka Regency, were included in the region of Student Field Work in July-August 2016 and Community Engagement Program for Lecturer Integrative in July-October 2016 [10-11].

Based on the cases stated above, the team decided to do research relating to blood pressure of the people in both villages, and then the result was classified by JNC 7 [12].

MATERIALS AND METHODS

Study approval

The method of the study was approved by the Health Ethics Research Committee of Faculty of Medicine, Universitas Padjadjaran No. 815/UN6. C1.3.2/KEPK/PN/2016 on 18 August 2016.

Every participant signed the inform consent to participate in this study.

Study site

Blood pressure measurements were carried out in four hamlets in East Bongas and five hamlets in West Bongas, Sumberjaya district, Majalengka regency.

Study design

This was a cross-sectional design while the subjects were taken by a simple random sampling. Every hamlet was represented by six families.

Study population

Blood pressure measurement was done to the participant aged between 18 and 65 y.

The sample size was calculated by using the formula to the estimate proportion with 95%, confidence interval precision 5% and estimate the prevalence of hypertension 30%. A total of 323 families were found as the appropriate sample size.

Data collection

Measurement of blood pressure

The participant was seated then systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured using a sphygmomanometer and stethoscope.

The blood pressure measurements were classified by JNC 7 [11].

Questionnaire

Are you a hypertension patient?

The question will be asked to the participants if in the measurement of blood pressure was detected that participant has criteria of hypertension (the Stage 1 or Stage 2 hypertension).

Prevalence of patients with hypertension was divided based on the answered of a question above. If the participants answered: Yes, I am a hypertension patient. It meant they knew that they were hypertension patients. Therefore, if the participants answered: No, I am not a hypertension patient. It meant they are newly hypertension patient.

Data analysis

The blood pressure measurements were classified by JNC 7 [11].

Classification of blood pressure for adults by JNC 7 is Normal: SBP<120 and DBP<80 mmHg. Pre-hypertension (pre-HT) is SBP 120-139 and DBP 80-89 mmHg. Stage-1 HT is SBP 140-159 and DBP 90-99 mmHg. Stage-2 HT is SBP ≥160 and DBP ≥100 mmHg.

Statistical analysis

Data were calculated and analyzed using Epi Info, version 3.5.4. Categorical variables were summarized by calculating the number and percentage, whereas the continuous ones were summarized by calculating the mean and standard deviation. The chi-square test was used to assess the association between two data categorical. A P-value of ≤ 0.05 was considered to be statistically significant.

RESULTS

Sample distribution and sample size in East Bongas and West Bongas villages

Sample size calculated based on determine the sample size for proportion [13]. The total sample size is 323 families.

Based on data from the survey in two villages East Bongas and West Bongas, the total number of Citizens Association and Neighborhood Association were 9 and 52.

A number of families which included in the study in each neighbourhood= $\frac{323}{52}$ = 6 families.

Table 1: Distribution of the samples in East Bongas and West Bongas villages

Village	Total citizen association	Total neighbourhood association	Sample size (families)
East Bongas	4	21	130
West Bongas	5	31	193
Total	9	52	323

The distribution of the subjects based on the blood pressure classification

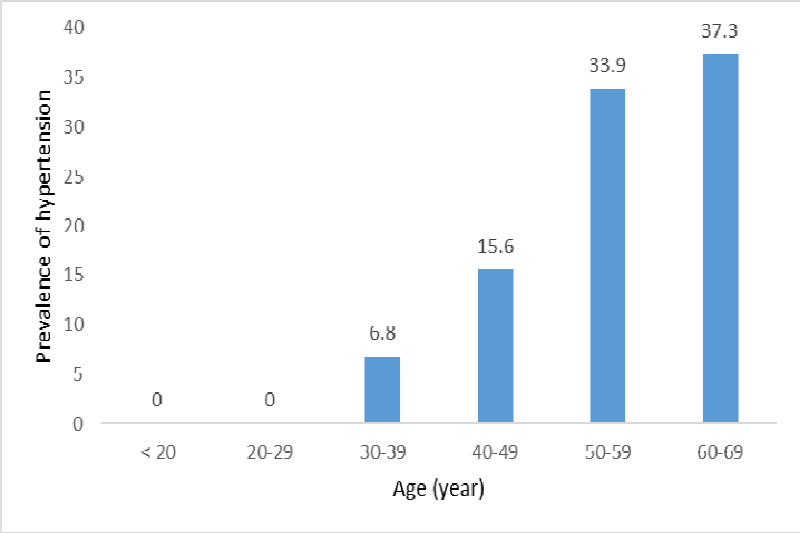

Fig. 1: Prevalence hypertension based on age group in both villages

Prevalence of patients with hypertension based on the age groups: 30-39, 40-49, 50-59, and 60-69 y was 6.8%, 15.6%, 33.9%, and 37.3%, respectively.

Table 2: Distribution of hypertension status based on gender and age in East Bongas and West Bongas villages

Age group (in years)	Male				Female				
	Normal	Pre-HT	Stage-1 HT	Stage-2 HT	Normal	Pre-HT	Stage-1 HT	Stage-2 HT	Prevalence of HT (%)
<20	8	2	0	0	17	0	0	0	0
20–29	20	15	0	0	41	4	0	0	0
30–39	16	46	3	0	50	26	5	2	6.8
40–49	12	57	11	1	24	42	11	2	15.6
50–59	5	32	13	4	5	32	14	7	33.9
60-69	3	17	9	6	0	17	5	2	37.3
Total	64	169	36: 14*	11:8*	137	121	35: 15*	13:8*	
Total (%)	22.9	60.4	12.9	3.9	44.8	39.5	11.4	4.3	

Classification of blood pressure for adults by JNC 7, * The number of hypertension patients who noticed that they suffered from hypertension, The age range of population: <20, 20-29, 30-39, 40-49, 50-59, and 60-69 y old, respectively, Total number subjects who were measured the blood pressure from two villages were 586 peoples.

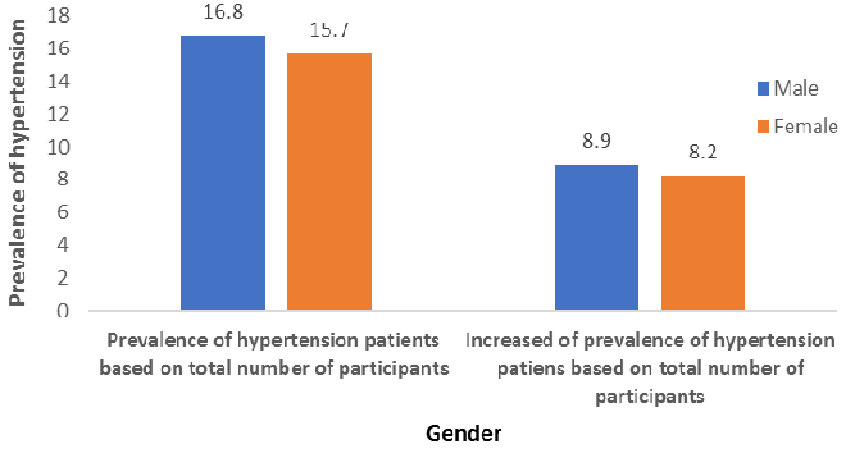

Fig. 2: Increased of prevalence of hypertension patients based on total number of participants in both villages

Prevalence of patients with hypertension in male was 16.8%, the female was 15.7%, and the total of both were 16.2%.

The increased prevalence based on population for a male was 8.9%, the female was 8.2%, and the total amount of both were 8.5%.

DISCUSSION

Table 2 revealed that among the participants aged under 20 y old, there were two males suffering from pre-HT with the youngest age was 18 y old. In addition, no female participant was found at the same age suffering from pre-HT in this study. In females aged between 20-29 y old, four participants were diagnosed suffering from pre-HT with the youngest age was 22 y old.

According to the World Health Organization (WHO), adolescents are young people between the ages of 10 and 19 y. Therefore, a pre-HT participant, male aged 18 y included in the category of adolescent patients [14]. In addition, the pre-HT condition was also found in females aged 22 y.

Pre-HT condition in young age is caused by many factors, e. g. family history/genetic factors of hypertension, race, gender, level of education, lifestyles (e. g. excess dietary sodium, obesity). Pre-HT with a criterion of SBP 120-139 and DBP 80-89 mmHg is not included in a disease category. Hypertension in adolescence becomes a problem that hypertension may continue until adulthood and have a higher risk of morbidity and mortality [14-17].

Lifestyle factors that cause hypertension, e. g. excess dietary sodium:

Physiologically, one of the healthy kidney capabilities excretes of salt (sodium chloride) load, this response to control body fluid volume. However, general epidemiological data describe that higher average sodium level in the human body can cause a higher prevalence of hypertension [18].

Sodium chloride is essential salt in life, of which 40% of the total body sodium is found in bone and 60% in cells as the fluid outside and inside.

The volume of extracellular fluid is mainly determined by sodium, including the volume of blood, which the body's sodium content affects a number of physiological mechanisms to regulate blood volume and blood pressure.

These are three mechanisms via sodium balance regulation that contributing in a homeostatic control system that effect in blood volume and blood pressure: renin-angiotensin-aldosterone system, anti-diuretic hormone, and dopaminergic, from a larger multifactorial that contributed in homeostatic control systems through regulation of sodium balance [19].

Renin-angiotensin-aldosterone system, renin was released by the kidneys into the circulation. It split angiotensinogen into angiotensin I. Angiotensin I is split become angiotensin II by angiotensin-converting enzyme (ACE), and then angiotensin II induces the constriction of small arteries, causing in increased blood pressure. Angiotensin II stimulate of aldosterone synthesis by the adrenal glands. Aldosterone acts on the kidneys to increase the reabsorption of sodium and the excretion of potassium. Retention of sodium by the kidneys leads to an increased retention of water and then will cause an increase of blood volume and blood pressure [19].

Anti-diuretic hormone (ADH), ADH in conjunction with the renin-angiotensin-aldosterone system, epithelial sodium channel (ENaC) is stimulated by ADH to increase the reabsorption of sodium and water.

Dopaminergic system, Dopamine promotes sodium excretion [19].

Furthermore, based on pre-clinical and clinical data were reported the excess dietary sodium intake caused unwanted effects on the metabolism of calcium and bone, asthma, kidney, heart, and brain [20].

Table 2 revealed that prevalence of normal blood pressure, pre-HT, stage-1 HT, and stage-2 HT in both villages were 34.3, 49.5, 12.1, and 4.1%, respectively.

Based on the statistical test (chi-square test), the composition of hypertension status between male and female in the table. 2 were considered significant (P<0.001).

Data in table 2 showed the prevalence of pre-HT is the highest among all the classification groups. Pre-HT group is meant to identify the people that showed an increase in blood pressure in the early stages, so it can be prevented disease progression towards a more severe like as hypertension stage-1.

Pre-HT people live in the village may know less about hypertension, the symptoms, causal factors and its risks, because hypertension barely causes symptoms [1]. Therefore, it may be a necessary effort to develop their knowledge in managing hypertension.

Fig. 1 explained the prevalence of patients with hypertension based on the age groups: 30-39, 40-49, 50-59, and 60-69 y was 6.8%, 15.6%, 33.9%, and 37.3%, respectively. This condition is similar to the report of a large number of studies that the patterns of hypertension showed changes in line with age [16, 19, 21-22]. Several changes of functional and structural are related with the change of age and contribute to increase blood pressure. The changes comprise the stiffening of the arterial wall, endothelial dysfunction [21].

Main molecular mechanisms related with hypertension and aging i.e. vascular aging: endothelial dysfunction, alterations in the production and/or bioavailability of nitric oxide, endothelial replication and apoptosis, oxidative stress and inflammation in aging-related diseases. New molecular mechanisms associated with hypertension and aging: the effects of telomeres length, dysfunction of progenitor cells, circulating microparticles, epigenetics and lifestyle [21].

A variety of factors that influences in hypertension have been discussed e. g. lifestyle factors such as intake excess sodium: the increase of salt sensitivity in older adults, reduced kidney's ability to excrete the sodium load diet, also decrease the activity of sodium potassium adenosine triphosphatase pump. This condition leads to an increase concentration of calcium intracellular that cause vasoconstriction then increased vascular resistance [23].

Age associated with changes in the renin-angiotensin-aldosterone system, low level of plasma renin and high level of aldosterone in older adults contribute to salt sensitivity and raised blood pressure, too [23].

Main roles of endothelial cells are several artery's properties, such as secretion of nitric oxide (NO), of which NO has the main role in the vasodilating of vascular smooth muscle cells with stimulating soluble guanylate cyclase. Therefore, one of the results of endothelial dysfunction that is caused by the decrease of NO is a vasoconstriction abnormal of blood vessels [21].

Fig. 2 explained of increased of the prevalence of hypertension patients based on the total number of participants in both villages. Prevalence of patients with hypertension in male was 16.8%, the female was 15.7%, and the total of both were 16.2%. The percentage of hypertension on women is lower than men. The condition is similar with WHO report [2].

The measurement of the increase of hypertension prevalence based on gender with a questionnaire (table 2), resulted that those who had information about hypertension in male were 46.8%, female were 47.9%, and the total of both were 47.4%, and prevalence based on gender showed that those who did not have information about hypertension in male were 53.2%, female were 52.1%, and the total of both were 52.6%.

Based on the above data appeared to have been an increasing prevalence of hypertension patients in both villages, increased prevalence based on population for a male was 8.9%, the female was 8.2%, and the total amount of both were 8.5%.

Hypertension occurred in the new hypertension patients unbeknownst to them. This is because the diagnosis of hypertension is based on blood pressure measurement. Hypertension does not give the specific sign or largely symptomless. Some people will experience symptoms, like sweating, facial flushing, nervousness, or difficulty sleeping, and a variety of symptoms that may be indirectly related to hypertension such as blood spots in the eyes, facial flushing, and dizziness. Moreover, these symptoms are not always caused by high blood pressure. Hypertension patients do not feel anything wrong in their health, but high blood pressure is a leading risk factor for stroke. Therefore, hypertension is called the silent killer [1-4, 25].

The new hypertension patients need to be given the advice to prevent the increase and to manage of their high blood pressure.

Limitation of study

There were many villages listed in the Student Field Work areas. However, every supervisor only monitored two villages. The supervisor activities in the villages should be performed based on the approved proposal.

CONCLUSION

Prehypertension occurred in the youngest male, and female were 18 and 22 y, respectively. This was caused by a limited ability to understand the consequences of their behaviour in the long-term. Prevalence of prehypertension is the highest among all classification groups. The increase of hypertension prevalence based on population for a male was 8.9%, the female was 8.2%, and the total amount of both were 8.5%, and the new hypertension patients did not know that now they are hypertension patients. All of the stages were caused by may know less about hypertension, the symptoms, causal factors and its risks. Therefore, it may be a necessary effort to develop their knowledge in managing hypertension.

Based on this information, the people in two villages should be given the appropriate knowledge and awareness regarding hypertension, which can reduce the quality of life.

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CONFLICTS OF INTERESTS

The authors have no conflict of interest

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