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Original Article

PRELIMINARY STUDY ON PROFILE OF BLOOD PRESSURE AND VEGETABLE CONSUMPTION AMONG WOMEN IN THE ERA OF GERMAS IN CICANIR AND JATIPAMOR VILLAGES, MAJALENGKA REGENCY, WEST JAVA PROVINCE

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ABSTRACT

Objective: To discover the profile of hypertension (HT) disease and consumption habit of vegetables among women in Cicanir and Jatipamor villages related to the program of *Gerakan Masyarakat Hidup Sehat* (GERMAS)/Healthy Living Society Movement.

Method: The study used a cross-sectional design while respondents were taken by using a simple random sampling. The blood pressure profile was classified based on the Seventh Report of the Joint National Committee (JNC 7). The respondents suffering from HT were given a question relating to their blood pressure. Vegetable consumption profile of the respondents was measured by using four questions.

Result: Youngest ages of pre-HT respondents in Cicanir and Jatipamor were 16 and 18 y, respectively; youngest ages of HT respondents in Cicanir and Jatipamor were 22 and 18 y, respectively. Numbers of the respondents with HT in Cicanir and Jatipamor villages had increased into 16.3% and 10.9%, respectively. Vegetables consumption frequencies for 4-7 d/w in Cicanir and Jatipamor were 81.33% and 62.66%, respectively. The respondents cleaning vegetables under running water in Cicanir and Jatipamor were 74.67% and 86.67%, respectively. The respondents who cooked the vegetables optimally in Cicanir and Jatipamor were 46.67% and 93.33%, respectively. Based on vegetable sources, the respondents bought the vegetables in the markets in Cicanir and Jatipamor were 81.33% and 93.33%, respectively.

Conclusion: In both villages, HT prevalence had increased. Vegetable consumption profile found in the respondents showed the respondents had a good vegetable consumption habit. It is important to improve awareness of respondents to maintain health for themselves and their families.

Keywords: Blood pressure, Vegetable consumption, GERMAS, Cicanir, Jatipamor, Majalengka Regency

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INTRODUCTION

National Health Indicator Survey (Sinkernas) in 2016 conducted by the Ministry of Health of the Republic of Indonesia reported numbers of people with HT in Indonesia had increased into 32.4% [1], while Indonesia Basic Health Research in Indonesia in 2018 revealed HT cases in Indonesia had increased into 34.1%. As significant increase of hypertension patients, West Java ranked 2nd (i. e: 44.1%<HT patients in West Java<34.1%, in which 44.1% was the highest rank of HT patients and 34.1% was national rank in Indonesia), thus, total HT patients in West Java were lower than South Kalimantan (44.1%) and the number of HT patients were also higher than average HT prevalence in Indonesia (34.1%) [2]. Therefore, the increasing numbers of HT patients can cause higher occurrences of related diseases such as stroke, heart attack, kidney failure.

Based on data reported 50 leading causes of death in Indonesia, the life expectancy of hypertension was the 16 rank while stroke, coronary heart disease, diabetes mellitus, and kidney disease were number one, two, three and nine ranks, respectively. In Indonesia, 25,868 deaths (1.54%) were caused by HT which were number 87 in the world rank [3].

The triple burden has become serious problems in Indonesia because the massive numbers of people who are in productive age must contribute to the health establishment provided by the government. Unfortunately, their contributions are prohibited due to non-communicable diseases (NCDs) and unhealthy lifestyles [4].

Indonesia Health Ministry in 2016 established a National Action Plan on the Control and Prevention of NCDs, including Healthy Living Society Movement (GERMAS) and Application Program of Healthy Indonesia with Family Approach programs (PIS-DPK). GERMAS plays important roles in the society to increase physical activity, promote a healthy lifestyle, and encourage people to be aware of prevention and early detection of diseases; PIS-DPK was established to give encouragement to the people to reduce smoking, be aware of mental health, and manage HT [5]. In the first phase, GERMAS was widely commenced by focusing on three guidelines; 1) doing physical activities in 30 min every day, 2) consuming fresh vegetables and fruits, and 3) attending regular health checkup [6].

The vegetables and fruits are also important for a healthy diet. Sufficient vegetable and fruit consumptions along with good lifestyle, the fruits and vegetables can inhibit micronutrient deficiency and NCDs, such as cardiovascular diseases and certain cancers. The Food and Agriculture Organization (FAO) and the World Health Organization (WHO) of the United Nations (UN) had initiated "Promotion of Fruit and Vegetables for Health" (PROFAV). Regular consumptions of a variety of fruits and vegetables are advantageous for a well-balanced diet and preventing NCDs. Moreover, appropriate fruits and vegetable consumptions are suitable to reduce the risk of NCDs [7, 8].

Family as a small part of the society consisting of a head of household and members of the family who live in a house with several occasions [9].

Housewives play major roles in the family such as acting like a family doctor, nurse, chef, and so on. Among the roles related to family welfare, housewives have the responsibility to maintain family health and welfare [10].

The Public Health Office in Majalengka Regency in 2013 reported that occurrences of HT were higher than diabetes mellitus. Hypertension can occur due to unfavorable lifestyle while the patients were young. Meanwhile, degenerative diseases were

frequently discovered in the persons whose age more than 45 y occurs due to accumulation abnormal of metabolism that occur along with an ongoing basis at time of them were still young [11].

Cicanir and Jatipamor were areas included in the Community Service Program of Universitas Padjadjaran. Both villages are considered as agricultural areas in West Java [12].

Base on the cases stated above, research was conducted on women. Blood pressure of the women was measured. Results collected through blood pressure examination were classified by using The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) [13]. The study of vegetable consumptions was carried out in housewives.

MATERIALS AND METHODS

Method

Study approval

The method used in this study was approved by the Health Research Ethics Committee, Faculty of Medicine, Universitas Padjadjaran with ethical number 815/UN6. C1.3.2/KEPK/PN/2017 issued on 5 January 2017. Therefore, every respondent signed informed consent in order to be included in the study.

Study site

The study was carried out in Cicanir and Jatipamor villages, Talaga District, Majalengka Regency, West Java, Indonesia.

Study design

The study used a cross-sectional design while the numbers of respondents were taken by using a simple random sampling.

Study population

The population of the study was women who lived in both villages. The blood pressure measurements were performed to the respondents aged between 18 and 65 y, and the study of vegetable consumptions was carried out in housewives.

The sample size was calculated by using a formula to estimate proportion with 95%, confidence interval precision 5% and estimate the prevalence of hypertension 30%. A total of 323 families were found as the suitable sample size for measurement of blood pressure, and 150 housewives for vegetable consumptions.

Data collection

Blood pressure measurements

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

Furthermore, the results of the blood pressure measurements were classified based on JNC 7 (JNC 7, 2004) [13].

The questionnaire was used to discover if the respondent was a new or diagnosed HT patient.

The respondents were asked a simple question: “Are you a hypertension patient?” [14].

The question would be continuously asked to the respondents if the respondents showed hypertension based on the measurement results of blood pressure. The results could diagnose that the respondents suffered from HT of stage-1 or stage-2.

Prevalence of respondents with HT was typically divided based on the data by using questionnaire distribution. The “Yes” answer of the questionnaire determined that the respondents had HT. However, the “No” answer explained that the respondents newly suffered from HT [14].

Vegetables consumption measurements

Method: four questions were asked to the respondents who were housewives related to total days of vegetable consumption per week by the members of the family, the ways to clean the vegetables, the way member of the family in eating vegetables, and source of the vegetable supplies because they lived in cultivated areas.

The interview including the questions and answer choices below

1. Vegetable consumption

How many d your family consumes vegetables every week?

Options of the answer: 1 d, 2, 3, 4, 5, 6 or 7 d

2. Attitude in process of vegetable

How do you clean the vegetables?

Options of the answer: A. Cleaning them by using water in a jar.

B. Cleaning them by using running water [15].

3. Way consume of vegetable

How does your family eat vegetables [15]?

Options of the answer: A. Cooked vegetables. B. Fresh vegetables.

C. Both/mixed (cooked and fresh vegetables)?

4. Source of vegetables

How do you get supplies of the vegetables?

Options of the answer: A. The market B. Own farmland.

C. Both/mixed (market and own farmland).

They live in agricultural areas.

Data analysis

The blood pressure measurements were classified by using JNC 7.

Classification of blood pressure in adults was carried out by using JNC 7 criteria. The criteria are normal blood pressure is 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, and stage-2 HT is SBP ≥160 and DBP ≥100 mmHg [13].

Statistical analysis

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

RESULTS

Study of HT prevalence among women in cicanir and jatipamor

Profile of female hypertensive respondents in Cicanir and Jatipamor was described in the study.

1. Population data in Cicanir and Jatipamor.

Based on data from a survey in Cicanir and Jatipamor, the total number of Citizens Association and Neighborhood Association were 5 Citizens Association and 23 Neighborhood Association, then 3 Citizens Association and 11 Neighborhood Association, respectively.

2. Sample

The sample size was calculated based on the determination of the sample size for proportion [16].

The total sample size was 323 families.

Based on data obtained from the survey in Cicanir and Jatipamor, the total number of Neighborhood Association were 23 and 11, respectively

Number of families included in the study from each neighborhood was calculated by the formula as follows = 323/34 = 10 families.

3. Distribution of the respondents was based on the blood pressure classification.

Total participants in Cicanir and Jatipamor were 289 and 320 women, respectively.

Table 1: Distribution of hypertension status among women based on age in cicanir and jatipamor villages

Age group (in years)	Cicanir				Jatipamor			
	Normal	Pre-HT	Stage 1-HT	Stage 2-HT	Normal	Pre-HT	Stage 1-HT	Stage 2-HT
<20	2	1	0	0	6	3	1	0
20–29	31	16	6	3	69	26	0	0
30–39	45	35	10	2	53	39	11	3
40–49	23	20	12	8	26	25	6	4
50–59	-	27	15	11	-	10	9	6
60–69	-	-	6	16	-	-	10	13
Total	101	99	49	40	154	103	37	26
			12*	30*			14*	14*
Total (%)	34.95	34.26	16.95	13.84	48.13	32.19	11.56	8.12

Note: Classification of blood pressure for adults by using JNC 7, *The number of hypertension respondents who noticed that they had HT, The study included adolescents and housewives. The data revealed that the youngest HT respondents in Cicanir and Jatipamor aged 20–29 y old and<20 y old, respectively.

In the study, prevalence of respondents with HT based on age group in Cicanir was<20, 20–29, 30–39, 40–49, 50–59, and 60–69 y old which was 10%, 0%, 13.21%, 16.39%, 60%, and 100%, respectively.

Prevalence of patients with hypertension based on age group in Jatipamor was<20, 20–29, 30–39, 40–49, 50–59, and 60–69 y old which was 10%, 0%, 13.21%, 16.39%, 60%, and 100%, respectively.

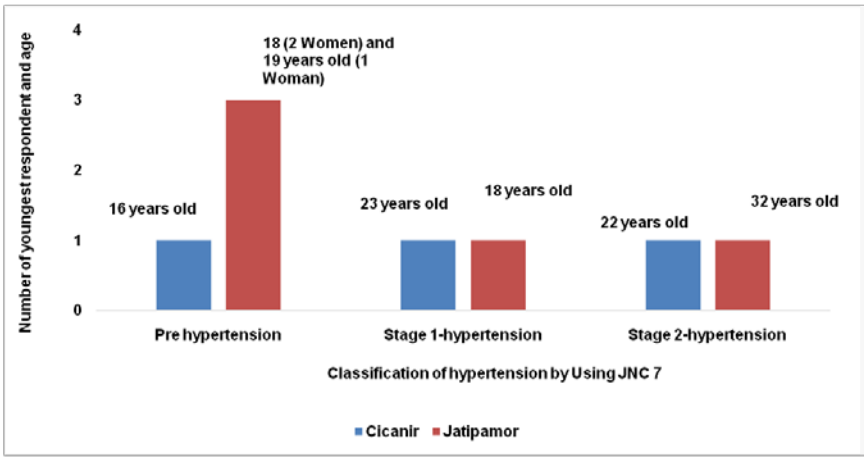

Fig. 1: The youngest age in the classification of hypertension by using JNC 7

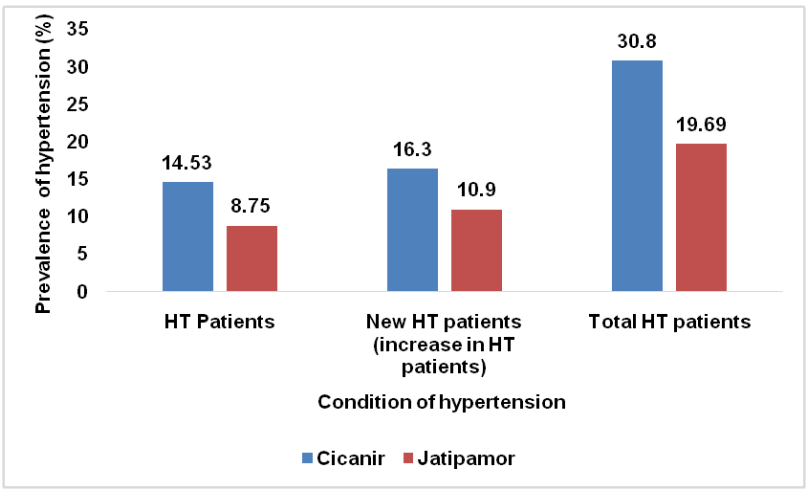

Fig. 2: Increased prevalence of hypertension respondents based on total number of respondents in both villages

The results (fig. 1) showed that pre-HT respondents in Cicanir and Jatipamor were 16 and 18 y old, respectively. Stage 1-HT respondents in Cicanir and Jatipamor were 23 and 18 y old, respectively. Therefore, stage 2-HT respondents in Cicanir and in Jatipamor were 22 and 32 y old, respectively

Prevalence of increased HT respondents in Cicanir and Jatipamor were 16.3% and 10.9%, respectively. Meanwhile, the total prevalence of respondents with HT in Cicanir was 30.8% and in Jatipamor was 19.69%.

In both Cicanir and Jatipamor villages, the results showed that the prevalence of increased HT respondents was higher than the initial condition of HT respondents.

Based on the statistical analyses by using chi-square test, the composition of HT status between Cicanir and Jatipamor villages was considered significant (P<0.003) which was described in the table 1.

Examination on vegetable consumptions profile among women in Cicanir and Jatipamor Villages

The study was conducted in agricultural areas.

1. Sampel

Based on the sample calculation, 100 housewives were obtained. In addition, 150 families or 75 families from each village were included in the study.

Result of the study in table 2.

Table 2: Profiles of vegetable consumptions, attitude in process of vegetables, way of vegetable consumptions, and source of vegetables

Question	Answer	Total families (%)	
		Cicanir	Jatipamor
Vegetable consumptions (in a week)	1 d	0	2.67
	2 d	4	8
	3 d	14.67	26.67
	4 d	20	17.33
	5 d	18.67	9.33
	6 d	4	6.67
	7 d	38.66	29.33
Attitude in process of vegetables	Cleaning by using water in a jar	25.33	13.33
	Cleaning by using running water	74.67	86.67
Way of vegetable consumptions	Cooked vegetables	46.67	93.33
	Fresh vegetables	30.67	5.33
	Mixed (cooked and Fresh vegetables)	22.66	1.34
Source of vegetables	The market	81.33	93.33
	Own farmland	8	5.33
	Mixed (market and own farm)	10.67	1.34

Table 2 showed the answer of participants in Cicanir and Jatipamor, for question number one, families that consumed vegetables 4–7 d/w were 81.33% and 62.66%, respectively. The answer for question number two, cleaning by using running water was 74.67% and 86.67%, respectively. The answer for question number three were cooked were 46.67% and 93.33%, respectively; and fresh were 30.67% and 5.33%, respectively. The answer for question number four, source from the market were 81.33% and 93.33%, respectively.

Based on the statistical test (chi-square test), the habits of women in consuming and processing vegetables between Cicanir and Jatipamor in the table. 2 were considered significant (P<0.026).

DISCUSSION

Finding in this study supports one of the guidelines of GERMAS which detected the persons who had HT and diabetes mellitus. The results discovered that many respondents included in the study suffered from HT as described in the table 1.

The table 1 revealed that among the respondents aged under 20 y old, four women suffered from pre-HT. The youngest age of the respondents was 16 y old in Cicanir and 18 y old in Jatipamor. In addition, a respondent in the study was found at the same age (18 y old) suffering from stage 1-HT. In women aged between 20–29 y old, six respondents were diagnosed suffering from stage 1-HT with the youngest age was 22 y old in Cicanir and 18 y old in Jatipamor (fig. 1).

The increased HT in Cicanir and Jatipamor were 16.3% and 10.9%, respectively (fig. 2).

According to the WHO, adolescents are young people between the ages of 10 and 19 y [17], and in Indonesia adolescents are those who are between the age of 10 and 18 y [18].

Therefore, a pre-HT respondent aged 16 y and a stage-1 HT respondent aged 18 y were included in the category of adolescents based on Indonesia and WHO definitions, respectively.

Pre-HT and HT conditions in younger age are caused by many factors e. g. family history/genetic factors of hypertension, race, gender, level of education, lifestyles (excessive 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 adolescences was discovered in a respondent from Jatipamor who suffered from stage 1-HT. This becomes a problem that HT can continue until adulthood and have higher risk of morbidity and mortality [17-19].

One factor that influences in elevating the blood pressure is excessive sodium intake.

Excessive sodium intake can increase salt sensitivity particularly in elderly, decrease kidney's ability to excrete the sodium load diet, and decrease the activity of sodium potassium adenosine triphosphatase pump. This condition causes an increase of calcium intracellular concentration which causes vasoconstriction leading to increased vascular resistance [18].

Also, people with pre-HT or HT who live in rural areas may have less knowledge about HT as well as the symptoms, causal factors and its risks. Therefore, it is important to encourage them in managing HT [20].

One of several programs proposed by GERMAS is to encourage people to consume fruits and vegetables. The program is in accordance with the program of the FAO and WHO of the UN which have been leading the global initiative "Promotion of Fruit and Vegetables for Health" (PROFAV). Regular consumptions of a variety of fruits and vegetables are necessary for a well-balanced diet and preventing NCDs [6-8].

Table 2. showed the habits of women in consuming and processing vegetables.

Based on habits on vegetable consumptions, the study determined that the prevalence of consuming vegetables 4–7 d every w of the respondents in Cicanir and Jatipamor villages were 81.33% and 62.66%, respectively.

The study revealed the habitual activity of cleaning the vegetables before the vegetables had been processed. Prevalence of suitable

vegetable cleaning by the respondents in Cicanir and Jatipamor villages determined that they cleaned the vegetables under the running water were 74.67% and 86.67%, respectively. This cleaning way is in accordance with the Food and Drug Administration (FDA) recommendation (15).

Prevalence of vegetable consumptions in Cicanir and Jatipamor villages showed that the respondents preferred consuming cooked vegetables than fresh vegetables which were 46.67% and 93.33%, respectively.

Based on the way the respondents getting supplies of vegetables, the prevalence of the respondents' buying vegetables from the market in Cicanir and Jatipamor villages was 81.33% and 93.33%, respectively. Fewer number of the respondents harvested and cooked vegetables from the farmland. This answer showed living in agricultural areas do not mean the villagers can plant varied vegetables. In this study, a limited variety of vegetables caused the respondents to buy various vegetables.

Several cohort studies had examined the relationship between fruit and vegetable intake and coronary heart disease (CHD). The micro- and macro-constituents of fruits and vegetables improve important risk factors of CHD such as hypertension, dyslipidemia and diabetes. A previous study also reported a similar association between fruit and vegetable consumptions and decreased blood pressure [21]. Another study reported that higher intake of fruits and vegetables had an effect on the prevention of hypertension [22].

Hypertension can be caused by many factors such as oxidative stress and increased activity of the renin-angiotensin-aldosterone system (RAAS). Endothelial cells play important roles in arterial relaxation. Nitric oxide is released by endothelium leading to vascular relaxation. The nitric oxide is immediately degraded by superoxide anion where the superoxide anion becomes a vasoconstrictor. Moreover, superoxide can cause endothelial dysfunction, change in contractility, and vascular remodeling. Hypertension discovered in the people are often associated with decreased bioavailability of NO and increased oxidative stress, therefore, antioxidant compounds can play a role in decreasing oxidative stress [23, 24].

Fruits and vegetables are rich of vitamins and minerals, dietary fiber, and a host of beneficial non-nutrient substances including plant sterols, flavonoids and other antioxidants. Consuming various fruits and vegetables is useful to ensure an adequate intake of many essential nutrients [8].

The functions and mechanisms of certain food components in disease prevention and health promotion have been widely informed by modern nutrition science [25].

The phytochemical compound has several functions such as flavonoid antioxidant compound. Flavonoids have antioxidant activity categorized as a non-enzymatic molecule which plays a role to inactivate ROS in the cells [26].

Angiotensin-converting enzyme (ACE) is a key component in RAAS which manage blood pressure. Excessive expression of RASS is associated with vascular HT so that the ACE inhibition becomes a major target in preventing HT [23, 27].

Several studies above reported that vegetable consumptions can decrease blood pressure, but in this study, vegetable consumption behaviors did not decrease HT prevalence. This result may be caused by lifestyles such as excessive sodium diet.

Limitation of study

Each team only was given a choice of 2 villages for the Community Service Program.

Our activities in the village were carried out in accordance with the approved proposal.

CONCLUSION

A pre-HT respondent aged 16 y and a stage-1 HT respondent aged 18 y were included in the category of adolescents.

Increased HT prevalence was discovered in both Cicanir and Jatipamor villages. The increased HT prevalence in Cicanir and Jatipamor were 16.3% and 10.9%, respectively.

Total prevalence of respondents with HT in Cicanir and Jatipamor was 30.8%, and 19.69%, respectively.

The profile of vegetable consumptions determined that the respondents had a good habit in consuming vegetables.

In this study, vegetable consumption behaviors did not decrease HT prevalence. Likely stated in many literatures, salt intake is one of many factors which can cause HT.

It is important to improve awareness of participants to maintain the health of themselves and their families.

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AUTHORS CONTRIBUTIONS

All the author have contributed equally

CONFLICTS OF INTERESTS

The authors have no conflict of interest

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