Vegetables and Fruits Intake as a Dominant Factor of Hypertension in Central Office PT.Pos Indonesia Employees, Jakarta 2016

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Abstract

Hypertension is a major public health problem and cardiovascular risk facor. The purpose of this study was to find dominant factor of hypertension in Central Office PT.Pos Indonesia, Jakarta. This research was a cross sectional study with 132 respondents. Data were collected from February to June 2016. Data of blood pressure were collected with sphygmomanometer and stethoscope, nutritional status with anthropometry, fat body percentage with *Bioelectrical Impedance Analysis* (BIA), stress with *Perceived Stress Scale* (PSS) questionnaire, quality and duration of sleep with *Pittsburgh Sleep Quality Index* (PSQI) questionnaire, fitness with step test YMCA 3 minutes, physical activity with *Global Physical Activity Questionnaire* (GPAQ), food intake with recall 3x24 hours. Data were processed with chi square, and logistic regression. Dominant factor of hypertension in this research is vegetables and fruits intake (p value=0.017), someone with very low vegetables and fruits intake will risk 7.2 more to have hypertension than someone with enough vegetables and fruits intake. It is suggested that employee have to decrease food which contain of high sodium, increase vegetables and fruits intake, and enhance physical activity.

Keywords: employee; food intake; hypertension; physical activity; vegetables and fruits intake

1. Introduction

Hypertension is a major public health problem[1] and main risk factor for cardiovascular diseases[2]. In 2011, approximately 54% stroke, 47% ischemic heart disease, and 25% other cardiovascular diseases are caused by hypertension[3]. Half of hypertension prevalence in the world is in Asia Pasific[3].

Uncontrolled hypertension in the world rising significantly from 1980 until 2010 because of growth and aging population in the world[2]. In 2014, global hypertension prevalence has reached approximately 22%[2]. In 2025, global hypertension prevalence is predicted increase up to 60%[4]. Hypertension prevalence in Indonesia in 2013 has reached 26,5%[5].

Hypertension is a condition when blood pressure rising chronically[5]. High blood pressure caused by heart pumps harder for fulfill nutrition and oxygen needed in body[5]. Hypertension is condition when systolic pressure and or diastolic pressure equal or more than 140/90 mmHg[6].

There are two types of factors causing hypertension, which are modified and unmodified factors[7]. Some factors related to hypertension are body mass index (BMI), fat body percentage, cardiovascular fitness, physical activity, smoking, stress, sleep duration, sleep quality, age, genetic, vegetables and fruit intake, sodium intake, and sex.

2. Method

2.1 Participants

Study has done in Head Office PT.Pos Indonesia, Jakarta from February until June 2016. This study has done on 132 respondents (age range: 19-54 years old) who employed in Pos Indonesia and spend many hour in front of computer. Analyze focused on finding dominant factor on hypertension. Analyzed that used are univariate, bivariate, and multivariate. Univariate analyzes used to get data distribution, average, standard deviation, minimum and maximum. Bivariate analyzes that using chi square is used to get proportion difference between independent variable and dependent variable. If *p value* <0,05, it proved that there is relation between independent variable with dependent variable statistically. Multivariate analyze that use logistic regression is used to get dominant factor. Variable with *p value* <0,05 and have highest Odds Ratio is a dominant factor.

2.2 Procedures

Blood Pressure
Data has taken by midwife whose used sphygmomanometer and stethoscope. Data has taken twice and minimal 1 hour after last eating time. If result from the first and second measuring has differences more than 10 mmHg, third measuring must done. Data that used is average from two measuring with least difference. Cut off hypertension is ≥140 mmHg for systolic and ≥90 mmHg for diastolic. If blood pressure less than them, it will categorize as normotensive[6].

Fat Body Percentage and Body Mass Index

Fat body percentage has taken by used Bioelectrical Impedance. Body fat percentage classified into 2 category, they are have hypertension risk, and have no hypertension risk. Cut off point body fat percentage for male and female is different. For women, if body fat percentage ≥34.1 categorized as have risk of hypertension and if less than 34.1 categorized as have no risk of hypertension. For male, if body fat percentage ≥20.4 it will categorized as have risk of hypertension and if less than that, it will categorized as have no risk of hypertension[8].

Body mass index has taken by used height and weight. Calculation to get BMI data used Quatelet Index.

$$BMI = \frac{weight\ (kg)}{height^2\ (m^2)}$$

BMI categorized into 3 category, there are obesity, overweight, and normal. Cut off point for each category is ≥30 kg/m^2 for obesity, 25 kg/m^2-29.9 kg/m^2 for overweight and 18.5 kg/m^2 -24.9 kg/m^2 for normal[5].

Cardiovascular Fitness

Cardiovascular fitness has done by used YMCA 3-minutes Step Test. After 3 minutes step test, heart rate respondent will measured for one minute with stopwatch. YMCA step test has done by used a 12-inch box and metronome with 96 beats per minute.

Physical Activity

Physical activity data has taken by used Global Physical Activity Questionnaire (GPAQ). Using MET as cut off point in categorized physical activity. Low physical activity if MET total is <600 MET, have moderate physical activity if 600-2999 MET, and have high physical activity if MET ≥3000[9].

Smoking status, age, sex, and genetic

Data has taken by questionnaire. Age data classified into two classification, they are have risk on hypertension and non-risk. Respondent will categorized have hypertension risk if ≥45 years old and will categorized as have no risk if <45 years old. Sex data will classified into two category, there are female and male. Genetic data has taken by ask about hypertension on their parents. Respondent will categorized as have hypertension risk genetically if one or both of their parents have hypertension.

Stress

Stress data has done by used Perceived Stress Scale (PSS). Questionnaire content of 10 questions. There are 4 answers for each question, never, almost never, rarely, often, and very often. Stress data categorized into 3 category, there are high, moderate, and low. High stress if PSS Score ≥20, moderate if PSS score 13-19, and low stress if <13[10].

Duration and Quality of Sleep

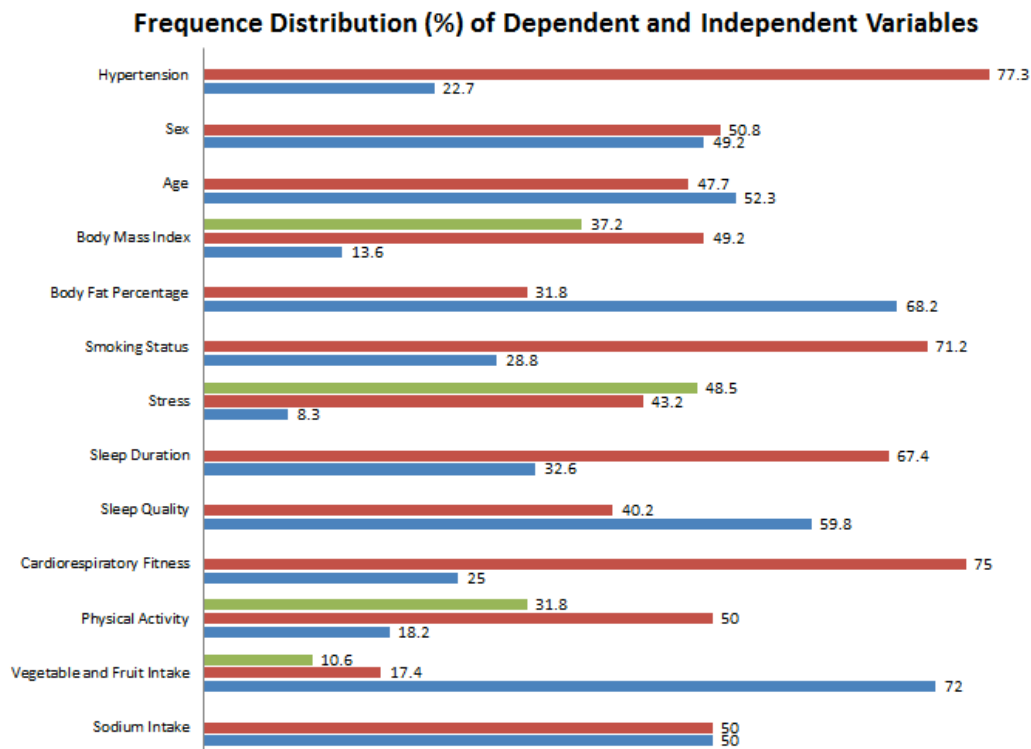Data has taken by used Pittsburgh Sleep Quality Index (PSQI). The answer for each question has 0-3 point.

Sodium, Vegetable and Fruit Intake
Data has taken by used recall 3x24 hours. Respondent will ask about what they eat from 00.00 until 23.59 the day before.

3. Result

3.1 Univariate Analyze

Univariate analyze has done to get information about frequency distribution from independent variables and dependent variable.

Frequence Distribution (%) of Dependent and Independent Variables

Variable	Values
Hypertension	22.7 / 77.3
Sex	49.2 / 50.8
Age	52.3 / 47.7
Body Mass Index	13.6 / 49.2 / 37.2
Body Fat Percentage	68.2 / 31.8
Smoking Status	28.8 / 71.2
Stress	8.3 / 43.2 / 48.5
Sleep Duration	32.6 / 67.4
Sleep Quality	59.8 / 40.2
Cardiorespiratory Fitness	25 / 75
Physical Activity	18.2 / 50 / 31.8
Vegetable and Fruit Intake	72 / 17.4 / 10.6
Sodium Intake	50 / 50

Employees that have hypertension is 22,70% and 77,30% is normotensive. Sex distribution in respondents is almost balance, 49,20% is female and 50,80% is male. Age data classified into two classification, they are have risk on hypertension and non-risk. Respondent will categorized have hypertension risk if ≥45 years old and will categorized as have no risk if <45 years old. Study showed that respondents who have hypertension risk is higher than have no risk based on age. Respondents who have hypertension risk is 52,30% and have no hypertension risk is 47,70%. Study showed that 38,60% have obesity, 25% have overweight, and 36,40% have normal body mass index. Risk hypertension can predicted by body fat percentage. Based on cut off point body fat percentage that have risk on hypertension, most of respondents have risk on hypertension. Respondents who has hypertension risk based on body fat percentage is 68,20% and 31,80% have no hypertension risk.

Respondents who is smoking is 28,80% and no smoking is 71,20%. Study showed that respondents who have high stress is very low. Respondent who have high stress is 8,30%, moderate stress is 43,20%, and low stress is 48,50%. Sleep duration categorized into two classification. Respondents who have less sleep duration is

32,60% and have adequate sleep duration is 67,40%. Respondents who have low sleep quality is 59,80% and have good sleep quality is 40,20%. Respondents who have good cardiorespiratory fitness is 75% and low cardiovascular fitness is 25%. Respondents who have good physical activity is 31,80%, moderate 50%, and low is 18,20%.

Study showed that respondents who have adequate sodium intake and non-adequate sodium intake is same, 50%. Respondents who have adequate vegetables and fruits intake is 10,60%, 17,40% have low vegetables and fruits intake, and 72% have very low vegetables and fruits intake.

3.2 Bivariate Analyze

Analyze has done to know variables that relate statistically to hypertension.

Variable	Blood Pressure				Bivariate Analyze	
	Hypertension		Normotensive		P value	Odds Ration
	n	%	n	%		
Sex						
Female	11	16.90	54	83.10	0.115	-
Male	19	28.40	48	71.60		
Age						
Risk	17	24.60	52	75.40	0.583	-
No Risk	13	20.60	50	79.40		
Genetic						
Yes	13	40.60	19	59.40	0.008	3.341
No	17	17.0	83	83.0		(1.389-8.033)
Body Mass Index						
Obesity	8	44.4	10	55.60		5.733 (2.622-20.263)
Overweight	16	24.60	49	75.40	0.02	2.340 (0.841-6.514)
Normal	6	12.2	43	87.80		
Body Fat Percentage						
Risk	25	27.80	65	72.20	0.034	2.846
No Risk	5	11.90	37	88.10		(1.004-8.065)
Smoke Status						
Smoker	11	28.90	27	71.10	0.286	-
Non-Smoker	19	20.20	75	79.80		
Stress						
High	2	18.20	9	81.80		
Moderate	15	26.30	42	73.70	0.684	-
Low	13	20.30	51	79.70		
Sleep Duration						
Less	17	39.50	26	60.50	0.02	3.882
Moderate	13	14.60	76	85.40		(1.636-8.929)
Sleep Quality						
Low	14	17.70	65	82.30	0.096	-
Good	16	30.20	37	69.80		
Cardiovascular Fitness						
Low	13	39.40	20	60.60	0.011	-
Good	17	17.20	82	82.80		
Vegetables and Fruits Intake						
Very Low	17	17.90	78	82.10		
Low	8	34.80	15	65.20	0.105	-
Moderate	5	35.70	9	64.30		
Sodium Intake						
High	21	31.80	45	68.20	0.012	2.956
Moderate	9	13.60	57	86.40		(1.234-7.077)

Study showed that genetic, body mass index, body fat percentage, sleep duration, and sodium intake is related to hypertension statistically. Factor dominant has done by multivariate analyze, regression logistic.

Final Multivariate Analyze Stage

Variabel	P Value	OR
Genetic	0,003	6,607
Sleep Duration	0,001	7,00
Sleep Quality	0,011	0,234
Cardiovascular Fitness	0,02	4,553
Body Fat Percentage	0,364	1,863
Body Mass Index 1	0,099	0,234
Body Mass Index 2	0,126	0,360
Sodium Intake	0,054	3,075
Vegetables and Fruits Intake 1	0,017	7,204
Vegetables and Fruits Intake 2	0,306	2,482

Analyze showed that variables that have p value <0.05 are genetic, sleep duration, sleep quality, cardiovascular fitness, and vegetables and fruits intake. It means that they have association to hypertension. Finding dominant factor is based on p value and OR. Variable that have p value<0.05 and have the greatest OR is a dominant factor. Analyze showed that vegetables and fruits intake is a dominant factor of hypertension. This is based on p value <0.005 and the highest OR (7.204).

4. Discussion

The goal of this study is to find dominant factor of hypertension. Multivariate analyze showed that vegetables and fruits consumption is a dominant factor of hypertension. Genetic, sleep duration, sleep quality, and vegetables and fruits intake are variables that have p value <0.05. So, there are dominant factor candidate for hypertension. Beside based on p value, dominant factor examined by Odds Ratio (OR). Variables that have the greatest OR is a dominant factor. Vegetables and fruits intake variable has the greatest OR which is 7,204, so it means that vegetables and fruits intake is a dominant factor of hypertension in Head Office PT.Pos Indonesia.

Fiber consumption for four weeks can increase insulin secretion in overweight non diabetic individual[11]. Antioxidant from vegetable and fruit can decrease endhotelium malfunction that caused by high fat food consumption[12]. Vegetable and fruit contain antioxidants that have protective function to hypertension. Antioxidant like ascorbate acid can normalize endhotelium function through normalize amount of oxide nitric (vasodilator endhotelium)[12]. Vitamin E, B, and D in vegetable and fruit also associate with decrease risk of obesity and cardiovascular[13]. Vitamin C and E can improve endhotelium function through vasodilatation of endhotelium and decrease arteriosclerosis[14]. Other mechanism explained that Monounsaturated Fatty Acid (MUFA) which is enriched in vegetable and fruit can decrease insulin resistance, so MUFA consumption can decrease blood pressure[12].

5. Summary

Respondents that have hypertension in Head Office PT.Pos Indonesia is 22,70%. Variables that proved have relation significantly to hypertension are genetic, body mass index, fat body percentage, sleep duration, cardiovascular fitness, and sodium intake. Vegetable and fruit intake proved as a dominant factor of hypertension. Vegetable and fruit contain of fibers, antioxidants, and MUFA that each of them have a preventive role to hypertension. Fiber can increase insulin secretion[11], antioxidants can decrease endhotelium malfunction and normalize endhotelium function[12] and MUFA can decrease insulin resistance which can decrease blood pressure[12].

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