



A Cross-sectional Study of Nutritional Status and Cardiovascular Health Status among Housewives in Tegal Regency, Central Java

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Abstract

Unhealthy diet and physical inactivity are two major factors related to degenerative diseases such as diabetes, hypertension, cancer, and it is still growing issues that mainly occurred in developing countries like Indonesia. It is a descriptive quantitative study, aims to investigate nutritional also cardiovascular health status among housewives in Tegal Regency, Central Java. Twenty adult women (33-57 years old) were voluntary and randomly signed up. Data on body weight (kg), height (cm), waist circumference (cm), hip circumference (cm), systolic-diastolic blood pressure (mm/hg) were collected by survey and measurement techniques. IBM SPSS 21 used to perform descriptive quantitative analysis for all data. Body mass index: 35% obese, 45% pre-obese, 5% overweight, 15% ideal weight. Waist circumference: 35% low category, 65% high category. Waist-to-hip ratio: 60% at risk of chronic diseases, 35% moderate, 5% good. Blood pressure: 40% hypertension stage-two, 25% hypertension stage-one, 25% elevated, 10% normal. Pre-obese and obese have found as the current nutritional status, followed by overweight. Meanwhile, hypertension has found as the current cardiovascular health status, followed by elevated blood pressure. This novel is empirical evidence for the housewife to be more physically active, and manage the diet to improve their health status.

Introduction

A housewife is the most important person in the family, it is determinant how a family to adapt, to develop, to prevent, and to fix any problem like health problems which occurred in the family. One family member's problem will affect overall functional and practical any other members, (Sutikno, 2011). The truth is physical health is the key factor in order to do daily activities without feeling tired, it is also included medical consumption, diet, physical fitness and sleeping duration. However, Indonesian housewives' behavior is

shifting time by time. They are tend to do such as snacking, coach potato, and inconsistent in healthy lifestyle. This is almost happen in every single of them, (Nakita, 2019).

Physical inactivity is able to increase the risk of many chronic diseases. On skeletal muscle, it causes disuse atrophy, and sarcopenia. On bone, it causes osteoporosis, osteoarthritis, imbalance bone remodeling, fracture/falls. On nervous, it causes cognitive dysfunction, depression, and anxiety. On cardiorespiratory, it causes heart disease, myocardial infraction, hypertension, stroke,

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hemostasis, congestive heart failure, endothelial dysfunction, atherosclerosis, peripheral artery disease, deep vein thrombosis. On immune system, it causes rheumatoid arthritis, and increase pain sensation. On endocrine, it causes insulin resistance, metabolic syndrome, type 2 diabetes, obesity. On digestive system, it causes nonalcoholic fatty liver, colorectal cancer, diverticulitis, and constipation. On reproduction, it causes breast cancer, endometrial cancer, gestational diabetes, pre-eclampsia, polycystic ovary syndrome, and erectile dysfunction, (Booth, Roberts, Thyfault, Rueggsegger, & Toedebusch, 2017).

Physical activity management and diet is the best combination to maintain or to improve overall health status. there is a positive correlation between nutritional status and the physical fitness levels in adult women, those who have balanced diet and exercise program are having good fitness levels, (Utami, 2012). Exercise is able to positively affecting the energy balance, also it can be performed as the strategy for inducing short-term energy deficits irrespective of adiposity and sex. This phenomenon comparable in active versus sedentary individuals, (Dorling et al., 2018).

Other positive effects of exercise showed that mixed impact aerobic dance with average intensity (60% up to 80% of maximum heart rate), three times a week for about 30 up to 45 minutes is significantly able to lowering blood pressure and resting heart rate, (Ali, M. A., et al., 2017). Relaxation exercises like Taichi Chuan and Jacobson's Progressive Muscular Relaxation are able to decrease cortisol concentration, lowering blood pressure in pre-hypertension population, (Kosoema, Chasani, & Handoyo, 2016). Physical activity (exercise) recommendation for adults with non-communicable disease are: 1) Aerobic with moderate intensity must be done no less than 150 minutes each week, and 75 minutes with vigorous intensity or a combination of both. 2) Muscle-strengthening activities must be done at least twice a week, (Geidl, Abu-Omar, Weege, Messing, & Pfeifer, 2020).

The amount and the composition are keys to nutrient intake in order to achieve optimal health for each individual. Excessive calories, especially food high fat and carbohydrates are

well known causing unwanted health problems. Reducing fats and cholesterol consumption is a way of lowering the risk of chronic diseases such as heart disease and cancer. Along with that, food containing high sugar causes inflammation, high blood pressure, and obesity, (Touger-Decker & Sirois, 2005). Based on the elucidation above, Purposes of this study are: 1) To investigate the nutritional status, and 2) To investigate the cardiovascular health status among housewife in Tegal Regency, Central Java, Indonesia.

Method

This is descriptive quantitative study with cross-sectional data. Twenty adult women (33 years old up to 57 years old) were voluntary and randomly signed up in this study. Measurement techniques were performed to collect the data such as body weight (Kg), height (cm), waist circumference (cm), hip circumference (cm), systolic and diastolic blood pressure (mm/Hg). All the procedures in this study have been approved by the institutional committee of Faculty of Sports Science, state university of Semarang. First of all, samples received the explanation about study purposes, and the protocol. Secondly, they were asked to rest (sitting) for about 15 minutes before blood pressure measurement was performed using Automatic Blood Pressure Monitor (OMRON Model HEM-7203 with pressure accuracy ± 3 mmHg and Pulse Accuracy $\pm 5\%$ of display reading). To measure Body Mass Index (BMI), samples were asked to step on the portable electronic weighing scale (OMRON Model HN289 Digital Personal Scale up to 150 Kg) and height was measured by a portable height meter (One Med No. 26SM up to 200 CM). Last step their waist and hip circumferences were measured by using a constant tension tape/tape measure (Figure Finder, Rockton, IL USA Pat. No. 4.433.486). To get easier visualization of our procedure, see Figure 1. IBM SPSS Statistics Version 21 was used to perform descriptive quantitative analysis for all data.

Result and Discussion

Different spectrum of physical inactivity causes different effects on health problems. It is categorized from motorized transportation like using scooters versus using bike; aging affecting the physical activity levels; sitting as

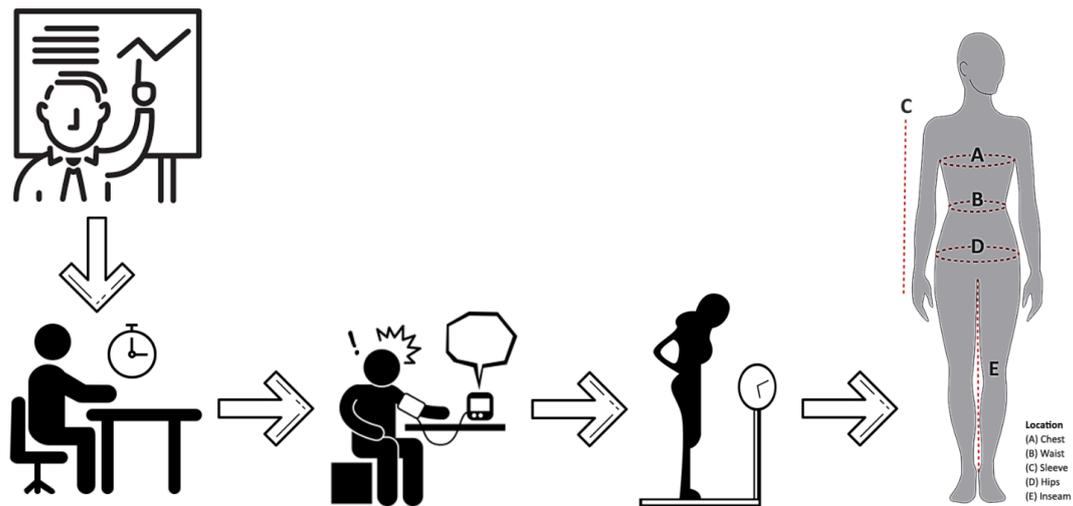


Figure 1. Research procedure

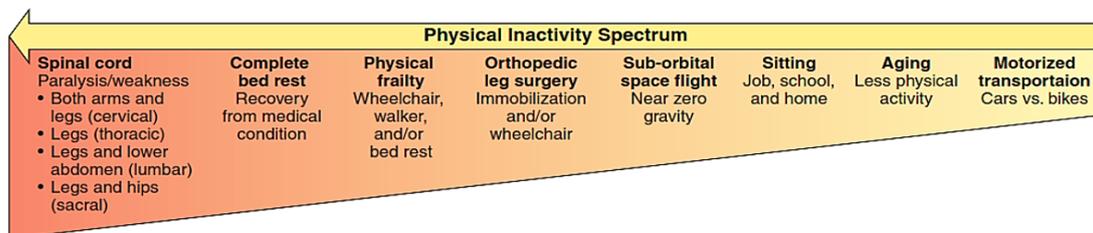


Figure 2. Spectrum of the types of physical inactivity, (adopted from Booth et al., 2017)

sedentary lifestyle pattern such as job, school, home; sub-orbital space flight such as aircraft crews or astronauts (near to zero gravity); immobilization and/or wheelchair caused orthopedic leg surgery; physical frailty like wheelchair, walker, and/or bed rest; recovery from medical condition (complete bed rest); both arms and legs/cervical, legs/thoracic, leg and lower abdomen/lumbar, legs and hips/sacral due to spinal cord paralysis/weakness, (Booth et al., 2017).

All data in this study are primary. Obtained directly from the subjects. Additional data such as reference values of body mass index, waist circumference, and waist-to-hip ratio are from the World Health Organization year 2008, and blood pressure reference value is from Blood Pressure Association, 2008. Based on the BMI data as a determinant of nutritional status, seven samples (35%) are in obese category, nine samples (45%) are in pre-obese category, one sample (5%) is in overweight category, and only three samples (15%) are in

normal weight category, (Figure 3).

From total sample in this study we have found only two categories, there are: low category is 35% (7 samples), and high category is 65% (13 samples), data are in table 1. According to BMI data, samples who have low waist circumference they are ones who have normal BMI (3 samples), overweight (1 sample), and pre-obese (3 samples). Whereas, those sixty five percent of sample (high circumference) who are classified into pre-obese (6 samples), and obese (7 samples). Data on table 2 are showing that sixty percent (60%) of total sample is at risk of chronic diseases, thirty five percent (35%) is at average/moderate, and only five percent (5%) is at good category. Meanwhile, data on table 3 are showing that forty percent (40%) of sample are having hypertension stage two, twenty five percent (25%) are having hypertension stage one, another twenty five percent (25%) are elevated blood pressure, and only ten percent (10%) having normal blood pressure.

Both physical in-activity and sedentary

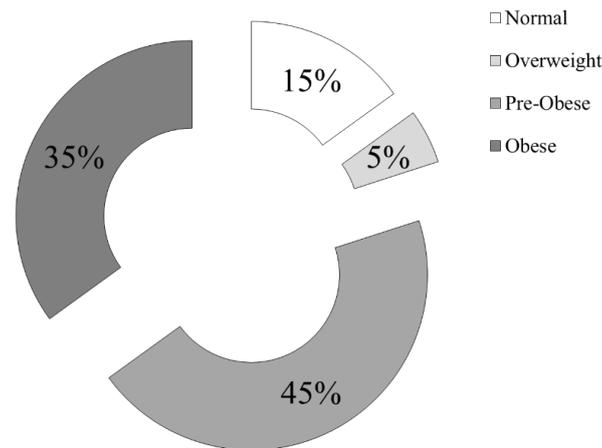


Figure 3. Study result of nutritional status based on Asian female's Body Mass Index, (research data, year 2019; WHO, 2008).

Table 1. Norms of waist circumference (WC) and study result on WC, (research data, year 2019; WHO, 2008).

Category	Range	Sample (n=10)	Percentage (%)
Very High	>110	0	0
High	90-109	13	65
Low	70-89	7	35
Very Low	<70	0	0

Source: Primary Data

Table 2. Female's Waist-to-Hip Ratio (WHR), (research data, year 2019; WHO, 2008).

Category	Range	Sample (n=10)	Percentage (%)
Very High	<0.75	0	0
High	0.75-0.79	1	5
Low	0.80-0.86	7	35
Very Low	>0.86	12	60

Source: Primary Data

Table 3. Norms of blood pressure and study result on blood pressure, (research data, year 2019; Blood Pressure Association, 2008).

Category	Systolic BP	Diastolic BP	Sample (n=10)	Percentage (%)
Normal	<120	<80	2	10
Elevated	120-129	<80	5	25
Hypertension 01	130-139	80-89	5	25
Hypertension 02	140-179	90-121	8	40
Hypertension Crisis	>180	>120	0	0

Source: Primary Data

behavior such as eight hours per day sitting at work, long distance driving, prolonged study at school cause low energy expenditure which leads to energy imbalance, where eventually leads to overweight, pre-obese, and obese, (Inyang, 2015; Owen, Sparling, Healy, Dunstan, & Matthews, 2010). Type 2 diabetes mellitus is confirmed has strong association with physical in-activity, and it is regardless of sex, age, ethnics, or BMI. Further, two of ten people in this modern lifestyle are physically in-active, (González, Fuentes, & Márquez, 2017). Since BMI has different cut-off values among ethnics especially for Asian population, waist circumference measurement is needed to confirm action levels based on BMI. Caucasian is having less amount of visceral adipose tissue compared to Asian by waist circumference measurement, (WHO, 2008).

Different ways to do physical activity such as walking, cycling, household activities, physical exercise, sports recreation, and it can be done anytime, anywhere, at home, school or at work. With sufficient duration and proper intensity, it will bring many benefits effect on the body. Noncommunicable diseases (diabetes, heart disease, stroke, breast and colon cancers) can be prevented even can be treated by regular physical activity. It also capable to prevent hypertension, overweight and obesity. Hence, it can improve mental health and overall the wellbeing and quality of life. Physical activity itself defined as any movement produced by bio-motor (skeletal muscle) that requires energy expenditure, (WHO, 2018).

Waist-to-hip ratio is a measurement of waist circumference compared to hip circumference, it is used to be simple and good indicator for fat storage in abdomen and hip, and it is assumed as a better approach to evaluate the obesity levels, supporting the BMI measurement, (Hartanto & Yong, 2018; Ntuk, Gill, Mackay, Sattar, & Pell, 2014). Interestingly, obesity is not only risk factor for metabolic disorder linked to degenerative diseases, but also a risk factor for asthma both sex in female and male, and the risk factor is increased in females with abdominal obesity, (Brumpton, Langhammer, Romundstad, Chen, & Mai, 2013).

The relationship between WHR, BMI

and women are complicated. At first, the idea of very low WHR and low BMI in women are believed become the center of attraction for gentlemen, because they believe those are the reliable features for superior fertility. However, scientific evidence shows that female with higher BMIs have earlier menarche and later menopause compared to lower BMI and lower WHR; they do not have predisposes to conditions that compromise infant survival; they have more chance to live births and conditional for education; mothers with ideal pre-pregnancy BMIs have a decreased of producing both preterm infants and low-birth-weight, (Lassek & Gaulin, 2018).

A condition when individual is having excess body fat $\geq 20\%$ is simple definition of obesity, and it is long-term implication from imbalance energy intake (energy consumption is higher than energy expenditure), and it has strong relationship with hypertension, (Jiang, Lu, Zong, Ruan, & Liu, 2016; Kotsis et al., 2018). Other factors related to hypertension are lifestyle such as ad libitum salt consumption, sleep disturbances, and keep elevating the waist circumference, (Zanchetti, 2017). Angina (chest pain), heart failure, heart attack, stroke, and chronic kidney disease are degenerative diseases related to harden arteries (decreased blood flow) caused by hypertension, (Chockalingam, 2007). Interestingly, social support and social integration are having physiological impact in hypertension prevalence, (Yang, Boen, & Mullan Harris, 2015).

Hypertension is defined as the blood pressure elevated $\geq 140/90$ mm/Hg, and it is related to short life expectancy. It is the most common modifiable risk of cardiovascular diseases, but it leads to cause of the death especially in women in developing countries. However, hypertension prevalence is higher in men compared to women in the younger population than sixty-five years old, (Ahmad & Oparil, 2017). However, elderly women predicted having higher risk of hypertension than men, it is due to the negative effect of combined oral contraceptive drugs. Furthermore, women are in the high incidence of cancer, (Pimenta, 2012). There are some considered strategies to lower the incident both obesity and hypertension: 1) active lifestyle, 2)

body weight management, 3) diet management (less last and more magnesium), 4) sleep management, 5) environmental and social intervention, (Kotsis et al., 2018).

Physical exercise is considered having association with the regression and even prevention of left ventricular hypertrophy (a condition of heart wall's main pumping chamber become thickening and enlargement "LVH"), (Hegde & Solomon, 2015). Other than that, there is an evidence state that weight management having positive feedback with hypertension which weight increase makes higher probability to hypertension and it vice versa, (Sabaka et al., 2017). Furthermore, the overall body weight is not the actual deal who is having a relationship with blood pressure, but the body composition. The body fat and systolic blood pressure were significantly changed during the alternation of diet management causes body composition modification, (Fazliana et al., 2018).

Unsurprisingly, insomnia and sleep deprivation are positively related to prevalence of hypertension. Based on both the observational and prospective studies, there is a strong correlation between the risk of hypertension with obstructive sleep apnea, (Calhoun & Harding, 2010). More detail, increased hypertension risk is associated with the duration of sleeping, either short or long sleep duration, (Grandner et al., 2018). Additionally, increased blood pressure and endothelial inflammation are associated with poor sleep patterns. Common but frequently neglected sleep disturbances (insomnia, poor sleep quality, short sleep duration) is able to causes harmful effects on blood pressure as well as the vascular inflammation, (Aggarwal et al., 2018).

Increased in systolic blood pressure is associated with decreasing individual education, extended with decreasing residential neighborhood education. Body mass index/waist circumference and resting heart rate mediate the association between blood pressure and residential neighborhood education, (Chaix et al., 2010). Other social factors linked to hypertension are economic status, to access affordability of care, (Wenger et al., 2018). The association between low socioeconomic status

with higher blood pressure is due to the level of education, (Leng, Jin, Li, Chen, & Jin, 2015). Interestingly, although some studies showing that education is related with increased blood pressure, but a study by Cuschieri in 2017 showing that it did not have any association with the risk of hypertension prevalence, (Cuschieri, Vassallo, Calleja, Pace, & Mamo, 2017). It is a research gap, to any scientist who is interested to do strongly suggested to consider more variables which maybe could be different factors in different places.

Conclusion

Unfortunately, instead of normal/ideal weight, pre-obese and obese were found become the current nutritional status for the majority of housewife in Central Java, followed by overweight. Alert, Hypertension both stage one and two are found become seriously current cardiovascular health status, followed by elevated blood pressure. These found become empirical evidence to advise housewife for being more physically active, manage their diet and sleeping time to improve their current nutritional and cardiovascular health status. At last, to complete our limitations, future study is suggested to evaluate the physical behavior, to investigate the food intake, and to check biomarkers such us blood glucose, uric acid, nitrogen balance, and many other indicators related to nutritional status and cardiovascular health.

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