Prediction of Blood Pressure by Waist Circumference, Waist Pelvic Ratio and Body Mass Index

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ABSTRACT

Hypertension cases in Yogyakarta are above the average cases of hypertension Indonesia. Hypertension can be prevented by controlling weight. Obesity indicators include; waist circumference, waist circumference ratio and Body Mass Index (BMI). The objectives of the study were to predict blood pressure based on the size of the waist circumference, waist lumbar ratio and body mass index (BMI). The cross-sectional study method. Samples of GKJ Gondokusuman Yogyakarta congregation, male and female, age 20-39 and 40-59 years old. Sampling proportionate stratified random sampling. Data analysis with Pearson test. The result showed that there was a relationship of waist circumference with systolic blood pressure and diastole, there was a relationship between body mass index with systolic and diastolic blood pressure. In the female group, there was no relationship between waist circumference, waist lumbar ratio, and BMI with systolic or diastolic blood pressure.

Keywords. Waist circumference, Waist lumbar ratio, BMI, Blood pressure, Obesity

INTRODUCTION

Background

Regional health surveys in 2007 showed cases of hypertension in Yogyakarta Province reached 35.8% above the Indonesian average (31.7%). As many as 75.8% of cases of hypertension in Indonesia have not been detected by health workers[1]. Hypertension is associated with morbidity and mortality of cardiovascular disease[2]. Health Professional Study reported that US men with 29-33 kg / m^2 IMT were twice as likely to have cardiovascular disease. Men with a BMI greater than 33 kg / m^2 have a threefold risk of developing cardiovascular disease. Obesity is one of the risk factors for cardiovascular disease[3].

Women with waist circumference ≥88 cm have a two-fold higher risk, than women with waist circumference <80 cm, are exposed to hypertension[4].

Body mass index is used to assess obesity, epidemiological studies, and weight control[5]. In the low body mass index, the possibility of hypertension also persists, but this needs further analysis[6].

Currently, there are not many studies that predict blood pressure based on waist circumference, Round Waist Circumference, and Body Mass Index (BMI). This is what encourages research on the prediction of blood pressure based on waist circumference, waist-hip ratio and BMI on blood pressure at age 20-59 years.

Purpose

The general purpose of this study was to find out whether there is a relationship between waist circumference, waist-hip ratio and body mass index with blood pressure in congregation GKJ Gondokusuman Yogyakarta.

METHODS

The type of research that has been done is analytic observation with cross-sectional approach. Examining the relationship between waist circumference, hip circle ratio, Body Mass Index with blood pressure, measured for a moment. Research data used primary data. The data obtained is then described and analyzed. Research population were member of Javanese Christian Church (GKJ) Gondokusuman. Inclusion criteria were aged 20-59 years, exclusion criteria were taking antihypertensive medications, pregnant, taking hormonal contraceptives, taking 2-3 cups of alcohol per day, severe activity before measurement, kidney disease, diabetes mellitus, thyroid, corticosteroid use, ascites and cirrhosis hepatitis. Exclusion criteria were performed with anamnesis. Samples were taken by proportional stratified random sampling method, randomly. After calculated by the formula, the sample size is at least 116 samples. Then sampling was done by stratified random sampling, the required sample was 120.

Independent variables were waist circumference, waist-to-hip ratio, and body mass index (BMI) and dependent variable was blood pressure. Materials and tools needed were 1) questionnaire, 2) staturmeter with accuracy of 0.1 cm and maximum length of 200 cm, 3) Elitech digital body scale with an accuracy of 0.1 kg with a capacity of 180 kg, 4) nonelastic parameters with 0.5 cm accuracy with maximum length of 150 cm, 5) digital digitizer Omron IA2.

RESULTS

Of the 174 subjects, 124 were eligible for the study. Samples taken were the first 120 people. The result of the research shows that most of the work is a private employee (male = 38,3% and female = 30%). The other types of work are nurses, doctors, musicians, priests, housewives, and retirees. The highest level of education is Strata-1 male (40%) and female (53.3%). Based on IMT classification, 40% men and 31.7% women. The percentage of overweight was most prevalent in women (61.7%) than in men (56.6%).

The waist circumference is at most <90 cm (36.7%), while in wait at most $\geq$ 80 cm (60%). The male group showed the waist-hip ratio at most <0.9 (58.3%), women $\geq$0.8 (65%). This means that waist circumference and waist-waist circumference ratio of many women who show the risk of hypertension than men.

The prehypertensive blood pressure category was the highest percentage, in the male group (40%), the highest percentage of normal blood pressure (48.4%). The percentage of hypertension is higher in the male group than in women.

The results showed that there was an association between waist circumference and systolic and diastolic blood pressure in male ($p<0.05$). Pearson correlation value in males and all samples interpreted very weakly ($r<0.4$). In the female analysis, there was no correlation between waist circumference with systolic and diastolic blood pressure ($p>0.05$).

Pearson test between waist-hip ratio and systolic and diastolic blood pressure showed no significant association in the men and women group ($p>0.05$). While in the group of all samples obtained a positive relationship ($p<0.05$) between RLPP with blood pressure with a very weak correlation value ($r<0.4$).

There was an association between BMI with systolic and diastolic blood pressure in the men group and all samples ($p<0.05$) with very weak Pearson correlation (0.4). In women, there was no significant correlation between[7] BMI with blood pressure ($p> 0.05$)

CONCLUSION

Blood pressure in men can be predicted related to waist circumference, while in women cannot be predicted between blood pressure and waist circumference. Systolic blood pressure is unrelated and unpredictable based on Ratio of Waist Circumference in both male and female groups. Systolic blood pressure can be predicted from the Body Mass Index (BMI) in the male group. While in the blood pressure group of women cannot be predicted based on BMI.

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