CHAPTER I

INTRODUCTION

A. Background

Overweight and obesity are both labels for ranges of weight that are greater than what is generally considered healthy for a given height. World Health Organization (WHO, 2006) simply defined overweight and obesity as abnormal or excessive fat accumulation in adipose tissue that may impair health. For adult population and individuals, the definition of overweight was commonly described by body mass index (BMI).

BMI is defined as the weight in kilograms divided by the square of the height in meters (kg/m^2). It classified adult population into underweight, normal weight, overweight, and obese status. Overweight in adults according to BMI was classified as a BMI more than or equal to 25 (WHO, 2000).

According to Centers for Disease Control and Prevention (CDC, 2009), results from the 2005-2006 National Health and Nutrition Examination Survey (NHANES), using measured heights and weights, indicate that an estimated 32.7 percent of U.S. adults 20 years and older are overweight.

Tesfaye et.al. (2007) conducted a research across three populations in Asia and Africa, found that mean body mass index in men varied between 19.41 (2.28) in

was noted among Indonesian women (25%) and men (10%), whereas low BMI was widely prevalent in Ethiopia and Vietnam, ranging from 33 to 43%.

Since height is still increasing and body composition is continually changing, the use of BMI in children and adolescents was modified. According to Centers for Disease Control and Prevention (CDC, 2000), classification of overweight in children and adolescents is defined by body mass index-for-age percentiles. Children and adolescents who had BMI for age more than or equal to 95th percentile were considered to be overweight. This criterion is also, sometimes, referred as obesity in children and adolescent.

WHO (2010) found the prevalence of obese children aged 6-to-11 years has more than doubled since the 1960s. Obesity prevalence in youths aged 12-17 has increased dramatically from 5% to 13% in boys and from 5% to 9% in girls between 1966-1970 and 1988-1991 in the USA.

Kliegman at al., (2006) also explained the prevalence of obesity in children has increased dramatically. Data from 1999-2000 indicate that 15% of American children age 6 to 19 years were considered obesity. The prevalence of obesity has increased to approximately 10% in children 4 to 5 years old. The largest increases in the prevalence of obesity were seen in the most overweight classification and in certain ethnic group, such as African American and Mexican American children of

According to Huriaty (2006), the prevalence of obesity in children in Indonesia increases. In DKI Jakarta, prevalence of obesity increased as increasing age. Prevalence of obesity in children aged 6-12 years old was 4%, in adolescents aged 12-18 years old was 11.4%. In adolescents, prevalence of obesity in female (10.2%) was greater than male (3.1%).

Huriaty (2006) also found an increasing number of obesity prevalence in children and adolescents in D.I.Yogyakarta in two years. In 2003, prevalence of obesity in children and adolescent was 7.3% from 4747 persons. In 2005, prevalence of obesity in children and adolescent increased to 10.3% from 4677 persons.

Introduction survey which was done personally on March 2009 in some Senior High Schools in Yogykarta found that SMA Muhammadiyah 3 Yogyakarta seems to have a large number of overweight students. From 720 students, out of 42 (5.83%) students were classified to overweight.

Hockenbery and Wilson (2007) explained that in children and adolescents, just as in adults, BMI described fat accumulation over the body. Unfortunately, it could not explain the pattern of fat distribution. In fact, fat accumulations in persons with obesity were sited at the different parts of body.

Port and Matfin (2009) lower body obesity is also known as *peripheral, gluteal-femoral*, or *gynoid* obesity, was referred as fat accumulation at the lower body part such as hip and bottom. It was likely occurred in

Whereas, other types of obesity, *central, abdominal, visceral*, or *android* obesity was referred as fat accumulation in upper body such as abdomen, chest, and face. It was likely occurred in man than woman.

Overweight or obesity in children and adolescent related to several diseases. However, research suggested that fat distribution may be a more important factor for morbidity and mortality than BMI (McCance, at al., 2010). The presence of excess fat in the abdomen out of proportion to total body fat is an independent predictor of risk factors and mortality. Waist circumference is a better predictor of abdominal or visceral fat content than BMI (WHO, 2000).

Fat accumulations in abdomen were mostly consisted of saturated fats. They had bigger fat cells and potentially lead to several health problems. Diabetes mellitus and cardiovascular problems were most common in persons with this type of obesity (Porth and Matfin, 2009). These reflections explicitly described the influence of waist circumference to health problems such as, cardiovascular diseases.

Problems in cardiovascular system might impair blood pressure mechanism. In Indonesia, there were many researches proved that waist circumference in adult had a high correlation with both systolic and diastolic blood pressure in adult population. Adult with high level of waist circumference had greater blood pressure (Adiyo, 2008). That condition increased mortality and morbidity from a variety of

Overweight in children and adolescents will grow up to become obese adult (Porth and Matfin, 2009). So that waist circumference in overweight children and adolescents probably also had a correlation to blood pressure as what was happened in adult. There were just a few research in Indonesia describe this correlation.

Based on those reflections, this research conducted to discover the correlation between waist circumference and blood pressure among overweight adolescent. Furthermore, this result of this research was expected to be an early disease-related-overweight prevention.

B. Problem Formulation

Is there any correlation between waist circumference and blood pressure among overweight student in SMA Muhammadiyah 3 Yogyakarta?

C. Research Objectives

1. General Objective

This research aimed to investigate the correlation between waist circumference and blood pressure among overweight students in SMA Muhammadiyah 3 Yogyakarta.

2. Specific Objectives

Specific objectives of this research are:

a. To identify prevalence of overweight in students of SMA Muhammadiyah

b. To know the level of blood pressure among overweight students of SMA Muhammadiyah 3 Yogyakarta.

D. Research Benefits

1. Benefit for researcher

This research was expected to be a reference for further research about blood pressure, waist circumference, and overweight in adolescents.

2. Benefit for nursing practice

Nursing practice may get information about correlation of waist circumference and blood pressure among overweight adolescents and apply nursing responsibilities in preventing the further complications earlier.

3. Benefit for student

Students were expected to get information blood pressure; overweight and its further complication; its prevention, including how to maintain an ideal body weight.

4. Benefit for school

School, its staffs, and teachers were expected to get information about blood pressure, overweight and its complication, and the best prevention.

E. Research Authenticity

Numbers of researches discussed about relationship between waist circumference and blood pressure were found as following:

1. Research conducted by Perdana (2008) about "Hubungan Antara Tekanan Darah dengan Lingkar Pinggang pada Penderita Obesitas di RSUP Dr. Sardjito Yogyakarta" was found and related to this study. Perdana (2008) conducted the research by cross sectional method for assessing relationship of blood pressure and waist circumference among obese patients in RSUP Dr. Sardjito Yogyakarta. The result showed that waist circumference had a statistically significant correlation to diastolic blood pressure but not statistically significant correlation to systolic blood pressure. Research conducted by Perdana (2008) had some differences with this research. They include research location and research sample. This research was conducted in SMA Muhammadiyah 3 Yogyakarta with students as research sample; while, Perdana (2008) conducted the research in RSUP Dr. Sardjito Yogyakarta with hospital's staffs as the sample.
2. Adityo (2008) also conducted a research about "Hubungan antara Lingkar Pinggang atau Rasio Lingkar Pinggang-Panggul dengan Resiko Hipertensi pada Remaja Puteri SLTP Obes di Kota Yogyakarta". This research was cross sectional research, and resulted that diastolic hypertension occurred at cut off 88 cm of waist circumference in female obese students. Research conducted by Adityo (2008) also had some differences with this research. They include research variables, in which Adityo had waist

circumference, waist-hip ratio, and risk of hypertension as the variables. While this research had waist circumference and blood pressure as the variables. Research sample and location were also different with this study.

3. Poirier et al., (2005) also conducted research about "Impact of Waist Circumference on the Relationship between Blood Pressure and Insulin" showed that association between obesity, fasting insulin, insulin sensitivity, and blood pressure is largely explained by concomitant variation in waist circumference. Method which was used by Poirier at al., (2005) was cross sectional design.

   Differences between research conducted b Poirier at al., (2005) and this research were the variables. Priorier et al., (2005) had obesity, fasting insulin, insulin sensitivity, and blood pressure as the variables; while this research only used waist circumference and blood pressure as the variables. Since, Poirier at al., (2005) used adult as the sample, the research was different to this research