BODY MASS INDEX AND WAIST CIRCUMFERENCE PREDICTORS OF CARDIOVASCULAR RISK IN AFRICAN AMERICANS

Objective: The purpose of our study was to determine which measure of obesity is better at predicting cardiovascular risk in African Americans. We hypothesized that BMI alone would be significantly associated with cardiovascular reactivity. We also hypothesized that waist circumference alone would be significantly associated with cardiovascular reactivity. Lastly, we hypothesized that BMI and waist circumference together would be more associated with cardiovascular reactivity and account for more of the variance than the two measures alone.

Design: BMI and waist circumference were measured in 105 African American college students (21 men and 84 women) aged 18–27. In addition, heart rate, cardiac output, stroke volume, and systolic and diastolic blood pressure were measured as the participants viewed a racially noxious scene on videotape.

Results: BMI and waist circumference analyzed separately were significantly associated with stroke volume, cardiac output, and systolic blood pressure. These positive associations showed that heavier participants had higher systolic blood pressure and their hearts pumped out greater blood volume compared to their thinner counterparts. Body mass index also completely mediated the relationship between waist circumference and cardiovascular activity.

Conclusions: The findings may be attributed to the premise that the waist circumference standards are different for African Americans than for Whites. Future research should establish waist circumference thresholds that are better predictors of cardiovascular disease in African Americans. (Ethn Dis. 2012;22(2):162–167)

Key Words: Body Mass Index, Waist Circumference, Cardiovascular Risk, Stroke Volume, Cardiac Output, Blood Pressure

INTRODUCTION

Obesity is a well documented risk factor for cardiovascular disease, yet there is no consensus on the best method of assessment.\(^1\) Body mass index (BMI), a measure of body fat based on height and weight, is the traditional method of measuring obesity and has been associated with the onset of cardiovascular disease. However, a major weakness of BMI is that it does not distinguish between muscle and fat which leads to misclassification of certain people.\(^2,3\) Researchers\(^4–6\) found that BMI is useful in predicting cardiovascular disease in individuals with a BMI $\geq 35$, who have more fatty tissue and less muscle, and are more vulnerable to cardiovascular disease. For example Clark et al\(^6\) examined the effects of body mass on cardiovascular reactivity to stress in African American college students. They found that obese men had increased reactivity to the racial stressor.

Another well documented method of assessing obesity is the measurement of abdominal fat. Waist circumference is considered a risk factor for cardiovascular disease because the abdomen tends to have more visceral fat than subcutaneous fat.\(^7\) Visceral fat in the abdomen produces the hormone adiponectin which leads to a reduction in the body’s response to insulin resulting in insulin resistance.\(^7\) Brenner et al\(^8\) investigated whether waist circumference or BMI is a better predictor of blood lipid concentrations. Waist circumference was significantly related to triglycerides, total cholesterol and high density lipoproteins after adjusting for BMI and covariates among men and women. After the authors adjusted for waist circumference and covariates, BMI was not significantly associated with the two serum lipid measures. In addition, waist circumference demonstrated better predictability of triglycerides, total cholesterol and high density lipoproteins among all sex and subgroups except among East Asian women. The authors concluded that waist circumference is a stronger predictor of cardiometabolic health when compared with BMI among young adults, especially among men.

Other researchers\(^9–12\) have reported that BMI and waist circumference together, is the best predictor of the future onset of cardiovascular illnesses. For example, Sarno et al\(^9\) studied the effects of BMI and waist circumference on the occurrence of arterial hypertension. The authors found that the combination of BMI and waist circumference increased the prevalence for arterial hypertension. Likewise, Janssen et al\(^10\) investigated the ability of BMI and waist circumference to predict abdominal fat in a sample of healthy White men and women. The investigators found that BMI and waist circumference combined accounted for additional visceral abdominal fat and is a better predictor of metabolic risk than BMI or waist circumference alone.

While the debate over the best measure of obesity continues, few studies have examined the efficacy of BMI and waist circumference to predict cardiovascular illness in African Americans. To this end, the purpose of our study was to determine which measure of obesity would be associated with heart rate, stroke volume, cardiac output and systolic and diastolic blood pressure hyperactivity in African Americans. The following hypotheses were proposed: 1) BMI alone would be significantly associated with cardiovas-