THE RELATIONSHIP BETWEEN TYPE 2 DIABETES AND OBESITY IN AFRICAN AMERICANS: JACKSON HEART STUDY – A QUEST FOR A JOINT INDEX (BODY MASS INDEX AND WAIST CIRCUMFERENCE)

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Abstract: There are 23.6 million people in the United States, or 8% of the population, who have diabetes. Total diabetes prevalence increased 13.5% from 2005-2007. Currently, 24% of persons with diabetes are undiagnosed, down from 30% in 2005 and from 50% ten years ago. There are 1.6 million new cases of diabetes were diagnosed in people aged 20 years or older in 2007. Type 2 diabetes mellitus (T2DM) is an important contributor to most manifestations of cardiovascular disease including coronary heart disease (CHD). T2DM represents one of the great threats to the health of African Americans both at the present time and perhaps for many years into the future. A wide range of serious morbidities and too often fatal conditions are strongly associated or caused by T2DM. Though the mechanism of the relationship between T2DM and two its risk factors -- obesity defined by Body Mass Index and central adiposity, there is correlation which is becoming more profound with the population is becoming increasing more obese. Thus, obtaining the best measure(s) of obesity is paramount in addressing diabetes and its related complications. The primary objective of this study is to compare the individual and joint effects of two measures of obesity – body mass index (BMI), waist circumference (WC), measure of central adiposity (CA), and an index (hereby referred to as obesity index) which is the categorization of the intersection between three categories of BMI (normal, overweight and obese) and the two level of central adiposity. The secondary objective was to assess difference in the risk profile of the six sub-groupings of the obesity index. T2DM was defined as person with a self-reported history of physician diagnosed diabetes, or history of taking anti-diabetic medications or provided evidence of anti-diabetic medication on the date of clinical assessment, or had a fasting glucose of 126 mg/dl or greater. Classification of medications was by the Therapeutic Classification System (TCS) of medication coding/identification. BMI was classification as normal, overweight and obese by the following ranges: 18.5 – 24.9 kg/m², 25 - <30.0 kg/m² and ≥ 30 kg/m². CA was defined as waist circumference ≥ 102 cm for men and ≥ 89 cm for women. The obesity index with six categories was defined by the intersection between 3 categories of BMI and the two level of CA (yes versus no). Logistic regression analyses were performed at a significance level of 0.05. The percentage of variances explained by BMI, WC, and obesity index are 3.2%, 3.1% and 3.8%, respectively. In each case there was a very highly significant trend (p<0.001). There were significant differences in risk profile of subgroups such as overweight persons with CA compared to an obese person without CA (p=0.0181). Where as there no significant difference in T2DM prevalence between persons with normal BMI with CA and overweight persons without CA (p=0.8396). Though BMI and WC are both significant independent risk factors to T2DM prevalence, however, the derived obesity index was a better risk factor compared to each of individual measure (BMI and WC). Further understanding of the risk profile of the subgroups defined by both BMI and WC is very important in determining persons at greater risk.

Keywords: Body mass index, BMI, waist circumference, central obesity, obesity index, obesity, type 2 diabetes mellitus, diabetes, prevalence, risk factors, Jackson Heart Study, risk profile.