

# **Is There an Association Between Waist Circumference and Type II Diabetes or Impaired Glucose Tolerance in Adolescents?**

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**Background:** The incidence of type 2 diabetes (T2DM) in children and adolescents is increasing and parallels the rising incidence in childhood obesity; as of 2003, 85-96% of children with T2DM are overweight or obese. Impaired fasting glucose (IFG) is a predictive factor of type 2 diabetes. Total body fat is a predominant factor influencing insulin sensitivity, whereas visceral fat has additional metabolic effects on fasting insulin. Traditionally, body mass index (BMI) is used as an index of health-related risk factors, however BMI has been recognized to be a poor proxy for abdominal fatness.

**Methods:** We used a subset of data from the combined 2001-2002 and 2003-2004 National Health and Nutrition Examination Surveys (NHANES) to evaluate the possibility of an association between waist circumference (WC) and T2DM as well as between WC and IFG among adolescents aged 12-19 years. Only subjects with complete information on age, gender, race/ethnicity, diabetes history, and relevant physical examination and laboratory screen were included in the analyses.

**Results:** Of 2,105 adolescents examined, only 7 were classified as having T2DM, an insufficient number of cases on which to base an analysis of a potential relationship between WC and T2DM. Consequently, we turned our attention to IFG. Of 923 adolescents examined, 139 (15%) were classified as having IFG. Adolescents 12-19 years with a waist circumference between the 75<sup>th</sup> and 90<sup>th</sup> percentile of subjects in our sample were twice as likely to have IFG as the reference group in the crude model (crude OR 2.025, 95% CI 1.267, 3.238,  $P < 0.0032$ ), however this result was not statistically significant in the model adjusted for age, gender, race/ethnicity, poverty index, BMI, and skinfold measurements. In multiple linear regression analyses, only race, age and gender were independently associated with fasting plasma glucose levels.

**Conclusions:** We were unable to test for an association between WC and T2DM, due to the insufficient number of cases in the sample. We were unable to find an association between WC and IFG which may indicate that waist circumference is not an appropriate predictor of impaired fasting glucose. However, early identification of impaired fasting glucose can facilitate careful monitoring of adolescents at risk for type 2 diabetes and is critical for public health practice.

## **Thesis Committee:**

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