Waist circumference is correlated to TSH in apparently healthy obese individuals

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Overt hyperthyroidism and hypothyroidism are commonly associated with weight loss and weight gain, respectively. Although there are several large epidemiological studies on thyroid function, none have studied its relationship to obesity. We have correlated TSH to body mass index (BMI) [measures overall adiposity] and waist circumference (WC) [measures central adiposity]. WC, BMI and TSH of adult participants (n = 1928) of the National Health and Nutrition Examination Survey (NHANES) 2001-2002 were abstracted and analyzed with Microsoft Access and Microsoft Excel, respectively. We excluded participants with thyroid disease, any hospitalization, pregnancy, and diastolic blood pressure>100 mmHg. Reference interval plots were then generated for the remaining "healthy" 12 to 85 years old males and females. The 97.5, 95, 90, 50, 5 and 2.5 percentiles were plotted for subjects with the following WC intervals: 70.1 to 80 cm (153M, 184F), 80.1 cm to 90 cm (148M, 172F), 90.1 to 100 cm (190M, 157F) and >100 cm (276M, 159F) and the following BMI intervals: 15.1 to 20 kg/m² (115M, 129F), 20.1 to 25 kg/m² (253M, 279F), 25.1 to 30 kg/m² (300M, 187F), and >30 kg/m² (166M, 187F). Non Hispanic white males and females have a higher percentage of elevated TSH. The upper reference limits of TSH are highly correlated to WC in both females and males ($P<0.01$), but the correlation between TSH and BMI is not statistically significant. Further studies of the relationship between obesity and thyroid function are indicated.

Table: Comparison between 97.5P of highest and lowest intervals of WC and BMI in three ethnic groups of males and females