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## Association Between Objectively Measured Body Fat Percentage and Two Indirect Measures of Adiposity

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Body mass index (BMI), calculated using height and weight, is used clinically to diagnose obesity. The ability of BMI to estimate adiposity is limited in the general population and unknown in college aged individuals. Relative fat mass (RFM) has been proposed as an alternative technique to BMI for diagnosis of obesity. RFM accounts for mass stored in the lower portion of the torso by incorporating height and waist circumference into the equation. **PURPOSE:** The purpose of this study was to compare rates of obesity determined by BMI, RFM and objectively measured percent body fat (BF%) via bioelectrical impedance analysis (BIA) in a large cohort of college aged men and women. **METHODS:** 3804 college students completed an objective fitness assessment, where they self-reported their age and sex, and height, weight, waist circumference, and BF%, were assessed. Correlation and chi-square tests for independence analyses examined the relationships and differences in rates of obesity between each method. **RESULTS:** The mean age of the sample was  $21.2 \pm 1.1$ , and the majority ( $n = 2406$ , 63%) identified as male. Significant correlations were found between BMI and BF% for men ( $r=0.79$ ,  $p<0.001$ ) and women ( $r=0.84$ ,  $p<0.001$ ); BMI and RFM for men ( $r= 0.85$ ,  $p<0.001$ ) and women ( $r=0.83$ ,  $p<0.001$ ); and, BF% and RFM for men ( $r= 0.74$ ,  $p<0.001$ ) and women ( $r= 0.76$ ,  $p<0.001$ ). Differences were found between the observed and expected classification of normal adiposity or obesity by BMI, RFM and BF% for men and women (for all  $p<0.001$ ). Among men, comparing BF% vs. BMI and RFM vs. BMI, more obese men via BF% or RFM were classified as normal via BMI (BF%;  $\chi^2=665$ ,  $p<0.001$ ; RFM;  $\chi^2=1189$ ,  $p<0.001$ ). For women, comparing BF% vs. BMI and RFM vs. BMI, more women who were obese via %BF and RFM were classified as normal via BMI (%BF  $\chi^2=576$ ,  $p<0.001$ ; RFM  $\chi^2=108$ ,  $p<0.001$ ). Comparing RFM and BF%, more men and women classified as obese by RFM were considered normal by %BF ( $\chi^2=626$ ,  $p<0.001$ ;  $\chi^2=246.5$ ,  $p<0.001$ ). **CONCLUSION:** Strong associations are observed among BMI, RFM and objectively measured %BF in college students. Despite these strong relationships, discrepancies were observed between obesity classifications between BF%, B Active and Passive