

Evaluation of Fat-free Mass Characteristics at Different Adiposity Levels: Impact of Weight Status Stratification Method

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ABSTRACT

The method used to stratify weight status when evaluating fat-free mass (FFM) characteristics has primarily been based upon body mass index (BMI) and not body fat percent (BF%). As a result, it is unknown whether deviations in FFM characteristics are similar when stratifying weight status based upon BMI or BF%. **Purpose:** The purpose of this study was to evaluate FFM characteristics at different adiposity levels when stratifying weight status via BMI and BF%. **Methods:** 150 adults (50% males) participated in this study. 3-compartment (3C) model body composition was based upon body density (D_b) via air displacement plethysmography (ADP) and total body water via bioimpedance analysis. FFM density (D_{FFM}), residual (R_{FFM}), and hydration (H_{FFM}) were evaluated in all subjects. The D_b obtained from a stand-alone assessment of ADP (2C- D_b) and 3C model (3C- D_b) were also compared between groups. Subjects were stratified based upon weight status (BMI and BF%). First, subjects were divided into a normal weight (NW-BMI), overweight (OW-BMI) or obese (OB-BMI) group, which were based upon BMI values of 18.5-24.99 kg/m² (n=50), 25.0-29.99 kg/m² (n=50), and ≥ 30.0 kg/m² (n=50), respectively. Next, subjects were divided into groups based upon BF% where normal weight BF% values (NW-BF%) for males and females were < 25 and 35% (n=81), respectively, and obese BF% values (OB-BF%) were ≥ 25 and 35% (n=69), respectively. **Results:** The D_{FFM} ranged from 1.096 - 1.097 g/cm³ for all groups in both weight status stratification methods (all $p > 0.05$). H_{FFM} and R_{FFM} were similar for all comparisons and ranged from 73.99 - 74.33% and 25.67 - 26.01%, respectively, for BMI groups and 74.02 - 74.26% and 25.74 - 25.98%, respectively, for BF% groups (all $p > 0.05$). In contrast, the 3C- D_b (1.050, 1.036, and 1.013 g/cm³) and 2C- D_b (1.051, 1.036, and 1.014 g/cm³) were statistically significant for all comparisons between NW-BMI, OW-BMI, and OB-BMI respectively (all $p < 0.05$). Furthermore, 3C- D_b (1.051 and 1.011 g/cm³) and 2C- D_b (1.052 and 1.012 g/cm³) were significantly different when comparing NW-BF% and OB-BF% (both $p < 0.05$). **CONCLUSIONS:** Previous research has reported the FFM characteristics when stratifying weight status via BMI classification. As a result, it was unknown whether deviations in FFM characteristics existed when stratifying by BF%. Uniquely, the current study findings revealed that FFM characteristics are similar between groups regardless of the weight status stratification method (BMI or BF%).