TACSM Abstract

Validity of BMI-based Equations for Estimating Body Fat Percentage in Collegiate Male Soccer Players: A Three-Compartment Model Comparison

ALEXANDRA LOREDO, KASSANDRA A. JARAMILLO, and BRETT S. NICKERSON

Exercise Physiology Laboratory; Department of Professional Programs; Texas A&M International University; Laredo, TX

Category: Undergraduate

Advisor / Mentor: Nickerson, Brett (brett.nickerson@tamiu.edu)

ABSTRACT

The ease of calculating body mass index (BMI)-based body fat percentage (BF%) is appealing in collegiate male soccer player who have limited time availability and strict training regimens. However, research has yet to evaluate whether BMI-based BF% equations are valid when compared to a criterion multi-compartment model. **PURPOSE:** The purpose of this study was to compare BMI-based BF% equations with a three-compartment (3C) model in collegiate male soccer players. **METHODS:** Sixteen NCAA Division II male soccer players (age = 21 ± 2 years; ht = 179.0 ± 8.2 cm; wt = 78.0 ± 8.5 kg) participated in this study. BMI was calculated as weight (kg) divided by height squared (m^2). BF% was predicted with the BMI-based equations of Jackson et al. (BMI_{JA}), Deurenberg et al. (BMI_{DE}) Gallagher et al. (BMI_{GA}), and Womersley and Durnin (BMI_{WO}). The criterion 3C model BF% was determined using air displacement plethysmography (BOD POD®) for body volume and bioimpedance spectroscopy for total body water. **RESULTS:** The BMI-based BF% equations significantly overestimated mean group BF% for all equations when compared to the 3C model (2.78 to 5.18%; all $p < 0.05$). The standard error of estimate ranged from 4.18 (BMI_{DE}) to 4.29% (BMI_{WO}). Furthermore, the 95% limits of agreement were similar for all comparisons and ranged from ±7.96 (BMI_{GA}) to 8.18% (BMI_{JA}). **CONCLUSIONS:** The results of this study demonstrate that the selected BMI-based BF% equations produce fairly small SEEs and 95% limits of agreement. However, the equations also revealed systematic error and a tendency to overestimate mean group BF% when compared to the 3C model. BMI-based equations can be used as an alternative for the individual estimation of BF% in collegiate male soccer players when a more advanced 3C model is not available, but practitioners should consider adjusting for the systematic error (e.g., decrease BMI_{DE} by 2.78%).