

The Accuracy of Non-Exercise VO₂max Prediction Equations in College students

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Category: Undergraduate

ABSTRACT

The non-exercising testing of VO₂max is a widely used method since it is inexpensive, practical and requires very little skill. The accuracy of non-exercise prediction equations, however, needs further examination. **Purpose:** To determine the accuracy of two non-exercise VO₂max prediction equations **Methods:** Forty-one participants (23 males and 18 females, age = 29.3±7 yrs, ht = 67.2±3.9 cm, wt = 85.1±23.5 kg, BMI = 28.9±6.0) successfully completed a maximal graded exercise test (GXT) where VO₂max was assessed by using an open-circuit indirect calorimetry (VO₂max = 35.4±8.1 ml·kg⁻¹·min⁻¹) as the criterion measure of VO₂max using the Bruce protocol (E1). Two non-exercise prediction equations were used: one developed at U of Houston using a population of 18-70 yrs (NE1) and the other developed at BYU using a population ages 18-65 years (NE2). Data collected for both equations included the participant's age, gender, height, weight, body mass index (BMI) using self-reported height and weight, and current physical activity (PA-R) level. Repeated measures ANOVA was used to determine the differences between non-exercise equations and the criterion, with alpha set at .05. Bland-Altman plots were used to provide an indication of agreement, and percent error was calculated as [(nonexercise-E1) / E1] X 100. Pearson's coefficients were used to examine the relationship between the measures. **Results:** Significant differences existed between NE1 and E1 (38.7±8.9 and 35.3±8.0 ml·kg⁻¹·min⁻¹, respectively, p < .05) and NE2 and E1 (39.6±8.3 and 35.3±8.0 ml·kg⁻¹·min⁻¹, respectively, p < .05). This corresponded to error of 11.7±23.8% and 13.8±18.4% for NE1 and NE2, respectively. There was a significant positive correlation between NE1 and E1 (r(41) = .78, p = .001) as well as NE2 and E1 (r(41) = .63, p = .001). **Conclusion:** The results of the analysis indicate that caution should be used when applying the two non-exercise VO₂max prediction equations for estimating VO₂max in college students. While there is only a mean difference of 3.4±0.9 and 4.3±0.3 ml·kg⁻¹·min⁻¹ between the criterion and NE1 and NE2, respectively, the agreement as indicated by the Bland-Altman plots suggest that while the results from the equations may be accurate for some, they may not provide valid information for others.

