

Comparison of Measured Versus Predicted Resting Energy Expenditure in Individuals With Excess Body Weight

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Objectives: Assessing resting energy expenditure (REE) is important for determining energy requirements. Indirect calorimetry is usually not available in clinical settings and for this reason, predictive equations for estimating REE have been developed. Body composition influences REE; therefore, body compartments such as fat-free mass (FFM) and fat mass (FM) should be considered in predictive equations. The aim of this study was to compare REE measured by indirect calorimetry with REE estimated from seven predictive equations that consider body composition in individuals with excess body weight.

Methods: This was a preliminary baseline data from a randomized controlled trial. REE was measured in adults with overweight and obesity using a whole-body calorimetry unit. Dual-energy X-ray absorptiometry was used to assess FM and FFM. Measured REE (mREE) was compared to seven predictive equations that incorporated FFM and FM. Age and body composition were compared between sexes using independent-samples t-test. A paired-samples t-test was

used to compare mREE versus predicted REE (pREE). Bias and limits of agreement (LOA) were assessed by Bland-Altman analysis. pREE values between 95% and 105% of mREE were considered accurate.

Results: Twenty-one adults (n = 15 females, age: 27 ± 7 years, BMI: 29.0 ± 2.9 kg/m², mREE: 1769 ± 342 kcal/day) were assessed. Age, FM, and FFM were not different between sexes ($P > 0.05$). The Muller *et al.*, 2001 (Praxis 90: 1955–1963) and Horie *et al.*, 2007 (Obesity 19: 1090–1094) equations were considered accurate and showed small bias, but high standard deviation (33.5 ± 178.2 and -51.4 ± 208.6 kcal/day) and wide LOAs (-316 to 383 and -460 to 357 kcal/day, respectively). However, when separated by sex, only the equation by Muller *et al.*, 2001 was accurate for males (bias: -85.3 ± 161.4 ; LOA: -402 to 231 kcal/day) and only the equation by Horie *et al.*, 2007 was accurate for females (bias: 28.0 ± 162.4 ; LOA: -290 to 346 kcal/day). All other equations (5) underestimated mREE.

Conclusions: The equations by Muller *et al.*, 2001 and Horie *et al.*, 2007 can be used for estimating REE in adults with excess body weight. The use of body composition per se is not enough to ensure accuracy of predictive equations.

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