Is the Resting Metabolic Rate Ratio a Good Proxy Indicator of Energy Deficiency in Men? A Preliminary Study.

Ana Carla C. Salamunes, Keiona M. Khen, Nancy I. Williams, Mary Jane De Souza, Pennsylvania State University, University Park, PA

Active individuals who have low energy availability may experience an energy deficiency, evidenced by low serum total triiodothyronine (TT3). The ratio of measured-to-predicted resting metabolic rate (RMR ratio) has been established as a proxy indicator of energy deficiency and metabolic compensation in active women, but parameters for men have not yet been established. **PURPOSE:** To determine if RMR ratio is associated with TT3 in active young men and to investigate possible cut-offs of the RMR ratio to predict energy deficiency. **METHODS:** Subjects were men aged 22±0.5 years (n=41), with a body mass index of 16-29.9 kg/m², exercising for a minimum of 150 min/week and who achieved peak oxygen consumption of at least 44 mlO₂/kg/min. Dual-Energy X-Ray Absorptiometry (DXA) assessed body composition. RMR was assessed after a 12-h fast via indirect calorimetry and a blood draw was obtained to assess serum TT3. The ratio of the measured RMR to the predicted RMR was calculated using the predictive equations of Cunningham (1980, 1991), Harris-Benedict, and Hayes (DXA-predicted). Pearson’s correlation coefficients and simple linear regressions determined the relationship between the RMR ratios and TT3. Subjects within the lowest sample tertile of TT3 were categorized as energy deficient. **RESULTS:** The DXA-predicted (0.966±0.014), Cunningham (1980) (0.968±0.013), and Cunningham (1991) RMR ratios (1.019±0.014) were positively correlated with TT3 (114.4±3.4 ng/dl) (r=0.493, R²=0.243, p=0.001; r=0.351, R²=0.123, p=0.025; and r=0.379, R²=0.144, p=0.015, respectively), and the Harris-Benedict RMR ratio (0.953±0.017) was negatively correlated with TT3 (r=−0.474, R²=0.225, p=0.002). A cut-off of 0.98 using Cunningham predicted low TT3 with a sensitivity of 78.6% and a specificity of 51.9%, a cut-off of 1.00 using Cunningham yielded 71.4% and 59.3%, respectively. The highest sensitivity and specificity were 78.6% and 66.7%, respectively, obtained with a 0.97 cut-off for the DXA-predicted RMR ratio. **CONCLUSION:** The Harris-Benedict RMR ratio does not account for body composition differences and does not seem useful to predict TT3. The Cunningham RMR ratios and the DXA-predicted RMR ratio have the potential to be used as proxy indicators of energy deficiency in men, but more data is necessary to confirm that assumption. **SIGNIFICANCE/NOVELTY:** This is the first study to investigate RMR ratio cut-offs of energy deficiency in active young men.

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