

Portable Indirect Calorimetry for Measuring Resting Metabolic Rate in Overweight and Obese Adolescents: A Pilot Validity and Reliability Study

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Background: Resting metabolic rate (RMR) is the amount of calories a body needs at rest to perform all of its essential functions. Clinicians use RMR to help determine calorie needs for patients. Resting metabolic rate is determined one of two ways in the clinical setting: via predictive equations or indirect calorimetry. Indirect calorimetry measured via the traditional indirect calorimeter is considered the “gold standard” for determining RMR; however, use of a traditional indirect calorimeter for assessment in the clinical setting is expensive. Predictive equations are easy to use; however, these equations are often not accurate. Therefore, portable devices for measuring RMR are a more accurate option for assessing RMR in the clinical setting, and are less expensive than the traditional indirect calorimeter. The purpose of this pilot study is to test the reliability and validity of a portable indirect calorimeter in measuring RMR for overweight and obese adolescents in the clinical setting.

Materials and Methods: Participants met the following criteria: Georgia State University students who were \geq 85th percentile for age and gender (as determined by the Center for Disease Control and Prevention (CDC) BMI growth charts), and 17-20 years of age (n=13). The participating students completed metabolic tests using both a portable indirect calorimeter (KORR ReeVue) and a traditional indirect calorimeter (Cosmed Quark CPET) in a randomized order on two separate days.

Results: The test-retest intraclass correlation coefficient for assessing RMR using the portable indirect calorimeter was 0.92 which signifies reliability. A paired samples t-test comparing the portable device and the traditional indirect calorimeter found no significant difference (p=0.46).

Conclusion: The preliminary results of this pilot study suggest that in the clinical setting, when assessing RMR in an overweight and obese adolescent population, portable indirect calorimetry is a reliable and valid alternative to predictive equations and traditional indirect calorimetry.

Keywords: Resting Metabolic Rate, Indirect Calorimetry, Overweight Adolescents