The accuracy of equations used to predict resting metabolic rate (RMR) requirements in acutely ill adults in Trinidad and Tobago: aged 18 to 65 years

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This study used to determine the level of accuracy of recommended resting metabolic rate (RMR) prediction equations among acutely ill adults in Trinidad and Tobago; aged 18 to 65 years.

Following informed consent and enrolment, sixty-three acutely ill hospitalized adult volunteers (females 30; males 33) had anthropometry and RMR (MedGem® indirect calorimeter, Micro life, USA) measured using recommended procedures. RMR from prediction equations were compared to RMR measured by indirect calorimetry with values between ± 10% of measured RMR being considered accurate. The university’s ethics committee approved the study.

The top-two ranked recommended RMR prediction equations for females, in decreasing order of accuracy were Owen (46.7% and Bernstein (40%). Among males, the top-two ranked recommended RMR prediction equations with a similar accuracy level of 39.4% were Müller and Bernstein. Population-derived RMR prediction equations had 56.7% and 54.5% accuracies among females and males respectively. These were significantly higher than the top-two recommended prediction equations for both males and females. Notably, the RMR per weight (kilogram) was reported as 16.4 kcal/kg and 17.5 kcal/kg, for females and males respectively. Thus limiting the risk of malnutrition by at least 5%: through diet quality via energy prediction accuracy with the population-specific equation, could improve health-related quality of life.

With the exception of Bernstein's, Müller's and Owen's equations recommended the RMR prediction equation resulted in biases >50%. Our population-derived RMR equations were more accurate than recommend RMR prediction equation among participants and can be used as an alternative to determining the energy-needs of acutely ill individuals.

Substituting the commonly used prediction equations with population-specific equations can increase the level of accuracy by at least 10%, thus limiting risk of malnutrition by at least 5% and improving health-related quality of life.

Key Words: Energy balance, Body composition, Malnutrition, Diet quality, Acutely ill individuals, Resting Metabolic Rate