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Accuracy of predictive equations for the measurement of resting energy expenditure in older subjects

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The measurement of resting energy expenditure (REE) is important in the assessment of individual total energy requirements using the factorial method. Algorithms have been developed for the prediction of REE using simple anthropometric measurements but their validity in older subjects has not been thoroughly evaluated. The objective of the present study is to assess the accuracy of anthropometric prediction equations for the assessment of REE in older subjects.

REE was measured in a thermo-neutral environment (24–26°C) and with no external stimulation by means of an open-circuit ventilated-hood indirect calorimetry system (Sensor Medics 29, Anaheim, CA, USA). Body weight, height were measured following standardised procedures and body mass index (BMI) was estimated. Sixty-eight older subjects,13 men and 55 women, aged between 60 and 94 years and with a mean BMI of 26.3 kg/m^2 (SD 5.0) were included. Measured REE was compared to 14 published equations for the calculation of REE estimates. In addition, two novel approaches (aggregate model and meta-regression equations) for the prediction of REE were evaluated (1, 2).

The average measured REE for all 68 subjects was 5530 kj/day (SD = 1105.4) (mean 1297.9 kcal/day, SD = 264.2). The equation producing the smallest bias was the one proposed by Muller (3) (Bias (2SD) = + 12.6 kj/day (1230.9)), whereas the Mifflin equation (4) was associated with the largest error (Bias (2SD) = − 717.6 kj/day (1180.3)). The aggregate, Muller (3), Harris-Benedict (5) and Fredrix (6) equations were characterised by a prediction within ± 10% of measured REE in more than 60% of subjects. Of the four algorithms, only the aggregate equation did not show a significant differential bias with age, BMI and gender.

These results show that the aggregate algorithm was characterised by a higher, overall accuracy for the prediction of REE in older subjects and its use should be advocated in older subjects for the prediction of REE. However, due to the large variability of the estimates, the direct measurement of REE is still recommended for an accurate assessment of individual REE.

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