Relationship between basal metabolic rate, gender, age, and body composition in 8780 white obese subjects.

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The objective of the present study was to explore the relationship between basal metabolic rate (BMR), gender, age, anthropometric characteristics, and body composition in severely obese white subjects. In total, 1412 obese white children and adolescents (BMI > 97th percentile for gender and age) and 7368 obese adults (BMI > 30 kg/m^2) from 7 to 74 years were enrolled in this study. BMR was measured using an indirect calorimeter equipped with a canopy and fat-free mass (FFM) were obtained using tetrapolar bioelectrical impedance analysis (BIA). Using analysis of covariance, we tested the effect of gender on the relationship between BMR, age, anthropometry, and body composition. In children and adolescents, the predictor × gender interaction was significant in all cases except for FFM × gender. In adults, all predictor × gender interactions were significant. A prediction equation based on body weight (BW), age, and gender had virtually the same accuracy of the one based on FFM, age, and gender to predict BMR in both children and adults (R^2_{adj}=0.59 and 0.60, respectively). In conclusion, gender was a significant determinant of BMR in children and adolescents but not in adults. Our results support the hypothesis that the age-related decline in BMR is due to a reduction in FFM. Finally, anthropometric predictors of BMR are as accurate as body composition estimated by BIA.

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