

Body composition obtained from the body mass index: an Italian study.

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BACKGROUND: Since obesity and related diseases are now considered epidemic, new and more accurate formulas for epidemiological studies are of interest to the scientific community. Several equations have been proposed to estimate the body composition simply from anthropometric measurements. However, with time, the body

composition of the populations studied changes in relation to their food habits and lifestyle, and, therefore, the equations must be regularly updated and corrected.

AIM OF THE STUDY: The aim of the study was to develop new equations to determine the body composition among the Italian population using the body mass index and independently by variables such as age and body structure.

METHODS: Bioelectrical impedance and anthropometric analysis of 764 Italian Caucasian subjects (342 females and 422 males), 11 to 80 years of age, were analysed. Females and males were analysed separately. Multiple regression analyses were performed in order to estimate the body composition of the subjects. The estimated masses were then compared with the measured masses using Bland and Altman plots. We also calculated the differences between the estimated and measured masses, reported as % of the body weight, for the 95, 85 and 75 degrees percentile of the female and male groups. Finally we compared our formulas with the Watson equations, which are used to estimate the total body water.

RESULTS: All body masses estimated were positively correlated to the measured values. Moreover, at any percentile analysed, our formulas resulted more precise than the Watson formula. Equations: Females: $FM = 1.9337 \text{ BMI} - 26.422$; $FFM = BW$

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 FM ; $BCM = 0.3655 \text{ FFM} + 4.865$; $TBW = 0.5863 \text{ FFM} + 7.1732$; Males: $FM = 1.407 \text{ BMI} - 21.389$; $FFM = BW - FM$; $BCM = 0.4485 \text{ FFM} + 3.3534$; $TBW = 0.6997 + 1.4567$.

CONCLUSIONS: Although an inevitable inaccuracy must be expected in epidemiological studies, our equations are adequate to analyze the body composition state and changes occurring among the Italian population by simply considering weight and height.

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