

Correlation Between Body Mass Index And Body Composition Parameters In An Adult Population: An Observational Study

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Abstract

Background: BMI is a widely used tool to assess obesity. However, it does not directly measure body fat percentage, which can provide a more accurate reflection of an individual's adiposity. Understanding the relationship between BMI and BFP across adult populations is essential for improving obesity classification and management strategies.

Aim: To examine the correlation between BMI and body composition parameters in an adult population and how this relationship varies across genders and age groups.

Objective: To assess how well BMI predicts fat distribution and lean mass. To assess difference in the W/H ratio between men and women.

Methods: An observational study was conducted with 86 adults aged 18-60 years. Participants underwent BIA to assess their body composition, including total body fat percentage, lean mass, and visceral fat area. BMI was calculated using standard height and weight measurements. Correlation analysis was performed to examine the relationships between BMI and the various body composition parameters.

Results: Age shows a weak positive correlation with Bone mineral content ($r=0.153$, $p=0.161$) and Skeletal muscle mass ($r=0.107$, $p=0.327$). Age has a slightly positive correlation with the Waist hip ratio at ($r=0.205$, $p=0.058$). BMI demonstrates strong positive correlations with Body fat percentage ($r=0.565$, $p=0.000$), Fat free mass ($r=0.444$, $p=0.000$), Skeletal muscle mass ($r=0.409$, $p=0.000$) all of these are highly significant correlations. Body fat percentage is positively correlated with Waist hip ratio ($r=0.577$, $p=0.000$), and this correlation is statistically significant at the 0.01 level. There is a significant difference in Skeletal muscle mass between males & females, males having a higher mean difference (9.0611 units). There is no significant difference in the waist hip ratio between males & females ($MD=0.02953$). There is a significant difference in bone mineral content between M/F, male having a higher mean (0.67978).

Conclusion: BMI and Body Fat Percentage are strongly correlated; however, the results suggest that BMI alone should not be used to make clinical decisions regarding BCA, especially in cases where lean mass or fat distribution is concern. Incorporating Body fat percentage measurements alongside BMI can improve the assessment of obesity and metabolic disorders.

Keywords: BMI, body fat percentage, obesity, bioelectrical impedance analysis, correlation.

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