Clin Physiol Funct Imaging. 2025 Sep;45(5):e70028. doi: 10.1111/cpf.70028.

Adolescent obesity and insulin resistance: The role of anthropometric indicators in metabolic health

Prasenjit Chaudhuri [1], Debanjana Sen [1], Jhuma Saha [1], Suparna Parua [2], Koushik Bhattacharya [2], Alak Kumar Syamal [1]

Affiliations

PMID: 40908859 DOI: 10.1111/cpf.70028

Abstract

The present study investigates the relationship between obesity and metabolic, hormonal, and clinical indicators in adolescent girls. A total of 75 girls aged 15-19 years (mean age: 17.53 ± 1.29 years) were enrolled, including 58 with excess weight or obesity and 17 with normal weight. Anthropometric parameters related to obesity, various clinical scores, fasting glucose, fasting insulin, insulin resistance indices, lipid profile, blood pressure, and thyroid-stimulating hormone (TSH) were assessed. Mann-Whitney U test compared differences between the groups, while Spearman's rho correlation analysed the associations among adiposity, metabolic, and clinical parameters. Simple linear regression predicted insulin resistance indices using BMI, WHR, and WHtR. Receiver operating characteristic (ROC) analysis evaluated the predictive ability of BMI, WHR, and WHtR for insulin resistance. Girls with obesity exhibited significantly higher weight, BMI, WC, WHR, and WHtR ($p < 0.05$). Acanthosis scores and insulin resistance indices strongly correlated with BMI, WHR, and WHtR, while lipid profile parameters showed no significant association with adiposity. Regression analysis identified BMI and WHtR as strong predictors of HOMA-IR, while WHR and WHtR inversely correlated with QUICKI and GIR. The McAuley Index moderately correlated with BMI and WHtR. ROC analysis confirmed BMI (AUC = 0.779, $p = 0.000$) and WHtR (AUC = 0.776, $p = 0.000$) as strong predictors of insulin resistance. Concluding that, obesity in adolescent girls is strongly linked to insulin resistance but not lipid profile parameters. BMI and WHtR emerge as reliable predictors, with acanthosis as a potential clinical marker.

Keywords: BMI; adolescent; anthropometry; insulin resistance; obesity.

Related information

GEO Profiles
MedGen
PubChem Compound (MeSH Keyword)

LinkOut - more resources

Full Text Sources
Wiley