ABSTRACT

Background: Sedentary lifestyles among young adults have led to rising obesity rates and declining cardiorespiratory fitness. Body Mass Index (BMI) is a widely used anthropometric measure, and Pulmonary Function Tests (PFTs) provide objective evaluation of cardiorespiratory fitness (CRF). The relationship between BMI and PFT parameters in sedentary college students remains inadequately studied.

Methodology: A cross-sectional observational study was conducted on 48 sedentary college students (32 males, 16 females; mean age 22.23 ± 1.75 years) at Brainware University, Barasat. Participants were classified into four BMI groups: Underweight (< 18.5), Normal Weight (18.5–24.9), Overweight (25.0–29.9), and Obese (≥ 30.0) — each group comprising 12 subjects. PFTs were recorded using a computerized spirometer. Pearson's and Spearman's correlation coefficients were used for statistical analysis; One-way ANOVA was applied for inter-group comparisons.

Results: The mean BMI of the study population was 24.45 ± 5.05 kg/m². Spearman's correlation revealed weak negative correlations between BMI and FVC ($r = -0.188$, $p = 0.201$), FEV_1 ($r = -0.099$, $p = 0.505$), FEV_1/FVC ($r = -0.119$, $p = 0.419$), and PEFR ($r = -0.146$, $p = 0.323$), none of which reached statistical significance. However, One-way ANOVA demonstrated a statistically significant difference in PEFR across BMI groups ($F = 3.015$, $p = 0.040$). The Normal Weight group had the highest mean PEFR (69.00 ± 19.51 L/min), while the Obese group showed the lowest FVC (87.42 ± 6.96 %).

Conclusion: Spearman's correlation analysis showed weak negative associations between BMI and pulmonary function parameters, indicating a trend of reduced respiratory function with increasing BMI. One-way ANOVA revealed a significant difference in PEFR among BMI groups ($p = 0.040$), with normal-weight individuals demonstrating the best performance. Obese participants exhibited the lowest mean FVC and FEV_1 values, suggesting impaired lung mechanics related to excess body fat. Gender differences were also observed, with females showing higher FEV_1/FVC ratios and males higher PEFR values. Overall, higher BMI was associated with reduced cardiorespiratory fitness among sedentary young adults.

Keywords: BMI, Cardiorespiratory Fitness, Pulmonary Function Tests, FVC, FEV_1, PEFR, Sedentary, Young Adults.

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