Abstract

Background: Body Mass Index (BMI) is a widely used indicator for evaluating body composition and identifying potential health risks in adults. The structure of the human foot—particularly its arches, which are formed by tarsal and metatarsal bones and supported by muscles, ligaments, and tendons—can be significantly affected by a person's body weight. Previous studies suggest that individuals who are overweight or obese tend to have flatter arches and a reduced range of ankle dorsiflexion compared to those with a normal BMI. However, there is limited research examining these relationships in young adults aged 18 to 25 years, particularly when it comes to differences between males and females. This gap highlights the need for further investigation, especially to inform early screening and preventive strategies.

Objective: To evaluate and compare foot arch structure, ankle dorsiflexion range of motion, and foot function among college students aged 18–25 years across different BMI categories, and to examine gender differences in these parameters.

Materials and Methods: Informed consent was obtained from all participants following ethical approval from the Institutional Ethics Committee. Data collection followed standardized procedures. BMI was measured using a stadiometer and digital weighing machine, ankle dorsiflexion with a goniometer, and footprint patterns with the Harris Mat. Foot function was evaluated using the Revised Foot Function Index (FFI-R). All assessments were performed by trained personnel, and the collected data were statistically analyzed.

Result: This study analyzed 69 participants (mean age 20 years) using SPSS version 30. Results showed females had slightly higher BMI and marginally greater ankle dorsiflexion ranges compared to males. Significant negative correlations were found between foot arch type and dorsiflexion range for both left ($\rho = -0.505$) and right ankles ($\rho = -0.490$), with higher arch types showing reduced dorsiflexion. A strong positive correlation existed

between foot arch type and functional impairment ($\rho = 0.669$), as Foot Function Index scores increased from 34-40 in low arch types to 66-94 in high arch types. Additionally, BMI increased with higher arch classifications, peaking at 31.2 in type 6 arches i.e., flat foot of 3 degree suggesting relationships between foot structure, function, and body composition.

Conclusion: This study found a clear association between higher BMI and changes in foot structure in young adults, including reduced arch height and foot function. These changes may lead to discomfort or mobility issues. The findings highlight the importance of healthy weight management and regular foot assessments to promote long-term foot health and quality of life.

Keywords: Body Mass Index (BMI), Foot arch, Ankle dorsiflexion.

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