Abstract

Background: Hand grip strength (HGS) and endurance are critical indicators of overall muscular function and health status. While smoking's detrimental effects on cardiovascular and respiratory systems are well-established, its specific impact on quantifiable physical performance metrics, particularly hand grip parameters, requires comprehensive investigation. This study aimed to investigate the correlation between hand grip strength and endurance in smokers versus non-smokers among young adults.

Objectives: To assess and compare hand grip strength and hand grip endurance between smokers and non-smokers among male college students aged 18-25 years using handheld dynamometry, and to determine the correlation between smoking status and muscular performance parameters to understand smoking's impact on hand function and overall physical capacity.

Methods: A cross-sectional observational study was conducted at Brainware University, Kolkata, involving 70 male college students aged 18-25 years. Participants were equally divided into two groups: smokers (n=35) and non-smokers (n=35), selected using simple random sampling. Hand grip strength and endurance were measured using a hand-held dynamometer for both hands. Spearman's correlation analysis was performed to assess relationships between smoking status and grip parameters.

Results: The study revealed significant positive correlations between non-smoking status and grip endurance for both hands (right hand: $r=0.319$, $p=0.007$; left hand: $r=0.360$, $p=0.002$). Hand grip strength showed weaker, non-significant correlations with smoking status (right hand: $r=0.222$, $p=0.065$; left hand: $r=0.136$, $p=0.262$). Non-smokers demonstrated superior grip endurance performance compared to smokers, while grip strength differences were less pronounced.

Conclusions: Smoking status significantly affects hand grip endurance more than grip strength, with non-smokers exhibiting better sustained muscle performance. Hand grip strength and endurance assessment may serve as an early indicator of smoking-related functional impairment. These findings suggest that smoking impairs muscle endurance through mechanisms affecting aerobic metabolism and oxygen utilization, even in young adults.

Keywords: Hand Grip Strength (HGS), Hand Grip Endurance (HGE), Hand Held Dynamometer (HHD).

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