ABSTRACT

Background: Neck pain is highly prevalent among college students engaged in prolonged academic work and digital device use. It has been hypothesized that cervical musculoskeletal dysfunction may adversely influence upper limb neuromuscular performance, including grip strength. However, limited studies have quantitatively assessed grip strength differences between dominant and non-dominant hands in relation to neck pain severity in a young collegiate population.

Objectives: To assess grip strength in dominant and non-dominant hands among college students; to compare grip strength between males and females; and to evaluate whether differences in grip strength are associated with neck pain-related factors including forward head posture and prolonged device usage.

Methodology: This cross-sectional correlational study recruited 60 college students (34 males, 26 females) aged 18-26 years from Brainware University, Kolkata. Grip strength was measured using a standardized hydraulic dynamometer for both dominant and non-dominant hands. Neck pain severity was assessed using the Numeric Pain Rating Scale (NPRS) and Neck Disability Index (NDI). Wrist range of motion (ROM) was also measured. Statistical analyses included descriptive statistics, paired t-tests, independent samples t-tests, and Pearson correlation coefficients.

Results: The mean right-hand grip strength was 8.06 ± 2.50 kg and left-hand grip strength was

7.47 ± 2.36 kg. A statistically significant difference was found between right and left grip strength ($t = 2.461$, $p = 0.017$). Males demonstrated significantly higher grip strength than females (males: 9.80 kg; females: 5.69 kg; $p < 0.001$). Right wrist extension was significantly greater than left (62.77° vs. 58.69°; $p < 0.001$). No significant age correlation was found with grip strength ($r = -0.14$, $p = 0.29$).

Conclusion: Significant differences exist in grip strength between the right and left hands and between genders among college students. These findings support the need for bilateral assessment in physiotherapy practice and highlight how sedentary academic lifestyles may contribute to asymmetrical upper limb strength. Future research should incorporate direct NDI measurements alongside grip data to establish a clearer relationship between neck pain severity and hand function

Keywords: *Neck pain, grip strength, dominant hand, non-dominant hand, college students, physiotherapy, Neck Disability Index, wrist ROM*

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