

Sleep Quality, Stress and their Combined Effect on Cognitive Function among University Students: A Cross-sectional Study

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ABSTRACT

Introduction: University students face significant risks from poor sleep quality and high psychological stress, both of which can negatively impact cognitive functioning. Although evidence suggests a bidirectional link between stress and sleep issues, the interactive effects on cognition have not been well researched in this context.

Aim: This study aimed to assess the independent and combined effects of sleep quality and perceived stress on cognitive function among university students in Delhi-NCR, and to examine gender differences in these variables.

Materials and Methods: A cross-sectional observational study was conducted with 400 university students (aged 18-26 years) recruited from universities across Delhi-NCR using convenience sampling. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), perceived stress using the Perceived Stress Scale (PSS), and cognitive function using the Montreal Cognitive Assessment (MoCA). Physical activity (IPAQ-SF) and screen time were included as covariates. Hierarchical multiple regression and interaction analysis were performed using SPSS ($p < 0.05$).

Results: The sample mean PSQI score (8.57 ± 2.55) indicated poor sleep, while the mean PSS score (20.95 ± 5.04) suggested moderate stress. The mean MoCA score of 22.58 ± 4.21 was at the lower edge of the normative range. Significant negative correlations were found between poor sleep quality ($r = -0.488$, $p < 0.001$) and higher perceived stress ($r = -0.511$, $p < 0.001$) with cognitive performance. PSQI and PSS explained 32.3% of the variance in MoCA scores ($R^2 = 0.323$), but their interaction did not show significant effects ($\beta = -0.053$, $p = 0.201$). Female students reported poorer sleep quality and higher stress, while male students had slightly higher MoCA scores ($p < 0.001$).

Conclusion: Sleep quality and perceived stress are significant, independent, and additive predictors of cognitive function in university students. These findings support the integration of routine sleep and stress screening into university health programmes and the development of targeted cognitive wellness interventions, including sleep hygiene education and stress management strategies.

Keywords: Cognitive function, Montreal cognitive assessment, Perceived stress, Pittsburgh sleep quality index, Sleep quality, University students.

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