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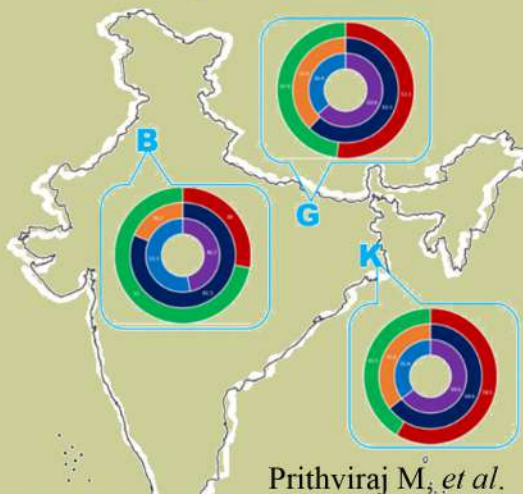
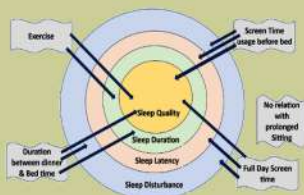
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Insomnia among Indian medical graduates: Exploring the impact of internet addiction

Manoj Prithviraj¹ , Rama S Rath² , Palani S Mohan³ , Sanjay K Patel⁴ , Meena Mirdha⁵ , Riya Wasnik⁶ , Arani Das^{7*} 

ABSTRACT

Background: Internet use and screen time have significantly increased among medical students. Recent literature also suggests a surge in cases of insomnia among them. This study aims to assess the association between insomnia and internet addiction among Indian medical undergraduate students. **Methods:** This was an institution-based, cross-sectional, multicentric study. Data were collected from 280 first-year medical students on internet addiction and insomnia using the Internet Addiction Test (IAT) and the Insomnia Severity Index (ISI) scales. A logistic regression analysis was performed to examine the association between internet addiction and insomnia. **Results:** 67.9% of the students had high IAT scores, and 52.9% exhibited clinical insomnia symptoms, as determined by their ISI scores. Analysis showed a 2.76-fold increase in the likelihood of insomnia among students with abnormal IAT scores. **Conclusion:** This study highlights the significant impact of internet addiction on insomnia symptoms among Indian medical undergraduates, emphasising the need for interventions to promote healthy digital habits and mental well-being.

Keywords: Insomnia, Internet addiction, Medical undergraduate.

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INTRODUCTION

The COVID-19 pandemic and the post-pandemic era have led us into a novel transition toward digital dependency. Digital exposure and screen time have increased significantly. Online courses, entertainment, social media, and work-from-home have increased individuals' engagement with digital screens. Online Academic activity has become a major way to continue learning. Exposure to the internet and online activities has increased significantly among medical students.¹ In Indian institutions, E-learning is not a well-established mode of learning, especially in medical Institutions. This sudden change in teaching-learning modes and methods brings new experiences for students. The intriguing nature of online activity can drive a person towards the tendency of internet abuse and addiction, and students are more vulnerable due to peer pressure and a novelty-seeking nature. Internet addiction and excess screen time can lead to disruption of normal biological rhythms, as well as lead to various maladaptive behaviors and mental health problems.^{2,3} Recent reports show that insomnia is a commonly reported symptom among students with increased exposure to digital screens.⁴ Recent evidence among Indian medical students has shown that problematic internet use is positively associated with poorer psychological health, loneliness, and greater social media use, while being negatively associated with academic use of the internet.⁵ These findings highlight the potential psychosocial and academic implications of excessive internet use among medical students and underscore the importance of examining its association with sleep-related problems.

The findings of the present study may have important implications for medical education and student well-being,

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as excessive internet use and clinically significant insomnia may adversely affect concentration, academic performance, psychological well-being, and overall functioning. Identifying the magnitude of these problems among medical students may help institutions develop strategies for digital health awareness, healthy screen-use practices, sleep hygiene, and early identification of at-risk students. The multicentric nature of the present study, involving students from three

AIIMS institutions, provides additional insight into these concerns among students pursuing medical education in contemporary Indian settings.

In this study, we have accumulated data from students of three premier medical institutions of India on the association of internet addiction and insomnia symptoms.

METHODS

This institution-based cross-sectional study was conducted between December 2022 and April 2023 at three premier medical institutes in India: All India Institute of Medical Sciences (AIIMS), Gorakhpur; AIIMS, Kalyani; and AIIMS, Bathinda. All first-year undergraduate medical students at the participating institutes who consented to participate in the study were included. Hence, a formal sample size calculation was not performed. Undergraduate students who had any chronic physical and/or mental illness were excluded from the study.

A total of 525 medical students were approached through personal email, of whom 323 responded, yielding a response rate of 61.5%. Of these 323 respondents, 43 students reported having a pre-existing medical condition and were excluded according to the predefined exclusion criteria. Therefore, the final analysis included data from 280 students. The institute-wise distribution comprised 140 students from AIIMS Gorakhpur, 65 from AIIMS Kalyani, and 75 from AIIMS Bhatinda. Information was collected using Google Forms about internet addiction and insomnia using the Internet Addiction Test (IAT) and the Insomnia Severity Index (ISI) scales. It was ensured that the data collection form was not circulated in the open group and that each participant could submit only one response. The study population comprised first-year undergraduate medical students (69% male, 31% female) within a relatively narrow and comparable age range. The Internet addiction test,⁶ a twenty-item questionnaire rated on a 5-point scale, was used to measure the presence and severity of Internet addiction and technology dependency. Total scores range from 0 to 100, with higher scores indicating more severe addiction. The Insomnia Severity Index,⁷ a seven-item self-report Likert-type scale, was used to screen for the presence and severity of insomnia. Total scores range from 0 to 28, and higher scores indicate severe clinical insomnia. Analysis was performed using statistical software STATA version 17. Continuous data were categorized according to standard parameter analysis. The Insomnia Severity Index was used as the primary outcome. Various logistic regression models were fitted, and a scatter plot was created with ISI and IAT scores on the X and Y axes, respectively. The Odds ratio was calculated with a 95% confidence interval. Ethical approval was obtained from all the participating Institutes from their respective Institute human ethics committees (AIIMS Gorakhpur: IHEC/AIIMS-GKP/BMR/10/2020 dated 25th September 2020; AIIMS Kalyani: IEC/AIIMS Kalyani/2021-007 dated 20th July 2021; and AIIMS Bathinda: IEC/AIIMS/BHI/108 dated 17th August 2021).

RESULT

Among the 280 students included in the final analysis, 190 (67.9%) had IAT scores ≥ 50 , indicating moderate-to-severe internet addiction. Based on the IAT scoring criteria, scores of 0–30 were considered normal, 31–49 mild, 50–79 moderate, and 80–100 severe internet addiction. Furthermore, 148 students (52.9%) had ISI scores ≥ 22 , indicating severe clinical insomnia. According to the ISI scoring criteria, scores of 0–7 indicate no clinically significant insomnia; 8–14, subthreshold insomnia; 15–21, moderate clinical insomnia; and 22–28, severe clinical insomnia.

An institute-wise distribution of students according to gender, Internet Addiction Test scores, and Insomnia Severity Index scores across the three participating AIIMS is depicted in Figure 1. The figure provides a comparative representation of the proportion of students with normal and abnormal IAT and ISI scores at AIIMS Gorakhpur, AIIMS Kalyani, and AIIMS Bhatinda, along with the corresponding gender distribution. A logistic regression analysis examined the association between internet addiction and insomnia, indicating a 2.76-fold increase in the likelihood of insomnia among students with abnormal IAT scores compared with those with normal IAT scores (OR = 2.76, 95% CI: 1.62–4.69, $p < 0.001$). However, age and gender were not substantially linked to insomnia in this study sample. The odds ratio for insomnia in students aged less than 20 years was 0.90 (95% CI: 0.53–1.54, $p = 0.711$), while the odds ratio for insomnia in female students was 0.99 (95% CI: 0.60–1.64, $p = 0.985$).

The association between IAT and ISI scores was assessed using Pearson's correlation coefficient, with the corresponding

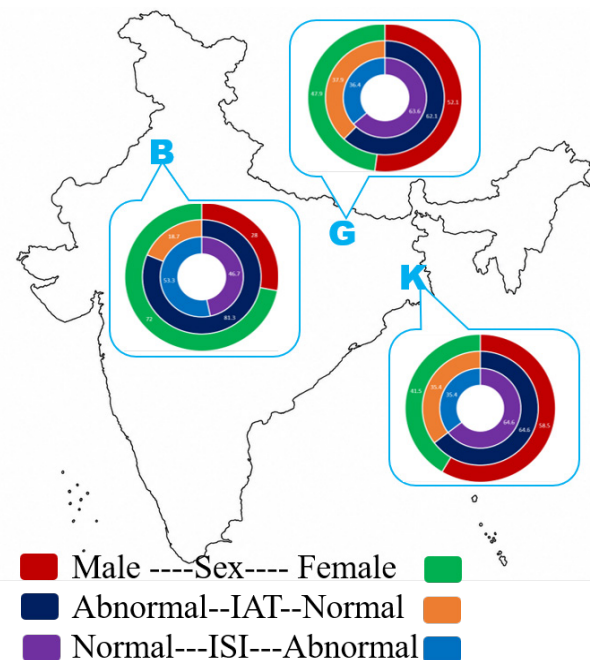


Figure 1: Institute-wise distribution of gender, IAT scores, and ISI scores across the three participating Institutes. B = AIIMS, Bhatinda; G = AIIMS, Gorakhpur

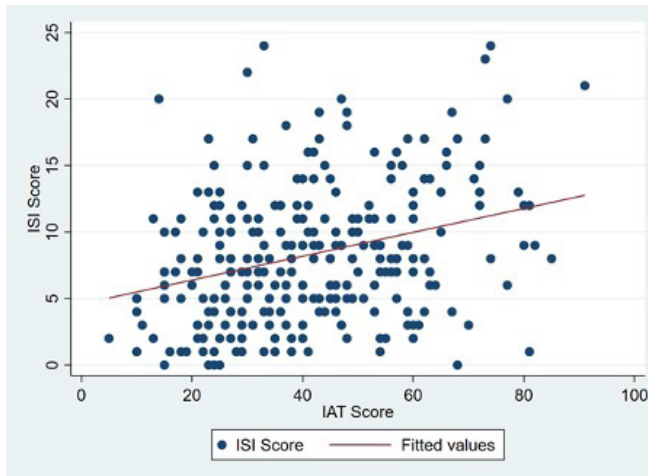


Figure 2: Scatter plot showing the relation between IAT score and ISI score

p-value reported. A p-value <0.05 was considered statistically significant. A scatter plot was generated to visualise the relationship between IAT and ISI scores, which showed a positive correlation ($R^2 = 0.0955$), as shown in Figure 2. However, the relatively low R^2 indicates that internet addiction accounts for less than 10% of the variance in insomnia severity, suggesting that IAT scores alone have limited explanatory value for insomnia severity.

DISCUSSION

In this digital world, students use the internet for multiple purposes such as entertainment, social networking, online shopping, gaming, and e-learning. In our study, it was found that 67% of the students had some level of internet addiction. In a previous study conducted in a medical college in India, it was found that 70 % of the study participants had some level of internet addiction.⁸ In a similar Indian study conducted among medical students, it was found that 58% of the participants had Internet addiction.¹ The prevalence of internet addiction among undergraduate medical students in India fluctuates significantly, spanning from 34 per cent to 90 per cent across various studies, indicating a concerning scenario.^{9,10} Across the globe, the prevalence of internet addiction among students ranges from 10- 80%, with a pooled prevalence of 30%.¹¹ These high prevalence rates may be explained by excessive indulgence in online activities, easy and affordable internet access, and the exponential use of smart gadgets for various purposes. In our study, around 52% of the students had some level of insomnia. In a meta-analysis by Jahrami et al., 55% of medical students were reported to have poor sleep quality.¹² Our findings also suggest that there is a positive correlation between internet addiction and insomnia among the medical students. This is in accordance with the findings of a systematic review, which showed an association between Internet addiction and poor sleep quality among young students in general.¹³ A study from a medical college in Delhi has found that nighttime sleep

was significantly lower in participants having moderate to severe internet addiction.¹⁴ The association between internet addiction and poor sleep can be understood by multiple factors. The pattern of internet use, including duration of use and content, can influence sleep quality. Internet addiction is often observed with unhealthy lifestyle habits. Students tend to use the internet more in the late evening and at night after their routine classes for various purposes, such as entertainment, online learning, gaming, and social networking. Students may also turn to stimulant-containing refreshments, which can delay sleep onset. Students with poor sleep hygiene and excessive internet use are prone to develop sleep-related abnormalities, including insomnia.¹⁵ Untimely and prolonged use of the internet at night can alter the sleep pattern by disturbing the circadian rhythm of the sleep-wake cycle, leading to increased risk of other mental health problems, such as depression.¹⁶ Increased screen exposure may alter the timing and maintenance of melatonin secretion, possibly explaining the association between excessive internet use and sleep problems.

Insomnia is a complex phenomenon, and internet addiction can have a potential interplay in sleep initiation and maintenance. Unhealthy patterns of internet use in terms of content, duration, and timing can also contribute to insomnia. Persistent insomnia coupled with internet addiction can negatively impact the student's academic performance as well. It may increase the risk of other mental health disorders if not appropriately addressed.

Our study has a few limitations. Sample size was not calculated a priori. However, we calculated the study's statistical power based on the existing sample size and found it to be adequate (power = 97%). The response rate was 61.5% (323/525), and therefore, the possibility of non-response and self-selection bias cannot be excluded. Students who chose to participate may have differed from non-respondents in internet use, digital dependence, sleep patterns, or other characteristics. As information on non-respondents was unavailable, we could not assess or quantify the extent of this potential bias. Many other confounding factors, beyond internet use, could influence sleep patterns among the subjects. Background socioeconomic and other environmental factors and present mental health were not considered, which might have some association with insomnia.

Overall, the results highlight the significant impact of internet addiction on insomnia symptoms among Indian medical undergraduates, emphasizing the need for interventions to promote healthy digital habits and mitigate the adverse effects of excessive internet use on mental well-being.

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PEER-REVIEWED CERTIFICATION

During the review of this manuscript, a double-blind peer-review policy has been followed. The author(s) of this manuscript received review comments from a minimum of two peer-reviewers. Author(s) submitted revised manuscript as per the comments of the assigned reviewers. On the basis of revision(s) done by the author(s) and compliance to the Reviewers' comments on the manuscript, Editor(s) has approved the revised manuscript for final publication.

Gymguard-SCD Clinical Decision Support System

GYM GUARD-SCD: THE FUTURE OF SPORTS CARDIOLOGY AND PREVENTIVE CARDIOLOGY



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**SYSTEM AND METHOD
FOR PRE-EXERCISE
DYNAMIC ELECTRO-
AUTONOMIC INSTABILITY
DETECTION**

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