

## Original Research Article

# Prevalence of daytime sleepiness and internet addiction among college going students in Bangalore

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## ABSTRACT

**Background:** In recent years, the dual burden of excessive internet use and daytime sleepiness has emerged as a growing concern among college students. Balancing academic responsibilities with prolonged screen time often disrupts sleep patterns and affects students' overall well-being.

**Methods:** A cross-sectional study was conducted among 280 college students in Bangalore. Data were collected using two validated tools: the Epworth sleepiness scale (ESS) to assess daytime sleepiness, and Young's Internet addiction test (IAT) to evaluate internet usage patterns. The data were entered into Microsoft excel and analyzed using SPSS version 23. Descriptive statistics were used to present frequencies and percentages, and chi-square tests were applied to determine associations.

**Results:** Of the 280 participants, 180 were female and 100 males. The ESS results showed that 10 students (3.5%) had pathological daytime sleepiness, while 121 (43.2%) had normal levels. The IAT revealed that 47 (16.7%) students had moderate internet addiction, 69 (24%) had mild addiction, and 165 (59%) used the internet appropriately. A statistically significant association was found between internet addiction and daytime sleepiness (Chi-square=25.8,  $p<0.05$ ). No significant association was found between gender and either internet addiction or daytime sleepiness.

**Conclusions:** A considerable proportion of college students in Bangalore experience internet addiction and daytime sleepiness. The significant correlation between the two underscores the need for awareness programs and interventions promoting healthy sleep and responsible internet use among students.

**Keywords:** Daytime sleepiness, Internet addiction, College students, Epworth sleepiness scale, Young's Internet Addiction test, Bangalore

## INTRODUCTION

The proliferation of smartphones and internet access in recent years has brought about dramatic changes in the lifestyle of young adults, especially college students. While these technologies offer academic and social benefits, their excessive use has raised concerns regarding behavioral addiction and its consequences. Internet and smartphone addiction are emerging as behavioral disorders marked by compulsive use, neglect of daily responsibilities, and withdrawal symptoms upon

deprivation. These behaviors can severely impact mental health, leading to disturbances in sleep, cognition, and emotional regulation among students, thereby affecting their academic performance and overall quality of life.<sup>1,2</sup>

One of the most frequently observed outcomes associated with excessive smartphone and internet use is poor sleep quality, often manifesting as excessive daytime sleepiness (EDS). EDS is characterized by an increased tendency to fall asleep during the day, interfering with academic, professional, and personal functioning. The prevalence of

EDS among young adults has been reported to range between 20% and 30%, particularly in populations exposed to high academic stress and poor sleep hygiene, such as medical and college students.<sup>3,4</sup> Sleep deprivation, which is often the root cause of EDS, may be exacerbated by the compulsive late-night use of smartphones and internet browsing.<sup>5</sup>

Several studies have demonstrated a significant relationship between internet/smartphone addiction and poor sleep patterns among students. Medical and professional college students often experience chronic stress, academic pressure, and irregular sleep schedules, all of which are compounded by the high screen time associated with internet use. These factors are independently and synergistically linked to the onset of EDS and poor sleep quality.<sup>3,5</sup> Furthermore, studies have suggested that psychological factors like anxiety and depression may both contribute to and result from internet addiction and sleep disturbances.<sup>2,3</sup>

Despite the increasing recognition of this public health issue, there is a dearth of region-specific data, especially among the general college-going population in Indian urban settings. Most Indian studies have focused on medical students or adolescents, leaving a gap in understanding the broader impact of internet usage on sleep health in urban student populations. This study aims to address this gap by determining the prevalence of EDS and internet addiction among college students in Bangalore and by exploring the association between these variables.

### ***Aim and objectives***

Aim and objectives were to determine the prevalence of daytime sleepiness among college-going students in Bangalore, to assess the prevalence of internet addiction in the same population and to evaluate the association between internet addiction and daytime sleepiness.

### ***Need for the study***

In today's digital era, internet use is deeply integrated into academic, social, and personal lives of young adults, especially college students. While online engagement supports learning and connectivity, excessive use can disrupt healthy sleep patterns and contribute to daytime sleepiness. Poor sleep not only affects concentration and academic performance, but also impacts emotional wellbeing and daytime functioning. Despite rapid growth in smartphone and internet penetration among Indian youth, limited research has explored how this behavioral shift translates into sleep-related problems within the general student population in urban settings like Bangalore. Most existing studies focus on specific groups such as medical students or adolescents, leaving a gap in understanding the dual burden of internet overuse and daytime sleepiness among a broader college cohort. Investigating these associations is crucial for designing

targeted interventions and promoting holistic wellbeing among students who are navigating both academic demands and digital lifestyles.

## **METHODS**

This cross-sectional survey was carried out among 280 medical college students in Rajarajeswari medical college and Hospital Bangalore, Karnataka the survey was performed from September to November 2024. After explaining the study, informed consent will be taken from the study participants. Participants will be selected by purposive sampling technique. The sample size was determined to be 280 using the formula  $n = \frac{Z^2pq}{d^2}$ , where  $Z=At$  95% CI, value is 1.96;  $p$ =proportion from reference study that is 0.24;  $q=(1-p)=1-0.24= 0.76$ ;  $d$ =precision level (0.05).<sup>3</sup> We obtained a sample size of 280. Each student will be interviewed by a pre-tested semi-structured questionnaire to collect information on socio-demographic variables, the ESS to assess daytime sleepiness,<sup>7</sup> and Young's IAT to evaluate internet usage patterns.<sup>8</sup>

### ***Study tool***

#### ***ESS***

Daytime sleepiness, which interferes with daily activities, is termed EDS and it is measured by the ESS, a self-administered questionnaire with eight questions. Respondents are asked to rate, on a 4-point Likert scale (0-3), their usual chances of dozing off, or falling asleep while engaged in eight different activities. The ESS score (the sum of 8 item scores) can range from 0 to 24. The higher the ESS score, the higher that person's average "daytime sleepiness."

#### ***Young's IAT***

It is a 20-item self-report scale developed by Young to assess internet addiction. The criteria include loss of control, neglecting everyday life, relationships and alternative recreation activities, behavioral and cognitive salience, negative consequences, escapism/mood modification, and deception. It is a Likert scale ranging from 1 to 5. The minimum score that can be obtained is 20, whereas the maximum is 100 points.<sup>12</sup>

### ***Statistical analysis***

The data was compiled in Microsoft excel worksheet and analyzed using SPSS (Statistical package for social sciences) software version 20.0. The descriptive statistics- All qualitative variables was presented as frequency and percentages. All quantitative variables were presented as mean and standard deviation. Chi-square tests of significance was applied to analyses the association between eating disorders and demographic variables.  $p$  values of less than 0.05 was considered statistically significant.<sup>14</sup>

## RESULTS

In this study, prevalence of daytime sleepiness and internet addiction were assessed among 280 college going students in Bangalore, Karnataka. Among them, 180 (64.3%) were female and 100 (35.7%) were male.

**Table 1: Sociodemographic characteristics of the study participants, (n=280).**

Gender	N	Percentage (%)
Male	100	35.7
Female	180	64.3

### Daytime sleepiness (ESS)

Based on the ESS: 10 students (3.5%) were found to have pathological daytime sleepiness (ESS score >16), indicating a high level of EDS, 149 students (53.2%) had mild to moderate daytime sleepiness, while 121 students (43.2%) had scores within the normal range, indicating minimal or no daytime sleepiness.

This suggests that more than half the participants experienced some degree of daytime drowsiness, which could potentially affect their academic performance and daily activities.

**Table 2: Distribution of participants based on ESS.**

ESS score category	N	Percentage (%)
Normal daytime sleepiness (0-10)	121	43.2
Mild to moderate sleepiness (11-15)	149	53.2
Pathological sleepiness (>16)	10	3.6

**Table 4: Association between internet addiction and daytime sleepiness.**

Internet addiction	Normal sleepiness	Mild/moderate sleepiness	Pathological sleepiness	Total
Normal use	92	70	2	164
Mild addiction	20	45	4	69
Moderate addiction	9	34	4	47
Total	121	149	10	280

\*p<0.05-significant association

## DISCUSSION

In the present study, 3.5% of participants exhibited pathological daytime sleepiness, while 53.2% had mild to moderate levels. These results align with findings from Sathe et al who reported that 27.4% of medical undergraduates experienced EDS, and nearly 44.4% had poor sleep quality, highlighting vulnerability of students to disrupted sleep patterns and their consequences.<sup>3</sup>

Similar trends were observed in the study conducted by Basu et al where approximately 24.91% of the medical

### Internet addiction (Young's IAT)

Internet usage patterns as per Young's IAT revealed: 47 students (16.7%) had moderate internet addiction, 69 students (24.6%) had mild addiction, while 164 students (58.6%) were considered to have normal or minimal internet use.

The data demonstrates that approximately 41.3% of students exhibited problematic or addictive internet usage behavior, highlighting a considerable burden in this population.

**Table 3: Distribution of participants based on Young's IAT.**

IAT score category	N	Percentage (%)
Normal usage (0-30)	164	58.6
Mild addiction (31-49)	69	24.6
Moderate addiction (50-79)	47	16.8
Severe addiction (80-100)	0	0

### Association between internet addiction and daytime sleepiness

A statistically significant association was found between levels of internet addiction and daytime sleepiness. The chi-square test yielded a value of 25.8 with a p<0.05, indicating that higher levels of internet addiction were significantly associated with increased levels of daytime sleepiness.

This suggests that students with higher internet use were more likely to experience EDS, which may be due to disrupted sleep cycles and poor sleep hygiene associated with late-night internet use.

undergraduates were found to have EDS as assessed by the Epworth daytime sleepiness scale (EDSS).<sup>4</sup> Moreover, 63.48% of participants reported poor sleep quality based on the Pittsburgh sleep quality index (PSQI). The study identified significant associations between EDS and multiple lifestyle and demographic factors including age, semester of study, place of residence, lack of regular physical activity, and excessive use of mobile/laptop devices, all of which contributed to sleep disruption. The authors emphasized that academic pressure, high workload, and erratic sleep habits common among medical students were key contributors to both EDS and poor sleep quality, underscoring the need for institutional

strategies to promote sleep hygiene and student well-being.

The prevalence of moderate and mild internet addiction in our study (16.7% and 24.6%, respectively) reflects increasing reliance on digital platforms for both academic and non-academic purposes. This is comparable to the study by Karki et al where 36.8% of undergraduate medical students in Nepal were found to be addicted to smartphones, with significant self-reported overuse and behavioral signs of addiction.<sup>1</sup> Demirci et al also observed that increased smartphone use was positively correlated with poor sleep quality, depression, and anxiety in university students, reinforcing the adverse psychological impacts of digital overdependence.<sup>2</sup>

Importantly, our study found a significant association between internet addiction and daytime sleepiness ( $\chi^2=25.8$ ,  $p<0.05$ ). This is consistent with findings from multiple studies, including Sathe et al and Kadian et al which emphasize the negative influence of excessive internet and smartphone use on both subjective sleep quality and alertness during daytime activities.<sup>3,5</sup> These findings point toward a vicious cycle: excessive internet use leads to late-night screen time and reduced sleep duration, which in turn causes EDS, affecting concentration and academic performance.

No significant gender differences were observed in our study with respect to either internet addiction or daytime sleepiness. This contrasts slightly with the study by Karki et al where male students exhibited a higher addiction score.<sup>1</sup> However, the gender-neutral findings in our context may reflect a convergence in digital behavior patterns among college students of both sexes in urban India, where internet access and usage habits are becoming increasingly uniform.

Our results also align with Pagel's review, which described EDS as a common consequence of poor sleep hygiene, with potential impacts on academic and occupational functioning (6). Given the cognitive demands placed on students, persistent EDS can interfere with memory, focus, and productivity. Hence, identifying its link with modifiable behaviors like internet use is critical for early intervention.

### Limitations

Study was conducted in medical college students so findings may not be generalizable beyond the study setting.

### CONCLUSION

This study highlights a significant prevalence of both daytime sleepiness and internet addiction among college students in Bangalore. More than half of the participants reported varying degrees of daytime sleepiness, and over 40% exhibited mild to moderate internet addiction. The

statistically significant association between internet addiction and daytime sleepiness suggests that excessive internet use may be a contributing factor to sleep disturbances and impaired daytime functioning in this population.

These findings underscore the urgent need for awareness programs and preventive strategies aimed at promoting responsible internet use, better sleep hygiene, and stress management among college students. Interventions at the institutional level such as digital wellness education, counseling services, and sleep health promotion can play a vital role in mitigating the dual burden of internet addiction and its impact on students' academic performance and mental health.

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