ORIGINAL ARTICLE

Sleep Hygiene, Sleep Patterns and the Impact of Sleep Insufficiency Among University Students in North India: A Cross-Sectional Study

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ABSTRACT

Background: Sleep-related difficulties are increasingly documented among university students and are influenced by pressures of academic work, extensive screen exposure, lifestyle behaviours and mental stress. **Aim**: To assess sleep hygiene behaviours, sleep patterns and perceived effects of sleep insufficiency among university students in North India. **Materials and Methods:** A descriptive cross-sectional study was conducted among 250 undergraduate students from 1st to 3rd year at Subharti Medical College, Meerut. A semi-structured, self-administered online questionnaire (Google Forms) assessed sleep hygiene, sleep patterns and effects of insufficient sleep. Ethical approval was granted by the Institutional Ethics Committee. **Results**: Among 250 respondents, 44% were male and 56% female. Common sleep-promoting habits included academic reading (72.4%), physical activity (83.2%) and calming methods (24%). Disruptive habits included tea/coffee consumption (62%), smoking (6.4%) and heavy use of electronic devices (89.2%). Although 94% felt that more than six hours of sleep were essential to feel refreshed, only 56% achieved this duration on weekdays. Reported consequences of insufficient sleep included low energy (80.8%), stress (74.8%), difficulty maintaining focus (74%), behavioural changes (71.2%), academic hindrance (70%) and feelings of sleep deprivation (62%). **Conclusion**: Findings show a gap between students' sleep needs and sleep obtained; better hygiene improves wellbeing.

KEYWORDS

Sleep Determinants, Sleep Hygiene, Health Behaviour

INTRODUCTION

Sleep is a fundamental biological process essential for physical, cognitive and emotional well-being. The Oxford Dictionary defines sleep as a natural, periodic state of rest marked by reduced consciousness and responsiveness to external stimuli. (1) Adequate sleep is vital for memory consolidation, emotional regulation, metabolic homeostasis and immune functioning. However, poor sleep hygiene and insufficient sleep have emerged as widespread concerns among university students.

Rapid changes in lifestyle, including increased academic demands, prolonged study hours, excessive use of digital devices, irregular routines and rising psychological stress, have significantly disrupted normal sleep–wake patterns. Inadequate sleep is associated with fatigue, irritability, impaired academic performance, suboptimal decision-making and a higher risk of anxiety and depressive symptoms. (2) Sleep duration, quality,

regularity and timing are recognized as key determinants of academic success, and disturbances in these domains adversely affect learning, memory and executive functions. (3)
Chronic sleep deprivation further contributes to daytime sleepiness, reduced alertness and increased risk of errors and accidents in academic and clinical environments. (4) Students often adopt maladaptive coping behaviors such as daytime napping, weekend oversleeping and excessive caffeine intake. (5-8) Late-night screen exposure and stimulant use have been identified as major contributors to delayed sleep onset and poor sleep quality. (9,10) Stress both precipitates and perpetuates sleep disturbances, with higher stress levels consistently linked to irregular sleep patterns. (11)

MATERIAL & METHODS

This descriptive cross-sectional study was conducted over three months among undergraduate students (1st, 2nd and 3rd year) of Swami Vivekanand Subharti University, Meerut, Uttar Pradesh.

Study Type & Study Design: A descriptive cross-sectional study was conducted to assess sleep hygiene practices, sleep patterns and perceived effects of insufficient sleep among undergraduate students.

Study Setting: The study was carried out at Swami Vivekanand Subharti University, Meerut, Uttar Pradesh.

Study Population: The study population comprised undergraduate students from the 1st, 2nd and 3rd academic years enrolled at the university.

Study Duration: The study was conducted over a period of three months, with data collection completed within one month.

Sample Size Calculation: A total sample size of 250 students was included in the study. The sample size was determined based on feasibility and availability of participants during the study period.

Inclusion Criteria: Undergraduate students from 1st, 2nd and 3rd year
Students aged between 17 and 22 years
Students who provided informed consent

Exclusion Criteria: Students diagnosed with anxiety, depression or any sleep-related disorder
Students from 4th and 5th year due to ongoing examinations during the data collection period

Strategy for Data Collection: Data were collected using a self-designed, pre-tested, semi-structured questionnaire administered online through Google Forms. The questionnaire consisted of four sections:
Sociodemographic details (6 items)
Sleep hygiene practices (2 multiple-response items)
Sleep pattern (3 items)
Perceived effects of insufficient sleep (6 items)

Working Definition: Poor sleep hygiene was defined as the presence of irregular sleep routines, excessive screen exposure before bedtime or stimulant use adversely affecting sleep quality.

Ethical Issues & Informed Consent: Ethical approval was obtained from the Institutional Ethics Committee (EC/NEW/INST/2023/UP/0358). Participation was voluntary, and electronic informed consent was obtained from all participants prior to data collection. Confidentiality and anonymity were ensured throughout the study.

Data Analysis – Software: Data were entered in Microsoft Excel and analysed using Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics such as frequencies and percentages were used. Continuous variables were summarised using mean and standard deviation where applicable.

Study Population and Sampling: A total of 250 students aged 17–22 years were selected using purposive sampling. Only students from 1st to 3rd year were included as 4th- and 5th-year students were occupied with examinations during data collection. Students diagnosed with anxiety, depression or sleep disorders were excluded to avoid confounding.

Data Collection Tool: A self-designed, pre-tested, semi-structured questionnaire was administered online via Google Forms. It was composed of four sections:
Sociodemographic profile (6 items)
Sleep hygiene practices (2 items with multiple responses)
Sleep pattern (3 items)
Effects of insufficient sleep (6 items)
Most questions were subjective in nature and included yes/no and multiple-choice formats. The questionnaire demonstrated acceptable face validity.

Data Collection Procedure: The online survey link was sent via WhatsApp and email. Participation was voluntary, and informed consent was obtained prior to starting the questionnaire. Data collection was completed within one month, followed by data cleaning and entry in MS Excel.

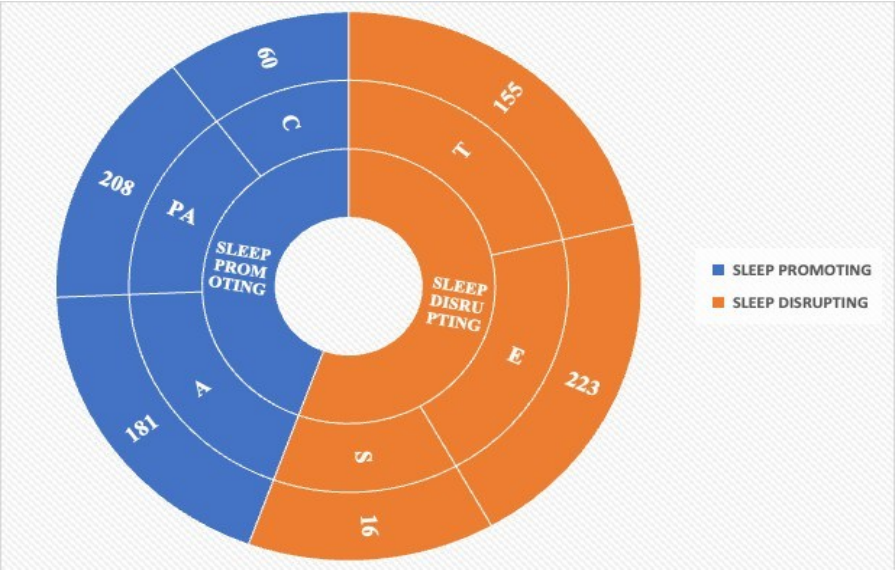
RESULTS

Section 1: Sociodemographic Profile

Table/Fig. Socio- demographic factors	Variables	Frequency	Percentage
Sex	Male	110	44.0
	Female	140	56.0
Age	17-18 years	31	12.4
	19-20 years	152	60.8
	21-22years	67	26.8
Academic year	3rd year	64	25.6
	2nd year	93	37.2
	1st year	93	37.2
Residence	Hostel	206	82.4
	Day scholar	44	17.6
Roommate	Yes	167	66.8
	No	83	33.2

The study included undergraduate students from all three academic years, with representation across both sexes and the 17–22 year age range. Most participants were in the middle age group and were residing in hostels, with a substantial proportion sharing accommodation with roommates. Distribution across academic years was relatively uniform, though representation from the final included year was comparatively lower.

Section 2: Sleep Hygiene Practices



Both sleep-promoting and sleep-disrupting behaviors were commonly reported among students. Engagement in academic reading or discussion and participation in physical activity were frequently identified as practices perceived to aid sleep. A smaller proportion reported the use of calming techniques such as meditation or listening to soothing music.

Conversely, several behaviors known to interfere with sleep were prevalent. Use of electronic devices before bedtime emerged as the most frequently reported disruptive habit. Consumption of caffeinated beverages before sleep was also common, whereas smoking was reported by relatively few participants.

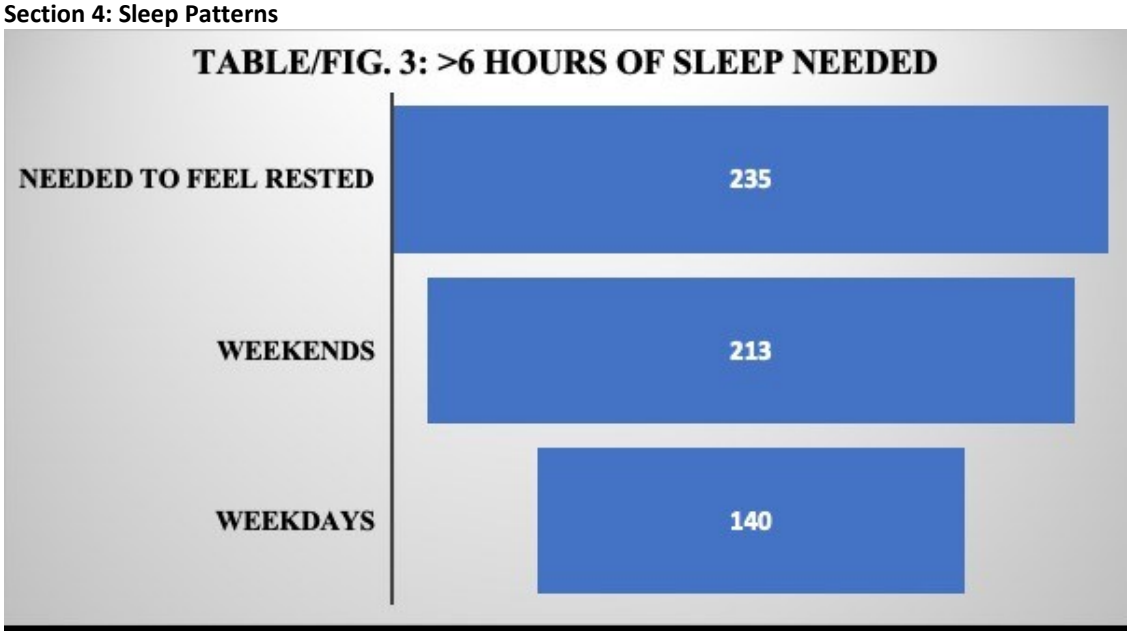
Section 3: Bedtime Habits

Table/Fig. 2: Bedtime Habits

Sleep Promoting Factors		**Sleep Disrupting Factors**	
Factors	Frequency	Factors	Frequency
1. Academic related reading/discussion [A]	181	1.Tea/coffee [T]	155
2. Physical activity [PA]	208	2.Smoking [S]	16
3. Calming therapies [C]	60	3.Electronic items [E]	223

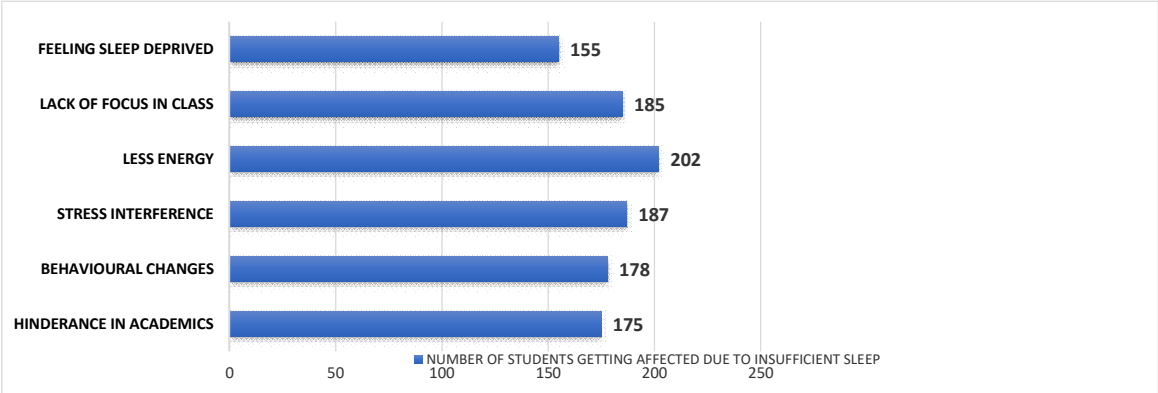
Both sleep-promoting and sleep-disrupting bedtime habits were commonly reported among the participants.

Section 4: Sleep Patterns



Although most students were aware of the need for adequate sleep duration to feel rested, a mismatch was observed between perceived requirement and actual sleep obtained during weekdays. Sleep duration showed a marked improvement during weekends, suggesting compensatory sleep behavior. This pattern indicates the presence of weekday sleep restriction followed by partial recovery during weekends.

Section 5: Effects of Insufficient Sleep



Students reported multiple adverse effects related to inadequate sleep. Reduced energy levels and psychological stress were the most prominent concerns, followed by impaired attention during classes and behavioral changes. Academic functioning was also perceived to be adversely affected. A considerable proportion of students subjectively identified themselves as sleep deprived.

Table/Fig. 4: Commonly Reported Consequences

Table/ Fig. 4 Effects due to insufficient sleep	Number	Percentage
Less energy	202	80.8%
Stress interference	187	74.8%
Lack of focus in class	185	74%
Behavioural changes	178	71.2%

Hinderance in academics	175	70%
Feeling sleep deprived	155	62%

Discussion

The present study demonstrates a marked discrepancy between perceived sleep requirements and actual sleep duration among university students, fulfilling the primary objective of assessing sleep patterns and hygiene practices. Although most students were aware of the need for adequate sleep, weekday sleep duration remained insufficient, suggesting that awareness alone does not translate into healthy sleep behaviour. Academic workload, prolonged self-study hours and competitive academic environments, particularly among medical students, likely contribute to delayed bedtimes and sleep restriction.

Academic-related reading or discussion was commonly perceived as a sleep-promoting practice. This may reflect the tendency of students to associate bedtime with quieter study periods rather than physiological sleep preparation. Engagement in physical activity was also frequently reported and is known to support circadian rhythm regulation, improve sleep quality and reduce stress. The use of calming therapies, though less prevalent, indicates emerging awareness of emotional self-regulation strategies.

In contrast, electronic device use before bedtime emerged as the most prominent sleep-disrupting factor. Exposure to screen-based blue light is known to suppress melatonin secretion and delay sleep onset,(9) and the high prevalence observed in this study suggests a growing dependence on digital technology compared to earlier regional reports. The mismatch between required and achieved sleep duration observed in this study is consistent with findings by Mirghani et al.(12) and Almojali et al.,(13) underscoring that inadequate sleep among medical students remains a persistent global concern.

The consequences of insufficient sleep were substantial, with reduced energy levels, impaired concentration and academic difficulties being frequently reported. Similar patterns of daytime sleepiness and reduced alertness have been documented by Abdulah et al.(14) Emotional and behavioural disturbances were also commonly observed, supporting existing evidence linking sleep deprivation with irritability, emotional instability and depressive symptoms.(15–17) Gender-related differences in sleep duration noted in the present study align with observations by Muhammad Chanchal et al.,(15) where female students reported shorter sleep duration despite comparable or better perceived sleep quality.

Overall, this study reinforces that inadequate sleep among university students is not merely a behavioural concern but a significant public health issue. By highlighting prevalent sleep hygiene practices, sleep deficits and their perceived consequences among students in North India, this study adds region-specific evidence to the existing literature and identifies modifiable behavioural targets for intervention.

Conclusion

This study shows that a majority of university students experience inadequate sleep and poor sleep hygiene despite awareness of its importance. Academic pressure, excessive electronic device use and irregular routines were identified as key modifiable contributors. Insufficient sleep was associated with fatigue, psychological stress, behavioural changes and impaired academic functioning, thereby fulfilling the study objectives.

The findings add region-specific evidence from North India to current literature and reinforce sleep deprivation among students as an ongoing public health concern. Integrating sleep hygiene education, stress management and screen-time regulation into university-based student wellbeing programmes may help improve sleep practices and academic performance.

Limitation of the Study

- Reliance on self-reported data may lead to recall bias.
- Objective measurements such as actigraphy or sleep diaries were not used.
- Purposive sampling may limit external validity.
- Findings are from a single medical university and may not represent all student populations.
- The cross-sectional design limits causal inference, and reliance on self-reported data may introduce recall bias. The single-centre nature of the study may restrict generalisability.

Authors Contribution

All authors have contributed equally.

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Nil.

Conflict of Interest

There are no conflict of interest

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Declaration of Generative AI and AI Assisted Technologies in the Writing Process

The authors haven't used any generative AI/AI assisted technologies in the writing process.

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