ORIGINAL ARTICLE

Sleep-Wake dilemma in future generation Health Care Providers: A cross-sectional analysis

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ABSTRACT

Introduction: Medical students are at higher risk for sleep disorders due to academic workload, stress, and mental health issues. This study evaluates sleep disorders and their contributing factors. **Material and methods**: It was a cross sectional study with a sample size of 255 respondents. Collection of demographic information, Socio-economic status and anthropometric information with SLEEP-50 was done. Data was analysed by SPSS and $p<0.05$ was considered as statistically significant. **Result**: Out of 255 subjects 236 provided complete information. ~80% students admitted having at least one sleep disorder. Majority of subjects reported to have narcolepsy (65.3%), followed by nightmares (31%), and restless leg syndrome (20.3%). Respondents experiencing nocturnal disturbances, such as phone ringers or vibrating modes, and prolonged engagement with social media were found to be more predisposed to poor sleep quality. Among these 47 respondents, 90.9% of Tobacco users, 96.7% of Alcohol users, and 83.3% of other types of substance abusers reported experiencing sleep disorders compared to their counterparts. **Conclusion**: The study confirmed that poor sleep is prevalent in medical students. The study suggests that research should focus on improving general sleep education for medical students, identifying at-risk students, and implementing programs to improve sleep.

KEYWORDS

Sleep Disorder; Narcolepsy; Medical Students; Substance Use

INTRODUCTION

Sleep is crucial physiological process for overall well-being, with poor sleep patterns affecting neurobehavioral and cognitive performance, and poor sleep patterns directly impact an individual's mental, emotional, and physical well-being (1,2,3,4). About one-third of adults

worldwide report some form of sleep disorders (5,6).

Sleep disorders affect all ages, with college environments causing issues like trouble falling, staying asleep, early wakefulness, poor quality sleep, morning tiredness, and daytime napping (7,8,9). College students' sleep disturbances, influenced by late-night studying, social obligations, and exam stress, negatively impact neurocognitive and psychomotor function, leading to poor academic performance (10).

Medical students forms a distinctive subset of population with increased susceptibility to develop sleep disorders due to their demanding academic calendars, clinical responsibilities, stressful work environment, overnight duties and poor lifestyle choices (11). Students completing rigorous medical courses may experience inconsistent sleep patterns, poor sleep quality, and excessive stress, potentially leading to mental health issues like depression and anxiety (11,12).

Several western studies have identified high prevalence of sleep disorders in medical students, but very few literatures are available from India. Hence, this study is undertaken to evaluate the problem of sleep disorder and its associated factors in Indian medical students.

MATERIAL & METHODS

The study entitled "A study on sleep disorders among medical students" was carried out in the department of Community Medicine, SRHU University, written consent from the participants and ethical clearance from the institute ethical committee.

Type of study: College based -Cross sectional study

Sample size and its calculation: Sample size was calculated using the formula: N= 4pq/l2. Prevalence of sleep disorders was taken as 30.6% from a reference study (13) with 10% allowable error. So, the desired sample came out to be ~85. This sample size was evenly distributed over the first, second and third prof part-I students of the MBBS Program, i.e. 85 students were selected from each year, resulting in 255 students surveyed during the study.

Selection of study subjects: Medical students were selected from 1st (Y1), 2nd (Y2) and 3rd (Y3) academic years because they do not have night duties or shift that alter sleep habits and their classes usually start at similar time. The strength of students in these academic years is 450, we applied systematic random sampling methods by which 85 study subjects were selected from each year of MBBS.

Inclusion criteria:

1. Undergraduate medical students (U.G) of SRHU.
2. All those ready to give consent.
3. Those who are never diagnosed of any mental and chronic health problem.
4. Who are currently not taking any medicine affecting sleep.

Exclusion criteria:

1. Those who were not available at the time of survey.
2. Those not willing to give consent
3. Questionnaire with greater than 20% of missing data were excluded from analysis.

Collection of samples

After the approval by institution ethics committee students falling under inclusion criteria, were enrolled. The participants were briefly informed about the purpose of study and informed consent was taken. Then, specially constructed semi structured Proforma was given to the study population to collect the required information in the study tool.

1. First part of Questionnaire- consisted of demographic information such as age, gender, religion, Socio-economic status etc along with other information like height, weight and attendance.

2. Second part in Questionnaire- SLEEP-50 (14) SLEEP-50 consists of 50 self-reported questions to guide in recognizing sleep disorders. It has nine different sections that accord to 7 distinct sleep disorders i.e. "obstructive sleep apnea, insomnia, narcolepsy, restless legs

syndrome/periodic limb movement disorder, circadian rhythm sleep disorders, sleepwalking, and nightmares and the last two sections determine sleep hygiene and sleep impact".

It improves diagnostic specificity by emphasising symptom severity over frequency. The 50 items are scored on a four-point scale: 1 (not at all), 2 (somewhat), 3 (rather much), and 4 (very much). A total SLEEP-50 score may be calculated; however, it is better to consider specific sections. A minimum score of 3 or 4 is required to consider any item as sleep problem, and each subsection requires a minimum of one item to be scored as 3 or 4 to be considered a possible sleep disorder or the below given cut off can be used to determine section wise sleep disorder:

Section	Disorder	Items	Sub score
1	Obstructive sleep apnoea	1-8	≥15
2	Insomnia	9-16	≥19
3	Narcolepsy	17-21	≥7
4	Restless leg syndrome	22-25	≥7
5	Cardiac rhythm sleep disorders	26-28	≥8
6	Sleepwalking	29-31	≥7
7	Nightmares	32-36	≥9
8	Sleep hygiene	37-43	≥12
9	Sleep impact	44-50	≥15

Data analysis and statistical test: Data was evaluated using SPSS latest Version. Quantitative values were calculated as frequency & percentages were calculated, whereas qualitative data was expressed as mean and standard deviation. The chi-square test was applied to evaluate categorical values. p-value of < 0.05 was taken as statistically significant.

RESULTS

Out of 255 respondents, 236 forms were complete or with acceptable missing information. Table 1 illustrates that the participants, ranging in age from 18 to 23 years, exhibited a predominant age distribution around 21 years, with the fewest individuals at the extremes of 23 and 18 years. The gender distribution revealed a slight majority of female respondents (55.5%), with males constituting 44.5%. The religious affiliation of the majority leaned towards Hinduism, encompassing 94.1% of the participants. Additionally, the participants spanned from the 1st to the 3rd years of the MBBS program, with a nearly uniform representation from each academic year.

Table 1 Demographic distribution of the study subjects

	AGE	N (236)	(%)
	Mean age	20.394±1.04	
Age	18	9	3.8
	19	35	14.8
	20	79	33.5
	21	85	36
	22	23	9.7
	23	5	2.1
Gender	Male	105	44.5
	Female	131	55.5
Religion	Hindu	222	94.1
	Muslim	4	1.7
	Punjabi	4	1.7
	Jain	4	1.7
	Others	2	0.8
MBBS year	1st	76	32.2
	2nd	86	36.4
	3rd	74	31.4

Table 2 illustrates the sleep patterns of during a typical week and the night before an examination. The data is categorized into key parameters, including the time students go to bed, sleeping and waking hours, and the occurrence of naps. Notably, a substantial proportion of students tend to stay up beyond midnight, with 44.1% going to bed between 12 am and 1 am during typical weeks. Additionally, the majority of students (64%) sleep for 6 hours or less during typical weeks, but this increases significantly to 87.7% on the night preceding an examination. Furthermore, there is a notable change in waking hours, with 30.1% waking up before 6 am during exam periods compared to only 6.4% during typical weeks. Interestingly, a considerable number of students (69.1%) report napping during typical weeks, and this remains high (62.3%) even on the night before an examination, suggesting a prevalent pattern of sleep-related behaviours which could be impacted due to academic demands. Occurrence of day time nap is little more during typical week as compared to days before examinations.

Table -2 Sleep pattern during typical college week and prior to an examination

ITEMS	During typical college weeks	Prior to examination
Time to go to bed		
Before 11pm	12 (5.1)	8 (3.4)
11pm-12am	68 (28.8)	21 (8.9)
12am-1am	104 (44.1)	44 (18.6)
After 1 am	52 (22.0)	163 (69.07)
Number of hours slept at night		
6 hours or less	151 (64.0)	207 (87.7)
7 hours or more	83 (36.0)	29 (12.3)
Time to wake up		
Before 6am	15 (6.4)	71 (30.1)
6am – 7am	84 (35.6)	70 (29.7)
7am – 8am	131 (55.5)	72 (30.5)
After 8am	6 (2.5)	23 (9.7)
Occurrence of naps		
Yes	163 (69.1)	147 (62.3)
No	73 (30.9)	89 (37.7)

Table 3 essentially illustrate the distribution of various types of sleep disorders among 236 respondents, with each disorder having specific criteria for classification based on the total scores of relevant items. The last row provides an overall percentage of respondents presenting with at least one sleep disorder, considering the criteria from sections 1 to 7. Highest percentage of subjects reported to have narcolepsy (65.3%), followed by nightmares (31%), and restless leg syndrome (20.3%).

Table -3 Sleep disorder based on SLEEP 50 questionnaire

Section	Disorder	Items	Sub score	N (236)	%
1	Obstructive sleep apnea	1-8	≥15	13	5.5
2	Insomnia	9-16	≥19	30	12.7
3	Narcolepsy	17-21	≥7	154	65.3
4	Restless leg syndrome	22-25	≥7	48	20.3
5	Cardiac rhythm sleep disorders	26-28	≥8	18	7.6
6	Sleepwalking	29-31	≥7	12	5.1
7	Nightmares	32-36	≥9	75	31
8	Sleep hygiene	37-43	≥12	38	16.1
9	Sleep impact	44-50	≥15	77	32.6
At least one sleep disorder present		From sec1-7	Respective cut offs	189	80.1

Table 4 reveals occurrence of sleep disorders among female participants in comparison to their male counterparts. Furthermore, second-year MBBS students exhibited a heightened frequency of sleep disorders compared to first year and third year MBBS students. Respondents who encountered disturbances during the night, such as phone ringers or vibrating modes, reported poor sleep quality. Additionally, students who reported indulging in consumption of caffeinated beverages during bed time, 74% of them reported one or the other form of sleeping disorder and also students reporting prolonged engagement with social media displayed a higher proportion of sleep disorders.

Table -4 Association of various factors with any sleep disorder

	At least one sleep disorder		X2, p-value
	N (189)	%	
Gender			
Male	83	43.9	0.128,0.7
Female	106	56.1	
Year of study			
First	62	32.8	0.633,0.73
Second	70	37	
Third	57	30.2	
Ringer setting			
On	96	50.8	4.4,0.35
Vibrate	52	27.5	
Silent	27	14.3	
Off	14	7.4	
Social media use at bedtime	99	52.4	0.59,0.7
Study in bed	157	83.1	*9.48,0.024

**P value < 0.05 is considered statistically significant*

Table 5a and 5b offers insights into the correlation between various forms of substance use (Tobacco, Alcohol, and other substances) and sleep disorders. Out of the 236 subjects, only 47 reported to indulge in substance abuse. Among these 47 respondents, 90.9% of tobacco users, 96.7% of alcohol users, and 83.3% of individuals with other forms of substance abuse reported experiencing sleep disorders. A notable correlation was found between alcohol consumption and the proportion of students having inadequate sleep. (p=0.01)

Interestingly, no associations were found with tobacco or other substances consumption.

Table 5a: Distribution of subjects according to substance use

History of substance use	N (236)	(%)
Any Substance use	47	19.92
Tobacco use	11	4.7
Alcohol use	30	12.7
Other types of substances	6	2.5

Table 5b: Association of substance use with sleep disorder

Substance used	No of users (N)	No of respondents with sleep disorder (n)	%	X2, p-value
Tobacco	11	10	90.9	0.848,0.35
Alcohol	30	29	96.7	5.925,0.01*
Other types of substances	6	5	83.3	0.041,0.84

*P value < 0.05 is considered statistically significant

DISCUSSION

This study was planned to explore the frequency of sleep disorders among medical students, as well as to assess the proportions of different sleep disorder within this student population. Approximately four-fifths of the students in medical college were at risk of at least any one sleep disorder, in contrast, another study revealed that only two-thirds of medical college students were at risk (15). The predominant sleep disorder identified among medical students in our study was narcolepsy (65.3%). Corresponding results were noted in an alternate study (16). Different research studies have documented lower prevalence of this disorder among medical students (15, 17). Regarding gender, we observed that a higher proportion of females experienced some form of sleep disorder compared to males. Our findings align well with those of another study (15, 17). The frequency of daytime napping tends to be slightly higher on regular weekdays in contrast to days preceding examinations. These observations are substantiated by another study, wherein daytime sleepiness was frequently noted among medical students (18,19). Majority of research findings indicate subpar sleep conditions amidst medical students (15,19,20). We found that a significant proportion of students obtain less than 6 hours of sleep, mirroring similar results found in a study conducted among medical and dental students in Ghana (21). Consumption of caffeinated drinks during bed-time affected the sleep patterns of students. Numerous additional studies have likewise found that the consumption of caffeinated drinks affects the sleep cycle (22,23). The utilization of social media did not emerge as a significant factor influencing the sleep cycle of the subjects in our study. This finding deviates from the consensus reached in other studies, where social media was identified as a noteworthy predictor of compromised sleep patterns (23,24). On an interesting note we found that ringer setting of the mobile found to be having no significant effect with sleep disorders. There are other studies where mobile phones were found not to affect sleep quality (24,25). We found that use of alcohol was significantly associated to poor sleep. In contrast to this, a study in Bogota revealed no discernible associations between poor sleep patterns and the consumption of alcohol or tobacco (26). Our research outcomes align with studies carried out in Nigeria, indicating a notable link between regular alcohol intake and diminished sleep effectiveness (27).

CONCLUSION

The study found that medical students often suffer from inadequate sleep, which could indicate mental health issues. However, the effectiveness of using sleep disorders as a diagnostic tool is not yet proven. The study suggests that research should focus on improving general sleep education for medical students, identifying at-risk students, and implementing programs to improve sleep. The study may not be applicable to other demographic groups due to sample size variations and potential biases related to substance use, memory recall, or socially desirable responses. Comparing medical students with those in different academic disciplines could help identify the specific factors contributing to poor sleep experiences.

Recommendation

A comprehensive exploration of various facets of sleep disorders and sleeping patterns is essential to uncover the underlying issues among the adolescents and youths. More attention should be directed towards promoting further research, given the limited number of studies addressing the intersection of sleep quality and substance use among medical students

Limitation of the Study

As the sample was drawn solely from a single educational institution, there is a possibility that the findings may not be widely applicable to all medical students across country. A notable number of students failed to provide accurate information concerning substance abuse, a crucial predictor proven to disrupt the sleep cycle in many other studies.

Relevance of the Study

This paper addresses a critical issue within the medical field, shedding light on the sleep-wake dilemma faced by future physicians. The cross-sectional analysis presented in this study addresses a crucial issue that medical students encounter in achieving healthy sleep habits while meeting the rigorous demands of their training. This issue is pertinent as it impacts both their well-being and professional performance, making the research highly relevant for consideration in curriculum design and policymaking for medical professionals.

Authors Contribution

All authors have contributed equally.

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Nil

Conflict of Interest

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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