



ASSESSMENT OF QUALITY OF SLEEP AND ITS ASSOCIATION WITH SOCIODEMOGRAPHIC AND CLINICAL FACTORS AMONG MEDICAL UNDER GRADUATES: A CROSS-SECTIONAL STUDY

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ABSTRACT **Background-** Sleep is a very important physiological process for many restorative functions. For maintaining the body's circadian rhythm sleep is essential. Reduced sleep quality can lead to excessive daytime sleepiness result in impaired daytime function, increased health problem, reduced work performance and impaired quality of life. **Methods-** A cross-sectional study was conducted among 590 medical undergraduates pursuing medical course. Blood pressure and anthropometric measurements of participants were recorded while Pittsburgh sleep quality index (PSQI) study tool was used to assess the sleep quality of medical undergraduates. **Results-** Out of 590 medical students, males and females were 60.7% and 39.3% respectively. 51% study subjects had poor sleep quality (PSQI score ≥ 5) with the mean global PSQI score of 6.44 ± 1.80 . The proportion of poor sleep quality among hypertensive and overweight/ obese medical students were 60.6% and 54% respectively. A statistically significant association of sleep quality was found with gender ($p=0.033$) and hypertension ($p=0.027$). It was also observed that 164 (27.8%) of study subjects had a sleep latency of more than 30 minutes while 196 (33.2%) had sleep duration less than 6 hours. Sleep efficiency of more than 85% was observed among 576 (97.6%) of the study subjects and 542 (91.9%) did not use any sleep medicine during the past 1 month **Conclusion:** A high prevalence of poor sleep quality was found among medical undergraduate students.

KEYWORDS : Sleep quality, medical students, PSQI, overweight/obesity, hypertension

INTRODUCTION

It is documented that once in a college, students find themselves cutting back on their sleep, in an effort to adjust and cope with their newfound workloads.^{1,2} Medical students, in particular, are often thought to have less free time, longer courses, and longer working hours than most of their fellow non-medical students. A very few studies, including a systematic review published in 2006, confirm these claims and show an increased incidence of stress and burnout among medical graduates.³⁻⁷ Studies conducted in countries around the world on college students pursuing a wide range of courses reveal that on an average, more than half the students are poor sleepers as identified by the Pittsburgh Sleep Quality Index (PSQI), with a score greater than 5. Academic schedules play an important role in sleep disturbances of medical students, with the maximum disturbances occurring in the weeks preceding an exam.

A higher prevalence of poor sleep quality among medical students than non-medical students and the general population has also been reported. Various factors, including medical students' attitudes, knowledge of sleep, and academic demands, have been recognized as the causative factors.⁸ Other associated factors includes inadequate vacation and long duration of hospital posting along with academic sessions and stressful lifestyle. Due to high flow of patients, students have to perform more clinical duties. Consequently sleep deprivation can lead to various manifestations like depression, suicidal thoughts, and a high probability of substance abuse among them.⁹ There is limited evidence in published literature regarding the burden of poor sleep quality among medical students in India. Hence, this study aimed to determine the prevalence of poor sleep quality and its correlates among medical undergraduates in a medical college.

MATERIAL AND METHODS

A cross-sectional study was conducted among 590 out of total 850 medical undergraduates pursuing medical course and studying in first to final year at a medical institution in northern India during 1st December, 2021 to 31st May, 2022. A predesigned, pretested, structured, self-administered questionnaire was used for collection of information regarding general demographic profile like age, sex, year/ batch of course, blood pressure and body mass index (BMI) while Before the start of study, validation of study tool used for data collection was done firstly by prior through study of the relevant literature available both online and offline; secondly by in-depth

discussion with experts in the field of medical education, head of the concern department and professors. The study commenced after taking approval from the institutional ethics committee.

There were only 590 medical students present during the process of data collection. Data was collected after taking their informed written consent. The study subjects were assured that their information will not be disclosed at any level and only will be used for analysis and evaluation as per the study objectives. The questionnaire was distributed to all the students simultaneously while seated in the lecture hall and not given any scope for discussion during answering. The students absent on that day were contacted through telephonic communication and those who could not be contacted were excluded from the study.

The Pittsburgh sleep quality index is an effective instrument used to measure the quality and patterns of sleep in adults. It differentiates poor from good sleep quality by measuring seven components: subjective sleep quality (C1), sleep latency (C2), sleep duration (C3), habitual sleep efficiency (C4), sleep disturbances (C5), use of sleeping medications (C6) and daytime dysfunction (C7) over the last month. Each component has a range of 0-3 points. The individual score of seven components are added to yield a global score, with a range of 0-21 points. A total score of 5 or greater is indicative of poor sleep quality. Blood pressure, height and weight were measured using mercury sphygmomanometer, stadiometer and analogue weighing scale respectively.

Data Entry And Statistical Analysis

The data collected from study units was entered into Microsoft excel spread sheet and statistical analysis done using statistical package for social sciences (SPSS) software, version 25.0, IBM Inc. Chicago, USA. Results were expressed in the form of tables; percentage, proportions, means and appropriate statistical test namely chi-square test, Students unpaired t-test were applied as per the requirements in the tables.

RESULT

Analysis of information obtained from 590 medical undergraduate revealed that 358 (60.7%) were males with mean $\pm$ S.D. of age 23.14 ± 2.44 years while the females were 232 (39.3%) with mean $\pm$ S.D. of age 22.42 ± 2.13 years. Higher proportion of hypertension (male, 20.67%;

female, 15.08%, $p=0.088$) and overweight /obesity (male, 60.1% ; female, 52.6%, $p=0.073$) were observed among the study subjects.

The mean BMI of male subjects ($23.55 \pm 2.54 \text{ kg/m}^2$) was higher and statistically significant ($p<0.001$) compared to females ($22.82 \pm 3.41 \text{ kg/m}^2$) and assessment of sleep quality (PSQI score) revealed that males 188 (65.1) had comparatively higher proportion of good sleep (PSQI score < 5) as compared to females 101 (34.9%) which was found to be statistically significant ($p=0.033$). [Table: 1]

Table-2 explains the observations of sleep quality according to various components of Pittsburgh sleep quality index(PSQI). Subjective sleep quality(C-1) ranged from very bad sleep (09, 1.5%) to very good sleep(

Table 1- Socio-demographic And Clinical Profile Of Study Subjects

S.N.	Variable name	Male (N=358)	Female (N=232)	Total n (%)	P value
1.	Mean age (in years) $\pm$ S.D	23.14 $\pm$ 2.44	22.41 $\pm$ 2.13	22.85 $\pm$ 2.35	$P<0.001^{*}, \#$
2.	Proportion of hypertension n(%)	74 (20.67)	35 (15.08)	109 (100)	$P=0.088\$$
3.	Mean Systolic blood pressure (in mm of Hg) $\pm$ S.D	123.68 $\pm$ 6.53	120.04 $\pm$ 9.20	122.25 $\pm$ 7.89	$P<0.001^{*}, \$$
4.	Mean diastolic blood pressure (in mm Hg) $\pm$ S.D.	81.50 $\pm$ 4.77	79.15 $\pm$ 6.27	80.57 $\pm$ 5.52	$P<0.001^{*}, \#$
5.	Proportion of overweight/ obesity(BMI > 23)n (%)	215 (60.1)	122 (52.6)	337 (100)	$P=0.073\$$
6.	Mean BMI (Kg/m ²)	23.55 $\pm$ 2.54	22.82 $\pm$ 3.41	23.26 $\pm$ 2.93	$P=0.003^{*}, \#$
7.	Good Sleep Quality(PSQI score < 5) n(%)	188 (65.1)	101 (34.9)	289 (100)	$P=0.033^{*}, \$$
8.	Poor Sleep Quality(PSQI score > 5) n(%)	170 (56.5)	131 (43.5)	301 (100)	
9.	Mean global PQSI score $\pm$ S.D	4.41 $\pm$ 2.41	4.89 $\pm$ 2.37	4.59 $\pm$ 2.40	$P=0.677\#$

*Statistically significant at 95%confidence interval($p<0.05$), * Students' unpaired t-test, [§] Chi-square test

Table 2. Assessment Of Sleep Quality According To Components Of Pittsburgh Sleep Quality Index (PSQI)

S.N.	Components of PSQI	Frequency n (%)
1.	Subjective sleep quality (C1)	
	Very good	211 (35.8)
	Fairly good	323 (54.7)
	Fairly bad	47 (8)
	Very bad	9 (1.5)
2.	Sleep latency (in minutes)	
	< 15 minutes	162 (27.5)
	16-30 minutes	264 (44.7)
	31-60 minutes	144 (24.4)
	> 60 minutes	20 (3.4)
3.	Sleep duration (in hours)	
	> 7 hours	179 (30.3)
	6-7 hours	215 (36.4)
	5-6 hours	182 (30.8)
	< 5 hours	14 (2.4)

211, 35.8%) among the study subjects. It was also observed that 164 (27.8%) of study subjects had a sleep latency of more than 30 minutes and 196 (33.2%) had sleep duration less than 6 hours. Sleep efficiency of more than 85% was observed among 576 (97.6%) of the study subjects and 542 (91.9%) did not use any sleep medicine during the past 1 month. Sleep disturbance was observed among 469(79.5%) of study subjects with day time dysfunction among 298(50.5%).

Cross tabulation to determine association of sleep quality with various socio-demographic and clinical variables (Table3) revealed statistically significant association for gender ($p= 0.033$) and hypertension ($p=0.027$) while it was not statistically significant for age, BMI status and study years.

4.	Habitual sleep efficiency	
	$> 85\%$	576 (97.6)
	75-84%	12 (2.1)
	65-74%	2 (0.3)
	$< 65\%$	0 (0)
5.	Use of sleep medication	
	Not during the past month	542 (91.9)
	Less than once a week	28 (4.7)
	Once or twice a week	12 (2)
	Three or four times a week	8 (1.4)
6.	Day time dysfunction	
	Not difficult	292 (49.5)
	Little difficult	218 (36.9)
	Difficult	76 (12.9)
	Very difficult	4 (0.7)
7.	Sleep disturbances	
	Not in last month	121 (20.5)
	Once in a week	385 (65.3)
	1-2 times a week	77 (13.1)
	3-4 times a week	7 (1.2)

Table 3. Association Of Sleep Quality With Sociodemographic And Clinical Variables

S.N.	Variable name	categories	Good sleep quality (Global PSQI score < 5) N=289 n(%)	Poor sleep quality (Global PSQI score ≥ 5) N=301 n (%)	Total n (%)	p value
1.	Age groups (years)	18-23	195(50.3)	193 (49.7)	388 (100)	$p = 0.075\$$
		24-29	88(45.1)	107 (54.9)	195(100)	
		30-35	6(85.7)	1 (14.3)	7 (100)	
2.	Gender	Male	188 (52.5)	170 (47.5)	358 (100)	$p = 0.033^{*}, \$$
		Female	101 (43.5)	131 (56.5)	232 (100)	
3.	Study year	5th year	52 (46.8)	59 (53.2)	111 (100)	$p=0.335\$$
		4th year	48 (43.2)	63 (56.8)	111 (100)	
		3rd year	54 (47)	61 (53)	115 (100)	
		2nd year	51 (50)	51 (50)	102 (100)	
		1st year	84 (55.6)	67 (44.4)	151 (100)	
4.	Body mass index (Kg/m ²)	Non-obese (< 22.9)	134 (53)	119 (47)	253(100)	$p=0.094\$$
		Overweight / obese (≥ 23)	155 (46)	182(54)	337(100)	
		Mean BMI $\pm$ S.D.	23.14 $\pm$ 2.90	23.38 $\pm$ 2.96	23.26 $\pm$ 2.93	
5.	Blood pressure (mmHg)	Normotensive	246 (51.1)	235 (48.9)	481 (100)	$p=0.027^{*}, \$$
		Hypertensive	43 (39.4)	66 (60.6)	109 (100)	
		SBP (mean $\pm$ S.D)	121.91 $\pm$ 7.73	122.58 $\pm$ 8.03	122.25 $\pm$ 7.89	
		DBP (mean $\pm$ S.D)	80.15 $\pm$ 5.51	80.99 $\pm$ 5.53	80.57 $\pm$ 5.52	
6.	PQSI score	Mean $\pm$ S.D	2.68 $\pm$ 1.11	6.44 $\pm$ 1.80	4.59 $\pm$ 2.40	$P<0.001^{*}, \#$

*Statistically significant at 95%confidence interval($p<0.05$), * Students'unpaired t-test, [§] Chi-square test

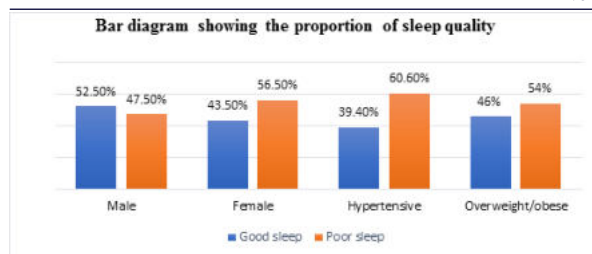


Figure 1 Shows That Proportion Of Poor Sleep Was Comparatively Higher In Subjects Who Were Either Hypertensive, Overweight/ Obese Or Female By Gender.

DISCUSSION

A higher prevalence of poor sleep quality (PSQI score 5), 51% observed in the present study among medical undergraduates is in lines with the observations reported by other researchers among studies done on medical students and college students of basic Sciences.¹¹⁻¹³ On the other hand, studies done on college students of countries have reported a lower prevalence of poor sleep quality.^{14,15} This could be attributed to differences in the socio-demographic and academic environment in India and other countries. The possible other reasons could be a higher duration of medical education course (5.5 years) as compared to other undergraduate courses in basic science which range from 3 to 4 years.¹⁶

In the present study, a statistically significant association between gender and quality of sleep was observed which is similar to the findings reported by Gouthaman R et al¹⁷, Ibrahim NK et al¹⁸, Lee et al¹⁹, Fatima Y et al²⁰, Hung H C et al²¹, in their studies. A comparatively higher proportion of poor sleep quality observed among females could be due to their biological and psychological response to day today stress.

Progressively increasing trend of poor quality sleep was observed in relation to increase in the duration of medical study as it was 56.8% among final year students. Possible reasons supporting this observation could be busy academic schedule and activities as the students' progress from pre-clinical to clinical study years along with stress related to upcoming entrance and qualifying exam for post graduate courses with job insecurities to a certain extent.

Relatively higher proportion of poor quality of sleep among overweight/ obese in comparison to non-obese students was observed which is similar to the findings of Giri PA et al²² and Ibrahim NK et al.¹⁸ It has been reported that obstructive sleep apnoea (OSA), a sleep disorder which cause loud snoring and breathing difficulty during sleep, is seven times more common among obese individuals and it cause disturbance.²³ This could be the possible risk factor in the present study also.

A higher proportion of poor sleep quality among hypertensive students (60.6%) was observed in the present study as reported by other researchers like Jain N et al²⁴ (77.4%), Shittu RO et al²⁵ (62.5%) and Mariana E R et al²⁶ (82.9%). On the other hand, Karnik R et al²⁷ in his study reported a lower proportion (47.2%) of poor sleep quality among students.

The present study also observed that 534 (90.5%) and 20(3.4%) of the study subjects had perception of subjective good sleep quality and a sleep latency of more than 60 minutes respectively. Another observation of non-usage of sleep medication among 542 (91.9%) study subjects and habitual sleep efficiency of more than 95% among 97.6% students points to the fact that the sleep disorder could be in the initial phase of its progression and could have adverse manifestation if remain uncontrolled.

Limitations

Some of the observed limitation in the present study are the usage of self-reporting questionnaire for various sleep related variables which may lead to information bias because of wrong interpretation and recall of sleep related events. Moreover the cross sectional study design used in the present study could not provide the information to ascribe causality of poor sleep quality to any of the associated factors.

CONCLUSION

A high prevalence of poor sleep quality was found among medical

undergraduate students in this study. Based on study findings, we recommend academic counselling focusing on students' mental health status and sleep hygiene. The early detection of poor sleep quality not only helps the students to prevent the adverse health outcomes in advance but also gives our society a group of healthy doctors who will contribute to the advancement of the nation. Further prospective study would be helpful to find out the cause-effect relationship of risk factors of poor sleep quality.

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