

A comparative study of sleep quality in different phases of the medical course: A study from Haryana (North India)

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ABSTRACT

Background: Inadequate sleep quality is a crucial problem in today's hectic lifestyle. Sleep is known to facilitate cognitive skills, aid memory, and is important for physical, emotional and intellectual health. **Objectives:** To determine the sleep quality of the medical undergraduate students and to explore differences in various phases of medical curriculum. **Material and Methods:** Sleep quality was assessed in 400 medical students in various phases of the medical course using the Pittsburgh Sleep Quality Index (PSQI). Chi square test was used for comparisons of the all seven components of PSQI and sleep quality for different study year, whereas ANOVA was used for comparison of the components and global score. **Results:** Of the total, 25.3% of the participants classified their sleep quality as either very or fairly bad, and 31.1% reported taking more than 30 min to fall asleep. The average hours slept per night was 7.1 ± 1.21 . Of the total, 8.4% of the participants reported using sleep medication at least once a week. Subjective sleep quality and sleep duration were found to be significantly different among the four groups. **Conclusion:** Poor subjective sleep quality was high for students in all class years of the undergraduate medical course. The comparison across the various phases of the course showed that first years reported worse sleep quality than did those in other class years.

Keywords: Medical course, phases, sleep quality

Introduction

Inadequate sleep quality is a crucial problem in today's hectic lifestyle.^[1] Sleep is known to facilitate cognitive skills, aid memory, and is important for physical, emotional, and intellectual health. Sleep practices are distinct in each individual and are dependent on age, public participation, nature of employment, and psychiatric and physiological characteristics.^[2] Adequate sleep optimally impacts mental functioning and therefore impacts

students' performance on examinations and ultimately grades received. Cognitive performance is susceptible to inadequate sleep duration, defined as fewer than 7 hours a day for adults.^[3]

Many studies have indicated that less than 7 hours of sleep is associated with poorer general health and increased risk or presence of disease compared to 7–8 hours of sleep.^[4] On admission to college, students cut back their sleep, in an effort to accommodate their heavy workloads.^[5] Medical students are extremely prone to unorganized sleeping patterns. It is imperative to understand such irregular sleep patterns. Therefore, this study was conceptualized with the objective of determining the sleep quality of the medical undergraduate students and to explore differences in various phases of the medical curriculum.

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This research will provide data for improving the sleep quality of medical students, which in turn will help to enhance their clinical skills and academic standard. Medical students are the future medical professionals of our country and their academic growth will lead to better healthcare in the community.

Methods

Materials and Methods

Study setting

This study was conducted in a medical college in Haryana. The study was reviewed and approved by the Institutional Ethics Committee.

Sample size

The study included all medical students. Of 600 medical students, 400 volunteered and gave consent to participate (response rate: 66.7%).

Study period

The study was done in September 2019. This period was chosen as this period was relatively free from examinations and other activities. During this time, the students were not only exposed to various academic stressors but also psychosocial and health-related stressors.

Study design

Cross-Sectional study design was adopted for this study.

Study setting

This study was conducted in a medical college in Haryana.

Study tool

This was a questionnaire-based study. The socio-demographic profile of the participants was recorded. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI).

Pittsburgh sleep quality index

The PSQI is a self-rated questionnaire consisting of 19 questions used to assess 7 components of sleep – subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, usage of sleep medication, and daytime dysfunction during the previous month. Each question on the questionnaire is scored from 0 to 3, with 0 being the highest and 3 being the lowest score. The seven component scores are then added to get a global PSQI score in the range of 0–21. A global score ≥ 5 indicates poor sleep quality in the past month. The PSQI is reliable with a Cronbach's α of 0.83.^[6]

Data collection

The intention of the study was explained to the students and they were assured of complete confidentiality. Participants who volunteered and gave informed written consent were included in the study. All participants assembled in a lecture hall, in the morning. The questionnaires consisting of a socio-demographic

profile and the PSQI, were distributed to the participants. The contents were explained initially by one of the authors. Questions were addressed individually by the other authors. Adequate time was given to complete the questionnaires. The students were asked not to discuss the contents among themselves and were asked to mark the questionnaires appropriately.

Statistical analysis

The data collected from the filled-up questionnaire was fed into MS Excel spreadsheets and data analysis was carried out using Statistical Package for the Social Sciences (SPSS) for window version 21.0. Demographic data were categorized to calculate frequencies and percentages. In the inductive analysis, the Chi-square test was used for comparisons of all seven components of PSQI and sleep quality for different study year, whereas ANOVA was used for between-group comparison of the components and global score. A value of $P < 0.05$ was considered significant.

Results

All the students were included in this survey from the first year to fourth year. These students were divided into four groups according to their study years [Table 1].

A total of 600 students were called to be involved in this study after which it was revealed that 400 (66.6%) completed the PSQI, being given. The completion rate in the various phases was as follows: 127 (31.8%) in the first year, 111 (27.8%) in the second year, 78 (19.5%) in the third year, and 84 (21%) in the fourth year. A female preponderance was seen in the response.

The results for the seven components of the PSQI were analyzed for the total sample and for the four study groups. Of the total sample, 25.3% of the participants classified their sleep quality as either very or fairly bad, and 31.1% reported taking more than 30 min to fall asleep. The average number of hours slept per night was 7.1 ± 1.21 hours. Of the total sample, 8.4% of the participants reported using sleep medication at least once a week and 40% reported having difficulty staying awake during the day at least once a week. Subjective sleep quality and sleep duration were found to be significantly different among the four groups [Table 2].

Global PSQI scores for all students ranged from 0 to 15 and are depicted in Figure 1

The mean global PSQI scores for groups A, B, C, and D were respectively 6.36 ± 2.58 , 6.09 ± 2.53 , 5.15 ± 2.69 , and 6.35 ± 3.16 and 27.3% of the total sample had scores < 5 [Table 3]. Further, analysis by undergraduate class showed that PQSI scores of < 5 were found in 23.6% of first year students, 27.9% of second year students, 35.9% of third year students and 23.8% of fourth year students.

Additionally, the mean scores on the seven components of the PSQI were compared between groups [Table 4]. It was observed

that subjective sleep quality (component 1) was significantly different between groups A and C and A and D (p -value of <0.001 and 0.010 , respectively). Sleep latency was found to be significantly different in groups C and D (P value 0.020) whereas sleep duration was significantly affected in groups A and C (P value 0.001). The use of sleep medicine was significantly different in groups A and D (P value 0.003).

Table 1: Sample distribution by group and gender

Group	No. of Students	Percentage
A 1 st Year	127	31.8%
B 2 nd Year	111	27.8%
C 3 rd Year	78	19.5%
D 4 th Year	84	21%
Total	400	100%
Gender		
Male	163	40.8%
Female	237	59.2%
Total	400	100%

Discussion

Sleep quality among medical students is an important subject because of its impact on the academic routine and personal life of the students. Therefore, studying sleep quality by means of a validated and quantifiable instrument such as the PSQI is extremely important for the monitoring of sleep health in students and helps in the planning of interventions aimed at increasing awareness of this issue.

Adherence in the present was nearly 67%, which is similar to literature reports on the rate of return of this type of questionnaire (73.3%),^[7] but higher than another study (45.54%).^[2] In context of participation by gender, we found a female predominance (59.2%) in effective participation in the study, which is consistent with study (66.62%)^[8] but not inconsistent for some other studies that used this instrument in which a male predominance of 73%^[9] and 54.7% was seen.^[10]

Table 2: Pittsburgh Sleep Quality Index components

Components	Group-A	Group-B	Group-C	Group-D	Student, n (%)	P
Subjective Sleep Quality						
Very Good	18 (14.2)	25 (22.5)	28 (35.9)	23 (27.4)	94 (23.5)	0.006
Fairly Good	64 (50.4)	57 (51.4)	39 (50)	45 (53.6)	45 (51.2)	
Fairly Bad	37 (29.1)	27 (24.3)	9 (11.5)	14 (16.7)	87 (21.8)	
Very Bad	8 (6.3)	2 (1.8)	2 (2.6)	2 (2.4)	14 (3.5)	
Sleep latency						
≤ 15 min	44 (34.6)	33 (29.7)	31 (39.7)	17 (20.2)	125 (31.3)	0.140
16 to 30 min	45 (35.4)	40 (36)	30 (38.5)	36 (42.9)	151 (37.8)	
31 to 60 min	28 (22)	29 (26.1)	12 (15.4)	18 (21.4)	87 (21.8)	
> 60 min	10 (7.9)	9 (8.1)	5 (6.4)	13 (15.5)	37 (9.3)	
Sleep duration						
> 7 h	18 (14.2)	12 (10.8)	15 (19.2)	8 (9.5)	53 (13.3)	<.001
6 to 7 h	20 (15.7)	24 (21.6)	28 (35.9)	26 (31)	98 (24.5)	
5 to 6 h	35 (27.6)	48 (43.2)	22 (28.2)	32 (38.1)	137 (34.3)	
< 5 h	54 (42.5)	27 (24.3)	13 (16.7)	18 (21.4)	112 (28)	
Habitual sleep quality						
> 85	120 (94.5)	105 (94.6)	74 (94.9)	74 (88.1)	373 (93.3)	0.675
75 to 84	4 (3.1)	4 (3.6)	3 (3.8)	6 (7.1)	17 (4.3)	
65 to 74	3 (2.4)	1 (0.9)	1 (1.3)	3 (3.6)	8 (2)	
< 65	0 (0.0)	1 (0.9)	0 (0.0)	1 (1.2)	2 (.5)	
Sleep disturbances						
0	12 (9.4)	8 (7.2)	5 (6.4)	10 (11.9)	35 (8.8)	0.541
1 to 9	92 (72.4)	92 (82.9)	61 (78.2)	65 (77.4)	310 (77.5)	
10 to 18	22 (17.3)	11 (9.9)	12 (15.4)	9 (10.7)	54 (13.5)	
19 to 27	1 (0.8)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.3)	
Use of sleeping medication						
Not during past month	123 (96.9)	103 (92.8)	71 (91)	70 (83.3)	367 (91.8)	0.075
Less than once a week	3 (2.4)	5 (4.5)	6 (7.7)	9 (10.7)	23 (5.8)	
Once or twice a week	1 (0.8)	2 (1.8)	0 (0.0)	2 (2.4)	5 (1.3)	
Three or more times of week	0 (0.0)	1 (0.9)	1 (1.3)	3 (3.6)	5 (1.3)	
Daytime dysfunction						
1 to 2	30 (23.6)	21 (18.9)	26 (33.3)	19 (22.6)	96 (24)	0.188
3 to 4	85 (66.9)	83 (74.8)	44 (56.4)	52 (61.9)	264 (66)	
5 to 6	11 (8.7)	6 (5.4)	8 (10.3)	11 (13.1)	36 (9)	
Every day	1 (0.8)	1 (0.9)	0 (0.0)	2 (2.4)	4 (1)	

Table 3: Global PSQI scores as a function of the number of students

Global PSQI Score	Group-A	Group-B	Group-C	Group-D	Student, n (%)	P
<5	30 (23.6)	31 (27.9)	28 (35.9)	20 (23.8)	109 (27.3)	0.267
5-8	70 (55.1)	60 (54.1)	43 (55.1)	48 (57.1)	221 (55.3)	
9-16	27 (21.3)	20 (18)	7 (9)	16 (19)	70 (17.5)	

Table 4: Values of P for between-group comparisons of the seven components and the global score of the PSQI

Groups	COMPONENTS							PSQI
	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	
A vs. B	0.143	1.0	1	1.0	1.0	1.0	1.0	1.0
A vs. C	<.001	1.0	0.001	1.0	1.0	1.0	1.0	0.013
A vs. D	0.010	0.148	0.314	0.448	0.694	0.003	1.0	1.0
B vs. C	0.163	0.496	0.049	1.0	1.0	1.0	1.0	0.123
B vs. D	1.0	0.908	1.0	0.543	1.0	0.109	1.0	1.0
C vs. D	1.0	0.020	0.367	0.406	1.0	0.231	0.304	0.031

Of the students surveyed, 72.7% were found to be poor sleepers (Global PSQI score of more than 5). This is consistent with another study in Pakistan where 67.3% of medical students were reported to be bad sleepers,^[11] while another study in Ghaziabad reported this to be 60%.^[12] However, this surpasses the literature findings of 59.4%^[13] and 20.7%.^[14] The average global score of the PSQI was more than 5 (6.04), i.e. indicative of the presence of clinically significant sleep difficulties.

Nearly 25% of the students in our study classified their sleep quality as either very or fairly bad, a proportion that is lower than that reported in the literature. One study reported poor sleep quality in 40%,^[8] while another reported it to be 32.53%.^[15] On analyzing across various groups, maximum (35.4%) first-year students (group A) reported poor sleep quality. The poor sleep quality observed in group A is corroborated with findings from other studies, with similar findings in incoming students, emphasizing the association between poor sleep quality and first-year undergraduates, in which poor sleep habits, such as nighttime surfing of internet, lack of social life, and improper eating habits, are found to be enhancing factors.^[16]

Poor sleep quality is often associated with excessive daytime sleepiness. In the present study, daytime dysfunction was reported by 17.9% of the participants, who had difficulty staying awake during the day at least once a week. There is a wide variation in studies reporting day time sleepiness: 31%,^[7] 42.1%,^[17] and 63%.^[18]

Students in group A experienced greater harmful effects on subjective sleep quality and daytime dysfunction compared to those in other groups, with daytime dysfunction showing a trend toward a significant difference when comparing groups A and C ($P = 0.05$). This can be explained by the fact that fresher students undergo a period of transition from attending high school to attending a medical undergraduate course, which is characterized by too many academic activities and irregular daily routines, which vary too much because of the class load, shifts,

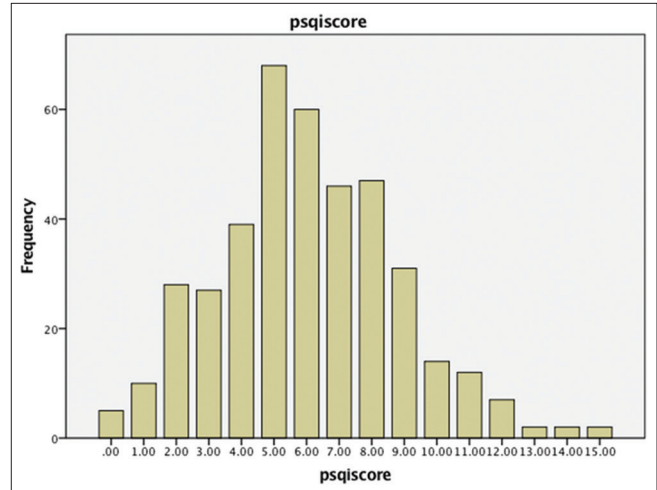


Figure 1: Global PSQI score of the students

breaks, and free study periods. After the second year of the undergraduate course, there is a better adaptation to the routine of studies and visits.

The results for the sleep latency component showed that sleep latency was slightly altered in 32.1% of the participants.

The results for the sleep duration component revealed that the maximum (34.3%) participants were sleeping for 5-6 hours per night while 28% of participants were sleeping for less than 5 hours. Similarly, daily sleeping hours of 4-6 hours were reported by 69.38%^[19] and 70.9%^[20] participants in other studies. Also, 68.0% of the participants reported sleeping for 6-7 h per night in another study.^[10]

Use of sleeping medication was identified in 8.4% of the participants in the present study, but this proportion is lower than that found in another study where 17% of those students used drugs for sleep induction^[21] but higher than another study, which reported that 2.7% of students had used medication for sleep in the past month.^[22]

To summarize, we investigated sleep quality in medical students in a medical college in Haryana, North India and found impairments in certain PSQI components, which highlights the need to continue research in different parts of the country and the world, to keep track of such students and encourage the translation of findings into health promotion practices. Our results are in concordance with literature findings of a high frequency of impaired aspects in sleep quality, which may have harmful effects on health.

The limitation of the present study was that other instruments, such as the Epworth Sleepiness Scale, were not used which could provide details on daytime sleep dysfunction. Furthermore, specific protocols for assessing sleep habits could have been used to better compare student behaviors across the various phases of the medical course, given that students in group A had greater problems regarding subjective sleep quality and daytime dysfunction than did those in groups B and C.

In conclusion, this study found that poor subjective sleep quality was high for students in all class years of the undergraduate medical course. The comparison across the various phases of the course showed that first years (group A) reported worse sleep quality than those in other class years (groups B, C, and D). It is imperative to adopt Health Promotion measures specifically in regard to good sleep hygiene among medical students.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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