Sleep Patterns among the Pre-clinical Medical Students of a Selected Medical College in Bangladesh

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Abstract

Introduction: Sleep is a complex biological pattern consisting of period of temporary unconsciousness. Sleep deprivation often leads to serious physical and mental health consequences. Medical college students often sacrifice sleep to comply with their demanding academic schedule which may influence their health and academic performance.

Objective: To observe sleep patterns in pre-clinical (first and second year) students of MBBS course of Armed Forces Medical College, Dhaka, Bangladesh.

Materials and Methods: This cross-sectional study was conducted during the period of March 2021 to July 2021 among 233 respondents. Two validated scales were used to assess quality of sleep and daytime sleepiness: 1) Pittsburgh Sleep Quality Index (PSQI) and 2) Epworth Sleepiness Scale (ESS).

Results: Sleep patterns observed in the study-group revealed that more than quarter of the medical students of pre-clinical MBBS course are having insufficient sleep, delayed sleep onset with excessive day time sleepiness.

Conclusion: The students should be made aware of the undesirable consequences of improper sleep habits so that they may inculcate healthy sleep practices in their day-to-day life and thus enjoy natural human circadian rhythm and cope up with their busy academic schedule with sound physical and mental health.

Key-words: Sleep, Medical students, Epworth Sleepiness Scale (ESS), Pittsburgh Sleep Quality Index (PSQI).

Introduction

Proper sleep habits play important role in maintaining sound physical and mental health in an individual. Medical students often sacrifice sleep to meet academic requirements and try to improve their performance at the cost of sleep hours. Sometimes students stay up late and interact on social networking sites. Lack of sleep has effects on the endocrine, immune and nervous systems and is associated with an increased risk of cardiovascular disorders including obesity, diabetes, impaired glucose tolerance and hypertension[1]. Sleep habits are defined as behavior pertaining to time to go to bed, time to rise, duration of night sleep, consumption of sleeping pills and sleep problems or disturbances are defined as any difficulty in falling asleep or failure to maintain sleep due to noise, nocturnal eating or snoring[2]. For students, specially medical students, sufficient sleep is required for maintaining good physical health which is a pre-requisite for attaining proper mental stability to carry out the academic load. Sleep has an important role for students as it has a relevant facilitating role in learning and memory processes[3]. Sleep disturbances among medical students received minimal attention and so not much is known about the nature of sleep pattern and sleeping difficulties among this population.

This study has been designed to observe sleep patterns among pre-clinical students of Armed Forces Medical College with an aim to ascertain whether the medical students are facing any type of sleeping difficulty which may affect their physical health, mental compliance, cognitive ability and thus their academic accomplishment.

Materials and Methods

Cross sectional design was used for this study. Data were collected through convenient sampling method. A total of 233 students were recruited for the study. Students were given a brief description about this study. Written informed consent was taken and the subjects were assured of confidentiality. Approval for conducting the study was taken from the authority of the concerned institution. Students suffering from any acute or chronic medical condition were excluded from the study.

Data collection tools

Two published scales: (a) the Pittsburgh Sleep Quality Index (PSQI) and (b) the Epworth Sleepiness Scale (ESS) were used in the study as data collection tools. Demographic information was also collected from the subjects.

a) PSQI consists of 19 items and it is a self-reported questionnaire that evaluates sleep quality within the past month. The seven components of PSQI include sleep duration (in hours), sleep disturbance, sleep latency, estimates of habitual sleep efficiency, use of sleep enhancing medication, daytime dysfunction due to sleepiness and overall perceived sleep quality. The reliability and validity of the PSQI for assessing sleep quality have been documented by previous studies[2,4]. PSQI consists of 24 questions and it has 07 component score ranging from 0 to 3 (0 score equals better and 3 is worst) and one global sleep quality score. The

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global score > 5 indicates poor sleep quality while score ≤ 5 is considered as good quality sleep. In PSQI specific categories were sleep latency (≥ 30 versus < 30 min); estimates of poor sleep efficiency such as daytime dysfunction due to sleepiness (≥ once per week versus < once a week); and sleep medication use during the past month (≥ once per week versus < once a week).

b)   ESS was used to assess daytime sleepiness. Students scoring ESS > 11 were regarded as having excessive daytime sleepiness; students with lower ESS scores presented significantly with greater scores of quality of life and perception of educational environment and lower scores of depression and anxiety symptoms[5].

Statistical analysis: Descriptive statistics was calculated to measure frequency, mean and SD. Bivariate analysis was done using Chi-square test and t-test to observe the differences between the dependent and independent variables. Statistical analyses were applied to use IBM SPSS statistics 25. All the *P* values observed are two-sided and considered statistically significant at α=0.05.

Results

Out of the 223 students, 101 and 122 were from 1st an 2nd year respectively. Among the participants, majority were female (64.3%) and mean age was 20.4 ± 0.9 years. At the time of data collection, the 2nd year students (54.0%) were undergoing their 1st professional MBBS exam. Due to some inadequate responses, a few of the data had to be disregarded and finally 212 PSQI scales (mean 6.9) and 222 Epworth (mean 10.08) results were analyzed.

The PSQI scale shows that 62.56% of the students were good sleepers while the rest being poor (34.6%) to worse (2.8%) sleepers. A total of 72.2% of the students' categorized themselves as good sleepers while 62.27% of sample had sleep latency of up to 30 minutes. It was noticed that 58.0% of the participants slept for a minimum of 5 to 7 hours. By analyzing the number of hours slept and the numbers of hours spent in bed, 73.1% of the students were measured to have habitual sleep efficiency of >85%. While calculating the patterns of sleep disturbances, specific interferences were marked and added according to their severity. About 76% (n=162) students were seen to have minimum sleep disturbance. About 12% of the students admitted to have taken sleep medication at least once a week.

ESS scores revealed that almost half (47%) of sample had normal daytime sleepiness. Lower normal daytime sleepiness was observed among 8.6%. The rest of the students reported to have mild (21.2%), moderate (14.9%) and severe (8.1%) excessive daytime symptoms. However, 44.1 % of the total students reported that they had excessive daytime sleepiness.

Table-I: Categorical Variables

Variables		N (%)
Result Epworth	Lower Normal Daytime Sleepiness	19 (8.6)
	Normal Daytime Sleepiness	105 (47.3)
	Mild Excessive Daytime Symptoms	47 (21.2)
	Moderate Excessive Daytime Symptoms	33 (14.9)
	Severe Excessive Daytime Symptoms	18 (8.1)
Result PSQI (Global Score)	Good Sleep quality	132 (62.6)
	Poor Sleep quality	73 (34.6)
	Worst Sleep quality	6 (2.8)
Subjective Sleep quality	Very Good	52 (24.5)
	Fairly Good	101 (47.6)
	Fairly Bad	40 (18.9)
	Very Bad	19 (9.0)
Sleep Latency	≤ 15 minutes	52 (24.5)
	16-30 minutes	80 (37.7)
	31-60 minutes	52 (24.5)
	> 60 minutes	28 (13.2)
Sleep Duration	> 7 hours	39 (18.4)
	6-7 hours	62 (29.3)
	5-6 hours	61 (28.8)
	< 5 hours	50 (23.6)
Habitual Sleep efficiency	> 85 %	155 (73.1)
	75-84 %	41 (19.3)
	65-74 %	11 (5.2)
	< 65 %	5 (2.4)
Sleep Disturbances	0	8 (3.8)
	1-9	162 (76.4)
	10-18-4	37 (17.5)
	19-27	5 (2.4)
Use of Sleeping Medication	Not during the past month	188 (88.7)
	Less than once a week	11 (5.2)
	Once or twice a week	10 (4.7)
	Three or more times a week	3 (1.4)
Daytime Dysfunction	0	42 (19.8)
	1-2	113 (53.3)
	3-4	42 (19.8)
	5-6	15 (7.1)

Mean differences regarding academic years and gender are shown in Table-II. The mean PSQI score of first year students was 5.5, second year students 8.2 where male students 6.4 and female students 7.1. In addition, the mean ESS score of the first year students was 9.68, second year students was 10.4, male students 9.9 and female students 10.2.

Table-II: Mean difference of PSQI and ESS scores according to their year of education and gender

Year of the student		N	Mean	Std. Deviation	df	t
PSQI score	First year	100	5.5	2.976	211	-6.478
	Second year	113	8.2	3.123	209.83	
ESS score	First year	101	9.7	3.203	221	-1.499
	Second year	122	10.4	3.835	220.979	
PSQI score	Male	72	6.4	2.952	210	-1.578
	Female	140	7.1	3.407	162.624	
ESSscore	Male	79	9.9	3.194	220	-0.617
	Female	143	10.2	3.780	184.636	

Significant mean difference (-2.717, P < .001; 95% CI: -3.544.-1.890) was observed in PSQI score according to the year of study. It means that second year students slept more than first year students.Chi square test was analyzed between each component of PSQI, score of PSQI and total score of ESS, according to gender (male and female) and year of study (1st and 2nd year). Influence of year of study and gender on PSQI components, total score of PSQI and ESS are shown in Table-III and IV respectively.

Table-III: Chi-square of the PSQI and its components and ESS with the year of study

Variables	Categories	Year of Study				P Value
		1st year		2nd year		
		n	%	n	%	
Subjective Sleep Quality	Very Good	43	20.2	9	4.2	.000
	Fairly Good	42	19.7	59	27.7	
	Fairly Bad	11	5.2	29	13.6	
	Very Bad	4	1.9	16	7.5	
Sleep Latency	≤ 15 Minutes	24	11.3	28	13.1	.612
	16-30 Minutes	42	19.7	38	17.8	
	31-60 Minutes	22	10.3	30	14.1	
	> 60 Minutes	12	5.6	17	8	
Sleep Duration	> 7 Hours	33	15.5	6	2.8	.000
	6-7 Hours	41	19.2	21	9.9	
	5-6 Hours	19	8.9	42	19.7	
	< 5 Hours	7	3.3	44	20.7	
Habitual Sleep Efficiency	> 85 %	90	42.3	65	30.5	.000
	75-84 %	4	1.9	37	17.4	
	65-74 %	4	1.9	7	3.3	
	< 65 %	2	0.9	4	1.9	
Sleep Disturbances	0	3	1.4	5	2.3	.591
	1-9	79	37.1	84	39.4	
	10-18-4	17	8	20	9.4	
	19-27	4	0.5	4	1.9	
Use of Sleep Medication	Not During the Past Month	93	43.7	95	44.6	.165
	Less Than Once a Week	2	0.9	9	4.2	
	Once Or Twice a Week	4	1.9	6	2.8	
	Three Or More Times A Week	1	0.5	3	1.4	
Daytime Dysfunction	0	20	9.4	22	10.3	.023
	1-2	61	28.6	53	24.9	
	3-4	17	8	25	11.7	
	5-6	2	0.9	13	6.1	
PSQI	Good Sleep quality	83	37.2	49	21.9	.000
	Poor Sleep quality	14	6.3	59	26.5	
	Worst Sleep quality	3	1.3	4	1.8	
ESS	Lower Normal Daytime Sleepiness	9	4	10	0	.000
	Normal Daytime Sleepiness	44	19.7	62	27.8	
	Mild Excessive Daytime Symptoms	32	14.3	15	6.7	
	Moderate Excessive Daytime Symptoms	11	4.9	22	9.9	
	Severe Excessive Daytime Symptoms	5	2.2	13	5.8	

Table-III shows that the subjective sleep quality, the sleep duration, the habitual sleep efficiency and daytime dysfunction had significant association ($P<0.05$) according to the year. Near about one-third of the sample was identified to have bad subjective sleep quality and of them 21.1% were at the 2nd year of study. About more than half of the sample were having <6 hours of sleep and of them 40.7% were studying in 2nd year. Among the 27.3% of the students who were having <84% habitual sleep efficiency, 22.6% belonged to 2nd year. Mild to severe level of daytime dysfunction were noticed in 80.2% of the students and among them 42.7% are from 2nd year of study. In addition, the association between total score of PSQI and year of study differences showed significance of 0.000. Here, out of 35.9% of the study subjects who were having poor to worst sleep quality, 28.3% were from 2nd year.

Table-IV: Association between PSQI total score, Epworth total score and seven components of PSQI with gender of the students.

| Variables | Categories | Year of Study | | | | P Value |
| | | 1st year | | 2nd year | | |
		n	%	n	%	
Subjective Sleep Quality	Very Good	20	9.4	32	15.0	.089
	Fairly Good	34	16.0	67	31.5	
	Fairly Bad	11	5.2	29	13.6	
	Very Bad	7	3.3	12	5.6	
Sleep Latency	≤ 15 Minutes	17	8	35	16.4	.073
	16-30 Minutes	34	16	46	21.6	
	31-60 Minutes	15	7	37	17.4	
	> 60 Minutes	6	2.8	22	10.3	
Sleep Duration	> 7 Hours	18	8.5	21	9.9	.226
	6-7 Hours	20	9.4	42	19.7	
	5-6 Hours	22	10.3	39	18.3	
	< 5 Hours	12	5.6	38	17.8	
Habitual Sleep Efficiency	> 85 %	54	25.4	101	47.4	.000
	75-84 %	15	7	26	12.2	
	65-74 %	2	0.9	9	4.2	
	< 65 %	1	0.5	4	1.9	
Sleep Disturbances	0	2	0.9	6	2.8	.689
	1-9	59	27.7	103	48.4	
	10-18-4	11	5.2	26	12.2	
	19-27	0	0	5	2.3	
Use of Sleep Medication	Not During the Past Month	64	30	124	58.2	.000
	Less Than Once a Week	3	1.4	8	3.8	
	Once Or Twice a Week	5	2.3	5	2.3	
	Three Or More Times A Week	0	0	3	1.4	
Daytime Dysfunction	0	12	5.6	30	14.1	.835
	1-2	43	20.2	70	32.9	
	3-4	13	6.1	29	13.6	
	5-6	4	1.9	11	5.2	
PSQI	Good Sleep quality	49	21.9	83	37.2	.000
	Poor Sleep quality	23	10.3	50	22.4	
	Worst Sleep quality	0	0	6	2.7	
Epworth	Lower Normal Daytime Sleepiness	6	2.7	13	5.8	.869
	Normal Daytime Sleepiness	38	17	67	30.1	
	Mild Excessive Daytime Symptoms	29	13	40	18	
	Moderate Excessive Daytime Symptoms	3	1.3	8	3.6	
	Severe Excessive Daytime Symptoms	3	1.3	15	6.7	

The habitual sleep efficiency and use of sleep medication had significant association (Table-IV). In case of <84% habitual sleep efficiency, out of 26.7 % of the students 8.4% were male and 18.3% were female. Among the 11.2% of students reporting to have used at least one sleep medication per week, 3.7% came out to be male and 7.5% female. In addition, the association between PSQI and gender differences showed significance (P < .001). Here, out of 35.4% of the sample who were having poor to worst sleep quality, only 10.3% were male.

Discussion

This study was designed to assess the sleep pattern and also to identify sleeping difficulties among the pre-clinical students of Armed Forces Medical College. Nearly two-third of the sample was found to be good sleepers and only 8.11 % had severe excessive day time sleepiness.

Sleep Habits: This study revealed that more than one-third of the sample were poor sleepers. This finding is in consistence with other studies[6]. A study in Bangladesh observed that overall prevalence of poor sleep quality was 66.6% and duration of bed time social media use was highly associated with poor sleep quality[7]. It was also evident that 58.02 % sample slept for a minimum of 5 to 7 hours[8]. Hannah et al also reported that 25 % of the college students were getting less than 6.5 hours of sleep at night[9]. The National Sleep Foundation recommends 7-9 hours of sleep for the 18-25 years age group of young adults of whom many are university level students[10]. Regarding sleep latency, this study revealed that two-third of the sample had sleep latency of up to 30 minutes. A study conducted by Forquer et al noted that 67 % of the study subjects took less than 30 minutes to fall asleep[11]. The study by Anjum et al which compared sleep patterns of medical and non-medical students noted that medical students had more disturbed sleep pattern than their non-medical counterparts[12]. A similar study by Waqas et al observed excessive daytime sleepiness in 35.7% of the medical students[13].

Gender Variation: The present study indicates that in comparison to the male counter parts the female students had poor to worst sleep quality, less habitual sleep efficiency and also reported frequent use of sleep medication. Similar findings were observed in a Bangladeshi study which found that female had a 4.1 times higher risk of having poor sleep quality and females were highly prone to suffer from mental trauma in contrast to their male counterparts[7]. These findings are in contrast to the observation made by Alqarni et al[6]. Similar findings were noted by a study conducted in Lebanon and it observed that male students were experiencing more sleeping difficulties than their female counterparts; indicating that testosterone may be responsible for poor sleep quality in men by reducing sleep time and including sleep apnea[14].

Use of Sleep Medication: More than ten percent of the study subjects admitted the use of sleep inducing medication at least once per week; among them female were more in number than male. A study conducted by Lemma et al revealed similar findings[15]. In another study conducted on medical students, it was found that 10% of the students admitted use of sleeping pills and of them 76% reported insomnia as the reason for using sleep medication[13].

Year of Study & Academic Stress: When we compared with 1st year, the 2nd year students had bad subjective sleep quality, less sleep duration and frequent daytime dysfunction. During the study period the 2nd year students were appearing in the Professional Examination so the parameters indicating poor sleep pattern in those students may be attributable to the stress associated with the compliance of busy examination schedule. Abnormal sleep practices in students might be due to fear of not being able to cover the day's academic load during examination[8].

Conclusion

Insufficient or poor sleep quality is associated with physical and emotional distress, decreased cognitive ability and poor academic performance and a host of behavioral problems. Mindfulness based stress reduction programs including group therapy, educational interventions through seminars, workshops and physical training sessions resulted in mental well-being and improved quality of life in medical students. Large scale studies for assessing sleep pattern and detecting sleeping difficulties among medical students of different universities must be conducted for ensuring quality sleep and thus sound health for the future care-givers.

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