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EGYPTIAN ACADEMIC JOURNAL OF
BIOLOGICAL SCIENCES
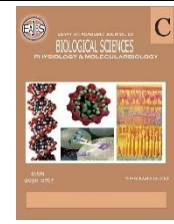## PHYSIOLOGY & MOLECULARBIOLOGY
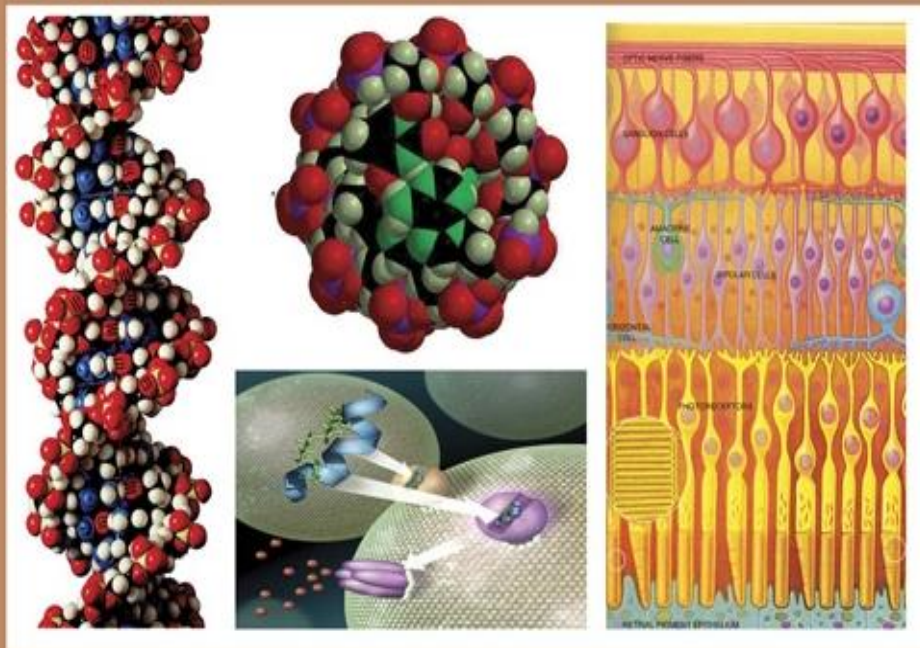
Vol. 14 No. 2 (2022)

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Assessment of Sleep Quality and Its Effects on Academic Performance Among the First Year MBBS Medical Students in A Tertiary Care Centre, TamilNadu.

Aghil R. B.[1,] Kanchana Bobby S.[2], KalpanaRani U.[3], and Saraswathi P. V.

1- Department of Physiology, Government Medical College and ESIC Hospital, Coimbatore, Tamil Nadu**.**
2- Department of Physiology, Coimbatore Medical College and Hospital, Coimbatore, Tamil Nadu**.**
3- Department of Physiology, Government Theni Medical College and Hospital, Theni, Tamil Nadu.
4- Government Erode Medical College, Erode, Tamil Nadu.
 *E. Mail: rbaghil211@gmail.com - kanchanambbs04@gmail.com - varshrosh10@gmail.com - saraswathivenkiduswamy@gmail.com

ARTICLE INFO

ABSTRACT

Background: The Sleep-Wake Cycle driven by Circadian Rhythm is an important physiological happening in our body. Medical students are having a great academic load which could lead to their poor quality of sleep. Medical students especially First MBBS students suffer from sleep deprivation. It has been found that the Sleep-Wake Cycle of medical students is characterized by delayed onset of sleep, reduced sleep duration, and excessive daytime sleepiness. These kinds of sleep disturbances will affect their Academic performance. **Objectives:** To find out the Prevalence of Sleep disorders among First MBBS medical students and to find its relationship with their academic performance. **Methodology:**It is a cross-sectional study done among the 100 First year MBBS Students during the period of 2020-2021. After obtaining the Institutional Ethical Committee Clearance their demographic details were obtained. The sleep quality was assessed by the Pittsburg sleep quality index (PSQI) Scale. The Academic performance was assessed by finding out the average of their internal assessment marks conducted by the 3 first-year departments over the past month. Data was entered in MS excel and analysis was done in SPSS 23 software. P value <0.05 is considered to be significant. **Results:**In our study, around 66% of the students had poor quality sleep. It was found that there was a significant relationship between sleep quality and academic performance. **Conclusion:**Identification and early intervention of sleep disorders among First MBBS medical students will help in improving their academic performances.

INTRODUCTION

The sleep-wake cycle driven by circadian rhythm is an important physiological happening in our body. This is influenced by various factors such as work schedule, habits and stress etc (Abdulghani HM *et al.,*2012). A good sleep during night time is essential for the physical and mental well-being of an individual (Giri P *et al.,*2013).

Sleep has a great influence on the learning ability and memory of medical students (Anim MT *et al.,*2013). Consolidation of memory is a conversion of short-term memory to long-term memory that happens during deep sleep. Medical students are at risk of developing various sleep disorders due to their high academic stress (Alsaggaf MA *et al.,*2016) (Yazdi Z *et al.,*2016). It has been found that the sleep-wake cycle of medical students is characterized by delayed onset of sleep, reduced sleep duration, and excessive daytime sleepiness (Shad *et al.,*2015) (Waqas A. *et al.,* 2015). These kind of sleep disturbances will affect their academic performance (Alaalgeri KM *et al.,*2017) (Abdulghani HM *et al.,*2012). Hence this study was planned to analyze the sleep quality of first-year MBBS medical students and to find out its impact on their academic performance.

Objectives:
1. To analyze the Sleep patterns of First-year MBBS medical students.
2. To correlate sleep quality with their academic performance.

MATERIALS AND METHODS

Study Setting: This cross-sectional study was conducted in the Department of Physiology, ESIC Medical College and, Coimbatore which is a tertiary care centre. The study was done for a period of one year, from August 2020 to August 2021.

Inclusion Criteria: All the first-year MBBS students without pre-existing medical illness who intended to participate in the study were included after obtaining written consent from them. The final sample obtained was 100(response rate was 80%).

Exclusion Criteria: Students with any medical illness and on drugs were excluded from the study.

Data Collection:

Ethical committee clearance was obtained from Institutional Ethical Committee. After obtaining written consent the students were asked to fill up the semi-structured questionnaire.

The following parameters were documented in the study proforma.

1. Personal particulars like Name, Age, Gender, and residence were obtained through the semi-structured questionnaire.

2. Sleep quality was assessed based on the Pittsburg sleep quality index (PSQI) Scale. It analyzes the sleeping pattern under 7 domains including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, using medication for sleep and daytime dysfunctions. The global score varies from 0 to 21. A lower score of PSQI <5 indicates a good quality of sleep (Smyth C et al.,2021). PSQI is a self-reporting questionnaire that assesses the sleep quality of an individual over the period of one month (Buysse D.J. *et al.,* 1989).

3. Students' academic performance was assessed from the average of their internal assessment marks conducted by the 3 first-year departments (Anatomy, Physiology and Biochemistry).

Statistical Analysis:

After collecting the data, it was entered in MS excel Windows10. Statistical analysis was done in SPSS 23. Continuous data were expressed in terms of Mean ± Standard deviation and Categorical variables were expressed in terms of numbers(percentages). Quantitative data were analyzed using the student t-test and Qualitative data using Chi-square test. P value of <0.05 is considered significant.

RESULTS

A total of 100 students participated in the study. Among the study group, the female preponderance was observed as there were 60 girls and 40 boys. The gender distribution of the study group is depicted in Figure 1. The medical students were of mean age of 18.9+/- 1.1 years. Anthropometric measurements were done and their average BMI was 22.6(normal BMI score). Among the medical students, 71% had a normal BMI, 17% were underweight, 11% were overweight and 1% had BMI in the Obese range.
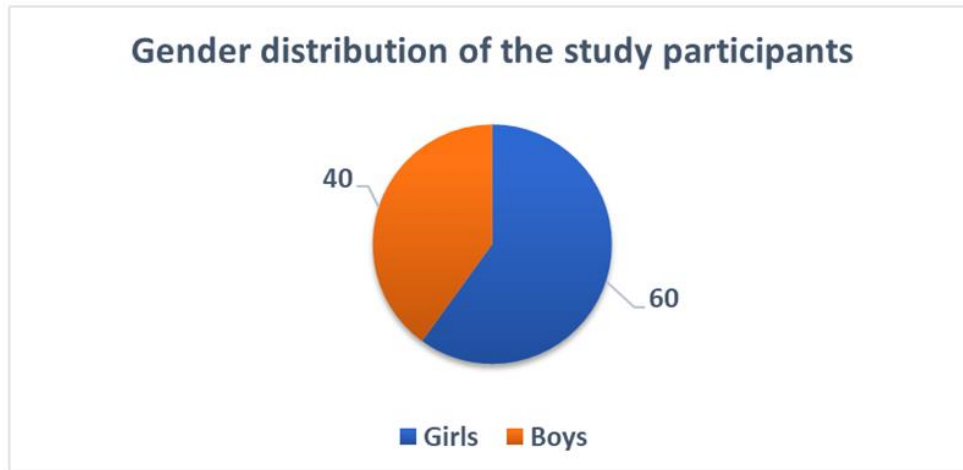
Fig. 1: Gender distribution of study group.

The sleep latency and duration varied from person to person. The majority of the students around 64% of them went to bed between 10 pm to 12 am and 21% went to bed after 12 am (midnight). Among the study population, 65% of them slept within 15 min whereas 8% of them took more than 30 minutes to fall asleep. While analyzing their duration of sleep, 65% of them slept for less than 6 hours and only 35 % of them slept for more than 6 hours.

Table 1: shows the summarized results for each question of the sleep habits questionnaire**.**

Parameter	Frequency distribution
Time to bed	
Before 10pm	3
10 to 11pm	41
11 to12 am	35
After 12 am	21
Time to wake up	
Before 5am	18
5 to 6am	25
6 to7 am	48
After 7 am	9
Sleep latency	
< 15 min	60
15 to 30 min	31
>30 to 60 min	7
>60 min	2
Subjective sleep quality	
Very good	17
Fairly good	66
Fairly bad	15
Very bad	2
Feeling tired when waking up	11
Feeling daytime sleepiness during class time	23
Daytime Dysfunction	
Never during the past 1 month	69
Less than once a week	16
Once or twice a week	12
Thrice or more times a week	3

Sleep quality was assessed using the standard PQSI Score. The study group had a Global PQSI score of 5.14 (>5 indicates poor quality of sleep). Among them 66% had PQSI score above 5 and 34% had a score below 5 (good quality of sleep) indicating that the majority of medical students had poor quality of sleep. The quality of sleep had no difference among male and female medical students. The PQSI Score of medical students is shown in Figure 2**.**
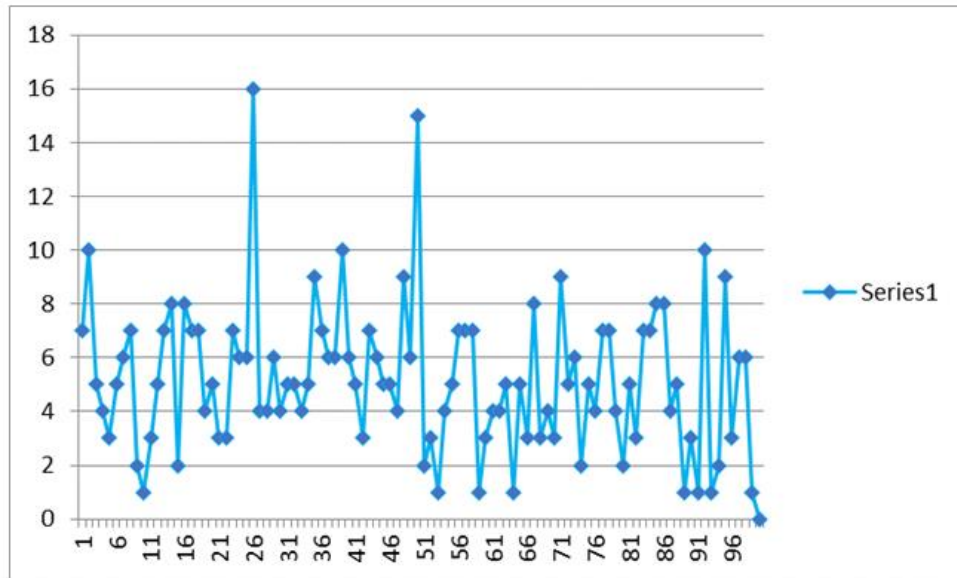

Fig. 2: PQSI Score of the study group.

Academic performance was assessed by finding out the average internal assessment marks conducted by 3 first-year departments over the past month. The average mark obtained by the study group was 25.24. Among them, 61% had a good academic performance and 39% had a bad academic performance as depicted in Figure 3.
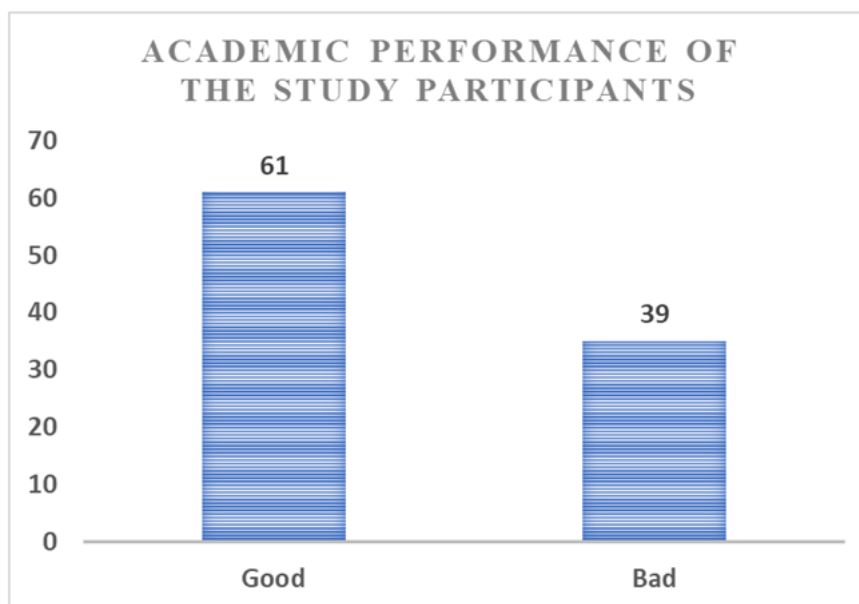

Fig. 3: Academic performance of study group.

While comparing sleep quality and academic performance it was found that there was a significant relationship between sleep quality and academic performance (P value<0.005). Those with poor PQSI scores had poor academic scores which means that sleep quality greatly affects their academic performance. Table 2 shows the significant relationship between bad sleep quality and bad academic performance.

Table 2 Relation between PQSI Score and Academic Performance.

Sleep quality PQSI Score	Academic performance		Total	P value
	Bad	Good		
>5 Bad	36	30	66	<0.001
<5 Good	3	31	34	<0.001
Total	39	61	100	

DISCUSSION

Sleep quality has a great influence on the learning ability and memory of students. Hence this study was conducted to assess the sleep quality of medical students and its impact on their academic performance. It was found that 66% of the medical students had poor quality sleep. The majority of them went to bed by 10 to 12 am. Among the study group, 65% of them had sleep latency of less than 15 min. However, their total sleeping hours were found to be less than 6 hours. Our findings showed that there was a significant influence between sleep quality and academic performance, Students with bad sleep quality had a poor academic performance.

Poor quality of sleep was present among almost two–thirds (66%) of our study population with no sex difference (Zailinawati AH *et al.,*2009) (Machado *et al.,*2015). These findings are much higher than obtained by similar studies conducted among medical students in Malaysia[12] (41.8%) and Saudi Arabia (30%) (Alsaggaf MA *et al.,*2016). In a study done in Colombia[14](79.8%) the prevalence of poor sleep quality among medical students was found to be much higher than in our study.

The majority of students went to bed around 10- 12 am in our study. This is similar to several studies conducted among medical students where around 60 -70% went to bed at the same time as our study (Henry JL *et al.,*2019) (Schlarb A *et al.,*2012). As medical students are having higher academic load they went to bed by midnight. Though they went to bed late students had a better sleep latency as 65% of them slept within 15 minutes. Similar sleep latencies were found in a study conducted among German medical undergraduates (Schlarb A *et al.,*2017). It has been stated in the study that this latency among medical students is comparatively longer than among other university students (8.2minutes) and the general population (7 minutes) (Bonnet MH *et al.,*2005). This difference has been attributed to examination fear and higher academic stress among medical students.

It was found in our study that 65% of them had a sleep duration of fewer than 6 hours. It is similar to other studies which have documented suboptimal sleep duration of (less than 7 to 8 hours) among medical students (Majid S *et al.,*2006) (Carkadon MA *et al.,*2005). PQSI score assesses the sleep quality under 7domains, using this it is found that the majority of them had a poor quality of sleep. Various other studies have demonstrated similar poor quality of sleep among medical students.

Good sleep is essential for physical and mental well-being. Adequate sleep is necessary for consistent cognitive and psychomotor performance (Demir G *et al.,* 2017) (Giri P *et al.,*2013). Recently, a meta-analytic review of several studies conducted among different populations has also proved a significant correlation between sleep disturbances and cognitive functioning (Lowe CJ *et al.,*2017). In our study, it was

found that those with poor quality of sleep had a poor academic performance. This is similar to several studies which have found that there is a directly proportional correlation between poor sleeping patterns and poor academic performance (Shilo L *et al.,*2002) (Gaultney JF *et al.,*2010). Medical students are having high academic load when compared to other college students. Regular reading habits, active involvement in self-directed learning, symposiums, seminars and case discussions will help them combat academic stress with ease.

It has been found in a recent study done by Mazar et al that sleep quality was poor among medical students which they attributed to poor sleep hygiene among them. They have tried an educational intervention that increased the sleep knowledge of medical students but failed to improve their sleep quality (Mazar D *et al.,* 2021).

Conclusion

Medical undergraduates are at risk of developing a poor quality of sleep. Poor sleep quality affects their academic performance. This may be attributed to high academic stress among medical students and the overuse of gadgets. Hence it is essential to have regular counselling sessions for medical students to improve their mental well-being.

Limitations

It is a very significant study but the limitation is that it was conducted in a small group. A large study should be conducted to find out the various other factors associated with poor sleep quality among medical students.

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