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Original Research Article

Role of sleep on alertness among medical students from a tertiary care hospital, Thrissur district, Kerala: cross-sectional study

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ABSTRACT

Background: Alertness and ability to perform vary as functions of homeostatic factors such as sleep duration, sleep quality, and time awake. As far as medical students are concerned, alertness during the lectures is important due to their vast curriculum, and their alertness aids in the development of better doctors in their future. Though the importance of sleep is known, there is scarcity of studies on how adequate sleep among medical students affects their alertness during lecture classes. The aim was to study effect of sleep duration on alertness among medical students from a tertiary care hospital in Thrissur district, Kerala.
Methods: A cross-sectional study was conducted among undergraduate medical students and alertness was assessed following afternoon lecture classes, using a Stanford sleepiness scale questionnaire. The sample size was calculated with a formula $4PQ/d^2$ and total 202 undergraduate students were included. The data regarding overnight sleep duration and post lunch nap was also collected using a semi-structured questionnaire.
Results: Based on stanford sleepiness scale 66.3% of students were alert and responsive, 29.2% were not alert and only 4.5% of students were sleepy following afternoon lecture classes. Out of total 202 undergraduate students 43.6% of them had poor overnight sleep and only 32.7% had taken post lunch nap. There was a statistically significant association between alertness and post lunch nap (p=0.01).
Conclusions: Those students who had good overnight sleep and post lunch nap had better alertness during lecture classes.

Keywords: Alertness, Nap, Medical students, Sleep duration

INTRODUCTION

The physiologic and cognitive functions in human beings vary with 24-hour or circadian rhythms. The Circadian rhythms are physical, mental and behavioral changes that follow a daily cycle. All human beings respond primarily to light and darkness, sleeping at night and being awake during day is an example of light related circadian rhythm. The most obvious circadian rhythm is that of sleep and wakefulness; more subtle examples include those expressed in alertness and performance levels. Although such circadian rhythms are endogenous, their expression and timing are strongly influenced by the environment. Alertness and ability to function also vary as functions of homeostatic factors such as sleep duration, sleep quality, and time awake. Acute and chronic sleep loss, whether partial or complete, substantially impairs our physical, cognitive, and emotional functioning.[1,2]

Food, water, and air are the basic physiological requirements needed for a human being for survival.

Though often ignored or underestimated, sleep is also a basic human biological need and is equally important to life for achieving optimal performance and alertness. Sleep is not elective; it is not an option, to be obtained when convenient. The CDC recommends that an adult human physiologically require about 8 hours of sleep; with a range of around 7 to 9 hours. Overwhelming scientific data clearly shows that sleep loss and circadian disruption can impair performance, degrade health, and disturb mood.[2]Many professors often complain that students are least alert during afternoon lecture classes. Studies have found that sleep tendency increases and subjective alertness and performance decrease in the afternoon, compared to both morning and evening hours.[3] As far as medical students are concerned, alertness during the lectures is important due to their vast curriculum and aids them in their future medical practice. Previous studies from different part of world had shown that daytime sleepiness is high among medical students.[3] Many researchers have also found that short naps of 15 minutes during the day improve alertness during mid afternoon.[4-6]

Though the importance of sleep is known, it is not known whether medical students have adequate sleep and how it affects their alertness during lectures. Only few studies have analyzed relationship between sleep and alertness among medical students during an afternoon lecture class. Hence the present study was undertaken to study the effect of overnight sleep and post lunch nap duration on alertness among medical students during lectures.

Aim

To study effect of sleep duration on alertness among medical students from a tertiary care hospital in Thrissur district, Kerala.

Objectives

- To assess the overnight sleep duration, and post lunch nap among undergraduate medical students using self administered questionnaire.
- To assess the alertness among undergraduate medical students using Stanford sleepiness scale.
- To find out the association between sleep duration and alertness among undergraduate medical students.

METHODS

A cross-sectional study was undertaken among undergraduate medical students of Amala Institute of medical sciences, Thrissur, Kerala from September 2018 to November 2018. The sample size was calculated using the formula $4PQ/d^2$ taking P as proportion of medical students taking 6-7hrs of overnight sleep from previous study done in Maharashtra.[3] The calculated minimum sample size was 194. All 2nd and 3rd year undergraduate medical students attending afternoon lecture classes who had given consent were included in the study and those students who had acute and chronic medical illness, or those who are taking drugs for sleepiness were excluded. Data was collected using a self administered semi-structured questionnaire. The questionnaire was given to undergraduate students at the end of afternoon lecture classes and instructions were given for filling. The questionnaire contain questions for assessing alertness, overnight sleep duration, whether student had taken post lunch nap and duration of nap. Alertness of the students was assessed by Stanford sleepiness scale.[7,8] The Stanford sleepiness scale degree rating indicates that 1 is "Feeling active, vital, alert, or wide awake." As the number on the scale gets higher, the degree of sleepiness rises as well, with a 7 indicating "No longer fighting sleep, sleep onset soon; having dream-like thoughts," and "Asleep" indicated by an "X". The scores were calculated for each individual. The degree of alertness was classified into 3 category based on the above score. Those students who got the score $\leq$3 were considered as alert and responsive and those who had scored between 4-6 were not alert, sleep onset started group and those with score 7-X were considered as sleepy. The overnight sleep duration were classified into two group those students who are sleeping $\geq$7 hrs were considered as average sleep and those who are sleeping <7 hrs poor sleep. Data was entered in Microsoft excel and appropriate statistical tests were used and analyzed using SPSS software version 23.

RESULTS

A total of 202 undergraduate medical students were included in the study. The mean and standard deviation of age of students were 20.87±0.86. With minimum age 19 and maximum 24 yrs. There were 101 females and 101 males. Based on Stanford sleepiness scale 66.3% students were alert and responsive, 29.2% were not alert and sleep onset started and only 4.5% were sleepy (Figure 1). On assessing overnight sleep duration, 56.4% of students had average sleep whereas 43.6% had poor overnight sleep duration (Figure 2). The average overnight sleep duration of medical students were 6.82±0.92 with males having more overnight sleep duration 6.95±0.853 and females with 6.69±0.987.

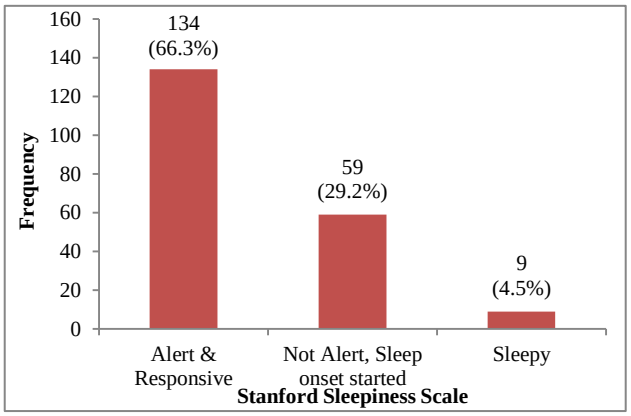

Figure 1: Distribution of students according to degree of sleepiness.

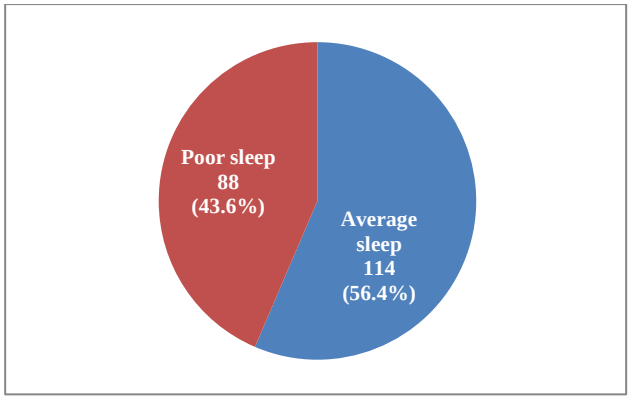

Figure 2: Distribution of students according to overnight sleep duration.

Out of 202 medical students only 66 (32.7%) of them were taking regular post lunch nap. Among them, majority 54 (81.8%) of them were taking 10-20 minutes of nap, after lunch and 12 (18.2%) of them were taking more than 20 minutes.

Out of total 134 students who were alert and responsive, more than half of them 80 (59.7%) had average duration of overnight sleep and out of total 9 students who were sleepy, majority 5 (55.6%) of them had overnight sleep less than 7 hr duration. But this difference was not statistically significant (p=0.17) (Table 1). Out of total 66 students who had taken nap, majority 51 (77.3%) of them were alert and responsive during lecture classes and only 1 (1.6%) student was sleepy and this difference was statistically significant (p=0.01) (Table 2).

Table 1: Association between degree of alertness and overnight sleep duration.

Degree of Alertness	Overnight sleep		Total	Statistical significance
	Average sleep	Poor sleep		
	N (%)	N (%)	N (%)	
Alert & Responsive	80 (59.7)	54 (40.3)	134 (100)	Fischer 's exact value-1.83; p=0.17
Not Alert, Sleep onset started	30 (50.8)	29 (49.2)	59 (100)	
Sleepy	4 (44.4)	5 (55.6)	9 (100)	
Total	114	88	202	

Table 2: Association between degree of alertness and nap

Degree of alertness	Nap		Total	Statistical significance
	Not taken nap	Nap taken		
	N (%)	N (%)		
Alert & Responsive	83 (61)	51 (77.3)	134	Fischer 's exact value-5.77; p=0.01
Not Alert, Sleep onset started	45 (33.1)	14 (21.2)	59	
Sleepy	8 (5.9)	1 (1.6)	9	
Total	136 (100)	66 (100)	202	

DISCUSSION

Disorders related to sleep are an issue of major concern and has long-term social and demographic consequences. Still, only few studies had been conducted to assess the sleep habits of medical students. A study conducted by Giri from Maharashtra, has found that, sleep duration of less than 6 hours was seen in 30% of postgraduates followed by 16% of undergraduates.[3] And daytime sleepiness was most commonly seen in postgraduates. In this study, out of 150 medical students, 17.3% students had abnormal levels of daytime sleepiness while 13.3% were border line. Also, it was found that Sleep quality in females was better than the males. Whereas in the present study, 56.4% of students had average sleep and 3.6% had poor sleep. With less sleep duration greater daytime sleepiness is reported in previous studies, in the present study too it is found that 55.6% of those students who were sleepy, had a poor sleep previous night.

Out of total 66 students who had taken nap, majority 51 (77.3%) of them were alert and responsive during lecture classes and only 1 (1.6%) student was sleepy. Previous study conducted by Takahasi indicates that a 15-min nap after lunch maintains subsequent alertness and performance even in subjects who sleep for only 4 hours the night before.[6] Also, study by Htwe on Napping and its effects upon medical student's ability to concentrate has found that napping does have a significant positive effect on student's ability to concentrate.[9]

CONCLUSION

The present study reveals that those students who had good overnight sleep and post lunch NAP had better alertness during afternoon lecture classes. Hence the medical students have to sleep for the recommended duration of young adults which improves their academic performance. The post lunch NAP also found to be effective in improving alertness during afternoon lecture classes.

Limitation

Alertness is assessed during afternoon lecture classes and it also depends on so many other factors like students interest on subject, faculty teaching the subject etc. Sleep problems may be worse than those reported in the study, as students may give socially desirable answers such as not having sleep problems. Thus, this study may be limited by under reporting.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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