Study to determine prevalence of poor sleep quality and its correlation with sleep hygiene practices among medical students

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ABSTRACT

Background: Sleep is essential to optimize physical, emotional, and cognitive functioning of the body. Sleep quality is a critical dimension of both physical and mental health. Poor sleep quality among medical students may have both academic and health consequences. **Aims and Objectives:** The objectives of this study were to assess the subjective sleep quality and determine the prevalence of poor sleep quality among medical students. The study also aimed to evaluate their sleep hygiene practices and determine its correlation with sleep quality. **Materials and Methods:** A cross-sectional study was done in 120 medical students after receiving Institutional Ethical Committee approval and informed consent from participants. They were subjected to self-administered questionnaires to document socio-demographic details and to assess sleep quality using Pittsburgh Sleep Quality Index (PSQI) and sleep hygiene practices using Sleep Hygiene Index (SHI). The data were subjected to statistical analysis. **Results:** The study showed that the prevalence of poor sleep quality among medical students was 49.16%. The mean $\pm$ SD global score of PSQI was was 5.5 ± 2.3. Chi-square test showed that there was no statistically significant difference in sleep quality between males and females. Ninety (75%) students had higher values of SHI (>16). Pearson's correlation showed the positive correlation between higher global scores of PSQI with higher SHI scores to be statistically significant ($P < 0.01$). **Conclusion:** There is prevalence of poor sleep quality among medical students, which is significantly associated with inadequate sleep hygiene. This needs to be addressed by promoting optimal sleep hygiene practices.

Keywords: Medical students; Sleep hygiene practices; Sleep quality

INTRODUCTION

Sleep, a basic and universal human behavior is an active and metabolically distinct state, regulated by homeostatic processes and circadian rhythm of the body. Sleep is essential to optimize physical, emotional, and cognitive functioning of the body. The cumulative long-term effects of sleep deprivation and disorders have been associated with an increased risk of hypertension, diabetes, obesity, and depression leading to various health consequences. Sleep has emerged as a significant domain of global health for its bidirectional relationship with diseases and also for health promotion.

Sleep quality is a critical dimension of both physical and mental health. It includes objective as well as subjective aspects of sleep such as depth or restfulness of sleep.[1] Sleep hygiene practices are one of the important variables that affect sleep quality. They are a collection of behaviors and environmental conditions[2] that aim to ensure a restorative and good quality sleep and to avoid or to treat certain sleep disorders.

The changing lifestyle in the modern society is leading to a deviation in natural sleep-wake pattern making the burden of sleep disorders and poor sleep quality an emerging public health issue, especially in young adults due to increased use of various technological devices

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before sleeping hours, thus creating conflict with body's circadian rhythms.

Sleep quality in students is significantly associated with academic performance, physical and psychological health.[3] Medical students are a vulnerable group to poor sleep. Their poor sleep quality may be attributed to meet the requirements of extended study years, increased academic obligations, clinical duties, emotionally challenging work, staying away from family and examination anxiety. The prevalence of sleep disturbances has been reported high in medical students.[4] This raises concerns as medical students require high level cognitive performance at critical times.

Most of the earlier studies have been done in other parts of the world. The literature on sleep quality in medical students is limited in South India. The prevalence of poor sleep quality among medical students will have measurable negative consequences on their academic performance and the quality of patient care. Hence determining prevalence of poor sleep quality among medical students is an essential step to identify the magnitude of the problem and thereby managing it. It is also necessary to assess inadequate sleep hygiene practices among them, which is an important variable causing poor sleep quality.

Aims and objectives

The aim of the study was to assess the subjective sleep quality and determine the prevalence of poor sleep quality among medical students. The study also aimed to evaluate their sleep hygiene practices and determine its correlation with sleep quality.

MATERIALS AND METHODS

A cross-sectional study was done in 120 first year undergraduate medical students of a Medical College in the state of Telangana in India. The Institutional Ethical Committee approval was obtained before the study (Reference number - BMC/IEC/2019/06). Medical students, both males and females in the age group of 18–25 years, who gave consent voluntarily to participate in the study were included in the study. Those with any chronic illness or medical/psychiatric/sleep disorders were excluded from the study. They were subjected to self-administered questionnaires to document socio-demographic details and to assess sleep quality using Pittsburgh Sleep Quality Index (PSQI) and sleep hygiene practices using Sleep Hygiene Index (SHI).

The PSQI is the gold standard questionnaire and effective tool for assessing subjective sleep quality and has been validated in both clinical populations[5] and non-clinical populations, including college and graduate students.[6] It differentiates poor from good sleep quality by measuring seven components – subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications and daytime dysfunction over the last month. Participants responses are scored on a Likert scale, ranging from 0 (no difficulty) to 3 (severe difficulty), providing a global sleep quality score. Higher scores (more than 5) indicates poorer sleep quality.

The SHI is a 13 item self-report measure designed to assess the practice of sleep hygiene behaviors. It includes questions regarding taking day time naps, going to bed at different times from day to day, getting out of bed at different times from day to day, doing exercise or use of alcohol, tobacco, or caffeine before bedtime, using electronic devices before bedtime, going to bed feeling stressed or angry, using bed for activities other than sleeping, having an uncomfortable bed or bedroom, doing important work before bedtime, and think, plan, or worry while in bed. Each item is rated on a 5-point scale ranging from 0 (never) to 4 (always). Total scores range from 0 to 52, with a higher score representing poorer sleep hygiene. It has shown adequate reliability and validity[7] and is developed from the diagnostic criteria for inadequate sleep hygiene as defined by the International Classification of Sleep Disorders.[8] Psychometric evaluation at various cutoff scores of SHI has shown that a total score of 16 had the best sensitivity and specificity to identify students who were categorized as experiencing poor sleep quality, according to the PSQI.[9]

Statistical analysis

All responses were considered anonymous and only aggregate responses are reported. Data were tabulated and analyzed using Statistical Package for the Social Sciences software version 21 for windows. Descriptive statistics were done to analyze quantitative data. Chi-square test was used to compare categorical variables. Pearson's correlation coefficient was used to assess correlation between sleep quality and sleep hygiene index. P < 0.01 were considered statistically significant.

RESULTS

The study showed that the prevalence of poor sleep quality (PSQI>5) among medical students was 49.16% (Figure 1). Chi-square test showed that there was no statistically significant difference in sleep quality between males and females (P>0.01). The mean global score of PSQI was 5.5 ± 2.3 with differential contribution from each of the seven components (Table 1). The distribution of sleep hygiene scores shows that ninety (75%) students have higher values of SHI (Score>16) (Table 2). There was no

major difference in prevalence of inadequate sleep hygiene between males (75.6%) and females (74.6%). Higher global scores of PSQI correlated positively with higher SHI scores. Pearson's correlation showed this correlation to be statistically significant (P<0.01) (Table 3).

DISCUSSION

Sleep is a physiological process necessary to orchestrate and recalibrate various functions of the body. Sleep deprivation leads to daytime sleepiness and decline in attention and efficiency. Prior studies have established association of poor sleep quality and sleep deprivation with various medical disorders, metabolic syndrome, endocrine disorders, psychiatric illnesses, premature mortality and morbidity.[10]

According to Džaferović and Ulen, there is a negative correlation between poor sleep quality and academic performance.[11] It is important to address this problem in medical students a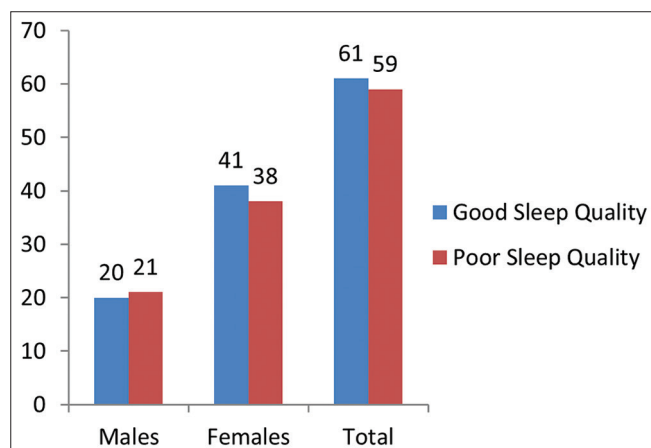s sleep deprivation may affect multiple distinct cognitive processes[12] and also lead to poor academic performance and increased medical errors.[13]

There are limited studies on sleep quality among medical students in South India. This study was done to assess sleep quality and evaluate its correlation with sleep hygiene practices among medical students.

The study showed that the prevalence of poor sleep quality (PSQI>5) among medical students was 49.16% (Figure 1). The findings are similar to studies done in other parts of the world.[14,15] Findings from a comparative study done by Palatty et al., have shown higher prevalence of poor sleep quality among medical students compared to non-medical students, attributing it to differences in academic burden and lifestyles.[16]

The mean global score of PSQI was 5.5±2.3 (Table 1). Among the seven components, mean scores of components 1 (subjective sleep quality), 2 (sleep latency), 3 (sleep duration), 5 (sleep disturbances) and 7 (daytime dysfunction) were higher compared to components 4 (habitual sleep efficiency) and 6 (use of sleeping medication), suggesting their greater impact on global score.

Pearson's Chi-square test showed that there was no statistically significant difference in sleep quality between males and females (P>0.01), which is consistent with a study done by Rezaei et al.[17]

Higher scores of SHI are used in most of the studies to reflect inadequate sleep hygiene practices as this questionnaire has no cut off score. However, in our study, we have considered psychometric evaluation done by Seun-Fadipe et al., at various cutoff scores of SHI, which has shown that a total score of 16 had the best sensitivity and specificity to identify students who were categorized as experiencing poor sleep quality, according to the PSQI.[9]

Figure 1: Graphical representation of prevalence of poor sleep quality among medical students based on gender

Table 1: Mean±SD of scores of seven components and global score of PSQI

	PSQI-1	PSQI-2	PSQI-3	PSQI-4	PSQI-5	PSQI-6	PSQI-7	Global Score
Mean±SD	1±0.59	0.97±0.89	1.22±0.80	0±0	1.08±0.55	0.08±0.40	1.14±0.85	5.50±2.30

PSQI: Pittsburgh Sleep Quality Index

Table 2: Distribution of scores of SHI from lower to higher values among medical students

	SHI								Total
	0–5	6–10	11–15	16–20	21–25	26–30	31–35	41–45	
Gender									
F	3	5	17	28	20	5	1	0	79
M	3	6	7	8	9	5	2	1	41
Total	6	11	24	36	29	10	3	1	120

SHI: Sleep Hygiene Index

Table 3: Pearson's correlation coefficient showing statistically significant correlation between PSQI and SHI among medical students

Correlations	PSQI	SHI
Spearman's rho		
PSQI		
Correlation Coefficient	1.000	0.436**
Sig. (2-tailed)	.	0.000
N	120	120
SHI		
Correlation Coefficient	0.436**	1.000
Sig. (2-tailed)	0.000	.
N	120	120

**Correlation is significant at the 0.01 level (2-tailed). PSQI: Pittsburgh Sleep Quality Index, SHI: Sleep Hygiene Index

The distribution of sleep hygiene based on scores shows that about 90 (75%) students have higher values of SHI (Score>16) (Table 2). There was no major difference in prevalence of inadequate sleep hygiene between males (75.6%) and females (74.6%).

Higher global scores of PSQI indicating poor sleep quality correlated positively with higher SHI scores, which reflect inadequate sleep hygiene practices. Pearson's correlation showed this correlation to be statistically significant ($P<0.01$) (Table 3). These findings suggest that inadequate sleep hygiene practices and lifestyle behaviors are the major factors associated with poor sleep quality. Other studies have also demonstrated a significant association between poor sleep hygiene practices and poor sleep.[7]

Although the impact of poor sleep on health and academic performance is well documented, the students often ignore the possible consequences. Furthermore inspite of increase in awareness of benefits of sleep hygiene, it is still not translated into practice by all. The high prevalence of poor sleep quality among medical students is a matter of concern for medical educationists and medical professionals. The study findings are reinforcing the significance of addressing this problem.

The study would recommend the need for policies to screen for poor sleep quality for its early detection and to evaluate factors responsible for it among medical students. Measures need to be taken to address the factors or components such as sleep duration and daytime dysfunction, which are contributing more to the global scores of sleep quality.

The results of the study would emphasize on promoting sleep hygiene practices. Optimal sleep hygiene includes behavioral and environmental practices such as maintaining consistent bed-on and bed-off times, encouraging a comfortable bed and sleeping environment, regular exercise, minimizing daytime napping, avoiding caffeinated beverages or stimulants prior to bedtime and avoiding emotionally and cognitively stimulating activities before bedtime.[18,19] Emphasis also needs to be given on their public health utility as recommended by Irish et al.[20]

Medical students also need to be educated about the significance of sleep as a determinant of health and the negative consequences of poor sleep quality. Timely intervention is essential to decrease the burden of consequences. The findings of our study would recommend curricular reforms with inclusion of sleep education, sleep hygiene, stress management and time management programs in curriculum to promote good quality sleep in medical students.

The study also has significance during current times where medical students have become more vulnerable to emotional challenges due to competitive field and changing health scenarios. Good sleep quality would develop their psychological health and thereby give them the ability to cope with these challenges. Recommendations to establish academic counseling centres that focus on improving students' study skills and coping with their stressful environment have also been done in a study done by Almojali et al.[21]

Considering the significance of the topic, it is necessary to continue research on this topic in different regions and cultures. The findings of the study may form a basis and reference for future research in this direction.

Limitations of the study

The limitations of the study are that it was conducted in first year medical students and the results may vary in higher phases of course due to differences in the academic requirements and adaptations to the curriculum. Including confounders for sleep hygiene such as stress for further evaluation needs to be done. The study may be conducted on a larger scale to know the trends in general.

CONCLUSION

The prevalence of poor sleep quality is high among medical students, which is significantly associated with inadequate sleep hygiene. This needs to be addressed by evaluating sleep quality and sleep hygiene practices among them at an early stage to prevent long term health consequences. There is also a need to emphasize on optimal sleep hygiene practices to promote good quality sleep.

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