



RESEARCH ARTICLE

Sleep Quality And Its Relation To Sleep Hygiene Awareness Among Undergraduate Medical Students In Haldwani, District-Nainital

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ABSTRACT

Background: Sleep is a vital part of an individual's life. Thus, good sleep practices, i.e., sleep hygiene, are the key to good health, and deviations from these may result in many problems. Such deviations are common among college students and are often attributed to lifestyle changes that cause variations in their daily sleep schedules, leading to poor sleep quality. The aim of the study is to assess the sleep hygiene awareness and sleep quality among medical students and association of sleep hygiene awareness and sleep quality among them.

Methodology: This descriptive, institution-based cross-sectional study was conducted among undergraduate medical students of Government Medical College, Haldwani, District Nainital. Two validated instruments were used: the Pittsburgh Sleep Quality Index (PSQI) and the Sleep Belief Scale (SBS). The questionnaire was administered as a Google Form, and the data were analyzed using SPSS version 20.0.0.

Result: Among medical students, female (57.3%) were more than males (42.73%), 288(63.44%) participants had good sleep quality while 166(36.56%) were having poor sleep quality. 301(66.30%) students were having intermediate followed by excellent awareness 111(24.45%) on sleep hygiene. 72 (64.86%) good sleeper and 39 (35.14%) poor sleeper got excellent score in SH awareness.

Conclusion: This study revealed that poor sleep quality was found among 1/3rd of the medical students. 2/3rd of the participants showed moderate level of awareness with respect to sleep hygiene. Moreover, no significant association was found between SH awareness and good sleep quality. But, there is strong need to implement sleep hygiene education programs among medical students so as to improve their academic performance and overall wellbeing.

Keywords: Sleep Hygiene Awareness, Sleep Quality, Sleep Belief Scale (SBS), Pittsburgh Sleep Quality Index (PSQI), Medical Students.

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INTRODUCTION

Good-quality sleep has a significant impact on an individual's health. We spend almost one-third of our lives sleeping. [1] Sleep specialists recommend that healthy people generally need about seven hours of sleep per day [2]. However, certain factors such as environmental and lifestyle changes are increasingly causing difficulties in sleeping, which reduce the duration of sleep and thus have a negative impact on an individual's health and day-to-day activities. [1] Sleep hygiene refers to the set of practices and habits that promote good-quality nighttime sleep and full alertness during the day [2]. Thus, Sleep hygiene (SH) is considered to be an effective method to treat sleep disturbances, especially among adolescents and young adults [3].

Stress is highly prevalent among medical students worldwide and is considered one of the most significant problems they face. It is often described as the "wear and tear" the body experiences while adjusting to pressure or threatening situations [4]. The intense workload and

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stress of medical training make students vulnerable to poor sleep[5]. They are likely to reduce their sleep, in order to adjust and cope with their workload and stressful environment[6]. Medical school can be a very stressful environment due to many factors. These include extensive curricula, numerous academic requirements, and frequent, difficult, and varied examinations.[7,8] Medical students often do not consider sleep a top priority given their academic demands. To gain extra hours for studying and managing their workload, they reduce their sleeping time, which leads to poor sleep habits, especially in the weeks before examinations.[9] SH refers to a set of life behaviors that promote a good sleep quality. These habits are associated with food stimuli, smoking, mental effort, and also to the individual's surrounding area during sleeping. [10]SH has now become an important tool for healthcare providers in the treatment of insomnia, as it has been found that consistently following healthy sleep habits can help in the management of chronic insomnia.[11,12]SH has been reported to be functional in adolescents and young adults, possibly because their sleep knowledge and practice are poor.[13-15] This is less explored area in North India and especially among medical students. Therefore, this study intends to explore the relationship between sleep hygiene awareness and sleep quality among medical students and to find out the association with certain factors in government medical college Haldwani, District- Nainital.

METHODOLOGY

An institutionbased descriptive crosssectional study was conducted among 454 MBBS students at Government Medical College, Haldwani, District Nainital during a period of 3 months. A total of 150 students were enrolled in each batch from first to final year MBBS, and all students who completely filled out the form were included as participants. The study used a convenience sampling method. Two validated questionnaires were used, which were prepared as a Google Form. The link to the Google Form was shared with students through their WhatsApp groups.

The questionnaire consisted of three sections. The first section included the Pittsburgh Sleep Quality Index (PSQI), a selfrated questionnaire that assesses sleep quality and disturbances during the 2

preceding month. This instrument comprised of 19 individual items and yields an overall score ranging from 0 to 21. Participants who score higher than 5 are considered poor sleepers. It differentiates "poor" from "good" sleep by measuring seven domains: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency,

sleep disturbances, use of sleep medication, and daytime dysfunction over the last month.[16]

The second section included the Sleep Belief Scale (SBS), a 20item revised version of the Sleep Hygiene Awareness scale by Lacks and Rotert. The SBS assesses awareness of the influence on sleep of drug consumption (alcohol, caffeine, nicotine, sleep medication), diurnal behaviors (physical exercise and naps), and activities and thoughts prior to sleep (eating, studying, relaxing, worrying), recording whether each has a positive, negative, or neither effect on sleep.[17] A correct answer corresponds to identifying a negative effect for all items except numbers 5, 9, 15, and 19, which have a positive effect. Correct answers were scored as one point, and incorrect answers (including all responses of "neither effect") were scored as zero. Total scores range from 0 to 20. Participants scoring 0–5 were classified as having poor awareness, those scoring 6–13 as having intermediate awareness, and those scoring 14–20 as having excellent awareness.

The data was collected and verified and then coded before entry. Statistical Package for Social Sciences (SPSS) software version 20.0.0 was used for data entry and analysis. P value less than 0.05 was considered to be statistically significant. Chi square, one way ANOVA and independent T test were applied in this study.

An ethical approval was taken from the Institutional Ethical Committee of GMC Haldwani. An informed verbal consent was taken from every respondent with the explanation of the questionnaire and permission was granted before distribution of the questionnaire.

RESULTS

A total of 454 students filled out the form correctly and were evaluated. Table 1 depicted the gender-wise and batch-wise distribution of the students; approximately half of the participants were female. The mean age of the students was 21.04 ± 1.545 years.

Figure 1 showed the distribution of respondents

Table -1: Gender-wise and Batch wise distribution of the students

Gender	N (%)
Male	194(42.73%)
Female	260(57.27%)
Mean Age $\pm$ SD	21.04 $\pm$ 1.545
Batches	
First year	133(29.29%)
Second year	134(29.51%)
Third year	104(22.90%)
Final year	83(18.28%)

Table 2: Relationship Between Pittsburg Sleep Quality Index (PSQI) and Sleep Belief Scale (SBS) Score (n=454)

SBS Score	PSQI SCORE		Total	
	Good sleeper	Poor sleeper		
	≤5	>5		
1-Poor awareness (0-5)	33(78.57%)	09(21.43)	42(100)	P=0.76
2-Intermediate Awareness (6-13)	183(60.80%)	118(39.20)	301(100)	
3-Excellent awareness (14- 20)	72(64.86%)	39 (35.14%)	111(100)	
Total	288 (63.44%)	166 (36.56%)	454(100)	

Table 3: Relationship Between Different MBBS Batches and Sleep Belief Scale (SBS) (n=454)

Batches	Sleep Belief Scale Score			Total	P=0.797
	Poor awareness	Intermediate awareness	Excellent awareness		
Final year	11(13.25%)	55 (66.27%)	17(20.48%)	83(18.28%)	
Third year	12(11.54%)	66(63.46%)	26(25%)	104(22.90%)	
Second year	08(5.97%)	93(69.40%)	33(24.63%)	134(29.52%)	
First year	11(8.27%)	87(65.41%)	35(26.32%)	133(29.3%)	
	42(9.25%)	301(66.30%)	111(24.45%)	454(100%)	
Gender					
Male	20(10.31%)	127(65.46%)	47(24.23%)	194(42.73%)	
Female	22(8.46%)	174(66.93%)	64(24.61%)	260(57.27%)	
Total	42(9.25%)	301(66.30%)	111(24.45%)	454(100%)	
AGE in years (MEAN ±SD)	21.36±1.54	20.98±1.54	21.07±1.55		P=0.315

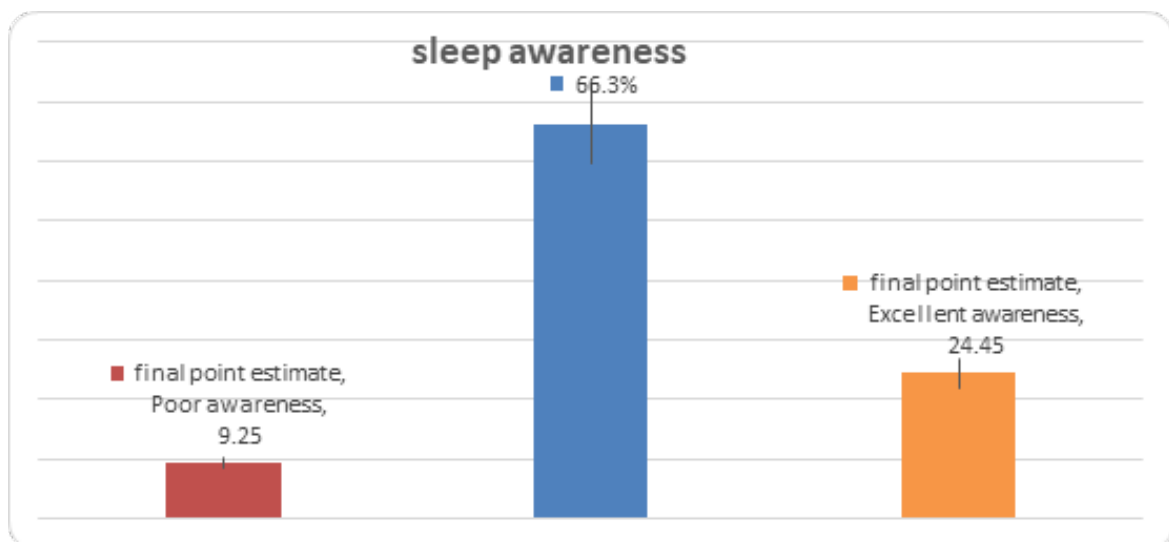


Figure 1: The distribution of the respondents according to their sleep beliefs score (n=454)

Table 4: Relationship Between Different MBBS Batches and Pittsburg Sleep Quality Index (PSQI) Score (n=454)

Batches	Total PSQI		Total	
	Score			
	Good sleeper	Poor sleeper		
Final year	49(59.04%)	34(40.96%)	83(18.28%)	P=0.377
Third year	66(63.46)	38(36.54%)	104(22.90%)	
Second year	81(60.45%)	53(39.55%)	134(29.52%)	
First year	92(69.17%)	41(32.83%)	133(29.3%)	
	288(63.44%)	166(36.56%)	454(100%)	
Gender				
male	123(63.40%)	71(36.60%)	194(42.73%)	P = 0.99
female	165(63.46%)	95(36.54%)	260(57.27%)	
Total	288(63.44%)	166(36.56%)	454(100%)	
MEAN $\pm$ SD	20.96 $\pm$ 1.59	21.17 $\pm$ 1.45		P = 0.568

according to their Sleep Beliefs Scale, reflecting their awareness scores; it appeared that a majority (over half) had intermediate awareness. Figure 2 showed the distribution of respondents according to their PSQI scores, with a majority (over half) being good sleepers.

Table 2 presented the relationship between the Pittsburgh Sleep Quality Index (PSQI) and Sleep Beliefs Scale (SBS) scores among the respondents. There was no statistically significant association between sleep hygiene awareness and sleep quality. 3

Table 3 depicted sleep hygiene awareness among different MBBS batches. A majority (over half) of all participants had intermediate awareness on the Sleep Beliefs Scale. There was no significant association between sleep hygiene (SH) awareness and the different MBBS batches. There was also no significant association between males and females in terms of SH awareness, and no association was identified between age and Sleep Beliefs Scale scores.

Table 4 depicted the relationship between different MBBS batches and PSQI scores. A majority (over half) of the participants were good sleepers, and the association between sleep quality and different batches was insignificant. On the PSQI, there was no significant association between males and females. The mean ages of the students were 20.96 $\pm$ 1.59 and 21.17 $\pm$ 1.45 years among good sleepers and poor sleepers, respectively. On independent t-test, the p-value was found to be insignificant.

DISCUSSION

The current study acknowledges about the important information regarding the sleep quality and sleep hygiene

practices among medical students. In our study the mean age of the student was found 21.04 $\pm$ 1.5 years which was consistent with the study conducted by Almojali AI et al., [6] in which average age of the participants was 21.9 $\pm$ 1.4 year, while the study of James BO et al., [18] at Nigerian university showed that mean age (SD) of the group was 24.45 (2.32) years.

Our study revealed that majority 288 (63.44%) of the students had good sleep quality and 166(36.56%) students had poor sleep quality. Almost similar results were found in the study done by Ananthachari KRet al., [19] at Gadag, Karnataka showing 176 (60.06%) student had “good” sleep quality while 117 (39.93%) had “poor” sleep quality and Chandrashekar TR[20] et al., at Belgaum showing that 79.2% had good sleep quality and 20.8% had poor sleep quality. Another study[21] on Pakistani medical students demonstrated the similar result with prevalence of poor sleeper was 40%. However this finding was contrary with the results of a previous study conducted among medical students by Mohsin Alshahrani et al., at Saudi Arabia[6] , by Siddiqui AF et al., at Saudi Arabia[22], by Almojali AL et al., [6] at Saudi Arabia, by Mojtaba Rezaei et al., [23] at Tehran University, by Zohreh Yazdi et al., [24] at Qazvin University of Medical Sciences Iran showed that the prevalence of poor sleep quality generally found in more than half of the students.

Mean PSQI score was 5.01 $\pm$ 2.52 in our study and this finding similar with the study done by Zohreh Yazdi et al., [24] where Global score of PSQI was 5.82 (0.9) in female and 6.64 (1.1) in male while study conducted by Almojali AL et al., [6] reported that mean PSQI score was 7.11 $\pm$ 3.84.

The result of present study observed that there was no significant difference in sleep quality among male and female students which was consistent with the finding of another study by Mojtaba Rezaei et al., [23]. Some studies had reported that male students had better sleep quality than female students [24], which was not in accordance with our study.

Considering the SH awareness, our study revealed that knowledge regarding sleep hygiene among study participant was intermediate. In the present study the mean sleep hygiene score was 10.7 ± 3.72 . These results was comparable with the result of the study by Mohsin Alshahrani et al., [3] where the mean score of the respondents was 10.49 (S.D 4.64). Similar findings were noticed in studies done in Ethiopia [25].

The present study did not found significant association between Sleep Hygiene awareness and sleep quality these findings were supported by the study of Mohsin Alshahrani at Saudi Arabia [3], Brown FC [13] at south eastern United States, and Omid Pournik at Tehran, Iran [26], S. Al-Kandari et al [27] in Kuwait. However the results were opposite in the study done by Kaur et al [28] in Chandigarh.

CONCLUSION

This study found that about one-third of participants had poor sleep quality. Majority over half of the participants showed moderate level of awareness with respect to sleep hygiene. However, sleep hygiene awareness was not significantly associated with good sleep quality, and no gender-wise or batch-wise associations were observed among the measured parameters.

LIMITATIONS & RECOMMENDATIONS

This study included only medical students; therefore, its findings cannot be generalized to the broader population, and a more representative sample is required. Sleep hygiene awareness positively influences students' personal and professional lives and can improve their academic performance. This highlights the importance of educating medical students about the consequences of poor sleep practices and sleep deprivation, as well as the benefits of good quality sleep. Raising awareness of this crucial aspect of life is therefore essential.

REFERENCES

1. Organization WH. WHO Technical Meeting on Sleep and Health. Report, World Health Organ (Internet). 2004; (January):22-4
2. Serkan, Özsoylu, Nur, AB, Dursun Adem. Assessment of sleep quality/quality of life and affecting factors in nurses working in child intensive care unit. Asian Pacific Journal of Health Sciences, 2018;5(2): 5-8.
3. Alshahrani M, Al Turki Y. Sleep hygiene awareness: Its relation to sleep quality among medical students in King Saud University, Riyadh, Saudi Arabia. J Family Med Prim Care 2019;8:2628-32.
4. Behere SP, Yadav R, Behere PB. A comparative study of stress among students of medicine, engineering, and nursing. Indian J Psychol Med 2011;33:145-8.
5. Thomas PC, Sundar BJ. Sleep quality, day time sleepiness and academic performance in first year medical students. J. Evolution Med. Dent. Sci. 2019;8(39):2934-38
6. Almojali AI, Almalki SA, Allothman AS, Masuadi EM, Alaqeel MK. The prevalence and association of stress with sleep quality among medical students. J Epidemiol Glob Health 2017;7(3):169-74.
7. Waqas A, Khan S, Sharif W, Khalid U, Ali A. Association of academic stress with sleeping difficulties in medical students of a Pakistani medical school: a crosssectional survey. PeerJ 2015;3:e840
8. Sreerama reddy CT, Shankar PR, Binu VS, Mukhopadhyay C, Ray B, Menezes RG. Psychological morbidity, sources of stress and coping strategies among undergraduate medical students of Nepal. BMC Med Educ 2007;7:26.
9. Ahrberg K, Dresler M, Niedermaier S, Steiger A, Genzel L. The interaction between sleep quality and academic performance. J Psychiatr Res 2012;46:1618-22.
10. Stepanski EJ, Wyatt J. Use of sleep hygiene in the treatment of insomnia. Sleep Med Rev 2003;7:215-25.
11. Morin C, Colecchi C, Stone J, Sood R, Brink D. Behavioral and pharmacological therapies for late-life insomnia. JAMA 1999;281:991-9.
12. Abe Y, Mishima K, Kaneita Y, Li L, Ohida T, Nishikawa T. Stress coping behaviors and sleep hygiene practices in a general population sample of Japanese adults with insomnia. Clin Neurophysiol 2012;42:145.
13. Brown FC, Buboltz WC, Soper B. Relationship of sleep hygiene awareness, sleep hygiene practices, and sleep quality in university students. Behav Med. 2002;28(1):33-8.
14. Digdon N. Circadian preference and college students' beliefs about sleep education. Chronobiol Int 2010;27:297-317.
15. Robinson D, Gelaye B, Tadesse MG, Williams MA, Lemma S, Berhane Y. Daytime sleepiness, circadian preference, caffeine consumption and Khat use among college students in Ethiopia. J Sleep Disord Treat Treat Care 2013;3.
16. Buysse D, Reynolds C, Monk T, Berman S, Kupfer D. The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Res 1989;28:193-213.
17. Adan A, Fabbri M, Natale V, Prat G. Sleep beliefs scale (SBS) and circadian typology. J Sleep Res 2006;15:125-32.
18. James BO, Omoaregba JO, Igberase OO. Prevalence and correlates of poor sleep quality among medical students at a Nigerian university. Ann Nigerian Med 2011;5:1-5.

19. Kr A, Sonavane R, Professor A. Assessment of Sleep Hygiene among Medical Students at Gadag District, Karnataka. *Indian J Forensic Community Med* [Internet]. 2017;4(2):77–80.
20. Chandrashekar TR, Rajashekar RK, Kanthi AG, Rajendr Kumar Katte, Shantha A R. Study of Sleep Hygiene in Relation with Quality of Life among Medical Students *Indian Journal of Public Health Research & Development*. 2014;5(2):22-25.
21. Surani AA, Zahid S, Surani A, Ali S, Mubeen M, Khan RH. Sleep quality among medical students of Karachi, Pakistan. *J Pak Med Assoc*. 2015;65(4):380–2.
22. Siddiqui AF, Al-Musa H, Al-Amri H, Al-Qahtani A, Al-Shahrani M, Al-Qahtani M. Sleep Patterns and Predictors of Poor Sleep. *Malaysian J Med Sci*. 2016;23(6):94–102.
23. Rezaei M, Khormali M, Akbarpour S, Sadeghniiat-Hagighi K, Shamsipour M. Sleep quality and its association with psychological distress and sleep hygiene: A crosssectional study among pre-clinical medical students. *Sleep Sci*. 2018;11(4):274–80.
24. Yazdi Z, Loukzadeh Z, Moghaddam P, Jalilolghadr S. Sleep hygiene practices and their relation to sleep quality in medical students of Qazvin university of medical sciences. *J Caring Sci* 2016; 5 (2): 153-60.
25. Bosie G, Tefera T, Hailu G. Knowledge, attitude and practice with respect to sleep among undergraduate medical students of Mekelle University. *Sleep Biol Rhythms* 2012;10:2649
26. Pournik O, Daneshvar M, Pakzadian S, Ghalichi L. Sleep hygiene in medical students in Tehran; do they learn to attend to their own health? *Shiraz E Med J*. 2020;21(4):1–6.
27. Al-Kandari S, *et al*, Association between sleep hygiene awareness and practice with sleep quality among Kuwait University students, *Sleep Health* 2017; 3(5):342-347.
28. Kaur G, Singh A. Excessive daytime sleepiness and its pattern among Indian college students. *Sleep Med*. 2017;29:23–8.