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Sleep Pattern in Undergraduate Dental Students Undergoing Clinical Summative Assessment in a Public Sector Dental Institute of Peshawar

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ABSTRACT

Background: Sleep is one of the most important determinants of human health. The quality of sleep has significant effects on academic performance and is influenced by multiple factors.

Objectives: To determine the association between sleep patterns / Quality and academic performance of dental undergraduates during their summative clinical examination by using an objective measure.

Material and Methods: This descriptive cross-sectional study was conducted at the Department of Medicine, Khyber Teaching Hospital Peshawar, from February 1, 2023, to June 30, 2023. A sample size of 82 was calculated by the Open Epi calculator. A validated questionnaire of the Pittsburgh Sleep Quality Index (PSQI) was used in this study. The study participants were selected by convenience based consecutive sampling technique and were 3rd BDS Students appearing in annual General Medicine Examination. After data collection, these variables were analyzed by SPSS version 26 software.

Results: This study comprised 43(52.4%) female and 39(47.6%) male participants, and amongst them, 34.1% of females and 20.7% of males rendered their sleep quality bad, whereas 18.3% of females and 26.8% of males responded otherwise. The findings were positively associated with bad sleep quality (47.6%). Measures of sleep quality were significantly deranged among poor sleepers compared to normal sleepers. On average, the academic performance of poor-quality sleepers was good compared to good-quality sleepers. Still, this finding is not statistically significant, as evidenced by the t-test (Mean 574 ± SD 62.156 vs. 581 ± 79.769) and *p*-value of 0.640.

Conclusion: Poor sleep quality was common among our students. The academic performance of these students was not statistically significant in comparison to that of good quality sleepers.

Keywords: Academic performance, Dental undergraduates, PSQI, Sleep quality

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INTRODUCTION

It has been has documented that "sleep is the golden chain that ties health and our bodies together."[1] Sleep is a recurring, reversible neurobehavioral state of relative perceptual disengagement and unresponsiveness to the environment.[2] Sleep is an important part of sound health. A normal person needs approximately 8 hours of sleep every night to perform daily activities efficiently and maintain good health.[3] Sleep deprivation influences many aspects of a person's life and is often associated with poor judgment, disturbed mood, high stress, anxiety, and reduced achievement.[4] Although reported sleep disorders in adults tend to increase with age, young people often suffer from a lack of sleep during their school and college years.[5] A meta-analytic review showed that sleepiness, sleep length, and sleep quality are negatively related to school performance in children and adolescents. The effect was strongest for sleepiness, followed by sleep quality and duration.[6] Most of the studies showed that students' academic performance was affected by the time they went to bed and when they woke up rather than the total time spent in bed.[7]

The dental specialty is known for its heavy didactic and clinical content, which stresses students seriously and demands long hours of study and practice. At the same time, the dental practice requires high levels of concentration and dexterity, which could be affected by several factors, including dentists' mental, psychological, and physical status.[8] In light of these considerations, this study endeavors to delve into a previously underexplored area. Specifically, we seek to objectively examine the sleep quality of dental students during their participation in clinical examinations. Our primary aim is to discern whether a discernible association exists between their sleep patterns and their academic performance. Despite the acknowledged significance of sleep in academic achievement and the unique demands placed on dental students, limited research has addressed this specific relationship within the context of clinical examinations.

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MATERIAL AND METHODS

This cross-sectional study was conducted in the Department of Medicine, Khyber Teaching Hospital Peshawar, from February 1, 2023, to June 30, 2023. Ethical approval was obtained from The Ethical Board of Khyber Medical College Peshawar (Ref# 49/DME/KMC; Dated 31-01-2023). An open EPI sample size calculator (www.OpenEpi.com) was used to determine the sample size 82 by keeping population size of 95, anticipated frequency 50%, confidence limit of 5 % and design effect of 1.0.[9] The sampling was done by convenience-based consecutive sampling technique. Dental Students of 3rd professional Khyber College of Dentistry Peshawar Pakistan, appearing in their annual clinical examinations of General Medicine, were included in this study. In contrast, those students who were unwilling to participate in the research or were already diagnosed with any psychiatric illness were excluded from this study. A validated questionnaire, the Pittsburgh Sleep Quality Index (PSQI), was utilized.[10] However, a few rectifications and face validation were performed by undergoing Lynn criteria by eight subject experts, taking a 0.80 score as the cutoff criteria for the local context. The content validity was undertaken by pilot testing on ten medical undergraduates of the same age group from 3rd-year Khyber Medical College Peshawar students. The PSQI is a twenty-four-item self-rated questionnaire developed to quantify sleep quality and alarm healthcare professionals of needing to assess subjects with symptoms of sleep problems further.[10] The following operational definitions are used: Good sleep quality refers to sleep that is characterized by sufficient duration, minimal awakenings, and leaves the individual feeling refreshed upon waking, and Bad sleep Bad sleep quality refers to sleep that is marked by insufficient duration, frequent awakenings, and results in daytime fatigue or impaired cognitive function. Academic performances were defined as:

i. Very Good Academic Performance (Beyond expectations): High score across theoretical and practical examination (= 70%).
ii. Fairly Good Academic Performance: Above-average scores in examination (= 60% but =70%).
iii. Satisfactory Academic Performance: Fulfilling the passing criteria for examination (= 50% but =60 %).
iv. Very Bad Academic Performance: Not fulfilling the passing scores set forth by Khyber Medical University Peshawar Pakistan. (=50%)

The Statistical Package for Social Sciences (SPSS)(IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.) was utilized to analyze various data variables. The t-test and *p*-values were used for statistical analysis. T-test was used to analyze the relationship between sleep patterns and the student's academic performance, and $p<0.05$ was taken as a criterion of significance.

RESULTS

This study analyzes sleep patterns in undergraduate dental students undergoing clinical simulation assessment and its effect on their academic performance. Response to various questions showed the following results (Table 01).

The data collected consists of 43 females and 39 males. Of these, 34.1% of females and 20.7% of males documented their sleep quality as bad, whereas 18.3% of females and 26.8% of males responded otherwise. The data was positively associated with bad sleep quality due to exam stress (47.6%). Measures of sleep quality were significantly deranged among poor sleepers compared to normal sleepers. Statistically significant differences were observed within total sleep time, sleep onset latency, subjective sleep quality, and use of sleep medications. Compared with normal sleepers, poor sleepers also reported various sleep disturbances. Commonly reported sleep disturbances among poor sleepers were not getting to sleep within 30 min after lying in bed and waking up in the middle of the night or early morning. Almost 52.4% of students had less than 6 hours of sleep with bad sleep quality; however, in contrast to this, 36.6% of students performed fairly well in the exams, and 12.2% showed satisfactory results. According to data analysis, 17.1% of students had taken medications to induce sleep multiple times.

The current study is documenting that, on average, students with bad sleep have better academic performance in this study in comparison to students with good quality sleep. However, this finding is not significantly significant, as evidenced by the t-test (Good quality sleep 574.19 ± 62.156 SD VS Bad quality sleep 581.73± 79.769 SD) and p-value of 0.640.

Table 01. Demographics and other Feedback from Participants

		Sleep Quality	
		BAD	GOOD
		N (%)	N (%)
GENDER	Female	28 (34.1)	15 (18.3)
	Male	17 (20.7)	22 (26.8)
Time To Go to Bed	After 12 AM	45 (54.9)	33 (40.2)
	Before 12 AM	0	4 (4.9)
Sleep Onset	Less than 30 minutes	26 (31.7)	27 (32.9)
	More than 30 minutes	19 (23.2)	10 (12.2)
Sleep Duration	Less than 6 hours	43 (52.4)	30 (36.6)
	More than 6 hours	2 (2.4)	7 (8.5)
Cause of Troubled Sleep	Stress due to exams	39 (47.6)	32 (39.0)
	Stress due to other causes	6 (7.3)	5 (6.1)
Medications Taken	All the time	4 (4.9)	1 (1.2)
	Less than five times	9 (11)	12 (14.6)
	More than five times	14 (17.1)	4 (4.9)
	Not even a single time	18 (22)	20 (24.4)
Academic Performance	Beyond expectations	2(2.4)	2 (2.4)
	Fairly good	30(36.6)	19 (23.2)
	Satisfactory	10(12.2)	12 (14.6)
	Very bad	3 (3.7)	3 (3.7)
Any Other Factor for Disturbed Sleep	No	38 (46.3)	30 (36.6)
	Yes	7 (8.5)	7 (8.5)

DISCUSSION

Sleep quality significantly affects cognitive performance and is influenced by multiple factors, such as stress. Contrary to the ideal, medical students and residents suffer from sleep deprivation and stress at times when they should achieve the greatest amount of learning. Sleep is an essential parameter for the consolidation of memories, and being sleep deprived reduces one's ability to learn.[11] Among our respondents, 34.1% of females and 20.7% of males reported experiencing poor sleep quality, while 18.3% of females and 26.8% of males reported good sleep quality. "Previous studies have explored the relationship between sleep and academic performance in various educational settings. A study conducted in Nepal showed the prevalence of poor sleep quality in 44% of individuals using the PSQI questionnaire.[12] The cause of poor sleep quality among individuals can be attributed to academic stress during exams and workload. A similar study was done on medical students in Karachi, Pakistan, which showed the prevalence of poor sleep quality of 39.5%, more prevalent among females, poor sleepers at 44% than males at 32.8%, which is almost similar to our study.[13] The increased frequency of various sleep disorders and disturbances among females can partly explain the association between poor sleep quality and female gender. Cultural and social norms of our society, where females are actively involved in household chores, can also account for such gender predominance. The mean total sleep time reported by our study was consistent with other studies, showing a sleep duration of less than 7 hours in 52.4% of individuals.[14'15] Most dental students experience sleeping problems while undergoing clinical evaluation that might affect their academic performance and physiological and psychological characteristics. Despite facing similar challenges, our dental student cohort exhibited good academic

performance, even in the face of stress and disrupted sleep patterns during exam periods. This somewhat contradicts the conventional hypothesis that stress and poor sleep quality invariably lead to diminished academic performance. One plausible explanation is that these students perceive stress as a motivating factor for achieving academic excellence, albeit at the cost of sleep quality.

The clinical summative evaluation of dentistry students has a deleterious effect on their sleep patterns.[16,17] Studies have revealed that because of their demanding schedules, extensive coursework, and tremendous amounts of clinical and practical work, dentistry students experience poor sleep quality.[18,19] They frequently experience sleep delay, have erratic sleeping habits, and sleep disturbances.[20,21] Furthermore, a sizable proportion of dentistry students mentioned feeling exhausted despite getting the advised 8 hours of sleep every night.[22,23] Their ability to do well on their clinical summative exams can also be negatively impacted by these sleep problems, which can negatively impact their general health and well-being.[24,25] Promoting the importance of sleep and implementing interventions to improve sleep quality, such as educating students about sleep hygiene, is imperative for dental institutions and their students. Recognizing the value of adequate sleep can enhance the overall well-being and academic performance of dental students.[26,27]

Studies to investigate sleep quality among dental students, specifically, and its effect on their academic performance and practice are limited. Our study findings are comparable in terms of sleep quality; however, the relation of academic performance with sleep quality is not statistically significant in our study. Our use of a self-reporting questionnaire for assessing sleep quality is not a quantitative measure and may not capture the full spectrum of sleep-related issues accurately. Future research should consider more comprehensive assessments, such as polysomnography, and incorporate variables like dietary habits and weight patterns. Longitudinal studies measuring these factors during different stages of preparation, examination, and recovery could elucidate cause-and-effect relationships more effectively.

It's important to note that our study was conducted at a single institution, and as such, our findings may not be universally applicable. Further research on a national scale, encompassing larger cohorts and examining additional health parameters, is necessary to comprehensively address the prevalence and causal relationships surrounding poor sleep quality among medical and dental students.

CONCLUSION

More than one-third of the subjects self-reported to have poor sleep quality. It was associated with female gender, total hours slept, sleep onset latency, and leads to the increased level of daytime sleepiness. Efforts directed towardeducating medical students about proper sleep hygiene and the consequences of poor sleep practices could have a positive impact.

Ethical Consideration

This study was approved by the ethical board of Khyber Medical College, Peshawar, Pakistan.

Funding

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Conflict of Interest

Authors declare no conflict of interest

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DATA SHARING STATEMENT: The data that support the findings of this study are available on request from the corresponding author. The data is not publicly available due to privacy or ethical restrictions.

AUTHOR'S CONTRIBUTION

The following authors full fill authorship criteria as per ICMJE guidelines;

Haider I:	Substantial contribution to conception and design, drafting the manuscript, final approval, agreed to be accountable for all the work.
Munib N:	Substantial contribution to conception and design, data acquisition, drafting the manuscript, final approval, agreed to be accountable for all the work.
Khan MT:	Analysis and interpretation of data, drafting the manuscript, final approval, agreed to be accountable for all the work.
Malik SE:	Analysis and interpretation of data, critical revision,final approval, agreed to be accountable for all the work.

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