

Original article:

Correlation between Psychological Stress and Sleep amongst Medical, Dental and Allied Sciences Students

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Abstract

Background: Students in healthcare sector face high levels of academic tension and peer pressure to keep up with their studies and pass their professional university examinations. Stress, poor sleep, and academic performance are all linked to form a vicious circle.

Objective: To determine the pattern of sleep value and prevalence of stress in second year students of a higher educational institution. **Methods:** This cross-sectional survey was done among second year medical, dental, and allied health sciences students. A semi structured questionnaire was prepared to perform the study. The evaluation of sleep pattern was done through Pittsburgh Sleep Quality Index and stress through k10 (Kessler Psychological Distress) Scale. Chi square test, bivariate logistic analysis and linear regression were used to analyse the association between sleep quality and stress. **Results:** A total of 313 students were recruited in the study. PSQI scores revealed that 75.1% of the participants were poor sleepers. Bivariate logistic regression showed that determinants college, caffeinated drinks, presence of chronic disease and napping hours were substantially associated with poor sleep quality. Logistic regression showed that determinants gender was significantly associated with stress. The association of PSQI and k10 were confirmed with chi square, linear regression and logistic regression and was significant at $p < 0.01$. **Conclusion:** Low Sleep quality and stress is highly dominant in medical, dental and para medical students and were associated with each other. More studies are needed to help students to overcome the stress.

Keywords: Sleep, Stress, PSQI SCALE, K10 Score

International Journal of Human and Health Sciences Vol. 07 No. 04 October'23 Page : 327-337
DOI: <http://dx.doi.org/10.31344/ijhhs.v7i4.594>

Introduction

One the most difficult educational discipline is medicine. It has challenging academic and professional prerequisites.¹Students' cognitive development and academic performance are negatively impacted by medical education². Humans experience sleep as a natural physiological function. Students studying medicine have reported shorter sleep times and worsening sleep quality, which has been linked to changing lifestyles, greater technology use, and more demanding professional and social obligations.³Medical scholars face extraordinary levels of academic stress and peer pressure to keep up with

their studies and pass their professional university exams. Heavy academic programmes as well have a considerable consequence on sleep problems of university learners, which dramatically escalate their work in the week's prior a test.⁴

According to studies done in Ghana, Ethiopia, Saudi Arabia, India, plus other countries, medical students generally have bad sleeping habits to varying degrees (77%, 56%, 55.8%, and 62.6%, respectively).^{5,6} Additionally, research from Nepal and India found that 65.2% and 68.7% of paramedical students experienced stress, respectively^{7,8}. Stress, poor sleep, and academic performance are all linked in a vicious circle. They

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are related because poor academic performance is correlated with poor sleep and high levels of stress before tests.⁹

There is a proven relation among poor sleep and stress in medical scholars. Due to the demands of their demanding curriculum, extensive study sessions and clinical rotations, and pressure to perform well, medical students frequently experience significant levels of stress. Their stress levels may increase as a result of these stress-related sleep problems and poor sleep quality.¹⁰

Numerous research has investigated the connection between medical students' stress levels and their quality of sleep. According to a research's, medical students who experience more stress tend to have lower-quality sleep. Daytime sleepiness and sleeplessness were more prevalent among medical students who expressed high levels of stress. The various studies have also discovered that among medical students, increased levels of stress were a strong predictor of deprived sleep quality.¹¹ Medical students stress levels may be reduced and their general wellbeing may be enhanced by sleep hygiene and other sleep-improvement techniques. Additionally, stress management strategies and other therapies meant to lessen stress should help medical students sleep better¹².

Medical study, assignments and clinical rotations must be balanced as medical students also attempt to maintain social life and take care of their health. Chronic stress has a detrimental effect on a person physical and mental health as well as the quality of their sleep. Studies have shown that up to 70% of medical student's experience sleep interruptions or poor sleep quality, making it a prevalent issue for them. This is due to a variety of factors, including the rigorous requirements of the curriculum, the lengthy clinical rotations, and the pressure to succeed and therefore, sleep quality are linked in a two-way relationship⁹.

Since stress and sleep quality are inversely correlated, both good and bad sleep can lead to an increase in stress. According to studies, experiencing insomnia, nightmares, or daytime sleepiness as a result of excessive amounts of stress might make the problem much worse⁴. A variety of medical and mental health issues, including as melancholy, anxiety, and reduced cognitive function, have been associated to poor sleep quality. These issues can further elevate stress levels and have a negative effect on academic

performance. There are several methods that can be used to enhance sleep quality and lessen stress among medical students. Good sleep hygiene practices can help to improve sleep quality by maintaining a regular sleep schedule, avoiding caffeine and electronic gadgets before bed and thus providing a calm resting environment. Exercise, deep breathing exercises, and stress-reduction approaches like mindfulness meditation have all been demonstrated to be successful in lowering stress levels among medical students¹³.

However, students who are studying medicine often lack knowledge about mental stress and sleep quality^{10,14,15}. Therefore, this investigation was done to assess the association between stress and sleep condition across all health sciences specialties including medicine, dentistry, physiotherapy and nursing in a tertiary level healthcare institution in India.

Methods

This study used a cross-sectional design. The survey questionnaire was prepared through extensive research of published literature.^{10,15} The students were asked to fill survey questionnaire form, either electronically or manually. A structured questionnaire that includes demographic details and lifestyle characteristics like gender, first professional exam marks, professional course, chronic disease, consumption of caffeinated beverages and energy drinks on a daily basis, smoking, regular exercise, dietary practises, afternoon naps, use of cell phones and other technological devices, and pressures from university (stressors were mentioned). Second part was semi structured questionnaires to evaluate sleep quality and stress. All the answers were subjective or self-reported, no documentary proof was asked from the participants.

Pittsburgh Sleep Quality Index (PSQI)¹⁶ was utilised for assessing the effectiveness of sleep and any disturbances. This self-assessed test consists of 19 questions regarding the students' sleeping patterns over the preceding month, with each question focusing on one of the following seven categories: daytime dysfunction, habitual sleep efficiency, sleep quality, disturbances, latency and duration, and latency and duration. Higher scores indicate poorer sleep quality. Each of these factors is scored between 0 and 3, and the total score goes from 0 to 21. Furthermore, utilising these 7 components to construct the global PSQI score,

children were classified as poor sleepers if their global score was higher than 5.

An established tool for assessing widespread psychological pain, Kessler Psychological Distress Scale (K10)¹⁷, was used to assess psychological distress. The K10 is a ten-item questionnaire that asks participants to rate their thirty-day history of anxiety and depressive symptoms. A 5-point Likert scale with a rating range is used to score each question. Only participants with a total score of 20 or more will be considered stressed; total score ranged from 10 to 50. Finite population size formula¹⁸ was used followed as the number of students registered in these programs (MBBS, BDS, BSc Nursing, BPT) varies. Sample required $(n) = N/1 + N \cdot d^2$. the total population is 340 and confidence interval is 95% and margin of error or precision rate is 5%. It was determined that 240 people would make up the sample size. The questionnaire was opened with a brief introduction about the need of the study. Confidentiality was maintained.

Data was entered using Microsoft Excel 2016 and imported to statistical package for social sciences Version.21 for analysis. To determine socio-demographic variables, frequency and percentage were used. Mean and standard deviation was calculated for each component of PSQI SCALE. The chi square test was applied wherever any relationship was suspected to be found. Furthermore, the factors that affect stress and sleep quality have been determined using bivariate logistic regression. K10 and PSQI scores were employed as dichotomous dependent variables, while stressors and sociodemographic factors were used as independent variables. The significant factors ($p < 0.05$) were further subjected to multivariate analysis to reduce any confounding factor. The interpretation between PSQI and K10 SCORE was assessed by bivariate logistic regression and chi-square test. Moreover, associations were assessed by linear regression model Using an independent T test, the relationship among academic pressures, sleep quality, and distress was evaluated. Values of $p < 0.05$ will be considered as significant.

Results

A total of 313 second year students participated in the study which were being distributed as 44.09% medical students, 18.53% dental students, 20.13% nursing students and 17.25%

physiotherapy students. Participants in the study had an average age was 20.49 ± 1.37 years. Table 1 shows the sociodemographic characteristics of all respondents. More females (66.1%) participated in the study as compared to males (33.9%). 64.54% of students have secured marks between 60%-74.9%. Majority of them 99.7% were non-smokers and only 36.10% of were on regular exercise. 32.3% of participants had daytime napping for <1hr. A large percentage (50.21%) of participants uses smartphone for 3-4hrs. The percentage of the participants that take only 1 cup of caffeinated and energy drinks were 58.8% and 88.50% respectively. 87.5% participants were under academic pressures. The prevalence of different stressors among participants is shown in figure 1. Majority (98.5%) of the participants were under academic pressure.

Mean PSQI scale was 8.21 ± 3.61 and median is 8. The mode of PSQI score is 7. Only very few participants (24.9%) participants were good sleepers (PSQI SCORE < 5) and majority (75.1%) were poor sleepers (PSQI SCORE > 5). Frequency of total scores is depicted in figure 2. Majority (47.9%) of participants had score between 10-15. However, only 29.1% of poor sleepers classified their sleep as fairly bad and very bad. 53.7% of poor sleeper's reported using sleep medication over the past month. 75.1% of poor sleepers had daytime dysfunction and sleep disturbances. 18.8% poor sleepers had sleep efficiency < 65%. The prevalence of PSQI components with sleep quality is depicted in figure 3. A large percentage (28.39%) of students with poor sleep had duration of sleep less than < 6 hours. Due to poor sleep a large percentage (69.6%) of students was associated with daytime dysfunction. The prevalence of other components was poor Individual sleep quality (80.8%), bad sleep latency (90.4%), bad sleep efficacy (85.3%), sleep disturbances (85.6%). The prevalence of use of sleep medication was comparatively less than other components (22.6%). In order to assess the contribution of each component, mean and standard deviation of each seven components of PSQI was calculated and is depicted in the Table 2. The mean of all the components is greater than 1 except for sixth component (sleep medication) where mean < 1. The mean was highest for sleep duration component which equals to 1.69.

Table 3 shows the numerous factors that affect sleep

Table 1. Sociodemographic profile of the participants

Parameters		N=313	Percentage
Age	18-20 Years	164	52.4
	21-23 Years	141	45
	>=24 Years	8	2.5
Sex	Male	106	33.9
	Female	207	66.1
College	Medical	138	44.1
	Dental	58	18.5
	Nursing	63	20.1
	Physiotherapy	54	17.3
Professional Exam Percentage	>75%	28	8.9
	60%-74.9%	202	64.5
	50%-59.9%	76	24.3
	<50%	7	2.2
Chronic Disease	Absent	263	84.0
	Present	50	16.0
Caffeinated Drinks	0-1cup	184	58.8
	2-3 Cup	105	33.5
	4-5 Cups	20	6.4
	6 Or More Cups	4	1.3
Energy Drinks	0-1 Drink	277	88.5
	2-3 Drink	33	10.5
	4-5 Drink	3	1.0
Smoking	Non Smoker	312	99.7
	Smoker	1	0.3
Regular Exercise	No	200	63.9
	Yes	113	36.1
Napping Hours	0 Hours	80	25.6
	<1 Hours	101	32.3
	1-2 Hours	93	29.7
	3 Or More Hours	39	12.5
Smart Phone Usage	>1 H	23	7.3
	1-2 H	117	37.4
	3-4 Hour	157	50.2
	> 5-6 H	16	5.1
Stressors	Present	274	87.5
	ABSENT	39	12.5

quality. On bivariate analysis, the category college, caffeinated drinks, presence of chronic disease and napping hours were significantly associated with bad sleep quality. The significant parameters were further subjected to multivariate analysis (Table 4). The students at medical college and dental college were significantly ($p < 0.01$) associated with poor sleep. The odd ratio was highest in medical and dental as compared to reference groups. The higher consumption of caffeinated drinks was associated with poor sleep and odd ratio was also low in

students who consume 4-5 cups of caffeinated drinks compared to reference group. The category no napping hours is significantly associated with poor sleep ($p < 0.01$). The category no napping at all had lowest odds as compared to reference group in multivariate analysis (3.13). The prevalence (65.5%) of stressors was more in students who were poor sleeper.

Average K10 score was 23.67 ± 8.83 and median is 24. The mode of k10 score is 10. Sixty-four (64.94%) of learner's report experiencing distress. The prevalence of different level of stress is depicted in figure 5. Determinations of k10 distress level is shown in table 5. There was as significant association of gender with k10 score. Females were more stressed as compared to males. Odd ratio (0.26) was higher in female's compared to males. The prevalence (63.9%) of stress was higher in participants who did not exercise regularly. Additionally, a significant association between the usage of sleep aids and k10 distress level was analysed using the chi square test (chi square value: 31.11, p value: 0.05). Only 4.5% of students who weren't stressed out used medication, compared to 32% of stressed-out students. Also, first (subjective sleep quality) and fifth (sleep disturbances) components was significantly associated with k10 distress level. The chi square value was 2.3 for first and 4.1 for fifth component and p value was < 0.05 . The prevalence (53.9%) of stress was more among the students who uses smartphone over 3-4 hours. According to the chi square (Pearson coefficient=61.227, $p = 0.01$), there was a significant connection between the PSQI (sleeping state) and the k10 score (stress) (table 6). The k10 score was found to be a significant predictor of PSQI sleep quality according to bivariate logistic regression (OR=0.117, 95% CI=0.066-2.09, $P < 0.01$), with a stressed person having a two-fold higher likelihood of having poor sleep quality than a non-stressed person. Stress was a factor for 57.83% of people who had trouble sleeping. (6 Figure). The linear regression model revealed a substantial correlation between PSQI and K10 scores, explaining that each increase in k10 score by one will result in a 0.4 rise in PSQI scores (F VALUE=102.898, P VALUE0.01). Academic stressors were significantly associated with k10 (T value 45.62, P value 0.01) and PSQI.

Table 2. Mean and Standard deviation (SD) of components of PSQI

PSQI subscales	Mean	SD	Range
Subjective sleep quality	1.2013	.85169	3.00
Sleep latency	1.6134	.89912	3.00
Sleep duration	1.681	1.0562	3.00
Sleep efficiency	1.2236	1.12993	3.00
Sleep disturbance	1.0927	.61580	3.00
Use of sleep medication	0.3323	.68276	3.00
Daytime dysfunction	1.0447	.87225	3.00

Discussion

In our study, stress and insufficient sleep were both highly prevalent (both 75.1% and 64.94%). The poor sleep was significantly associated with college, caffeinated drinks, presence of chronic disease and napping hours. The stress was significantly associated with gender and regular exercise. Mostly females (66.1%) participated in our study. Female percentage was also high in other similar researches done by Correa et.al.¹⁹ and by Toubasi et.al.¹⁰

The prevalence of poor sleep and stress was quite high in our study. The results were consistent with the studies done by Toubasi et.al.¹⁰ and Khan et.al.¹¹ where prevalence was 61.7 % and 77% respectively. This highlights the importance of taking gender into account when developing interventions to promote student well-being.

The findings of this study suggest that academic pressure is a significant stressor for the most of the second-year students. It is also worth noting that a large percentage of participants used their smartphones for a considerable amount of time and consumed energy drinks regularly. These findings may have implications for student health and well-being and highlight the need for interventions aimed at managing stress and promoting healthy lifestyles among students. The study also found that a large percentage of poor sleepers (75.1%) had daytime dysfunction and sleep disturbances. This finding is consistent with research by Kessler et.al that has linked poor sleep quality to daytime fatigue, reduced concentration, and decreased productivity ²⁰. In terms of the prevalence of PSQI components, the study found that poor sleep duration (<6 hours) was the most prevalent component among poor sleepers (28.39%), followed by poor individual

sleep quality (80.8%), bad sleep latency (90.4%), bad sleep efficacy (85.3%), and sleep disturbances (85.6%). These findings are in line with research by Buysse et al that has identified these components as key factors contributing to poor sleep quality¹⁶.

Interestingly, the study found that the use of sleep medication was comparatively less prevalent among poor sleepers (22.6%). This finding is somewhat surprising, as research done by Mojtabai & Olfson²¹ has reported high rates of sleep medication use among individuals with poor sleep quality. It is possible that the low prevalence of sleep medication use in this study reflects a reluctance among young adults to use pharmacological interventions for sleep problems.

The prevalence of poor sleep and stress was quite high in our study. The results were in accordance with the studies done by Toubasi et al.¹⁰ and Khan et.al.¹⁵, where prevalence were 61.7% and 77% respectively. Poor sleep was significantly associated with the professional course in which they have enrolled themselves which was highest in medical students (39%) followed by dental (9.9%) and physiotherapy (10.7%) and lastly nursing students (5.7%). Similar results were obtained from the studies done by Revathi et al.²² and Ogunsemi et al.²³ Association of poor sleep to more napping hours was also shown in study by Toubasi et.al.¹⁰ Concern should be expressed over the high rate of distress among university students because it has an adverse effect on learning, interpersonal relationships, and general wellbeing.

The study also identified several factors that are associated with distress, including gender, exercise habits, sleep quality, and smartphone use. According to the study, regular exercise is linked to lower levels of distress. Exercise has been demonstrated to provide several advantages for one's physical and mental health, including lowering stress and anxiety. Universities and schools could promote exercise and physical activity among students to help improve their mental health. The study also found that sleep quality is associated with distress. Specifically, the first (subjective sleep quality) and fifth (sleep disturbances) components of sleep were found to be significantly associated with k10 distress level. This highlights the importance of promoting healthy sleep habits among university students, such as avoiding screen time before bed and sticking to a consistent sleep schedule. The study found that smartphone use is associated with

Table 3. Bivariate analysis of socio demographic factors with PSQI score

PSQI sleeping quality		Sig.	OR	95% Confidence Interval for OR	
				Lower Bound	Upper Bound
	Intercept	.876			
College	Medical	.003**	.280	.121	.647
	Dental	.350	1.49	.647	3.413
	Nursing	.095	.48	.205	1.134
	Physiotherapy	.	.	.	.
Caffeinated drinks	0-1 cup	.068	.056	.002	1.237
	2-3 cups	.025*	.037	.001	.636
	4-5 cups	.012*	.009	.000	.356
	6 or more cups	.	.	.	.
Chronic disease	Absent	.044*	2.7	1.029	7.095
	Present	.	.	.	.
Napping hours	0 hours	.006**	3.13	1.754	26.653
	<1 hour	.026	4.65	1.205	17.937
	1-2 hours	.104	6.84	.792	12.380
	3 or more hours	-	-	-	-

Table 4. Multivariate analysis of sleep determinants with PSQI score

R SQUARE=0.178 (COX and Snell) & 0.264 (Nagelkerke)				Chi square value: 61.415 df=10	
PSQI Sleeping quality		Sig.	OR	95% Confidence Interval for OR	
				Lower Bound	Upper Bound
	Intercept	.876			
College	Medical	.003**	.280	.121	.647
	Dental	.350	1.49	.647	3.413
	Nursing	.095	.48	.205	1.134
	Physiotherapy	.	.	.	.
Caffeinated drinks	0-1 cup	.068	.056	.002	1.237
	2-3 cups	.025*	.037	.001	.636
	4-5 cups	.012*	.009	.000	.356
	6 Or more cups	.	.	.	.
Chronic disease	Absent	.044*	2.7	1.029	7.095
	Present	.	.	.	.
Napping hours	0 hours	.006**	3.13	1.754	26.653
	<1 hour	.026	4.65	1.205	17.937
	1-2 hours	.104	6.84	.792	12.380
	3 or more hours	.	.	.	.

**P<0.01, *P<0.05

Table 5. Bivariate analysis of sociodemographic factors with k10 score

R SQUARE=0.183 (Cox & Snell) & 0.252 (Nagelkerke) Model Chi Square Value: 63.173 (df=24)							
		Stress Absent (≤20)	Stress Present (>20)	P Value	Odd ratio (OR)	95% CI for OR	
						Lower	Upper
Age	18-20 years	57(18.2%)	107(34.2%)**	.749	1		
	21-23 years	50(16.%)	11(29.1%)	.498	1.793	.332	9.696
	>=24 years	3(1.0%)	5(1.6%)	.451	1.925	.351	10.556
Sex	Male	58(18.5%)	48(15.3%)		1		
	Female	52(16.6%)	155(49.5%)**	.000*	.216	.117	.399
College	Medical	46(14.7%)	92(29.4%)**	.086	1		
	Dental	26(8.3%)	32(10.2%)	.719	1.173	.492	2.798
	Nursing	16(5.1%)	47(15%)	.514	.738	.296	1.838
	Physiotherapy	22(7%)	32(10.2%)	.062	2.519	.953	6.658
Previous year professional percentage	>75%	12(3.8%)	16(5.1%)	.054	1		
	60%-74.5%	72(23%)	130(41.5%)**	.095	.109	.008	1.467
	50-59.9%	25(8%)	51(16.3%)	.330	.298	.026	3.413
	<50%	1(0.3%)	6(1.9%)	.624	.539	.045	6.399
Chronic disease	Present	16(5.1%)	34(10.9%)	.934	.969	.458	2.050
Caffeinated drinks	0-1 cup	77(24.6%)	107(34.2%)**	.070	1		
	2-3 cup	28(8.9%)	77(24.6%)	.804	.758	.085	6.778
	4-5 cup	3(1%)	17(5.4%)	.727	1.484	.161	13.652
	6 or more cups	2(1.8%)	2(1%)	.484	2.482	.194	31.729
Energy drinks	0-1 drink	98(31.3%)	179(57.2%)**	.771	1		
	2-3 drinks	11(3.5%)	22(7%)	.987	.975	.048	19.650
	4-5 drinks	1(0.6%)	2(0.3%)	.840	1.369	.065	29.023
Smoking	Present	0	1(0.3%)	1.000	.000	.000	.
	Absent	61(19.5%)	139(44.4%)		1		
Exercise	Present	49(15.7%)	64(19.5%)**	.237	1.436	.788	2.616
Napping H hours	0 Hours	30(12.8%)	50(16.0%)	.263	1		
	< 1 Hour	40(8.3%)	61(21.4%)	.524	1.367	.522	3.580
	1-2 Hour	26(8.3%)	67(21.4%)**	.732	.856	.352	2.084
	3-4 Hours	14(4.5%)	25(8%)	.280	1.641	.668	4.028
Smartphone usage	< 1 Hour	12(3.8%)	11(3.5%)	.182	1		
	2-3 Hour	46(14.7%)	71(22.7%)	.115	.262	.050	1.385
	3-4 Hours	48(15.3%)	109(34.8%)**	.302	.483	.122	1.920
	5-6 Hours	4(1.3%)	12(3.8%)	.636	.715	.178	2.871
Stressors	Present	94(30%)	180(57.5%)**	.679	.833	.352	1.974
Constant				1.000	336639536.161		

**higher prevalence

Table 6. Association of sleep with stress

PSQI sleep quality		K10 stress		Total
		Absent	Present	
GOOD	Count	56	22	78
	% of Total	17.9%	7.0%	24.9%
POOR	Count	54	181	235
	% of Total	17.3%	57.8%	75.1%

distress, with students who use their smartphones for over 3-4 hours per day being more likely to experience distress. This is consistent with the findings of some other research^{24,25} suggesting that excessive smartphone use can negatively impact mental health. Universities and schools could educate students on healthy smartphone habits, such as limiting screen time and using apps to monitor and manage their smartphone use.

Overall, the study's findings suggest that there are multiple factors that contribute to distress among university students, and interventions that address these factors could help promote student well-being. The study also found that there was a substantial relationship concerning gender and k10 score, with females being more stressed than males. The odds ratio was 0.26, indicating that females were about four times more likely to experience distress than males. Overall, the study emphasises how common distress is among students and the various factors that are associated with it, including gender, exercise habits, sleep quality, and smartphone use.

Students with no napping at all had lower odd as compared to others who were associated with daytime napping. Students who consume more cups of caffeinated drinks in order to concentrate in studies also experience poor sleep. Our findings agreed with the research done by sharif et.al.²⁶ Presence of any chronic aliment, can impair one mental health that lead to poor sleep among them. The PSQI scores show that a large percentage 75.1 % of the students slept poorly. Similar percentage was obtained in other studies done at Jordan¹⁰(61.7%), Nigeria²³ (84.6%), Pakistan¹⁵ (77.02%), Ethiopia⁶ (55.8%). Another study done in Nepal²⁷ showed that 44.23% had lower prevalence of poor sleep. The prevalence of poor sleep was high in medical and dental students (48.9%) as compared to paramedical students (16.4%). Our results were consistent with the studies done in Nigeria²³ and in meta-

analysis done in Iran²⁸. Poor Sleep was also highly prevalent in students who use smartphones for more than three hours. Thus, exposure to mobile phones for longer duration decreases sleep time and results in poor sleep. Similar results were obtained from the studies conducted in Saudi arabia²⁵ , united kingdom²⁹ and damman³⁰. Excessive smartphone use can negatively impact mental health. Universities should educate students on healthy smartphone habits, such as limiting screen time and using apps to monitor and manage their smartphone use. Though in our study majority of students consume only one caffeinated and energy drinks, but prevalence of poor sleep was high in students who consume more than two caffeinated drinks and energy drinks as compared to students with good sleep^{26,31,32}. The students who secured more than 60% marks also had poor sleep as compared to students with less than 60% marks. In order to keep with the performance, students work hard and compromise their sleep. This was contradiction to the study done by Almojali et al.³³ where students with less marks were having poor sleep. The study showed that napping hours were significantly associated with poor sleep, as students with no napping has p value <0.05(0.14) as compared to reference group. The presence of academic stressors was significantly associated with poor sleep. Similar results were seen in the studies done at Jordan¹⁰, Pakistan¹⁵. Majority (65%) of the students were stressed. Stress was significantly associated with female students and absence of regular exercise. Our results were consistent with similar studies done in Jordan¹⁰, Saudia Arbia³⁴ and Nepal⁹. Stress was more prevalent in medical and dental students as compared to paramedical students. Similar results were obtained from studies done at Uttar Pradesh in India¹¹. The prevalence (46.6%) of stress was more in students who score more than 60% marks. Similar results were obtained from studies done China³⁵, Malaya³⁶ and Nepal⁹. The odd ratio was high in students who consume more than 4 caffeinated and energy drinks in comparison to reference group. To cope with stress, they consume more drinks to cope with studies. Our findings concurred with research done by Kaur et al.³⁷, Park et al.³⁸ and Richard et.al.³⁹. High exposure to social media and usage of smartphone for more duration lead to stress among younger generation. Similar finding was seen in our study. Similar findings were seen in study conducted in Israel⁴⁰ and Sweden²⁴.

Several studies have found a significant connection between stress and poor sleep^{10,15,33,41}. High stress leads to poor sleep. The results described in the study showed a substantial correlation between poor sleeping status (measured using PSQI) and higher levels of stress (measured using K10 score) among college students. This was demonstrated through the chi-square test, Pearson correlation coefficient, binary logistic regression, and linear regression models. The results imply that the students with higher level of stress were more likely to have poor quality sleep. Our results are consistent with the findings of Kalmbach et al.⁴² and Lund et al.,⁴³ as a relationship was shown between stress and bad sleep quality among college undergraduates. Additionally, the studies concluded that academic stressors were significantly associated with higher levels of stress and poor sleep quality is also supported research done by Lund et al.⁴³ and Suen et al.⁴⁴ The study found a significant correlation between poor sleep quality (as measured by the PSQI) and higher levels of stress (as measured by the K10). This finding is consistent with other studies that have shown a strong association between sleep disturbances and stress.^{42,45} The logistic regression analysis found that stressed individuals were twice as likely to have poor sleep quality compared to non-stressed individuals. This is consistent with a meta-analysis of 27 studies that found a substantial association between stress and poor sleep quality.⁴⁶ The K10 score explained 24% of the variance in the PSQI score, according to linear regression model, demonstrating a substantial correlation between stress and poor sleep quality. This supports other studies that discovered a strong connection between stress and sleep problems.^{42,46} The study also found a significant association between academic stressors and both K10 and PSQI scores. This is consistent with the findings of Gaultney⁴⁷ and Suen et al.⁴⁴ that also have shown that academic distress can have a significant impression on both stress levels and sleep quality.

However, our study included only second year students in medical, dental and allied health sciences. Students from only one university made up the sample size. Therefore, the results cannot be generalized to whole population of India. It is important to note that study had some other drawbacks, including its transverse (cross-

sectional) design, which hinders the ability to demonstrate causality. Additionally, the self-reported assessments were used in the study, which may be subject to response bias. Future research could use objective measures of sleep quality and stress, such as actigraphy or cortisol levels, to provide a more accurate assessment.

Conclusion

To conclude, students studying medicine, dentistry, and allied health sciences are equally stressed. Presence of stress leads to poor sleep quality. Females experienced more stress. Now days modern lifestyle, increasing pressure of studies to secure marks to pass their professional exams and lack of exercise make them more prone to stress. We need more studies to help students to cope with stress and improve their sleep quality.

Our study results have important implications for various professional course students in medical field. Inadequate sleep and high levels of stress can negatively impact a student's academic performance, mental health, and overall well-being. Overall, the study's results provide valuable insights into the relationship between stress and sleep quality among college students and highlight the need for interventions to address both factors. The findings of this study add to the growing body of evidence highlighting the close relationship between stress and inadequate sleep quality, particularly in the context of academic stress. The high prevalence of bad sleep quality and its negative impact on daytime functioning highlights the importance of addressing sleep problems among this population. Interventions aimed at improving sleep hygiene, promoting relaxation techniques, and reducing stress may be beneficial in improving sleep quality and reducing the risk of associated health problem.

Conflict of interest: None declared.

Ethical clearance: The study was approved by the Institutional Review Board of Teerthanker Mahaveer Medical College & Research Center, Uttar Pradesh, India (Ref. IRB/96/2022).

Source of fund: Nil.

Authors' contribution: All the authors were equally involved in concept and design of the study, data collection, analysis, manuscript preparation, revision and finalization.

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