

## Quality of Sleep among Medical Students in Relationship with Personality Traits after COVID-19 Pandemic Lockdown in Erode, Tamilnadu: The Cross-Sectional Study

Isaac Christian Moses<sup>1</sup>, M. A. Vaithiyalingam<sup>2</sup>, N. Krishna Kumar<sup>3</sup>, S. Mohamed Musthafa<sup>4</sup>, B. Senthilsayinathan<sup>5</sup>, Sasikala Gunasekaran<sup>6</sup>, Panneerselvam Periasamy<sup>7</sup>

<sup>1</sup>Dean, Professor, Department of Medicine, Nanda Medical College and Hospital, Erode, Tamilnadu.

<sup>2</sup>Assistant Professor, Department of Surgery, Nanda Medical College and Hospital, Erode, Tamilnadu.

<sup>3</sup>Assistant Professor, Department of Medicine, Nanda Medical College and Hospital, Erode, Tamilnadu.

<sup>4</sup>Professor & HOD, Department of Pharmacology, Nandha Medical College and Hospital, Erode, Tamil Nadu.

<sup>5</sup>Assistant Professor, Department of Psychiatry, Government Erode Medical College Hospital, Perundurai, Erode, Tamilnadu, India.

<sup>6</sup>Department of Nursing, Government Erode Medical College Hospital, Perundurai, Erode, Tamilnadu, India.

<sup>7</sup>Assistant Professor, Department of Physiology, Government Erode Medical College, Perundurai, Erode, Tamilnadu, India.

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Corresponding author: Dr. S. Mohamed Musthafa

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### Abstract

**Introduction:** Few studies have explored the correlations between personality traits and mental health during the outbreak period of the COVID-19 pandemic. Students' academic success, interpersonal interactions, and propensity for mental illnesses are all impacted by their sleep quality. One of the recognised elements influencing a person's sleep design is their personality. Medical students' personality and academic success are both negatively impacted by poor sleep quality.

**Aim:** The current research looked into the connection between personality traits and sleep quality among medical students in Post Covid-19 Pandemic Lockdown in Erode, Tamil Nadu.

**Materials and Methods:** 288 undergraduate medical students participated in a cross-sectional study that was performed on an institutional level. Structured questionnaires that were administered by interviewers were used to gather the data. Medical students learning in Erode had their personality and sleep quality evaluated using the NEO personality inventory (NEO-PI) and Pittsburgh Sleep Quality Index (PSQI).

**Results:** 226 (78.5%) of the 288 medical students said they had poor sleep. The results of our study demonstrate a significant correlation between neuroticism and the global PSQI score ( $P < 0.05$ ). Students who slept poorly scored more highly on the neuroticism scale. The findings show that, among students during the COVID-19 outbreak, personality characteristics were risk factors

for psychological disorders. Our findings might serve as a guide for those conducting psychological disorder screenings.

**Conclusion:** In the Post Covid-19 Pandemic Lockdown, medical students who don't get enough sleep become neurotic. Medical students' mental health and academic success are impacted by COVID-19. The findings show that, among students during the COVID-19 outbreak, personality characteristics were risk factors for psychological disorders. Future research on these personality traits may help to better understand how sleep disorders affect academic achievement.

**Keywords:** COVID-19, Sleep Quality, Neuroticism, Personality Traits, Mental health, Pandemic Lockdown.

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## Introduction

People in China and many other nations around the world have acquired the coronavirus disease 2019 (COVID-19) since the first case was recorded in December 2019 [1]. Humans experience serious psychological and physiological threats from COVID-19 due to its high infectivity and mortality rate [2]. Numerous studies have revealed that during the COVID-19 pandemic, psychological disorders like anxiety, depression, and insomnia have predominated [3]. Greater knowledge of the medical student's population's mental health during this pandemic could help direct intervention strategies for shielding those who are susceptible from having psychological disorders.

With little understanding of the short- or long-term effects, the global SARS-CoV-2 (COVID-19) pandemic had an abrupt and unprecedented impact. Academic medical institutions quickly adopted new, more stringent regulations for efforts involving future medical education [4]. To safeguard their health and ease the strain on limited personal protective equipment, medical students were among the first to be benched. Students found inventive methods to help with the crisis when they were confined to online classrooms and infrequent online doctor visits, or they were forced to take a break from clinical work [5]. The effects of the ensuing isolation on either medical

student gender are still unknown, despite the fact that both male and female medical students received the same stringent stay-at-home orders.

Since December 31, 2019, the SARS-Cov-2 virus has spread to nearly every region of the globe, affecting 218 nations and territories [6]. On March 11, 2020, the COVID-19 disease epidemic, which is caused by the SARS-Cov-2 virus, was classified as a pandemic by the World Health Organization [7].

As of this writing, 1,756,947 individuals have died from COVID-19, and 80,194,841 people have been affected by the virus [6]. Countries have implemented a variety of measures, including quarantining, partial lockdowns, complete lockdowns, and spatial separation, to stop the spread of COVID-19 due to its rapid transmission.

Maintaining excellent physical, mental, and emotional health as well as improving life quality all depend on getting enough sleep [8]). Sleep quality is a difficult-to-define occurrence that can be assessed using both quantitative and qualitative factors [9]. The quantity and timing of sleep also affect brain function. Timing of sleep is influenced by the duration of previous wakefulness as well as circadian schedule regulation [10]. In addition to being a prevalent health issue for medical students, poor sleep quality can also

be a sign of many chronic physical and mental illnesses [11]. Both developing and high-income countries have a significant prevalence of poor sleep quality [12]. According to a WHO report from 2003[13].

Medical students frequently report having poor sleep quality, which may be because their area of study is one of the most stressful due to how demanding it is. Compared to general groups, medical students are twice as likely to experience it [12]. Due to their lengthy study years, intense study schedules, and overnight clinical responsibilities, medical students' scholastic programmes are more demanding [14]. According to numerous studies [15], poor sleep among medical students has a significant negative impact on their mental and physical health, leads to drinking problems and suicidal thoughts, and negatively impacts their academic performance. They also have an impact on the community through accidents and medical errors.

Various variables, such as an individual's personality, cognitive style, physical or mental illness, and sleep environment conditions, may contribute to the sleep architecture of the medical students [16]. After Covid 19 pandemic lockdown there is little information on the relationship between a person's personality characteristics and how well they slumber. Sleep disorders and mental illnesses are more likely to occur in people who have personality characteristics that are not adaptive [17]. Sleep disorders can result from mental illnesses like anxiety, depression, acute stress response, and psychotic disorder, and vice versa [18–20].

The link between personality characteristics, circadian typology, and the amount and quality of sleep has been tried to be explored in earlier studies [21–23]. Furthermore, according to other research, people with high neuroticism traits exhibit sympathetic hyperarousal due to cognitive recitation

problems and excessive worry about uncontrollable life events [24–28].

In contrast to neuroticism, which is linked to poor academic performance, extraversion and conscientiousness are essential personality characteristics for long-term success in medical training [19–22]. Therefore, the underlying personality traits may influence both the medical students' ability to sleep and their academic success. The purpose of the current research is to determine whether personality characteristics and sleep hygiene among medical students in post Covid 19 pandemic lockdown.

### Materials and Methods

This cross-sectional investigation was led in the lockdown period. The study was conducted via online survey students aged between 18 and 22 years during the period April–May 2022. Google Forms were utilized alongside an online poll for collecting the data from the study participants. The survey was prepared in English, and it comprised two sections. The initial segment of the poll included a presentation showing the goals of the examination and featuring that support to this investigation is intentional, and that the appropriate responses would be dealt with privately. The finishing of the online overview took around 8–10 min, including various close-ended questions.

After obtaining online consent, we collected data assessing students' sociodemographic details, Pittsburgh Sleep Quality Index (PSQI), and NEO personality inventory (NEO-PI) of self-explained questionnaires. The link to the online survey was shared to MBBS students in medical colleges in the Erode district of Tamil Nadu.

Those who are willing to give online consent and students studying MBBS within Erode district were included in this study, whereas other districts of Tamil Nadu students, not

willing to take part in this study, and other non-health care students and Students who have a history of psychiatric problems were excluded from this study. The Google Form online questionnaire was sent to the students via an online platform. Students pursuing MBBS in the Erode region of Tamilnadu were contacted via WhatsApp and E-mail and interviewed after receiving permission from their respective college.

### Study tool:

PSQI is a self-administered questionnaire [29] that may be used in both nonclinical and clinical settings to measure subjective sleep quality. Scores higher than 5 indicate poor sleep. We gathered data from the PSQI on how many hours participants spent in bed (TIB; min) and sleeping (TST; min) when they went to bed to sleep (BT; hr), and when they woke up in the morning (WU; hr) throughout the second wave of COVID-19, as well as changes in sleep pattern. The PSQI scale has been shown to be valid and reliable (Cronbach's Alpha 0.885).

The NEO-FFI has 60 items that are used to evaluate personality characteristics [30]. The neuroticism, extraversion, openness, agreeableness, and conscientiousness subscales each have 12 items. Examples include: "I laugh easily" (extraversion), "I often attempt new and foreign foods" (openness), "I try to be courteous to everyone I encounter" (agreeableness), and "I keep my belongings neat and clean" (conscientiousness).

A 5-point Likert scale is used to evaluate each item, with 1 denoting strong disagreement and 5 denoting strong agreement. The Cronbach's alpha coefficients for the NEO-FFI scale in this research were as follows: neuroticism =.82, extraversion =.82, openness =.67, agreeableness =.71, and conscientiousness =.76. The NEO-FFI scale has been shown to be valid and reliable (Cronbach's Alpha 0.958).

### Ethics approval

Government Erode Medical College's intuitional Ethical Committee assessed and approved the survey project (IEC/001-5 & 18/GEMC and H/2020). (July 31, 2020). Furthermore, before their participation in the study, all participants signed an informed consent form stating that completing the questionnaire was voluntary, that students might withdraw at any time throughout the survey, and that their responses would be kept secret.

### Statistical Analysis

In each category, demographic variables were presented in frequency with percentages. The mean, median, and standard deviation of the PSQI and NEO-FFI scores were provided. The Chi-square test was used to examine the relationship between demographic factors and PSQI and NEO-FFI scores. Correlation between PSQI and NEO-FFI score was assessed using Pearson correlation confidence method.  $P \leq 0.05$  is considered statistically significant, and two-tailed tests were used for significance testing. The data were analysed using Statistical Package for Social Sciences for Windows, Version 22 (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp. IBM Corp.).

### Results

There were 288 students were participated in the study. Among them, 91 (31.6%) were male and 197 (68.4%) were female. The mean age of males was  $19.66 \pm 1.21$  years and BMI were  $22.27 \pm 3.82$  years. Table 1 depicts that the majority of the students that took part in the study (68.4%) were female. Approximately 66.98% were between the ages of 19 and 20. About 37.50% of the student's monthly family income is less than Rs 30,000. About 70.20% of the students were first- and second-year undergraduates. Table 2 shows the students quality of sleep

and its components among medical students after COVID-19 pandemic lockdown. The global PSQI was  $6.33 \pm 2.13$ . Figure 1 depicts that 226 (78.47%) medical students have poor sleep quality, whereas 62 (21.53%) have

good sleep quality. Table 3 shows descriptive statistics for NEO Personality inventory of students. Table 4 Independent t test results show that all the domain mean score did not differ between male and female students.

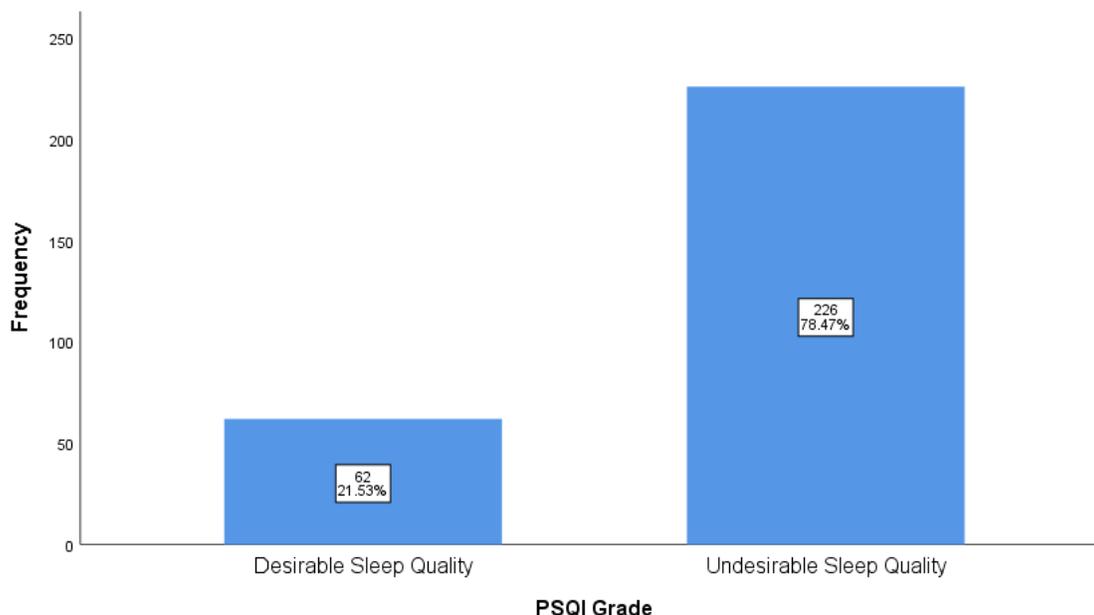
**Table 1: Socio-demographic characteristics of the participants**

Demographic Variables	Categories	Count	%
Sex	Male	91	31.6%
	Female	197	68.4%
Birth order	Youngest	118	41.0%
	Twin	1	0.3%
	Middle	22	7.6%
	Only Child	43	14.9%
	Eldest	104	36.1%
No. of Siblings	0	40	13.9%
	1	181	62.8%
	2	51	17.7%
	3	14	4.9%
	4	1	0.3%
	7	1	0.3%
Type of Family	Nuclear	222	77.1%
	Joint	51	17.7%
	Extended	15	5.2%
Place of living	Rural	102	35.4%
	Urban	94	32.6%
	Semi urban	92	31.9%
Year of study	I Year	150	52.1%
	II Year	52	18.1%
	III Year	65	22.6%
	IV Year	21	7.3%
Monthly family income Rs	<10000	26	9.0%
	11,000-20,000	25	8.7%
	21,000-30,000	57	19.8%
	31,000-40,000	29	10.1%
	41,000-60,000	29	10.1%
	61,000-75,000	62	21.5%
	76,000-90,000	5	1.7%
	>90,000	55	19.1%

**Table 2: Quality of sleep and its components among medical students after Covid 19 pandemic lockdown.**

Sleep quality	N	Minimum	Maximum	Mean	Std. Deviation
Sleep quality	288	0.00	3.00	0.64	0.77
Sleep latency	288	0.00	1.00	0.48	0.50
Sleep duration	288	0.00	3.00	0.68	0.91

Habitual sleep efficiency	288	0.00	3.00	0.59	0.87
Step sleep disturbances	288	0.00	18.00	3.84	3.73
Use of sleeping medication	288	0.00	2.00	0.84	0.55
Daytime dysfunction	288	0.00	2.00	0.52	0.65
<b>Global PSQI</b>	288	3.00	12.00	6.33	2.13



**Figure 1: PSQI Grade among medical of students**

**Table 3: Descriptive statistics for NEO Personality inventory of students**

NEO Personality inventory	Statistic	Range	Minimum	Maximum	Mean	Std. Deviation
Neuroticism	288	45.00	12.00	57.00	35.20	9.00
Extraversion	288	45.00	12.00	57.00	38.20	8.31
Openness	288	44.00	12.00	56.00	38.30	7.92
Agreeableness	288	44.00	12.00	56.00	36.81	7.75
Conscientiousness	288	45.00	12.00	57.00	39.41	8.92

**Table 4: Comparison of male and female subjects in terms of PSQI global score and NEO FFI scores**

Domain	Male		Female		P Value
	Mean	Standard Deviation	Mean	Standard Deviation	
Neuroticism	34.84	9.40	35.37	8.82	>0.05
Extraversion	38.02	8.31	38.28	8.33	>0.05
Openness	38.10	7.41	38.40	8.16	>0.05
Agreeableness	36.60	7.61	36.91	7.83	>0.05
Conscientiousness	39.25	8.71	39.49	9.04	>0.05
Global PSQI	6.29	2.17	6.36	2.12	>0.05

**Table 5: Correlations between NEO-FFI and Global PSQI**

		Correlations					
		Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness	Global PSQI
Neuroticism	Pearson Correlation	1	0.811**	0.736**	0.720**	0.734**	-0.036
	P Value		0	0	0	0	0.04*
	N	288	288	288	288	288	288
Extraversion	Pearson Correlation	0.811**	1	0.812**	0.776**	0.827**	-0.026
	P Value	0		0	0	0	0.656
	N	288	288	288	288	288	288
Openness	Pearson Correlation	0.736**	0.812**	1	0.846**	0.867**	-0.017
	P Value	0	0		0	0	0.78
	N	288	288	288	288	288	288
Agreeableness	Pearson Correlation	0.720**	0.776**	0.846**	1	0.843**	-0.001
	P Value	0	0	0		0	0.98
	N	288	288	288	288	288	288
Conscientiousness	Pearson Correlation	0.734**	0.827**	0.867**	0.843**	1	-0.046
	P Value	0	0	0	0		0.433
	N	288	288	288	288	288	288
Global PSQI	Pearson Correlation	-0.036	-0.026	-0.017	-0.001	-0.046	1
	P Value	0.54	0.656	0.78	0.98	0.433	
	N	288	288	288	288	288	288

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

On the PSQI, Table 5 compares students who had poor sleep quality to those who had excellent sleep quality. Pearson's correlational analysis was used to examine the degree to which personality characteristics, overall PSQI score, and subscales are related. The correlational analysis revealed a substantial and positive correlation between neuroticism and the overall score. Students who had poor sleep quality had greater neuroticism scores ( $p < 0.05$ ). The extraversion scores of the students with better sleep quality were higher than those with poorer sleep quality, but this

variation was not statistically significant ( $p > 0.05$ ). No significant relationship was observed between personality and Age, year of study, gender and family income.

### Discussion

Nearly every aspect of living has been impacted by the ongoing COVID-19 pandemic. Particularly in light of the second pandemic surge, the effect on mental health is becoming a factor that should not be overlooked. Because of the nature of their studies, the high workload, and constant exposure to ill patients, MSs are among the

groups known to experience high levels of stress and are therefore more likely to be impacted by the pandemic [31]. Social isolation and unease about the future can also have a detrimental psychological impact [32], and these are also factors that apply to the lengthy quarantine period in the India.

This study highlights the high prevalence of high poor sleep quality (78.47%) among the medical students at Erode. which agrees with the findings of the majority of research carried out in Brazil [33], Mexico [34], and India [35]. However, a Lithuanian research found that 40% of the medical students had poor sleep quality, as determined by the PSQI [36]. The majority of studies found no distinctions in outcomes depending on gender [33,31]. Few studies have examined gender differences in the outcomes of sleep quality; an Indian research [38] included more men than women, while a Brazilian study [33] included more women than men. Although we found that female respondents had worse sleep quality than male subjects (36.36% vs. 29.21%), the difference was not statistically significant. This could be explained by the high and low neuroticism and psychoticism ratings, respectively.

The prevalence of insufficient sleep varies between studies, possibly due to differences in measurement techniques, culture, sociodemographic factors, and medical student personality characteristics. Additionally, compared to the general population and other students, medical students have a greater prevalence of poor sleep quality. Personality traits may be a logical explanation for poor sleep quality in addition to the previously stated variables.

To the best of our knowledge, this study is the first to link personality traits among Indian medical students with the quality of their sleep. We found that people who had poor sleep quality had higher neuroticism scores but not on other emotional dimensions.

Additionally, neuroticism was linked to daytime dysfunctions, poor subjective sleep quality, sleep latency, and sleep disturbances. Additionally, it has nothing to do with sleep quality, duration, or disturbances. Our research adds to the growing body of evidence that personality trait neuroticism may be a special predictor of sleep quality [37–38]. Because it is an inherent factor that may be the cause of poor sleep quality, neuroticism must be recognised in order to improve the outcome. For medical students, understanding how their sleep quality affects their academic and cognitive performance as well as their propensity for minor psychiatric illnesses is important [41,42]. Our findings might be useful for comprehending how personality characteristics affect how pre-sleep cognition is processed cognitively and emotionally [43]. It is necessary to conduct more study to investigate how interventions that target these personality traits can enhance overall sleep quality.

## Conclusion

Personality characteristics can influence the lives and careers of medical students. Conscientiousness, extroversion, openness, and agreeableness are a few of these personality traits that have a beneficial impact on medical students' lives and careers. Students Compared to people with high levels of neuroticism, people with these traits typically have better health outcomes, greater life satisfaction, better doctor-patient relationships with patients, and better academic success. But only neuroticism affects how people perceive the danger of developing a disease in a positive way. Our study provides evidence that insufficient sleep among medical students is related to personality traits, especially in terms of neuroticism and extraversion. The current study will assist clinicians and scholars in the field of sleep medicine in deepening their comprehension of the biopsychological variables affecting sleep quality. Taking into

account these correlations among medical students may help to improve the outcome of sleep disorders and academic success.

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### IEC Approval

Institutional Ethics Committee Approval from Government Erode Medical College & Hospital Perundurai obtained with vide reference IEC/001-5 & 8/GEMC& H/2020 on 31.07.2020.

### Author Contributions

**Dr. S. Mohamed Musthafa and Dr. Isaac Christian Moses**—conceptualization, data curation, investigation, methodology, project administration, visualization, writing—original draft, writing—review and editing, **Dr. N. Krishna Kumar & Dr. M.A. Vaithiyalingam** —conceptualization, methodology, writing—original draft, writing—review and editing, **Dr. B. Senthilsayinathan** —conceptualization, visualization, supervision, writing—original draft, **Dr. Sasikala Gunasekaran and Panneerselvam Periasamy**—, methodology, writing—original draft, writing—review and editing. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work. All authors have read and agreed to the published version of the manuscript.

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