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Research Article

Perceived Stress among Medical Students during COVID-19 Pandemic and its Impact on Sleep and Studies - A Cross-sectional Study in South India

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A B S T R A C T

Background: COVID-19 pandemic has adversely affected the mental health of medical students due to the lockdown of colleges and educational institutions that had imposed a feeling of uncertainty and insecurity in students.

Objectives: The present study aims todetermine the prevalence of stress among medical undergraduate students and its association with sleep and studies during the COVID-19 pandemic.

Method: Perceived stress and sleep quality during COVID-19 pandemic was assessed among 446 undergraduate medical students using Perceived Stress Scale (PSS) and Pittsburgh Sleep Quality Index (PSQI) tools. An online questionnaire containing questions retrieved from PSS and PSQI tools was prepared in Google Forms and was shared by e-mail to the students. The students were classified into three categories based on PSS total scores and compared for differences in sleep quality and learning difficulties.

Results: The mean score of PSS was 13.38 ± 6.87. 252 (56.5%) had low perceived stress, 146 (32.7%) had moderate and 48 (10.8%) had high perceived stress. First year and final year medical students perceived more stress when compared with others. Among the 446 study participants, 34 (7.6%) reported poor sleep quality and it was significantly associated with the presence of stress (pvalue<0.001). 215 (48.2%) students had difficulty in concentrating on their studies.

Conclusion: The COVID-19 pandemic has resulted in perceived stress among medical undergraduate students of which most of them had moderate perceived stress which warrants immediate action.

Keywords: COVID-19 Pandemic, Perceived Stress, Undergraduate Medical Students, Copingstrategies, Sleep Disturbances

Introduction

The COVID-19 pandemic has adversely affected the functionality of various sectors of the society including traders, economists, labourers, employees and students. Unfortunately, students and educational activities are of least concern that is not addressed appropriately by the stakeholders. It is estimated that the closure of schools and educational institutions has affected 80% of students worldwide.[1] Mental health is largely affected during the crisis of a pandemic that can lead to maladaptive behaviours, emotional distress and defensive responses.[2] A recent study by Zhou SJ et al. in the Hubei province of China has shown the prevalence of depressive symptoms and anxiety among adolescent children to be 43% and 37% respectively during this COVID-19 pandemic.[3]

Amidst this unfavourable situation, the psychological status of medical students is worth considering. The prevalence of stress in medical students is already known and the global prevalence of anxiety among medical students was reported to be 33.8%.[4] A prospective study from China by Li Y et al. has shown the prevalence of psychological distress in COVID-19 pandemic to be 27% among medical students.[5] While among the general public, 54% of the respondents reported moderate to severe psychological impact due to COVID-19, 29% had moderate to severe anxiety and 17% had moderate to severe depressive symptoms.[6] The data on the mental health of medical students in our country is still deficient. Further lockdown of colleges and educational institutions had imposed a feeling of uncertainty and insecurity in students due to sudden transition to the novel unaccustomed online modes of teaching and lack of proper information about the exams for present year graduating students who are anxious about their future career.[7] With this background, the present study aims todetermine the prevalence of stress among medical undergraduate students, its association with sleep, studies and the coping strategies adopted by them during the COVID-19 pandemic.

Materials and Method

The present study is across-sectional study conducted in Government medical colleges in Tamil Nadu, India during the period from October 2020 to March 2021. Ethical clearance was obtained from the Ethics Committee (Human studies) of Government Villupuram Medical College. All the current undergraduate medical students (first year to final year) who were admitted in the institutionswere approached for willingness to participate in the study through e-mail. Students with known psychiatric illnesses and sleep disorders were excluded from the study. Among the eligible participants, those who gave online informed consent were approached for the study. The objectives of the study wereexplained and confidentiality of the results was assured through e-mail. Google Form containing the questionnaire was mailed to the students who expressed their willingness to participate in the study. Duration of one week was provided to the participants for submitting their responses through google forms. 446 students participated in the study.

Study Tool

An online questionnaire was prepared in Google Forms. The first part of the questionnaire contained questions retrieved from Perceived Stress Scale (PSS). PSS is a 10 items tool developed by Shelden Cohen, a widely used tool to measure the perceived level of stress.[8,9] It is a measure of the degree to which situations in a person's life are perceived to be stressful. Items in PSS were designed to assess how uncontrollable, unpredictable, overloaded respondents feel about their lives. PSS also includes a number of queries related to the current level of perceived stress. PSS was designed for use in persons with at least a junior high school education. Items in the PSS ask about the feelings and thoughts of persons in the last one month. For each item, students will choose their response from the following alternatives, never/ almost never/ sometimes/ fairly often/ very often. Individual scores for each item is added to a final score. Individual scores on the PSS scale range from 0 to 40. Higher scores indicate a higher level of perceived stress. Scores between 0 and 13 are considered to correspond to alow level of stress. Students with scores between 14 and 26 are considered to have a moderate level of stress. Scores in the range of 27-40 indicate high perceived stress.

The next section of the study tool assessed the sleep quality of students in the last 30 days using Pittsburgh Sleep Quality Index (PSQI) tool.[10]The tool consisted of19 self-rated questions that were combined to form 7 component scores each ranging from 0-3 points. "No difficulty" is indicated by a score of "0" and "severe difficulty" is indicated by a score of "3". The 7 component scores were finally combined to a global PSQI score ranging from 0-21 points in which the score"0" indicates "no difficulty" and score of "21" indicates "severe difficulty" in all the areas.

The third part of the questionnaire contains questions to understand the coping strategies adopted by the students to overcome the stress during this covid pandemic and whether they face difficulty in studying.

Statistical Analysis

The responses of students received through online Google forms were transformed into an excel sheet and analysed using SPSS software version 22. The students were divided into three categories based on PSS total scores as those who perceived low, moderate and high stress. Prevalence of perceived stress as per categories was expressed in

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frequency and percentages. The average PSS score of participants was expressed in mean and standard deviation. Components of the PSQI tool and presence of difficulties in concentrating on academics were expressed in frequency and percentages. Association between demographic characteristics, various components of sleep quality and coping strategies with various levels of stress were tested using chi-square test with a 5% level of significance.

Results

Table 1.Demographic Characteristics and Categories of Perceived Stress among the Study Population (n=446)

Age (years)	N	%
18	25	5.6
19	77	17.3
20	173	38.8
21	97	21.7
22	56	12.6
24	18	4.1
Gender		
Female	271	60.8
Male	175	39.2
Year of study		
Firstyear	74	16.6
Second year	127	28.5
Pre-final year	173	38.8
Final year	72	16
Categories of perceived stress		
Low (Scores between 0 and 13)	252	56.5
Moderate (Scores between 14 and 26)	146	32.7
High (Scores between 27 and 40)	48	10.8

The mean age of study participants was 20 years and the age rangewas 18 to 24 years. 60.8% of the participants were females. The percentages of students in the first, second, pre-final and final year were 16.6%, 28.5%, 38.8% and 16% respectively.The mean score of Perceived Stress Scale was 13.38 ± 6.87. Based on the classification, 252 (56.5%) had low perceived stress, 146 (32.7%) had moderate and 48 (10.8%) had high perceived stress (Table 1).

First year and final year medical students perceived more stress when compared with second year and pre-final year medical students and the association between year of study and categories of perceived stress was statistically significant (pvalue <0.001) (Table 2).Age and gender are not significantly associated with categories of perceived stress.

Out of 446, 34 (7.6%) mentioned their sleep quality as “Very bad”, duration of sleep was less than 5 hours in 60 (13.5%), 25 (5.6%) were experiencing sleep disturbances in the last month and 27 (6.05%) experienced day time dysfunction. Among the 34 participants with poor sleep quality, 16 (47%) were in high stress and 13(38%) were in moderate stress.A statistically significantassociation was observed between subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, day time dysfunction with levels of stress (Table3).

Study participants were asked about the major coping strategies adopted by them to relieve stress during this lockdown period of COVID-19 pandemic and the results were presented in Table 4.There exists a statistically significant difference (p value <0.001) between coping strategies adopted and presence of stress. Among the students who are perceived to be under moderate or high stress, 48.9% were spending time on social media. Maintaining regular contact with friends was also less (18.7%) among them when compared with students who wereunder a low level of stress. Out of 446 students, 215(48.2%) were facing difficulty in concentrating on their studies. Among them, 140 (65.1%) were perceived to be under stress. But the association observed between the stress level and difficulty in concentrating in studies was not statistically significant (Table 4).

Table 2.Association between Year of Study and Categories of Perceived Stress (n=446)

S. No.	Year of Study	Level of stress						X^2 value	P value
		Low		Moderate		High			
		N	%	N	%	N	%		
1.	First year	4	2	50	34	20	42	13.29	0.041*
2.	Second year	106	42	16	11	5	10		
3.	Pre-final year	132	52	31	21	10	21		
4.	Final year	10	4	49	34	13	27		
	Total	252	100	146	100	48	100		

*p value – statistically significant.

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Table 3.Association between Perceived Stress Categories and Components of Pittsburgh Sleep Quality Index

Components of PSQI	Level of Stress			X^2value	P value
	Low (N = 252)	Moderate (N = 146)	High (N = 48)		
Subjective sleep quality					
Very good	130	62	8	150.8	<0.001*
Fairly good	108	20	10		
Fairly bad	9	51	14		
Very bad	5	13	16		
Sleep latency					
≤ 15 min	122	30	16	111.5	<0.001*
16-30 min	110	36	12		
31-60 min	15	60	13		
> 60 min	5	20	7		
Sleep duration					
>7h	82	50	28	12.8	0.04*
6-7h	60	65	12		
5-6h	68	25	6		
<5h	42	16	2		
Habitual sleep efficiency (%)					
>85	106	45	13	28.86	< 0.001*
75-84	112	65	14		
65-74	20	24	11		
<65	14	12	10		
Sleep disturbances					
Not during the past month	122	80	11	69.07	0.013*
Less than once a week	113	50	14		
Once or twice a week	10	10	11		
Three or more times a week	7	6	12		
Day time dysfunction					
Never	128	45	9	80.09	< 0.001*
Once or twice	106	55	14		
Once or twice each week	10	37	15		
Three or more times each week	8	9	10		

*p value statistically significant.

Table 4.Association between Coping Strategies adopted among Students to Relieve from Stress, Difficulty in Concentrating in Studies and Presence of Stress (n=446)

Coping strategies adopted	Perceived Stress				P value
	Yes		No		
	N	%	N	%	
Keeping in regular contact with friends	82	42.2	88	35	< 0.001
Spending time in social media	35	18.1	47	18.7	

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Watching movies/ Listening to music	48	24.8	70	27.7	
Exercising regularly/ Yoga/ Meditation	25	12.8	41	16.3	
Eating a healthy diet	4	2.1	6	2.3	
Difficulty in concentrating in studies					
Yes	140	47.6	75	49.3	0.7
No	154	52.4	77	50.7	

Discussion

The current study has identified mental health issues among medical students, 146 (32.7%) had moderate and 48 (10.8%) had high perceived stress. A prospective cohort study conducted by Li Y et al. among medical students in China during COVID outbreak reported that 26.63% of students suffered psychological distress and 11.1% had probable acute stress reactionmany countries are considering or already graduating health professional students early to aid professional resources. We aimed to assess outbreak-related psychological distress and symptoms of acute stress reaction (ASR).[5] In this study, 146 (32.7%) had moderate and 48 (10.8%) had high perceived stress which warrants immediate intervention to strengthen the psychosocial networking of students who are now confined to their homes due to the lockdown of medical colleges.

The cause of stress among students during this COVID-19 lockdown may be diverse including fear of infection to self or relatives, frustration or boredom due to confinement that has reduced social contact and inability to perform day to day routine. 2019 coronavirus disease outbreak has seen many countries ask people who have potentially come into contact with the infection to isolate themselves at home or in a dedicated quarantine facility. Decisions on how to apply quarantine should be based on the best available evidence. We did a Review of the psychological impact of quarantine using three electronic databases. Of 3166 papers found, 24 are included in this Review. Most reviewed studies reported negative psychological effects including post-traumatic stress symptoms, confusion, and anger. Stressors included longer quarantine duration, infection fears, frustration, boredom, inadequate supplies, inadequate information, financial loss, and stigma. Some researchers have suggested long-lasting effects. In situations where quarantine is deemed necessary, officials should quarantine individuals for no longer than required, provide clear rationale for quarantine and information about protocols, and ensure sufficient supplies are provided. Appeals to altruism by reminding the public about the benefits of quarantine to wider society can be favourable.","container-title":"Lancet (London, England[11] Most of the universities have resorted to the online mode of teaching which has many challenges including infrastructure, faculty training, students' feasibility for online access and others. Notwithstanding this, the availability of professionally trained psychology counsellors in colleges who can help the students to tide over these challenges is still questionable.[7]

Moreover, first year and final year students perceived more stress when compared with second year and pre-final year medical students in this study. Heinen I et al. has also shown that perceived stress among first year students is more than the second year students who possessed high personal resources like joy, optimism, resilience and self-efficacy that was lacking in the first year students.[12] Stress among final year students may be due to frustration about lacking routine clinical postings, uncertainty about university examination etc.

Poor sleep quality is both a cause and effect of stress. Out of 446 study participants in this study, 34 (7.6%) mentioned their sleep quality as "Very bad," among them 16 (47%) were in high stress and 13(38%) were in moderate stress. 25 (5.6%) experienced severe sleep disturbances three or more times a week in the last month and among them, 12 (48%) were in high stress and 6 (24%) were in moderate stress. Few studies have reported similar findings. A study by Marelli S et al.conducted among 307 university students and 93 administration staff in Italy to assess the impact of COVID-19 lockdown on sleep quality found an increase in sleep latency, worsening of sleep quality and insomnia symptoms. They also reported 27.8% and 34.3% were showing depressive and anxiety symptoms.[13]Astudy by Rebello CR et al.conducted among 121 first year medical students in Karnataka found out that 33.8% of students had perceived stress scores of >28 and they found a positive correlation between the PSS-14 scores and global PSQI score.[14]

A longitudinal survey of 66 college students by Zhang Y et al. found that COVID-19 death count had a negative impact on the general sleep quality that in turn had an indirect impact on stress and anxiety.[15] Although the association between stress and difficulty in studying was not statistically significant, nearly 48.2% of the students had reported difficulty in concentrating in their studies. The cause for difficulty in concentrating in studies could be fear of the pandemic, unfavourable study ambience at home, poor sleep quality, deviation by social media, gaming addiction in students etc. The triad of stress, sleep and studies is crucial

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in a medical student where it can be both constructive and destructive unless adequately balanced. Liu N et al. has shown that better sleep quality decreased the post-traumatic stress disorder during COVID-19.[16] Zhang Y et al. has recommended daily physical activity and sleeping well as possible mitigation strategies for psychological stress during COVID-19. Increased physical activity is known to decrease morbidity due to mental illness by improving sleep quality.[17] Also,yoga and indoor relaxation training promote sleep quality and calm the mood.[18]Unfortunately, only 14.8% of students are engaged in regular physical activity, yoga and meditation.

Western countries likethe US has a Student wellness programme by the Liaison Committee on Medical Education[19] and UK' General medical council has laid guidelines for supporting mental health conditions among medical students.[20] Official guidelines on psychological support from the Medical Council Of India is still lacking which is the need of the hour during the pandemic and also can be imbibed as a part of the curriculum in the long run which is essential for medical students who are at higher risk of stress and anxiety. The study is not without limitations. This is a cross-sectional study where the cause-effect relationship of perceived stress and the pandemic cannot be evaluated. Further studies involving the control group are needed to evaluate this. Secondly, the assessment of perceived stress was not done by a medical interview by a professional but based on the subjective questionnaire prone torecall bias. However, the PSS scale is a validated questionnaire for the assessment of perceived stress.

Conclusion

Coronavirus pandemic hasimposed a threat to the mental wellbeing of MBBS students. This study has reported low tomoderate levels of perceived stressamong medical undergraduate students. Thirty-four (7.6%) has poor sleep quality and only 14.8% of students are engaged in regular physical activity, yoga and meditation. Information obtained from the current study will be discussed with all the faculty of the current institution and actions will be taken to reduce the stress among students. Online counselling sessions can be planned to educate the students on behavioural strategies like regular physical activity, maintaining a healthy diet, good quality sleep and to teach them to develop a positive and optimistic attitude towards COVID-19.

Conflict of Interest: None

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