EVALUATING THE PERCEIVED STRESS DURING THE ONLINE STUDY IN MEDICAL STUDENTS DUE TO THE COVID-19 PANDEMIC

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ABSTRACT

Background: COVID-19 is a highly contagious and newly identified coronavirus disease first reported in 2019 in Wuhan, China, and affected a large population globally. It was declared a pandemic by WHO. Owing to adaptation changes in education and lifestyle, the pandemic greatly affected psychological health.

Aim: To evaluate the perceived stress during the online study in medical students due to the COVID-19 infection outbreak in India.

Methods: The present online survey assessed 892 medical students using PSS (Perceived stress scale) questionnaire which was sent to all included medical students using emails and WhatsApp. The survey was to be filled out and resent. The collected data were statistically analyzed and the results were formulated.

Results: There were 60.76% (n=542) males and 39.23% (n=350) females in the present study. Low stress of 0-13 was seen in 56.50% (n=504) study subjects, moderate stress level of 14-26 in 32.73% (n=292) subjects, and high stress level of 27-40 was seen in 10.76% (n=96) subjects respectively. Sleep disturbances were significantly lesser in subjects with low-stress levels and were higher by 3 times/more in subjects with high stress with p=0.01.

Conclusion: Considering its limitations, the present study concludes that the COVID-19 pandemic has a varied and strong response from medical students and the issues of mental health should be taken into consideration for various domains and all age groups across the population. The stress level of the students can be reduced during online education by using management programs and online counseling.

Keywords: COVID-19, medical students, online education, perceived stress, students

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INTRODUCTION

A pandemic, as per WHO (World Health Organization) is defined as a certain disease spread across international borders or globally and affects a large number of populations. One such

recently identified pandemic is COVID-19 caused by the infectious coronavirus, SARS-Cov-2 (severe acute respiratory syndrome coronavirus 2) which is highly contagious and rapidly spread from one person to another by aerosols and droplets. Coronavirus was first seen in December 2019 in Wuhan, China, and was declared a health emergency of international concern by WHO in 2020 January.[1]

The COVID-19 infection pandemic has extensively affected the function of the different sectors in society including India. These sectors include students, employees, laborers, economists, and traders. However, the educational sectors and students were not given enough and required attention by various assessments. The literature data has estimated that nearly 80% of the students globally have been affected during the COVID-19 era due to the closure of different educational institutes. The COVID-19 pandemic has also greatly affected the mental health of the population during the pandemic era which could further lead to the development of defensive responses, emotional distress, and maladaptive behaviors.[2]

A recent study of 2021 conducted in Hubei, China has reported that the prevalence of anxiety and depressive symptoms in adolescent children during the COVID-19 pandemic is 37% and 43% respectively. During the unfavorable COVID-19 pandemic situation, it is vital to consider the psychological status of the medical students owing to the already known fact that stress levels are already high in medical students which were reported to be 33.8% by the previous literature data.[3]

Another study conducted in China has also depicted that there is a high prevalence of nearly 27% of psychological distress among medical students during the COVID-19 pandemic, whereas, in the general population, 54% of the study participants reported having severe or moderate psychological impact owing to COVID-19 pandemic, 17% subjects had moderate to severe symptoms of depression, and 29% subjects had moderate to severe symptoms of the anxiety.[4]

The data concerning the mental health of medical students in Indian subjects is scarce in the literature. Additionally, the sudden lockdown imposed the closure of educational institutes and colleges which posed insecurity and uncertainty to students owing to the sudden shift to an unaccustomed mode of teaching by online means and lack of information concerning exams and passing to move to next year making students anxious about their future and career.[5]

With this information, the present study was conducted to evaluate the perceived stress during the online study in medical students due to the COVID-19 infection outbreak in India. Also, its association with coping strategies, studies, and sleep was assessed.

MATERIALS AND METHODS

The present cross-sectional clinical study was done to evaluate the perceived stress during the online study in medical students due to the COVID-19 infection outbreak in India. Also, its association with coping strategies, studies, and sleep was assessed. The study was done after the clearance was given by the concerned Ethical committee. The study population was medical undergraduate students.

The study included undergraduate medical students who are currently in the study programs. The informed consent for the study participants was also taken in the online form either through email or WhatsApp. The exclusion criteria were subjects with sleep disorders and any other psychiatric illness. Of the eligible participants, those who were willing to

participate in the study were included in the study. The detailed study design was explained to all the participants and subjects were assured about the confidentiality of the results. Google forms having a questionnaire were sent to all the participating students via either email or WhatsApp. The students were given 1 week for submitting a response. The study sample was finally constituted of 892 participants.

The questionnaire was prepared using the online Google form. The first part of the questionnaire was taken from the PSS (perceived stress scale) which is a tool comprised of 10 items and is extensively used to evaluate the perceived level of stress.[6,7] PSS assesses the degree to which a person perceives life to be stressful. PSS tools also assess how overloaded, unpredictable, and uncontrollable the life of a subject is as they feel. PSS also comprises different queries as it relates to the current perceived level of stress. PPS was used in subjects with a minimum of junior high school education. PSS assesses the thoughts and feelings of the subjects in the past month. The alternatives for each PSS item were either very often/fairly often/sometimes/almost never/never. To get the final scores, all the individual scores were added within a range of 0-40. High perceived stress levels were shown by high scores of 27-40. A low level of stress was shown by scores of 0 and 13 and scores of 14 and 26 showed moderate stress levels.

The PSQI (Pittsburgh Sleep Quality Index) tool was also used to judge the sleep quality of the medical subjects during the past 30 days. PSQI consists of 19 self-rated questions combined to make a 7-component score in the range of 0-3 points. A score of 0 indicated no difficulty and a score of 3 as severe difficulty. The final PSQI scores range from 0-21 to form the final 7 components where 0 showed no difficulty and 21 showed severe difficulty in all areas. The third part had a questionnaire having questions on understanding the coping strategies adopted by study subjects to combat stress during the COVID-19 pandemic and if they had any difficulty while studying.

The data collected were assessed statistically using logistic regression and multivariate statistical techniques. The data were presented in tabulated and descriptive formats. SPSS version 22.0, 2013, Armonk, NY: IBM Corp and chi-square test were utilized. The data were expressed as mean and standard deviations and as percentages and numbers with a 0.05% significance level.

RESULTS

The present cross-sectional clinical study was done to evaluate the perceived stress during the online study in medical students due to the COVID-19 infection outbreak in India. Also, its association with coping strategies, studies, and sleep was assessed. The study included 892 subjects who were medical students. There were 60.76% (n=542) males and 39.23% (n=350) females in the present study. 5.62% (n=50) subjects were of age 18 years, 17.26% (n=154) subjects of age 19 years, 38.78% (n=346) subjects of age 20 years, 21.74% (n=194) subjects of age 21 years, 12.55% (n=112) subjects of age 22 years, and 4.03% (n=36) subjects of age 23 years respectively. For study year, 16.59% (n=148) subjects were in first year of medical school, 28.47% (n=254) subjects were in 2nd year, 38.78% (n=346) subjects in 3rd year, and 16.14% (n=144) subjects in final year of medical school. Based on the perceived stress category, low stress of 0-13 was seen in 56.50% (n=504) study subjects, a moderate stress

level of 14-26 in 32.73% (n=292) subjects, and a high-stress level of 27-40 was seen in 10.76% (n=96) subjects respectively as shown in Table 1.

On assessing the association between study year of subjects and perceived stress categories in study subjects, it was seen that for 1st-year medical subjects, low, moderate, and high-stress levels were seen in 1.58% (n=8), 34.24% (n=100), and 4.16% (n=40) study subjects respectively. For 2nd year medical students, 42.06% (n=212), 10.95% (n=32), and 10.41% (n=10) subjects had low, moderate, and high stress levels respectively. For 3rd year students, low, moderate, and high stress levels were seen in 52.38% (n=264), 21.23% (n=62), and 20.83% (n=20) students respectively. For final year students, 3.96% (n=20), 33.56% (n=98), and 27.08% (n=26) subjects had mild, moderate, and severe stress levels respectively as depicted in Table 2. These results were statistically significant with p=0.04 with high stress for 3rd and final year students compared to 1st and 2nd-year students.

Concerning the association between PSQI and perceived stress categories in the study subjects, the study results showed that subjective sleep quality of very good was highest in low stress 260 subjects, 124 subjects with moderate stress, and 16 subjects with low stress. The subjective sleep quality decreased from very good to very bad with an increase in the stress level from mild to severe with p<0.001. Sleep latency was ≤15 minutes in 244 subjects with low stress, 60 subjects with moderate stress, and 32 subjects with high stress, and of >60 minutes was seen in 10, 40, and 14 subjects with low, moderate, and high stress. Sleep latency of 16-30 minutes was seen in220, 72, and 24 subjects with low, moderate, and high stress and sleep latency of 31-60 minutes in 30, 120, and 26 subjects with low, moderate, and high-stress levels. These results were statistically significant with p<0.001. Sleep duration was significantly higher in subjects with low-stress levels and was lesser in most of the subjects with high-stress levels with p=0.04. Habitual sleep efficiency of >85% was higher in subjects with low-stress levels and was <65% in subjects with high-stress levels which was significant with p<0.001. Sleep disturbances were significantly lesser in subjects with low-stress levels and were higher by 3 times/more in subjects with high stress with p=0.01. Daytime dysfunction was also significantly lesser in subjects with low stress and higher in subjects with high-stress levels with p<0.001 as assessed using PSQI component scores as shown in Table 3.

The study results showed that 47.61% (n=280) subjects with perceived stress had difficulty in concentrating on the studies and 52.38% (n=308) subjects with stress had no difficulty in concentrating on the studies, whereas, 49.34% (n=150) subjects without perceived stress had difficulty in concentrating on studies. The most common coping strategy adopted by study subjects with perceived stress was talking to friends by 42.26% (n=164) study subjects followed by listening to music or watching movies by 24.74% (n=96) subjects, using social media by 18.04% (n=70) study subjects, regular exercise/meditation or yoga by 12.88% (n=50) subjects, and eating a healthy diet was adopted by least, 2.06% (n=8) study subjects as shown in Table 4.

DISCUSSION

There were 60.76% (n=542) males and 39.23% (n=350) females in the present study. 5.62% (n=50) subjects were of age 18 years, 17.26% (n=154) subjects of age 19 years, 38.78% (n=346) subjects of age 20 years, 21.74% (n=194) subjects of age 21 years, 12.55% (n=112) subjects of age 22 years, and 4.03% (n=36) subjects of age 23 years respectively. For study

year, 16.59% (n=148) subjects were in first year of medical school, 28.47% (n=254) subjects were in 2nd year, 38.78% (n=346) subjects in 3rd year, and 16.14% (n=144) subjects in final year of medical school. Based on the perceived stress category, low stress of 0-13 was seen in 56.50% (n=504) study subjects, a moderate stress level of 14-26 in 32.73% (n=292) subjects, and a high-stress level of 27-40 was seen in 10.76% (n=96) subjects respectively. These data were compared to the studies of Heinen I et al[8] in 2017 and Brooks SK et al[9] in 2020 where authors assessed subjects with demographics compared to the present study in their respective studies.

The study results showed that for 1st-year medical subjects, low, moderate, and high-stress levels were seen in 1.58% (n=8), 34.24% (n=100), and 4.16% (n=40) study subjects respectively. For 2nd year medical students, 42.06% (n=212), 10.95% (n=32), and 10.41% (n=10) subjects had low, moderate, and high stress levels respectively. For 3rd year students, low, moderate, and high stress levels were seen in 52.38% (n=264), 21.23% (n=62), and 20.83% (n=20) students respectively. For final year students, 3.96% (n=20), 33.56% (n=98), and 27.08% (n=26) subjects had mild, moderate, and severe stress levels respectively. These results were statistically significant with p=0.04 with high stress for 3rd and final year students compared to 1st and 2nd-year students. These results were consistent with the studies of Quek TT et al[10] in 2019 and Robello CR et al[11] in 2018 where authors reported similar perceived stress in study subjects during COVID-19 infection.

It was seen that subjective sleep quality of very good was highest in low stress 260 subjects, 124 subjects with moderate stress, and 16 subjects with low stress. The subjective sleep quality decreased from very good to very bad with an increase in the stress level from mild to severe with p<0.001. Sleep latency was ≤15 minutes in 244 subjects with low stress, 60 subjects with moderate stress, and 32 subjects with high stress, and of >60 minutes was seen in 10, 40, and 14 subjects with low, moderate, and high stress. Sleep duration was significantly higher in subjects with low-stress levels and was lesser in most of the subjects with high-stress levels with p=0.04. Sleep disturbances were significantly lesser in subjects with low-stress levels and were higher by 3 times/more in subjects with high stress with p=0.01. daytime dysfunction was also significantly lesser in subjects with low stress and higher in subjects with high-stress levels with p<0.001 as assessed using PSQI component scores. These results were in line with the findings of Marelli S et al[12] in 2021 and Ji XW et al[13] in 2017 where a similar pattern of sleep and associated disturbances were seen in subjects with perceived stress as in the present study.

In 47.61% (n=280) subjects with perceived stress had difficulty in concentrating on the studies and 52.38% (n=308) subjects with stress had no difficulty in concentrating on the studies, whereas, 49.34% (n=150) subjects without perceived stress had difficulty in concentrating on studies? The most common coping strategy adopted by study subjects with perceived stress was talking to friends by 42.26% (n=164) study subjects followed by listening to music or watching movies by 24.74% (n=96) subjects, using social media by 18.04% (n=70) study subjects, regular exercise/meditation or yoga by 12.88% (n=50) subjects, and eating a healthy diet was adopted by least, 2.06% (n=8) study subjects. These findings were in agreement with the studies of Li Y et al[14] in 2021 and Cullen W et al[15] in 2020 where authors reported difficult concentration in studies on subjects with stress and various coping methods adopted were also similar to the present study.

CONCLUSION

The present study concludes that the COVID-19 pandemic has a varied and strong response from medical students and the issues of mental health should be taken into consideration for various domains and all age groups across the population. The stress level of the students can be reduced during online education by using management programs and online counseling. The study had a few limitations of smaller sample size, cross-sectional nature, and short monitoring warranting further longitudinal studies.

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TABLES

Characteristics	Percentage (%)	Number (n=892)
Gender		
Males	60.76	542
Females	39.23	350
Age (years)		
18	5.62	50
19	17.26	154
20	38.78	346
21	21.74	194
22	12.55	112
23	4.03	36
Study Year		
First-year	16.59	148
Second year	28.47	254
Third year	38.78	346
Final year	16.14	144
Perceived stress category		
Low (0-13)	56.50	504
Moderate (14-26)	32.73	292
High (27-40)	10.76	96

Table 1: Demographic data and perceived stress in the study subjects

Study year of subjects	Stress Level						p-value
	Low		Moderate		High		
	n	%	n	%	n	%	
1st year	8	1.58	100	34.24	40	4.16	**0.04**
2nd year	212	42.06	32	10.95	10	10.41	
3rd year	264	52.38	62	21.23	20	20.83	
Final year	20	3.96	98	33.56	26	27.08	
Total	504	1003	292	100	96	100	

Table 2: Association between study year of subjects and perceived stress categories in study subjects

S. No	PSQI components	Stress Level			p-value
		Low (n=504)	Moderate (n=292)	High (n=96)	
Day time dysfunction					
1.	Never	256	90	18	<0.001
2.	Less than a week	212	110	28	
3.	Once/twice a week	20	74	30	
4.	3 times/more a week	16	18	20	
Sleep disturbances					
1.	Not during last month	244	160	22	0.01
2.	Less than a week	226	100	28	
3.	Once/twice a week	20	20	22	
4.	3 times/more a week	14	12	24	
Habitual sleep efficiency (%)					
1.	>85	212	90	26	<0.001
2.	75-84	224	130	28	
3.	65-74	40	48	22	
4.	<65	28	24	20	
Sleep duration					
1.	>7	164	100	56	0.04
2.	6-7	120	130	24	
3.	5-6	136	50	12	
4.	<5	84	32	4	
Sleep latency (min)					
1.	≤15	244	60	32	<0.001
2.	16-30	220	72	24	
3.	31-60	30	120	26	
4.	>60	10	40	14	
Subjective sleep quality					
1.	Very good	260	124	16	<0.001
2.	Fairly good	216	40	20	
3.	Fairly bad	18	102	28	
4.	Very bad	10	26	32	

Table 3: Association between PSQI and perceived stress categories in the study subjects

Parameters	Perceived stress		p-value
	Yes n=388 (%)	No n=504 (%)	
Difficulty in study concentration			
Yes	280 (47.61)	150 (49.34)	0.9
No	308 (52.38)	154 (50.65)	
Coping strategy adopted			
Eating healthy diet	8 (2.06)	12 (2.38)	<0.001
Regular exercise/Meditation/Yoga	50 (12.88)	82 (16.26)	
Listening to music/ watching movie	96 (24.74)	140 (27.7)	
Social media use	70 (18.04)	94 (18.65)	

Talking to friends	164 (42.26)	176 (34.92)	

Table 4: Difficulty in concentrating and coping strategies in the study subjects