Assessment of Severity of Stress Among Medical and Dental Students During the COVID-19 Pandemic

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Abstract

Background and Objectives: The COVID-19 pandemic has a major bearing on mental health. This study was aimed to study the level of stress among the medical and dental students amidst this crisis. **Materials and Methods:** A questionnaire was mailed to students pursuing medical and dental undergraduate and postgraduate degrees across India. It included sociodemographics, psychological status, academic activities, online classes, information about COVID-19, and the Perceived Stress Scale (PSS). **Results:** The overall response rate was 86%. 9.8% of students had low, 74.4% had moderate, and 15.8% had high stress according to PSS. The major worry was uncertain future (41.8%); academic inadequacies/delays (27.78%), apprehension of self-health (26.78%), and family's health (21.13%). 52.7% of participants experienced a lack of motivation; 74% were frustrated/irritable and 46.3% experienced loneliness. Their access to information about COVID-19 was from family and friends (71.42%); news (64.48%), social media sites (62.79%), Internet (36.87%), and newspapers (34.71%). Females were more stressed (*P* value = 0.000) with ages 21–25 years (*P* value = 0.000). The students who were motivated, frustrated/irritable, or lonely had high stress (*P* value <0.01). The students with no exercise had high stress (*P* value <0.01), however, the duration of exercise was not statistically significant. 58% were not satisfied with the online classes (*P* value <0.01). **Interpretation and Conclusions:** Our study showed that more than three-fourths of medical and dental students were under moderate to high-level stress. Multiple factors for the stress were identified. Exercise was a stress buster, which should be encouraged for good mental health. In view of the uncertain future identified as the major worry, it is prudent for health educators to change the curriculum to keep pace with the existing competency of training.

Keywords: COVID-19 pandemic, dental students, medical students, perceived stress

Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 has become an important public health emergency and is spreading all over the world in pandemic proportions.[1] This large-scale infection has placed enormous pressure as well as responsibility over central and state governments, medical and healthcare providers, and the general public. It has been reported in many studies that the disease could bring about a lot of psychological issues in the general population and persons directly dealing with the virus.[2]

Stress has become an integral part of life especially for medical and dental students in terms of both the curriculum and the disease. The continuous spread of this pandemic, strict isolation and quarantine measures, delay in starting schools, colleges and universities, and online classes are expected to have a negative impact on the mental health of college students.[3,4]

The medical and dental curriculum expects its students to acquire knowledge in domains not exclusive to theory but also clinical proficiencies and patient relation protocols resulting in a strenuous lifestyle affecting physical and mental health.[5] A recent report also highlighted that stress-induced emotional imbalance has been on a rise during the past few decades among the student population. It has been reported that environmental stress includes three components. The first is a socioenvironmental component, i.e., the physical environment stressor, the second is a psychological component that are the physiological and biochemical factors termed as perceived stress, and the interaction of these two factors forms the third component.[6]

A similar study of psychological impact from China envisaged that 0.9% of the surveyed students had severe anxiety, 2.7% had moderate anxiety, and 21.3% had mild anxiety.[4]

Currently, no research is available from India on the stress levels of medical and dental students. Hence, this article was mainly aimed to investigate the level of stress among the medical and dental students amidst the COVID-19 crisis.

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DOI: 10.4103/aian.AIAN_19_21

MATERIALS AND METHODS

A cross-sectional study was conducted from April 2020 to August 2020. The email addresses of the students from the medical and dental colleges were collected by request by voluntary disclosure. Email addresses of 700 participants were selected by convenience sampling. A questionnaire was sent by an online link through google forms in the e-mails to students pursuing medical and dental undergraduate and postgraduate degrees across India that came under the jurisdiction of the Medical and Dental Council of India. Undergraduate students of all years as well as postgraduate students of both streams were included for the analysis. Consent form was embedded at the beginning of the questionnaire. Students who consented proceeded to complete the questionnaire. Incomplete questionnaires were excluded from the study. All completed questionnaires were analyzed. Approval from the ethics committee was obtained dated April 2020.

The institutional ethics committee approved the study. The questionnaire consisted of different sections including a sociodemographic component, a personal component that included questions on psychological status, academic activities, online classes, and information about COVID-19. The last component was the assessment of the Perceived Stress Scale (PSS).

Perceived stress scale

PSS included ten items eliciting information about the stress felt by medical and dental students about COVID-19. Cohen developed it from the original scale in the year 1988. The temporal nature of the scale was designed to pick up daily hassles, major events like the COVID-19 pandemic, and changes in coping resources. The PSS score ranged from 0 to 4 for all the items. But four items 4, 5, 7, and 8 were reverse scored and were reverse coded. Individual scores on the PSS can range from 0 to 40. Scores ranging from 0 to 13 would be considered low stress. Scores ranging from 14 to 26 would be considered moderate stress. Scores ranging from 27 to 40 would be considered high perceived stress.[7]

The data thus obtained were compiled on a Microsoft Excel sheet which was then exported and analyzed using Statistical Package for Social Services (SPSS version 20).[8] The categorical variables were presented as frequencies and percentages and the Chi-square test was used as a test of significance. The Fisher's exact test was used wherever the expected count per cell is <5.

RESULTS

A total of 700 emails were sent to the students pursuing medical and dental undergraduate and postgraduate degrees across India. The overall response rate was 86%. In total, 602 students consented and completed the questionnaire. One incomplete response was deleted and hence data were analyzed for 601 participants. The ages of the participants ranged from 18 to 36 years. The majority of the students were females (females: 405; males: 196). There were 355 dental and 246 medical students. After the lockdown, 31 students were still in their hostels, 5 students at their friend's place, 15 at their relative's place, and the rest were at home.

Participants were enquired about their major worries, academics, daily habits, and source of information about COVID-19. The major worry was uncertainty of future in 252 (41.8%); next came academic inadequacy/delays in 164 (27.78%) followed by self-health in 161 (26.78%) and health of family in 127 (21.13%). In total, 75 (12.47%) participants had no worries, whereas the rest were bothered about social cutoff (14.1%), monotony of life (14.2%), and unfriendly environment (10.96%). 52.7% of participants experienced a lack of motivation; there was frustration/irritability in 74% and loneliness in 46.3% of them.

Their access to information about COVID-19 was from family and friends in 430 (71.42%); the news in 390 (64.48%), social media sites among 378 (62.79%), the Internet in 222 (36.87%), and the newspaper in 209 (34.71%).

The PSS had shown that almost 9.8% of students had low stress, 74.4% were experiencing moderate stress, and 15.8% had high stress.

The significance of the PSS to various variables as shown in Table 1 was that the students with moderate and high stress were aged between 21 and 25 years (*P* value <0.01). Most of the students with low and moderate stress were males, but high stress was observed in females (*P* value <0.01). The hostelers showed higher stress in all grades than the day scholars. Most of the students stayed at home during the lockdown. The students who lacked motivation to study had low stress but those who were motivated had shown moderate and high stress (*P* value <0.01). The students with no frustration/irritability had low stress and those with frustration/irritability had moderate and high stress (*P* value <0.01). The students not experiencing loneliness had low and moderate stress. The students experiencing loneliness had high stress (*P* value <0.01). The hours of reading had no effect on stress. The students doing any form of exercise had low and moderate stress but students without exercise had high stress (*P* value <0.01). Larger number of students exercising for less than 30 min per day had high stress and students exercising for more than 2 h reported no stress level as per the PSS. Lower levels of stress were associated with those who exercised. However, the duration of exercise to the perceived stress was not statistically significant. 77.5% of students were attending online classes. However, there was no difference in the stress levels among the students who were attending and those who were not. 58% were not satisfied with the online classes and were experiencing moderate and high stress, which was statistically significant (*P* value <0.01). The items of PSS showed higher mean value for feeling on top of things (2.40 ± 1.10) and a low mean value for

Table 1: Significance of the PSS to various variables

Variables	n (%)				Significance
	Low stress	Moderate stress	High stress	Total	
Age group					
18-20 years	22 (37.3)	153 (34.2)	29 (30.5)	204 (33.9)	χ^2=19.022
21-25 years	36 (61.0)	260 (58.2)	61 (64.2)	357 (59.4)	df=2
26-30 years	1 (1.7)	26 (5.8)	5 (5.3)	32 (5.3)	P<0.01
31-35 years	0	3 (0.7)	0	3 (0.5)	
35-36 years	0	5 (1.1)	0	5 (0.8)	
Total	59 (100)	447 (100)	95 (100)	601 (100)	
Gender					χ^2=19.022
Male	34 (57.6)	131 (29.3)	31 (32.6)	196 (32.6)	df=2
Female	25 (42.4)	316 (70.7)	64 (67.4)	355 (67.4)	P<0.01
Total	59 (100)	447 (100)	95 (100)	601 (100)	
Place of stay					χ^2=5.602
Hosteler	31 (52.5)	291 (65.1)	53 (55.8)	375 (62.4)	df=2
Day scholar	28 (47.5)	156 (34.9)	44 (44.2)	226 (37.6)	P=0.061
Total	59 (100)	447 (100)	95 (100)	601 (100)	
Present place of stay					χ^2=6.166
Home	55 (93.2)	408 (91.3)	87 (91.6)	550 (91.5)	df=6
Hostel	3 (5.1)	26 (5.8)	2 (2.1)	31 (5.2)	P=0.405
Friend's place	0	4 (0.9)	1 (1.1)	5 (0.8)	
Relative's place	1 (1.7)	9 (2.0)	5 (5.3)	15 (2.5)	
Total	59 (100)	447 (100)	95 (100)	601 (100)	
Lack of motivation					χ^2=34.509
No	44 (74.6)	215 (48.1)	25 (26.3)	384 (47.3)	df=2
Yes	15 (25.4)	232 (51.9)	70 (73.7)	317 (52.7)	P<0.01
Total	59 (100)	447 (100)	95 (100)	601 (100)	
Frustration/irritability					χ^2=42.795
No	33 (55.9)	115 (25.7)	8 (8.4)	156 (26.0)	df=2
Yes	26 (44.1)	332 (74.3)	87 (91.6)	445 (74.0)	P<0.01
Total	59 (100)	447 (100)	95 (100)	601 (100)	
Loneliness					χ^2=50.739
No	47 (79.7)	253 (56.6)	23 (24.2)	323 (53.7)	df=2
Yes	12 (20.3)	194 (43.4)	72 (75.8)	278 (46.3)	P<0.01
Total	59 (100)	447 (100)	95 (100)	601 (100)	
Hours of academic reading per day					χ^2=9.207
<3 h	29 (49.2)	269 (60.2)	67 (70.5)	365 (60.7)	df=6
3-6 h	21 (35.6)	128 (28.6)	20 (21.1)	169 (28.1)	P=0.162,
6-9 h	4 (6.8)	31 (6.9)	6 (6.3)	41 (6.8)	
>9 h	5 (8.5)	19 (4.3)	2 (2.1)	26 (4.3)	
Total	59 (100)	447 (100)	95 (100)	601 (100)	
Exercise					χ^2=19.125
No	15 (25.4)	185 (41.4)	57 (60.0)	257 (42.8)	df=2
Yes	44 (74.6)	262 (58.6)	38 (40.0)	344 (57.2)	P<0.01
Total	59 (100)	447 (100)	95 (100)	601 (100)	
Duration of exercise					χ^2=9.376
<30 min	27 (60.0)	255 (71.8)	56 (84.8)	338 (72.5)	df=6
31-60 min	14 (31.1)	79 (22.3)	8 (12.1)	101 (21.7)	P=0.154
61-120 min	3 (6.7)	18 (5.1)	2 (3.0)	23 (4.9)	
>120 min	1 (2.2)	3 (0.8)	0	4 (0.9)	
Total	45 (100)	355 (100)	66 (100)	466 (100)	
Attending online classes?					χ^2=3.175
No	9 (25.4)	108 (24.2)	18 (18.9)	135 (22.5)	df=2
Yes	50 (74.6)	339 (75.8)	77 (81.1)	466 (77.5)	P=0.204
Total	59 (100)	447 (100)	95 (100)	601 (100)	

Contd...

Table 1: Contd...

Variables	n (%)				Significance
	Low stress	Moderate stress	High stress	Total	
Satisfaction with online class					χ^2=33.263
No answer	4 (6.8)	18 (4.0)	3 (3.2)	25 (4.2)	df=4
No	17 (28.8)	262 (58.6)	72 (75.8)	351 (58.4)	*P*<0.01
Yes	38 (64.4)	167 (37.4)	20 (21.1)	225 (37.4)	
Total	59 (100)	447 (100)	95 (100)	601 (100)	

Table 2: Mean of perceived stress scale

Items	Mean	Std. Deviation
In the last month, how often have you been upset because of something that happened unexpectedly?	1.98	1.11
In the last month, how often have you felt that you were unable to control the important things in your life?	2.04	1.16
In the last month, how often have you felt nervous and stressed?	2.17	1.15
In the last month, how often have you felt confident about your ability to handle your personal problems?	1.65	1.07
In the last month, how often have you felt that things were going your way?	2.25	1.10
In the last month, how often have you found that you could not cope with all the things that you had to do?	2.07	1.09
In the last month, how often have you been able to control irritations in your life?	1.84	1.02
In the last month, how often have you felt that you were on top of things?	2.40	1.10
In the last month, how often have you been angered because of things that happened that were outside of your control?	2.22	1.14
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	2.02	1.19

feeling confident about their ability to handle their personal problems (1.65 ± 1.07) [Table 2].

DISCUSSION

The COVID-19 pandemic has reached enormous proportions and the consequences of the disease are not just physical but also have a major bearing on mental health. Students are a population vulnerable to mental health consequences. The basic and important measures to prevent the spread of the disease are to maintain social distancing and hand hygiene. But social isolation along with deprivation of the regular educational curriculum is disrupting the future of students.

The present study showed that more than three-fourths of the medical and dental students were under moderate and high-level stress. University education is arguably the most stressful time of a student's life as it shapes their future. An earlier study conducted on medical students found that their perceived stress and emotional distress were more than that of the general population.[9] COVID-19 will add an additional burden of stress on these students.

Female students between the ages 21 and 25 years were more stressed than the male students. Gender difference in the response to stress has been reported earlier with stress being more common in females.[10,11] A similar study conducted to assess the psychological morbidity in medical undergraduate students had found females to be more stressed than males.[12] 8.4% of the students could not go back home while the study was being conducted; however, that did not affect their stress levels. Almost half of the students were worried about their uncertain future. The COVID-19 pandemic is not showing any

signs of disappearing in the near future and that has stagnated the educational curriculum. It has especially impacted negatively the medical profession as it depends on acquiring skill training with bedside teaching and patient examination. The worry lingers with short- and long-term uncertainties. While the students were stressed about their future, they were also worried about their own and families' health, although health was less worrisome than their uncertain future. This could probably be because they had the advantage of a medical background and knew how to remain safe in these times. Furthermore, other worries like social cutoff, monotony of life, and unfriendly environment were also noted. Even with social media connectivity, around 14% felt the need to have social outings and reported a boring life. Students who have been long-term hostelers found it particularly difficult to engage in the monotonous daily routine and lack of independence.

The emotional state of the student was assessed. More than half of the students were not motivated and felt frustrated and irritable. The students who lacked motivation had low stress but those who were motivated had shown moderate and high stress. This could imply that although half of them were motivated, the present circumstances did not translate their enthusiasm to fulfill the educational demands. As noted, more than half of the students were not satisfied with their online classes, which were leading to moderate and high stress level. Their access to information were several, with the main source being family, friends, news, and social media sites followed by Internet and newspapers. There have been several information channels during this pandemic, which include mobile apps, artificial intelligence based chat bots, social media, video-based lectures, and renowned electronic databases.[13] Out of all these sources,

social media carries authentic information mixed with lots of misinformation. This tends to produce fear and distress among the public. In our study, maximum information was from public word of mouth and social media. This false information could be responsible for the frustration and irritability, which lead to moderate and high stress levels. Hence, apart from the pandemic, the human population should also be geared to deal with the tsunami of misinformation in this digital world. The WHO has started a customized information portal to curb this infodemic.[14]

The students without loneliness experienced low and moderate stress, whereas high stress was noted in students who were lonely. Earlier studies during epidemic outbreaks have also noted that isolation can induce early psychological issues ranging from irritability to suicidal ideation, which could partly be due to anxiety of contracting the disease.[15,16]

Several measures have been suggested simultaneously by health organizations during the COVID-19 period to help the person stay healthy. Physical exercise is an excellent means to combat mental ailments along with providing physical fitness. The WHO recommends 150 min of moderate-intensity or 75 min of vigorous-intensity physical activity per week, or a combination of both.[17] Medical students are prone to stress, which has been investigated in earlier studies.[18] A person's coping strategy and the social support do play a role in their mental health as has been shown in an earlier study.[19] Efforts should be made to inculcate good lifestyle measures like ensuring adequate and proper sleep timings, healthy diet, regular exercise, yoga, and leading a well organized life. The students must be made aware about the significance of mental health and normalize seeking help—be it in the form of counseling, cognitive behavioral therapy or practicing grounding techniques.

We enquired about the level of exercise in students. Students doing any form of exercise had low and moderate stress, but students without exercise had high stress. Exercise did find a positive impact in reducing stress, however, the duration of exercise was not significant. This could be due to the smaller sample size and needs further evaluation.

The study had limitations including the following: convenience sampling was selected and sample selected may limit to generalize the findings. Selection bias of more psychologically weak individuals or persons with psychiatric disorders cannot be ruled out.

In conclusion, our study showed that more than three-fourths of the medical and dental students were under moderate- and high-level stress. Females of age group 21–25 years were more vulnerable. The major worry was an uncertain future—augmented predominantly by online teaching. Exercise was a stress buster, which should be encouraged for a good mental health. However, this being a cross-sectional study, does not allow for inferences to be made with respect to the direction of association between the variables.

Amidst the COVID-19 pandemic, where the government and medical healthcare system is untiringly striving hard to control the disease, seminal time should not be lost in the training of the future doctors and dentists. Social distancing is one of the major means to curb the transmission of COVID-19. However, this also has a collateral damage to the hands-on experience in clinical and surgical settings for students. Hence, it would be prudent for policymakers to explore options where virtual teachings can bridge bedside teaching.

Financial support and sponsorship

Conflicts of interest
There are no conflicts of interest.

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