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ORIGINAL RESEARCH

Perceived stress and anxiety of first year undergraduate medical students of a Government medical college during COVID-19 pandemic: A cross-sectional study

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Background

Coronavirus disease 2019 (COVID-19) pandemic continues to spread across the Globe which has resulted in adversely affecting medical education. Medical students are withdrawn from real life clinical experiences. Virtual education is the main modality of teaching-learning, as one need to maintain physical distancing due to the highly contagious nature of the virus. The whole curriculum is transitioned to virtually delivered format. Even the medical student's assessment during examinations is being conducted online.[1]

Medical education is a full-time commitment and responsibility of students that involves academic tasks, activities, social conduct, support, and care provided to patients. The mental health of the medical students is affected throughout their training period. The various reasons attributed for this includes the extensive study and working hours, exhaustive curriculum, examinations, peer competition, sleep deprivation and loneliness. Worldwide, it has been demonstrated that nearly 25%–90% of medical students are stressed. This stress factor is an important determinant of depression and anxiety.[2,3] Medical education in general is considered to be stressful journey along with a substantial degree of psychological morbidity.[4-6]

As colleges closed down due to the COVID 19 lockdown, the medical students returned home and the mode of teaching- learning became entirely virtual. Clinical exposure and patient interaction which is an integral part of medical curriculum became non-existent. Medical students had to adjust with this new unprecedented situation.[1]

Medical students are currently experiencing increasing levels of anxiety as COVID-19 gradually affects their physical, emotional and mental well-being. Longer periods of social distancing norms can have undesirable effects on the mental healthstatus of medical students.[1]The present pandemic situation can worsen already existing mental health conditions of the medical students. The increasing number of deceased cases due to COVID-19 and its related news in the social media and other electronic media can also impact their mental health. Medical students are a vulnerable population group globally and as per one of the study are known to show higher rates of depression and suicidal ideation. They are also less likely to seek support.[7]Another global study evaluating the mental health status of medical students from 12

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different nations revealed very high rates of mental health issues, burnout, substance abuse, and mental stress.[8]It is therefore important to develop effective strategies and safeguard the mental health of medical students.

Aims and Objectives

To study the stress and anxiety perceived by the first year medical undergraduate students of Koppal Institute of Medical Sciences, Koppal during the COVID-19 pandemic.

Materials and Methods

The current study was undertaken during the second wave of COVID 19 in India from Jan-Mar 2021 at Koppal Institute of Medical Sciences (KIMS), Koppal. During this period, most of the medical students had returned home from the hostel as the cases were increasing in the hostels they were staying in and the offline classes were suspended by the University. The students had to attend their academic activities through online teaching only during this period. So, inevitably the medical students had to face some difficulties in coping with the new method of online teaching and learning. Under these circumstances, the undergraduate medical students from KIMS, Koppal naturally had to face more stress and anxiety during these times which eventually affected their mental health. The obligation of wearing the face masks regularly, following social distancing norms and the fact that many of the medical students' family members, relatives and friends were infected by COVID 19 virus affected their mental health.

In view of this, the present study was undertaken to assess the stress and anxiety perceived by our medical students in these hard times. This was a Cross-sectional observational study conducted on 221 first year undergraduate medical students from KIMS, Koppal. The ethical clearance was taken from Institutional Ethics Committee of KIMS, Koppal before initiating the study. Confidentiality of the data collected is maintained. Contact details of the researchers were included in the Google forms of data collection, so that it could be used by the respondents for any clarification, help or consultation. The data was collected through an online Google questionnaire with an inbuilt consent form for voluntary participation in the study. The online forms were disseminated to the subjects either through Whatsapp or e-mail of the participants.

To assess the stress experienced by our 1st year medical undergraduates we utilized Perceived Stress Scale (PSS-4). This scale is a 4-item self-administered instrument to measure the degree to which situations in one's life are appraised as stressful. Lowest score is 0 and highest score is 16. Higher scores are correlated to more stress.[9]

To assess the anxiety, we utilized Generalized Anxiety Disorder questionnaire (GAD-7). This scale is a 7-item, self-administered questionnaire which is used to assess severity of anxiety symptoms. Each of the 7 items is scored from 0 to 3, the GAD-7 scale score ranges from 0 to 21.[10]

Statistical method

The collected data was tabulated in a MS Excel sheet and analyzed using statistical software SPSS v16. Socio-demographic and other variables are described using descriptive statistical measures. Correlational analysis was done using linear correlation analysis for continuous variables and logistic regression analysis for categorical variables. The $p<0.05$ is taken as the level of significance.

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Results:

Table 1: Levels of anxiety stress and depression among college students during the epidemic

PS	Frequency	Percent
≥6	64	29.0
<6	157	71.0
GAD		
Minimal anxiety	94	42.5
Mild anxiety	73	33.0
Moderate anxiety	43	19.5
Severe anxiety	11	5.0
PHQ		
Minimal depression	80	36.2
Mild depression	71	32.1
Moderate depression	40	18.1
Moderately severe depression	26	11.8
Severe depression	4	1.8
Total	221	100.0

Table 1 shows how the mental health of college students was affected to varying degrees during the outbreak. Of the 221 MBBS students, more than 70% had high level of stress, whereas around 30% had low level of stress. More than 40% of the students had minimal symptoms of anxiety, whereas the proportions of students with mild, moderate, and severe anxiety were 33.0%, 19.5%, and 5.0%, respectively. Around 40% of the students had minimal symptoms of depression, whereas the proportion of students with mild, moderate, moderate severe and severe depression were 32.1%%, 18.1%, 11.8% and 1.8%, respectively.

The demographic and selected characteristics of the study population are shown in Table 2. Among the sample of 221 MBBS students, approximately 70.00% were age >20 years and more than 30% were age ≤20 years. More than 50% of the students were females and 47.96% were males. 19.00%, 44.34% and 36.65% of the students were taken admission in the year 2019, 2020 and 2021 respectively. More than 90% of the students were studying in 1st year. Most students (84.62%) had living in hostel in that 72.40% continued living in the hostel during COVID 19.

Table 2 shows the relationship between the demographic variables of students and stress level. Year of studying and Quota had a significant effect on anxiety ($P < 0.05$), whereas age, gender, year of admission, place residence during MBBS and Place of residences during lockdown had no significant effect on stress level ($P > 0.05$).

Table 3 shows the relationship between the demographic variables of students and anxiety. gender and place residence during MBBS had a significant effect on anxiety ($P <0.05$), whereas age, year of study, Quota, year of admission, and Place of residences during lockdown had no significant effect on anxiety ($P >0.05$).

Table 4 shows the relationship between the demographic variables of students and depression. Year of admission had a significant effect on anxiety ($P < 0.05$), whereas age, gender, year of

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study, Quota, place residence during MBBS and Place of residences during lockdown had no significant effect on stress level (P > 0.05).

Table 2: Univariate analysis of college students' stress about the epidemic

Age (in years)	PS		Total	Chi-square value	p value
	>6	≤6			
>20	41 (27.15%)	110 (72.85%)	151 (68.33%)	0.757	0.384
≤20	23 (32.86%)	47 (67.14%)	70 (31.67%)		
Gender					
Female	34 (29.57%)	81 (70.43%)	115 (52.04%)	0.043	0.836
Male	30 (28.30%)	76 (71.70%)	106 (47.96%)		
Year of admission					
2019	8 (19.05%)	34 (80.95%)	42 (19.00%)	3.251	0.197
2020	28 (28.57%)	70 (71.43%)	98 (44.34%)		
2021	28 (34.57%)	53 (65.43%)	81 (36.65%)		
Year of Study					
1	53 (26.37%)	148 (73.63%)	201 (90.95%)	7.248	0.007
2	11 (55.00%)	9 (45.00%)	20 (9.05%)		
Quota					
All India	11 (55.00%)	9 (45.00%)	20 (9.05%)	7.248	0.007
Karnataka	53 (26.37%)	148 (73.63%)	201 (90.95%)		
Place of Residence during MBBS					
Hostel	55 (29.41%)	132 (70.59%)	187 (84.62%)	3.324	0.190
Paying guest arrangement	3 (60.00%)	2 (40.00%)	5 (2.26%)		
Home	6 (20.69%)	23 (79.31%)	29 (13.12%)		
Place of residences during lockdown					
Continued in hostel	49 (30.63%)	111 (69.38%)	160 (72.40%)	0.564	0.453
Shifted to home	15 (25.42%)	46 (75.41%)	61 (27.60%)		
Total	64 (29.22%)	157 (71.04%)	221 (100.00%)		

Table 3: Univariate analysis of college students' anxiety about the epidemic

Age (in years)	GAD				Total	Chi-square value	p value
	Minimal anxiety	Mild anxiety	Moderate anxiety	Severe anxiety			
>20	60 (39.74%)	52 (34.44%)	32 (21.19%)	7 (4.64%)	151 (68.33%)	2.012	0.570
≤20	34 (48.57%)	21 (30.00%)	11 (15.71%)	4 (5.71%)	70 (31.67%)		
Gender							
FEMALE	53 (46.09%)	30 (26.09%)	23 (20.00%)	9 (7.83%)	115 (52.04%)	8.158	0.043
MALE	41 (38.68%)	43 (40.57%)	20 (18.87%)	2 (1.89%)	106 (47.96%)		
Year of admission							
2019	12 (28.57%)	17 (40.48%)	10 (23.81%)	3 (7.14%)	42 (19.00%)	5.789	0.447
2020	43	29	21	5	98 (44.34%)		

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	(43.88%)	(29.59%)	(21.43%)	(5.10%)			
2021	39 (48.15%)	27 (33.33%)	12 (14.81%)	3 (3.70%)	81 (36.65%)		
Year of study							
1	83 (41.29%)	67 (33.33%)	41 (20.40%)	10 (4.98%)	201 (90.95%)	1.875	0.599
2	11 (55.00%)	6 (30.00%)	2 (10.00%)	1 (5.00%)	20 (9.05%)		
Quota							
All India	11 (55.00%)	6 (30.00%)	2 (10.00%)	1 (5.00%)	20 (9.05%)	1.875	0.599
Karnataka	83 (41.29%)	67 (33.33%)	41 (20.40%)	10 (4.98%)	201 (90.95%)		
Place of Residence during MBBS							
Hostel	79 (42.25%)	63 (33.69%)	37 (19.79%)	8 (4.28%)	187 (84.62%)	34.944	0.000
Paying guest arrangement	1 (20.00%)	0 (0.00%)	1 (20.00%)	3 (60.00%)	5 (2.26%)		
Home	14 (48.28%)	10 (34.48%)	5 (17.24%)	0 (0.00%)	29 (13.12%)		
Place of Residences during lockdown							
Continued in hostel	68 (42.50%)	52 (32.50%)	34 (21.25%)	6 (3.75%)	160 (72.40%)	2.863	0.413
Shifted to home	24 (39.34%)	21 (34.43%)	9 (14.75%)	7 (11.48%)	61 (27.60%)		
Total	92 (41.63%)	73 (33.03%)	43 (19.46%)	13 (5.88%)	221 (100.00%)		

Table 4: Univariate analysis of college students' depression about the epidemic

Age (in years)	PHQ					Total	chi-sqaure value	p value
	Minimal depression	Mild depression	Moderate depression	Moderately severe depression	Severe depression			
>20	50 (33.11%)	49 (32.45%)	32 (21.19%)	19 (12.58%)	1 (0.66%)	151 (68.33%)	7.530	0.110
≤20	30 (42.86%)	22 (31.43%)	8 (11.43%)	7 (10.00%)	3 (4.29%)	70 (31.67%)		
Gender								
FEMALE	44 (38.26%)	33 (28.70%)	21 (18.26%)	13 (11.30%)	4 (3.48%)	115 (52.04%)	4.894	0.298
MALE	36 (33.96%)	38 (35.85%)	19 (17.92%)	13 (12.26%)	0 (0.00%)	106 (47.96%)		
Year of admission								
2019	10 (23.81%)	17 (40.48%)	8 (19.05%)	4 (9.52%)	3 (7.14%)	42 (19.00%)	21.696	0.006
2020	32	31	16	18	1	98		

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	(32.65%)	(31.63%)	(16.33%)	(18.37%)	(1.02%)	(44.34%)		
2021	38 (46.91%)	23 (28.40%)	16 (19.75%)	4 (4.94%)	0 (0.00%)	81 (36.65%)		
Year of study								
1	68 (33.83%)	66 (32.84%)	37 (18.41%)	26 (12.94%)	4 (1.99%)	201 (90.95%)	6.891	0.142
2	12 (60.00%)	5 (25.00%)	3 (15.00%)	0 (0.00%)	0 (0.00%)	20 (9.05%)		
Quota								
ALL India	12 (60.00%)	5 (25.00%)	3 (15.00%)	0 (0.00%)	0 (0.00%)	20 (9.05%)	6.891	0.142
Karnataka	68 (33.83%)	66 (32.84%)	37 (18.41%)	26 (12.94%)	4 (1.99%)	201 (90.95%)		
Place of Residence during MBBS								
Hostel	70 (36.25%)	57 (30.48%)	34 (18.18%)	22 (11.76%)	4 (2.14%)	187 (84.62%)	11.652	0.167
Paying guest arrangement	1 (20.00%)	0 (0.00%)	3 (60.00%)	1 (20.00%)	0 (0.00%)	5 (2.26%)		
Home	9 (31.03%)	14 (48.28%)	3 (10.34%)	3 (10.34%)	0 (0.00%)	29 (13.12%)		
Place of Residences during lockdown								
Continued in hostel	58 (36.25%)	49 (30.63%)	29 (18.13%)	23 (14.38%)	1 (0.63%)	160 (72.40%)	8.172	0.085
Shifted to home	21 (34.42%)	21 (34.42%)	11 (18.03%)	3 (4.92%)	5 (8.20%)	59 (27.60%)		
Total	79 (35.75%)	70 (31.67%)	40 (18.10%)	26 (11.76%)	6 (2.71%)	221 (100.00%)		

Discussion:

The objective of the present study was to study the stress and anxiety perceived by the first year medical undergraduate students of Koppal Institute of Medical Sciences, Koppal during the COVID-19 pandemic. The study included 221 medical students, with majority aged 20 years (70%). The students are at the beginning of their medical education in this age group.

The COVID-19 pandemic has caused global impact affecting healthcare, commerce and international travel. The healthcare providers face a dual challenge of treating the patients and also to be mentally balanced themselves to cope against the increased stress.[11-13]

Stress:

The stress was assessed using the Perceived Stress Scale (PSS-4). Majority of students (70%) reported to be having perceived stress related to COVID-19 and online teaching methodologies. Rapid change in the teaching methodology from physical/ offline classes to online teaching and use of personal protective equipment kits has put stress on medical students. [1] Univariate analysis reported significant difference in stress levels only among 1st and 2nd year of medical students and students admitted from all-India and state quota. Remaining baseline characteristics showed no difference in stress levels indicating similar stresses and negative impact of the epidemic.

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Review if previous literature shows varying levels of percieved stress using the PSS score. In cross-sectional study conducted by Pranjali PM et al among 300 medical students (151-boys and 149 girls), the mean perceived stress score was observed as 27.60. In boys the PSS score was found to be 27.85 and in girls it was 27.52.(14)
Another study done in Saudi Arabia among medical students reported moderate to high stress using PSS-4. (15) In a study conducted in China by Zhe Li et al reported a mean PSS score of 28.49±11.17 among medical students. (16)

Anxiety:
A study conducted in China in 2020 during the pandemic revealed that 24.9% of college students experienced anxiety.[17] Another study conducted in China reported overall anxiety to be 26.6%.[18] In the present study 33% of students reported mild anxiety and 19.5% reported moderate anxiety. A rapid systematic review with meta-analysis conducted by Lasheras I et al estimated prevalence of anxiety of 28% (95% CI: 22–34%). The study also reported that levels of anxiety have remained stable in medical students during the pandemic while increasing in their non-medical peers and the general population. Better access and use of official sources of information and peer support has been proposed as a reason for minimal change in levels of anxiety among medical students.[19] The study conducted by Cao W et al however reported no changes in experiences stress levels. [17] A US based study on 1428 students across 40 medical schools reported 30% prevalence of anxiety using the Generalized Anxiety Disorder (GAD-7) scale. The median GAD-7 scores were higher among females (7.0 vs 5.0, $P < .00001$), pre-clinical students (7.0 vs 6.0, $P < .00004$), and those with a friend or relative diagnosed with Covid-19 (7.0 vs 6.0, $P=.001$). (20)
Students face severe anxiety related to economic uncertainty, fear for health of their families, fear of infection, the need to support and care for children, and to deal with the challenges of distance education.(21)

Depression:
Majority (40%) of medical students reported mild to moderate depression in our study. Varying levels of depression has been reported in previous studies. Soltan et al reported 75.2% depression among medical students in Egypt. The Patient Health Questionnaire tool was used to assess depression in the present study.[22]
The study conducted by Scott J Halperin et al reported 14.3% prevalence of depression among US medical students using the PHQ-9 questionnaire. (20) Hajar Essangri et al reported a 74% prevalence of depression among medical students in Morocco. Multivariable logistic regression showed female gender and preclinical level of enrollment as a risk factor for depression. (23) A cross-sectional study on prevalence of depression among medical students, residents, and fellows using self-reported PHQ-9 reported moderate to severe depression in 17.2%; medical students more likely to screen positive for depression (OR: 2.74). (24)

Conclusion:
Majority of medical students in the present study reported to have suffered with stress, anxiety and depression during the COVID-19 pandemic. No significant changes have been observed in various baseline characteristics indication equal levels of stress, anxiety and depression present in all study participants. COVID-19 pandemic has impacted the teaching-learning of medical students and their approach to patient care.

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Limitations:

The study was conducted only among 1st and 2nd year MBBS students. Inclusion of all professional phases of students can give broader information of perceived levels of stress, anxiety and depression. Future research can also include and compare the impact of COVID-19 on different discipline of students like nursing, para-medical and non-medical departments.

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