



# Psychological Impact and Its Correlates Following COVID-19 Pandemic Among Medical Students

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## ABSTRACT

**Background:** The continuous spread of novel coronavirus (COVID-19) pandemic and delays in opening educational institutions across the country is expected to influence the mental health of college students. The aim of our study is to assess the psychological impact and its correlates following the COVID-19 lockdown period, among the MBBS exam going students of a medical college, Puducherry.

**Methods:** A Descriptive Cross-Sectional Study was conducted among Undergraduate students in a medical college of Puducherry between January-March 2021. Around 204 exam going students from Pre-final and Final year MBBS were enrolled in the study. Depression, Anxiety, and Stress was assessed using Depression Anxiety Stress Scale (DASS 21).

**Results:** Among 204 study participants, the prevalence of Stress, Anxiety and Depression among students was found to be 38.2%, 52.8% and 48% respectively. Practicing regular physical activity, history of contact with COVID19 patients, year of MBBS were found to be predictors of Stress, Anxiety and Depression. It was also found that Stress level increases with increase in age.

**Conclusion:** Around half of the study participants have either of the psychological impact following COVID 19 lockdown period that may adversely influence their performance in the university exams.

**Keywords:** COVID-19, Depression, Anxiety, Stress, Medical Students

## INTRODUCTION

Coronavirus disease 2019 (COVID-19) started spreading in the Chinese city of Wuhan in December 2019. Spread of COVID-19 virus is mostly from person to person via virus-laden respiratory droplets.<sup>1</sup> COVID-19 cases had abruptly increased and became a pandemic around the world. The challenges in preventing, identifying and managing the cases had become a burden in various countries. Due to these reasons, several countries in the world imposed a lockdown on their citizens to reduce the spread of the disease and leveraged the health system to manage the patients admitted in the hospital with appropriate care in the context of the COVID-19 outbreak.

In India, the first case of SARS COV-2 was reported on 27<sup>th</sup> January 2020. The Indian government has declared a three-week lock-down from 25<sup>th</sup> of March 2020 to the 14<sup>th</sup> of April 2020, as a measure to break the COVID-19 infection cycle. Social distancing is a critical means to break the cycle of infection.<sup>2</sup> There was a significant decrease in growth rate and increased doubling time after imposing the lock-down.<sup>3</sup> In response to the problems posed by the pandemic, various public health strategies such as isolation of infected or at-risk persons, restricting social contact, and maintaining hygiene by frequent hand wash, have been advised to reduce the risk of infection. Although isolation helped in achieving the goal of reducing infections, reduced access to family,

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friends, and other social support systems resulted in loneliness, increased mental issues like anxiety and depression. It was found that depression symptoms increased three-fold during COVID-19 lockdown than before the pandemic, up from 8.5% before COVID-19 to 27.8% during the lockdown.<sup>4</sup> A study conducted in University of Valladolid, Spain among students unveiled psychological symptoms such as anxiety, depression and stress.<sup>5</sup> Preliminary evidence suggests that younger adults seem to have been particularly affected by the COVID-19 restrictions.

Stress can be explained as a feeling of emotional and physical tension which arises from any event that threatens our homeostasis. Depression is a mood disorder which is characterized by short-term emotional responses to a serious health condition associated with impaired daily functioning accompanied by symptoms, such as sadness and frustration, feelings of guilt, insensibility, and loss of interest. Anxiety disorders are defined as a group of mental disorders characterized by an unpleasant feeling with uneasiness or worry about future events or the fear of responding to current events.<sup>6</sup> Depression is viewed as a state of disinterest in daily activities. World Health Organization has also issued guidelines to address issues related to mental health.<sup>7</sup> Suicidal thoughts are increased due to covid 19.<sup>8</sup>

There was compulsion on students to reduce physical contact with outside one's. Government implemented measures like curfews, quarantines, and closing of non-essential stores, schools, and universities. Teaching methods were changed in many universities, they have suspended classroom teaching and switched to online teaching. Social distancing measures decreased the spread of infection and kept disease under control, but there was increase in psychological well-being and mental health was noted.<sup>9</sup> Being under a lot of pressure to perform academically, students are prone to developing mental health problems.<sup>10</sup> These changes can potentially affect student's mental health negatively. In line with other ongoing research studies conducted across the globe, we examine the effects of the COVID-19 crisis on a student population.<sup>5</sup>

Students who were facing their exams will be in mental stress during and after the period of lockdown. They were in fact spending most of their time at home since the colleges have adapted online classes. There was reduction in social interaction, physical activities, and other extra-curricular activities among students. On that gloomy situation students from various part of India were also about to appear for their university exams and were doing their preparation in the isolated environment. Considering the situation of students and based on findings of various studies, the present study was aimed to assess the psychological impact and its correlates following the COVID-19 lockdown period among the MBBS exam going students of a private medical college, Puducherry.

## MATERIALS AND METHODS

A Descriptive cross-sectional study was conducted in a Private Medical College of Puducherry among Pre final and Final year MBBS students who were appearing for their university exam following the lockdown period for a duration of three months (January 2021 – March 2021). MBBS students who were appearing for university exam in the year 2021 (Third year and Final year students) were included in the study. MBBS students who were already tested positive for COVID-19 or who were having any type of mental illness or who were under drugs for any sort of mental illness were excluded from the study.

A total of 237 students (104 from 3<sup>rd</sup> year, 133 from Final year) appeared for university exam in the month of April 2021. Among them 204 students were included in the study as per the inclusion criteria. Consent was obtained from the students, after explaining in detail about the study. Data was collected in preformed, self-administered, pre tested questionnaire made of DASS 21 Scale. Study variables includes in the study were Socio-Demographic factors such as age, gender, year of MBBS and the outcome measures were Prevalence of Depression, Anxiety and Stress among exam going students. Data were entered in MS Excel and analysed using SPSS Statistics version 16.0. The data analysed in this study were Ordinal data. Spearman correlation test was performed to determine the correlation and Ordinal logistics regression were used for prediction of Depression, Anxiety and Stress with respect to selected variables.

The 21-item Depression Anxiety Stress Scale (**DASS 21 Scale**)<sup>11</sup> was used to assess depression, anxiety, and stress. There are 7 items for each subscale. The responses were collected on a 4-point rating scale ranging from 0 "didn't apply to me at all" to 3 "Applied to me very much or most of the time". Cronbach's alpha was found to be 0.85 for stress subscale, 0.75 for anxiety and 0.80 for depression subscales. The aggregated number for each subscale was multiplied by 2 and interpreted as suggested by the authors (Lovibond and Lovibond 1995). The severity ratings used to interpret are shown below

### Severity ratings to interpret DASS 21 scale

Severity	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely severe	28+	20+	34+

## RESULTS

Clinical characteristics of the study participants were shown in table.1. Among 204 study participants, 61.3% of the students were less than 23 years of age and 38.7% were either 23 or above 23 years of age. Around 57.8% were females' participants.

**Table 1: Socio-Demographic Characteristics of Study Participants (N=204)**

Socio-demographic Characters	Participants (%)
<b>Age</b>	
Less than 23 years	125 (61.3)
More than or equal to 23 years	79 (38.7)
<b>Gender</b>	
Male	86 (42.2)
Female	118 (57.8)
<b>Year of MBBS</b>	
3 <sup>rd</sup> Year students	106 (52.0)
4 <sup>th</sup> Year students	98 (48.0)
<b>Residence</b>	
Day scholar	92 (45.1)
Hostel student	112 (54.9)
<b>Family type</b>	
Nuclear family	175 (85.8)
Joint family	29 (14.2)
<b>Contact with COVID-19 Patients</b>	
Yes	27 (13.2)
No	177 (86.8)
<b>Family members tested positive for COVID-19</b>	
Yes	33 (16.2)
No	171 (83.8)
<b>Physical activity among students</b>	
Yes	113 (55.4)
No	91 (44.6)

**Table 2: Prevalence of Stress, Anxiety and Depression (N=204)**

Severity	Stress (%)	Anxiety (%)	Depression (%)
Normal	126 (61.8)	97 (47.5)	106 (52.0)
Mild	19 (9.3)	22 (10.8)	31 (15.2)
Moderate	17 (8.3)	44 (21.6)	30 (14.7)
Severe	22 (10.8)	10 (4.9)	9 (4.4)
Extremely severe	20 (9.8)	31 (15.2)	28 (13.7)

Almost equal number of students were included from both third and fourth year of MBBS. Based on residence, 54.9% students were residing in hostel and 45.1% were day scholars. Majority (86.8%) of the study participants had contact with lab confirmed COVID-19 patients and none of the students were COVID-19 positive. Around 16.2% of participants had either of their family members tested positive for COVID-19. Majority (55.4%) of the participants were performing regular physical activity.

Prevalence of Stress, Anxiety and Depression with their severity level were shown in Table. 2. The Psychological impacts were assessed based on DASS 21 scale. Overall, out of 204 students 38.2% of students had Stress, 52.8% had anxiety and 48% had Depression. Based on the severity of stress, 61.8% of students were normal followed by 10.8% had Severe stress, 9.8% of students had extremely severe stress. With respect to Anxiety, around half (47.5%) of the students were normal, around one-fifth (21.6%) students had moderate anxiety and 15.2% had extreme-

ly severe anxiety. Depression severity revealed that more than half of the students (52%) were normal, 15.2% had mild depression, 14.7% had moderate Depression and 13.7% had extremely severe Depression.

Spearman's Rank order correlation was applied to examine the relationship between Levels of Stress, Anxiety, Depression with Age group and Years of MBBS. Correlation was found to be positive and statistically significant between Age group and Stress level ( $r_s = 0.24, p < 0.001$ ); Age group and Anxiety level ( $r_s = 0.24, p < 0.001$ ); Age group and Depression level ( $r_s = 0.24, p < 0.001$ ) respectively. Also, correlation was positive and statistically significant between Year of MBBS and Stress level ( $r_s = 0.35, p < 0.001$ ); Year of MBBS and Anxiety level ( $r_s = 0.42, p < 0.001$ ); Year of MBBS and Depression level ( $r_s = 0.39, p < 0.001$ ). It is noted that the relationship between Year of MBBS with Stress and Depression were weak Correlation. Whereas the relationship between Year of MBBS and Anxiety was Moderately Positive. (Table 3)

Findings from table 4 indicates that, for every 1 unit increase in age there was 1.32 times odds of increase in stress level and for every 1 unit increase in Year of MBBS there was 3.04 times odds of increase in stress level. Study participants who had history of contact with COVID-19 patients had 3.04 times odds of increase in stress level compared to students who had no contact history. The odds of stress among participants who are performing physical activity were 0.48 times compared to those who were not practicing physical activity, which shows performing physical activity has a beneficial effect. These findings were found to be statistically significant.

Findings from Table 5 shows that, for every 1 unit increase in Year of MBBS, there was 4.07 times odds of increase in Anxiety level and this was found to be statistically significant. Increase in Anxiety level among study participants who had history of contact with COVID-19 patients was 5.55 times compared to participants who had no contact history. The odds of anxiety among participants who are practicing regular physical activity were 0.549 times compared to those who were not practicing regular physical activity, that indicates practicing regular physical activity has protective effect against anxiety. These findings were statistically significant.

Table 6 shows that for every 1 unit increase in Year of MBBS, there was 3.25 times odds of increase in Depression level. Increase in Depression level among participants who had history of contact with COVID-19 patients was 4.79 times compared to participants without contact history. The odds of depression among participants practicing regular physical activity were 0.27 times compared to those who were not practicing regular physical activity, that shows performing regular physical activity is protective against depression. These findings are statistically significant.

**Table 3: Correlation of Severity of Stress, Anxiety and Depression with Age and Year of MBBS (N=204)**

Variables	Stress level		Anxiety level		Depression level	
	Corr. Coeff	P value*	Corr. Coeff	P value*	Corr. Coeff	P value*
Age	0.24	0.000	0.24	0.001	0.24	0.001
Year of MBBS	0.35	0.000	0.42	0.000	0.39	0.000

Corr. Coeff= Correlation Coefficient; \*statistical significance two tailed

**Table 4: Ordinal regression to find the relationship between Severity of stress with selected variables**

Parameter	B	Std. Error	Exp(B)	95% Wald CI for Exp(B)	
				Lower	Upper
Male	-0.336	0.319	0.714	0.382	1.334
Day Scholar	-0.044	0.317	0.957	0.514	1.779
Nuclear family	-0.039	0.429	0.962	0.415	2.231
History of contact with COVID-19 Patients	1.111	0.446	3.039	1.269	7.279
Family members tested positive for COVID-19	-0.361	0.441	0.697	0.294	1.654
Performing Physical activity	-0.732	0.322	0.481	0.256	0.904
Age	0.281	0.130	1.324	1.027	1.708
Year of MBBS	1.111	0.338	3.036	1.566	5.885

Note: The Model Fitting information shows significant result and the Goodness fit of both Pearson chi-square and deviance were non-significant.

**Table 5: Ordinal regression to find the relationship between Severity of Anxiety with selected variables**

Parameter	B	Std. Error	Exp(B)	95% Wald CI for Exp(B)	
				Lower	Upper
Male	-0.149	0.288	0.862	0.491	1.514
Day Scholar	0.264	0.297	1.302	0.728	2.329
Nuclear family	0.339	0.432	1.404	0.601	3.275
<b>History of contact with COVID-19 Patients</b>	<b>1.714</b>	<b>0.444</b>	<b>5.552</b>	<b>2.326</b>	<b>13.250</b>
Family members tested positive for COVID-19	-0.015	0.395	0.985	0.455	2.136
<b>Performing Physical activity</b>	<b>-0.599</b>	<b>0.299</b>	<b>0.549</b>	<b>0.306</b>	<b>0.986</b>
Age	0.178	0.119	1.195	0.947	1.507
<b>Year of MBBS</b>	<b>1.403</b>	<b>0.320</b>	<b>4.068</b>	<b>2.172</b>	<b>7.617</b>

Note: The Model Fitting information shows significant result and the Goodness fit of both Pearson chi-square and deviance were non-significant.

**Table 6: Ordinal regression to examine the relationship between Severity of Depression with selected variables**

Parameter	B	Std. Error	Exp(B)	95% Wald CI for Exp(B)	
				Lower	Upper
Male	0.294	0.299	1.342	0.747	2.410
Day Scholar	0.152	0.299	1.165	0.648	2.092
Nuclear family	-0.219	0.438	0.803	0.341	1.894
<b>History of contact with COVID-19 Patients</b>	<b>1.568</b>	<b>0.458</b>	<b>4.798</b>	<b>1.957</b>	<b>11.765</b>
Family members tested positive for COVID-19	-0.523	0.430	0.593	0.255	1.376
<b>Performing Physical activity</b>	<b>-1.293</b>	<b>0.310</b>	<b>0.274</b>	<b>0.149</b>	<b>0.504</b>
Age	0.215	0.125	1.240	0.970	1.585
<b>Year of MBBS</b>	<b>1.178</b>	<b>0.324</b>	<b>3.247</b>	<b>1.720</b>	<b>6.130</b>

Note: The Model Fitting information shows significant result and the Goodness fit of both Pearson chi-square and deviance were non-significant.

## DISCUSSION

COVID-19 Lockdown had made a huge impact on student's mental health. This study was aimed to estimate the prevalence of Depression, Anxiety and Stress among exam going medical college students. Correlates and predictors of those psychological impacts were also addressed. Majority of the study participants were less than 23 years of age. Almost equal

number of students consented to participate in the study from Third and Final year MBBS. Majority of the study participants had history of contact with COVID-19 patients. More than half of the students were practicing regular physical activity.

The present study revealed that out of 204 students 38.2% of students had Stress, 52.8% had anxiety and 48% had Depression. A study conducted by **Saumik**

**Chakraborty et al**<sup>12</sup> Before the covid pandemic era shows less prevalence of Stress, anxiety and depression when compared to our present study. Similar kind of result was also found in **Sunil D. Kumar et al**<sup>13</sup> which was also done before the occurrence of Covid-19. More than one-third of the students had mild to extreme levels of stress. Around half of the study participants had mild to extreme severe levels of depression and anxiety respectively. A study conducted by **Usaman Rehman et al**<sup>14</sup> shows that, among various profession, students and health care profession were found to have higher proportion of stress, Anxiety and Depression during lockdown period. Various studies reported the psychological impacts of lockdown among students which supports the findings in this present study.<sup>15,16</sup> A statistically significant positive correlation was found between Depression, anxiety, stress with age and Year of MBBS. Among them majority were having weak correlation, whereas Year of MBBS with Anxiety had moderately positive correlation.

In this present study, Year of MBBS, History of Contact with COVID-19 and Physical activity were found to be the Predictors for Stress, anxiety and Depression. Adding to that age was also found to be predictor of stress that is level of stress increases with increase in age. Students more than 23 years of age were having higher odds of experiencing stress compared to young age group. A study by Jungmin L et al, also revealed that stress found to be higher among younger age groups.<sup>17</sup>

Level of stress, anxiety and depression increases with increase in grades of MBBS. Final year students were having higher chances of getting stress, anxiety and depression than Third year MBBS students. This could be due to the solicitude over their future vision after completion of final exams. A study conducted by **Sheela sundaesan et al** also mentions that stress could be due to future career prospects.<sup>18</sup> A study by **Ahmed Msherghi et al** also reveals that that anxiety was found to be increasing with increase in grades of education level.<sup>19</sup>

Interestingly, the participants with contact history with COVID-19 patients had increase in severity of stress, anxiety and depression. **Amy Dawel et al** study reveals that adults who had history of contact with COVID-19 patients had higher chance of getting depression and anxiety.<sup>20</sup> Adhering to regular physical activity found to be protective factor against severity of stress, anxiety and depression. In the study conducted by **ZayleaKua et al** concluded that reduction in physical activity leads to mild stress and moderate-to-severe depression while increase in physical activity found to be protective against depression.<sup>21</sup> In the present study, it is also evident that findings of spearman correlation and ordinal regression almost complement each other. The main limitation of our study was lack of pre-lockdown period data regarding mental health status of the study population chosen and lack of plan to conduct this study in multi-centric settings.

## CONCLUSION

COVID-19 Lockdown had detrimental effect on student's psychological health, in addition to stressful medical education that may adversely affect their performance in university exams. Alarmingly, around half of the study participants were found to be in stress, anxiety and depression. Year of MBBS, history of contact with COVID-19 patients, regular physical activity were found to have influence on Stress, Anxiety and Depression Still, further interventional and qualitative research could be planned to improve the mental health status of the students.

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