



# Reopening of Universities for On-Campus Teaching In COVID-19 Pandemic: Status of Generalized Anxiety in Medical Students

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## ABSTRACT

**Introduction:** Academic institutions all over the world have been closed for physical classes for a long time. This research is primarily focused upon the reopening of the institutions and the state of anxiety in medical students on this account.

**Aims & Objectives:** We aim to assess the status of generalized anxiety levels in medical students across the country about resuming on-campus academic activities during the ongoing COVID-19 Pandemic.

**Place and duration of study:** All PMC recognized undergraduate public and private medical colleges across Pakistan during the period of Sept-Nov 2020.

**Material & Methods:** A descriptive cross-sectional study was conducted on a target population of currently enrolled undergraduate medical students across Pakistan who could be accessed through social media. Study variables included socio-demographic variables such as age, gender, class, college type, residential status of student, stress, and anxiety. The sample size was calculated on Open Epi version 3 using 50% assumed prevalence; and sample size was 579, rounded up to 580. Data was collected from a sample of 585 across the country during Sept-Nov 2020. The data collection instrument included: a standardized and validated Generalized Anxiety Disorder-7(GAD-7) questionnaire along with a few socio-demographic questions. Mean and SD values and frequency trends of all variables were recorded. GAD level, anxiety scores and associations were determined through Chi-square test of significance, independent sample t-test, and Regression analysis model.

**Results:** Showed that 41% of the respondents had anxiety when assessed on the GAD-7 questionnaire; 67% of students were afraid of getting infected while on campus; 49% preferred online education in the present situation; significant associations were found between anxiety scores and respondents' age. Regression analysis revealed that the female students were 1.47 times more anxious and stressed than male students regarding the reopening of universities and continuation of physical education.

**Conclusion:** The students, particularly, have anxiety about the reopening of institutions amidst the pandemic. The impact on the mental health of the students requires special attention as the anxiety of being on-campus during the pandemic is markedly observed.

**Key words:** COVID-19 Pandemic, medical colleges, medical student's, generalized anxiety

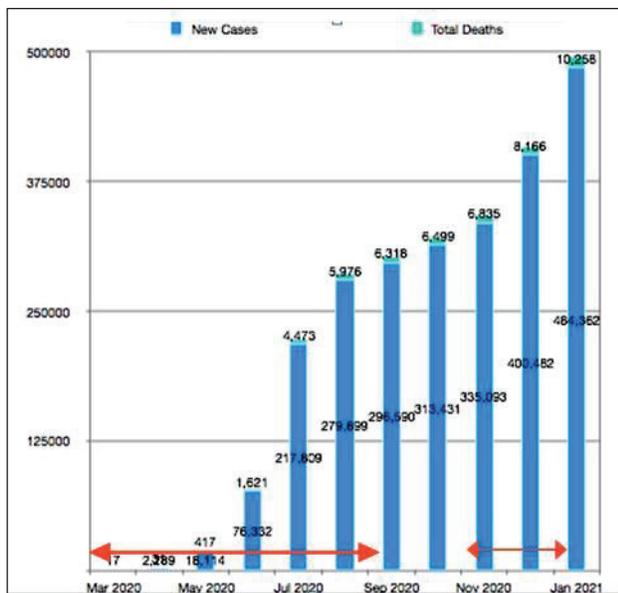
## INTRODUCTION

The World Health Organization (WHO) declared the novel corona virus disease 2019 (COVID-19) a pandemic on March 11th, 2020. The disease was spreading rapidly with risks of morbidity and mortality worldwide.<sup>1</sup> The pandemic forced travel restrictions and lockdowns all across the world. This pandemic has impacted healthcare workers, businesspersons, educators, and students alike. The social and psychological impact of COVID-19 has been tremendous.<sup>2</sup> Universities and colleges across the world suspended all on-campus activities and

substituted the traditional modes of teaching and learning with online classes.<sup>3</sup> In Pakistan, as the number of cases started rising, the closure of education institutions ensued from mid-March 2020. The initial closure of two weeks was extended as the country was put under a nationwide lockdown in April 2020. This lockdown was also extended twice until May 2020. The educational institutions carried online activities until 15th September 2020. The schools and colleges re-opened only to be closed again from 26th November 2020 to 18th January 2021, due to the second wave of COVID 19. The institutions started to open up phase-wise, but the third deadly wave of COVID-19 emerged and

physical education activities once again halted from 15th March 2021 (Fig-1). This closure has been extended till May 2021.<sup>4, 5</sup>

After months of fear, precautions, restrictions, and fighting the disease named COVID-19, the restrictions were being relaxed and plans were being made to reopen the educational institutions. The reopening of education institutions amidst the pandemic has its own set of challenges. The commencement of physical classes at the campuses for undergraduate medical students may be a matter of serious concern for the stakeholders i.e., parents, students, and the government. Adopting social distancing and other preventive measures like face coverings etc can be a daunting exercise for young adults. The logistics of these measures can be challenging for the educational institutions and hence the government.<sup>6</sup> The impact of stress and anxiety associated with the re-opening of educational, and more specifically medical institutions, has not been studied in Pakistan.



**Fig-1:** Timeline of closure of educational institutions' on-campus activities during the COVID 19 pandemic and number of reported cases and deaths in Pakistan.

In the ongoing pandemic, it is crucial to understand how students feel about reopening academic institutions, how they will act, and if they will be complacent to the policies of social distancing, while at the campus. It is not known how willing they would commit to observing the standard precautions at all times on campuses. Medical students must gain clinical training at the designated hospitals and many may be living in hostels, away from their hometowns. Since the environment has evolved altogether, it is imperative to gauge their

anxiety levels and apprehensions, if any. Results from this study may help prepare institutions in developing and implementing comprehensive administrative policies, support to students and faculty, as on-campus teaching resumes. Therefore, we aimed to assess the status of generalized anxiety levels in medical students across the country about resuming on-campus academic activities during the ongoing COVID- 19 Pandemic. The data collection instrument used was a standardized and validated Generalized Anxiety Disorder-7 (GAD-7) questionnaire along with a few socio-demographic questions.<sup>7</sup> A few questions related to the current pandemic, based on a literature search, and were also added to the online survey questions.<sup>8</sup> Historically, GAD-7 has been used to study anxiety and stress in various populations of mentally healthy as well as those with pre-diagnosed conditions of stress and anxiety this validated tool has been successfully used to identify generalized anxiety and depression among population, during the COVID-19 pandemic.<sup>9, 10</sup>

## MATERIAL AND METHODS

A descriptive cross-sectional study was conducted across Pakistan. The approval from the Institutional Review Board (IRB) of Shalamar Medical and Dental College was received vide letter number (SMDC-IRB 220). All Pakistan Medical Council (PMC) recognized public and private undergraduate medical colleges of Pakistan were included in a survey that lasted three months. The target population was currently enrolled undergraduate medical students across Pakistan; whereas the accessible study population was students who could be accessed through social media. Study variables included socio-demographic variables such as age, gender, class, college type, residential status of student (day scholar/ boarder), stress, and anxiety. The sample size was calculated on Open Epi version 3 using 50% assumed prevalence, a margin of error of 5%, Confidence Level 95%, Design-Effect 1.5 (since convenient sampling is used), and a total population of 1000000 (by default). The calculated sample size was 579, rounded up to 580. The study setting was all undergraduate PMC recognized medical colleges of Pakistan. Inclusion criteria was: 1) medical students who could be approached on social media with availability of online facility/ smart phone 2) medical students enrolled in Higher Education Commission (HEC) approved medical colleges/universities. Exclusion criteria was: 1) students from Nursing, Allied Health sciences, and BDS, and 2) medical students who had completed

clinical rotations and/or coursework and are waiting for the final professional examination or the results of it. A convenient sampling technique was applied to recruit the students from both private and public colleges of Pakistan. Medical students were approached through social media (WhatsApp mainly). Initially the researchers shared the link of the Google form to the students from our own medical institution; then they were asked to share the link with their friends in other medical colleges within the city and outside; and our third strategy was to share the questionnaire link with students we knew ourselves and who were studying in different medical colleges across the country (snowball sampling technique). Data was collected from a sample of 585 across the country during Sept-Nov 2020. The data collection instrument included: a standardized and validated Generalized Anxiety Disorder-7 (GAD-7) questionnaire along with a few socio-demographic questions.<sup>7</sup> A few questions related to the current Pandemic, based on a literature search, were also added to the online survey questionnaire.<sup>8</sup> These questions included information about their experience of ever being suspected or diagnosed to have COVID 19 infection and about their willingness to commit to precautionary measures while on campus. The total number of questions in the form was twelve, in addition to the basic bio data. The average time to complete the questionnaire was estimated to be 3-5 minutes. A survey designed on Google Forms was shared with students with an online consent document that included a summary of the purpose of the study, an invitation to the student to participate, and explicit consent of the student. The data was anonymous as no personal or institutional information was collected and the data was kept confidential in the password-protected computers of the investigators.

#### Statistical analysis:

Analysis was performed using SPSS version 20. Descriptive statistics, mean and SD, frequency trends of all variables and GAD level, Anxiety scores, associations were determined by application of Chi-square test of significance, independent sample t-test, and Regression analysis model. All ethical considerations were duly observed.

### RESULTS

Data of 585 undergraduate medical and dental students were entered and analyzed on SPSS 20. The mean age of the respondents was 21.46±1.943; while the Mean anxiety score was found to be 9.44±

6.003. Most of our respondents were females (67.7%). Following tables show the results in a systematic manner.

Variables	Distribution	n(%)
Provincial distribution	Punjab	529(90.4%)
	Sindh	28(4.8%)
	KPK	27(4.6%)
	Balochistan	1(0.1%)
MBBS Class	1 <sup>st</sup> year	178(30.4%)
	2 <sup>nd</sup> year	93(15.9%)
	3 <sup>rd</sup> year	62(10.6%)
	4 <sup>th</sup> year	185(31.6%)
	Final year	67(11.5%)
Age categories	<22 year of age	379(64.8%)
	=>22 year of age	206(35.2%)
Gender	Males	184(31.5%)
	Females	396(67.7%)
Type of Medical college	Public	76(13%)
	Private	509(87%)
Residential status	Day scholar	316(54%)
	Boarder	269(46%)

**Table-1:** Socio demographic characteristics of the respondents (n=585)

Feeling anxious, nervous, or on edge	
Not at all several days	326(55.7%)
>half the days-nearly every day	259(44.2%)
Inability to stop worrying or control worrying	
Not at all several days	338(57.7%)
>half the days-nearly every day	247(42.2%)
Excessive worrying about different things	
Not at all several days	314(53.7%)

>half the days-nearly every day	271(46.3%)
<b>A restlessness that it's hard to sit still</b>	
Not at all several days	352(60.2%)
>half the days-nearly every day	233(39.9%)
<b>Difficulty in relaxing</b>	
Not at all several days	369(63%)
>half the days-nearly every day	216(36.9%)
<b>Becoming easily annoyed or irritable</b>	
Not at all several days	337(57.7%)
>half the days-nearly every day	248(42.4%)
<b>Feeling afraid as if something awful might happen</b>	
Not at all several days	335(57.3%)
>half the days-nearly every day	250(42.8%)

**Table-2:** Results from the GAD-7 questionnaire revealed

<b>Have you ever been?</b>	
suspected of COVID-19	117(20%)
Diagnosed/ confirmed of COVID-19	37(6.3%)
Never been suspected or diagnosed with COVID-19	431(73.7%)
<b>Are you afraid of being infected by COVID 19 while on campus?</b>	
Yes	392(67%)
No	84(14.4%)
May be/ doubtful	109(18.6%)
<b>Do you prefer online educational activities as compared to being at campus?</b>	
Yes	288(49.2%)
No	216(36.9%)
May be/ doubtful	81(13.8%)
<b>How committed you will be to observe the precautions yourself at all times while you are at campus?</b>	
Very committed	340(58.1%)
Somewhat committed	223(38.1%)
Not at all committed	22(3.8%)

**Table-3:** Other responses relevant to COVID pandemic

Variable	Score categorization	n(%)
Anxiety (present)	=>10 score	240(41%)
No anxiety	<10	345(59%)

**Table-4:** Anxiety score categorization for the study population

Variable	Anxiety score		Chi square value	P-value	
Afraid of being infected while on campus	<10	=>10	45.383	<.01	
	Yes	194			198
	No	62			22
May be/ Doubtful	89	20			
Afraid of being infected while on campus	Respondents' age		6.630	.036	
	<22 yr	=>22yr			
	Yes	240			152
No	60	24			
May be/ Doubtful	79	30			
Preference for online education	Anxiety score		36.873	<.01	
	<10	=>10			
	Yes	140			148
No	162	54			
May be/ Doubtful	43	38			
Preference for online education	Respondents' age		15.301	<.01	
	<22 years	=>22 years			
	Yes	164			124
No	156	60			
May be/ Doubtful	59	22			

**Table-5:** Association identified between variables and Anxiety score/ respondents' age (n=585)

Variable	Group statistics	Mean ± SD	p-value	95% CI
Male	184	1.35	0.05	-0.172-0.000
Female	396	1.44		

**Table-6:** Independent Sample t-test upon gender and Anxiety score

Characteristics	Total (n)	Anxious n(%)	COR (95% CI)	AOR (95% CI)
<b>Age</b>				
• < 22 years	301	147(48.8%)	1	1
• ≥22 years	284	124(43.7%)	0.812*(0.59, 1.12)	1.30(.684, 2.46)
<b>Gender</b>				
• Male	184	73(39.7%)	1	1
• Female	401	198(49.4%)	1.48*((1.04, 2.11)	1.47*(1.02, 2.11)
<b>Residence</b>				
• Day scholar	269	117(43.5%)	1	1
• Hostilite	316	154(48.7%)	0.81*(0.58, 1.12)	1.28(0.92, 1.79)
<b>Year of study</b>				
1 <sup>st</sup> year	178	87(48.9%)	1	1
2 <sup>nd</sup> year	93	43(49.5%)	1.02(0.62, 1.69)	1.1(0.651, 1.81)
3 <sup>rd</sup> year	62	35(56.5%)	1.36(0.76,2.42)	1.2(0.65, 2.38)
4 <sup>th</sup> year	185	72(38.9%)	0.67*(0.44,1.01)	0.54(0.27, 1.11)
Final year	67	31(46.3%)	0.90 (0.513, 1.58)	0.76 (0.33, 1.75)

COR= crude odd's ratio, AOR= adjusted odd's ratio, \*significant

**Table-7:** Logistic Regression Analysis

Statistically significant associations were found between anxiety scores and fear of getting infected while on campus (Table 5); and preference for online classes (Table 5). A significant association was also found between the age of the respondent and fear of getting infected while on campus (Table 5); and preference for online education (Table 5). Other variables did not result in a significant association with anxiety scores.

Based on the Regression Analysis, it can be reasonably construed that the female medical/dental students are 1.47 times more likely to be anxious as compared to the males, adjusted for age, residence, and academic year (Table 7).

The majority of the research participants were afraid of the casual attitudes of others (56%) and lack of implementation of SOPs (65%) after the reopening of schools. More than 60% of the respondents feared close contact with patients and their families during their training at the hospitals.

## DISCUSSION

In Pakistan, there are 117 medical colleges from private and public sectors, registered by Pakistan Medical Council (PMC).<sup>11</sup> Nearly 20,000 students graduate from these medical and dental colleges, every year. The pandemic hampered the academic activities in all the institutions and putting a great impact on the mental health of medical students.

We specifically focused on the reopening of schools (Fig 1) when the gloom of the COVID pandemic is still in the air. The common socio-demographic factors included age, gender, residential status of students, and the type of colleges. The data collected for our study included respondents from various medical institutions in all provinces of Pakistan. Present study results upon the anxiety level scores (Table 4) found that 41% of students had anxiety with a score >10; which is supported by another past study conducted upon medical students, that reported to have moderate-severe anxiety in 46.17% students (score >10). The finding of our study upon students being positive for COVID-19 or suspected for it is supported by another study that reported 1.47% of students had confirmed COVID-19 while 57.82% had a suspicion of corona infection. All of these students were required to be isolated while at home.<sup>8</sup>

The authors of this study asked the participants about their perception of reopening their institutions with physical classes, whether they were afraid of getting infected while on campus, and their preference for online classes (Table 3). These study findings are supported by past research that found that 84.71% of students were afraid of becoming infected with COVID-19 while on campus, 57.06% were satisfied with the knowledge content received in online classes and many believed that the course should be suspended in the current pandemic situation.<sup>8</sup> A statistically significant relationship between GAD score and stress of getting infected while at the campus was observed in our study. This expresses added anxiety and stress, on medical students, of reopening their institutions. In another supportive study, Final year students have shown symptoms of depression and nervousness as they near their exit exams.<sup>12</sup> Another study of final year medical students across Pakistan also revealed various moods and levels of depression among the students.<sup>12</sup> A study in Brazil also showed a high prevalence of moderate to severe symptoms of anxiety and depression among medical students.<sup>13</sup> This shows that the impact of mental health on medical and dental students has been immense during the pandemic. The anxiety of online

education throughout the year and now the reopening of medical institutions has added to the stress of the disease itself. This may be a reason for committing to follow SOPs while at the campus, once on-campus activities resume as a majority of our study respondents said that they were very committed to observing the Standard Operating Procedures (SOPs), defined by the government and the institution, while on campus. This is encouraging information particularly when most of them reported that they were afraid of being infected while on campus. The level of impact on the mental well-being of medical students and increased level of anxiety have been reported widely.<sup>14</sup>

Independent sample t-test results in our study (Table 6) showed borderline significant p-value 0.05 with gender and anxiety score only; mean  $1.35 \pm .479$  in males & mean  $1.44 \pm .497$  in females. This is opposite to the past study that found a significant difference when applied to gender and anxiety scores.<sup>8</sup>

In Pakistan though, a study has been conducted among different university students (other than medical students) that reported 34% of students to have moderate-high anxiety levels during the COVID Pandemic situation (anxiety score >10).<sup>15</sup>

In the present study Regression analysis (Table 7) showed that female medical students were more anxious for reopening of institutions and continuation of physical classes, in the present pandemic situation. So for the present study, with caution, it can be stated that the female gender is a predictor for having higher anxiety problems. This finding is similar to another study conducted in Turkey, which found a significantly higher 'fear' score among female participants.<sup>8</sup> They also found significant levels of fear among previously infected medical students, contrary to our results where we did not see a statistically significant difference in anxiety levels of previously infected/suspected study participants.<sup>13</sup>

We have not observed any study about anxiety in medical students due to the reopening of academic institutions. So, this is the first study to explore anxiety associated with the reopening of medical institutions in Pakistan.

#### **Limitations:**

The study has a limitation of non-representativeness of the sample based on the convenient sampling strategy. This was an online survey so selective participation and coverage error may be present. The study participants reported their anxiety and

depression, so response bias and other shortcomings associated with self-reporting cannot be ruled out. At the time during the pandemic when the study was being conducted, the timelines for reopening educational institutions were being changed due to the changing prevalence of COVID infection in the community. Some of the educational institutions also opened a couple of weeks before the closure was announced due to an increase in the number of cases. So, no clear deadline for the reopening of institutions may have affected the level of anxiety and depression among medical students.

#### **Recommendations:**

As the educational medical and dental institutions have reopened after a long spell of online education, it is imperative to ensure strict safety protocols in all institutions. Special attention will be required in medical and dental institutions as the patients are exposed to the clinical environment.

Vaccination of all staff of the institutions as well as the students must be encouraged, if not enforced. The students have been through some unprecedented stress and extraordinary measures will be required by the institutions as well as the faculty members to facilitate and motivate the students. Many institutions already offer student counselors and psychological support. This situation requires extra resources to meet the challenges faced by the students. Emotional and psychological support should be considered a mandatory resource among all institutions to mitigate the effects and after-effects of this pandemic.

#### **CONCLUSION**

The COVID 19 pandemic has caused havoc in the lives of students. The medical and dental students have particularly faced many challenges as their training requires them to interact with patients in hospital settings. The impact on mental health due to the pandemic has been aggravated by disruption and uncertainty of academic activities. Generally, the medical students in Pakistan have some level of generalized anxiety and depression. The students, particularly, have anxiety about the reopening of institutions amidst the pandemic. However, they do show resolve and commitment to following the guidelines given by their institutions and the government. The medical institutions and educators have a grave responsibility to ensure safety protocols and facilitate medical students.

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