ORIGINAL ARTICLE

BUDDING MEDICAL PROFESSIONALS AND COVID-19: THE IMPACT OF COVID-19 ON MENTAL HEALTH AND MEDICAL STUDENTS

Syed Shabbir Afzal[1], Mohammad Aadil Qamar[1], Rubaid Azhar Dhillon[2], Maria Bhura[3], Muhammad Hashir Khan[2], Qosain Suriya[3], Shiza Siddiqui[4], M. Raafe Ali Khan[1], Syed Akbar Abbas[3]

[1]Ziauddin University, Karachi, [2]Medical College, Riphah International University, Rawalpindi, [3]The Aga Khan University, Karachi, [4]Dow International Medical College, Karachi-Pakistan

Background: Due to the Novel Coronavirus Disease, medical education has transformed from a physical to an online-medium. The importance of physical education in low-and-middle-income countries (LMICs), where online education can be challenging there is a need to explore the factors that affect online education. This study assesses the perspective and mental health of students whose medical education has been impacted by the pandemic. **Methods:** An online-questionnaire was distributed through social media platforms from October-to-December 2020 through Google-Forms among medical students across Pakistan. Two grading-scales were used to score anxiety and depression. Descriptive statistics and a logistic regression analysis were used to identify factors associated with anxiety and depression among medical students. $p<0.05$ was considered as significant. Data was analyzed using STATA v.15. **Results:** Total of 433 medical students participated in the study where 68.1% had some form of depression and 10.9% had anxiety. Around 65%-participants disagreed with the preference for online-classes. Seventy percent agreed on "Has the thought of the pandemic made you worry about your academic future" being associated with COVID-19 related-depression (OR: 2.03, 95%CI: 1.32-3.11). Multivariate analysis showed agreeing to "COVID affected my educational performance" was associated with anxiety (OR:1.45, 95%CI: 1.03-2.06) and depression (OR: 1.27, 95%CI: 1.03-1.56). **Conclusion:** Being part of the Low- and-Middle-Income Countries (LMIC), online-education itself becomes a challenge. Given the continued shutdown of universities across the country and the growing anxiety and depression amongst the students, adequate measures should be taken to help in coping up with the current challenge.

Keywords: COVID-19; Medical education; Medical students; Mental health

Citation: Afzal SS, Qamar MA, Dhillon R, Bhura M, Khan MH, Suriya Q, *et al.* Budding medical professionals and COVID-19: The impact of COVID-19 on mental health and medical students. J Ayub Med Coll Abbottabad 2022;34(3):483–8.

DOI: 10.55519/JAMC-03-9572

INTRODUCTION

COVID-19 has rattled the globe with many countries effectively going into lockdown resulting in closure of transportation, businesses, institutions etc. One such entity effected is the educational institutions resulting in a shift from in-person to online education, impacting 91% of the student population.[1] Learning issues regarding medical education are not the only major concern. Given the economic suffrage, downsizing in many organizations resulted in financial constraints on many families. A survey conducted by a student loan organization revealed that 4 out of 5 students have requested for financial aid during the COVID-19 pandemic.[2] In a larger proportion compared to the students, the faculty members face a major challenge adapting to the online teaching system due to technological knowledge barriers.[3]

Studies indicate students to be a major portion of the population reporting severe psychological distress with increased levels of anxiety, depression, and stress due to isolation.[4] Given the suddenness of the pandemic, ill-preparedness created the challenge of effective evaluation during online education.[5] Keeping in view such issues, this study was conducted to evaluate the impact of COVID-19 on students' perspectives on the transition to online medium, and how that impacts the mental health of students across Pakistan.

MATERIAL AND METHODS

A national cross-sectional study was conducted among medical students, aged 18 years or above across Pakistan between October 6th – December 28th, 2020. An electronic survey consisting of 20 questions was created using Google Forms and distributed through online medium like e-mail and social media platforms to ensure compliance with Standard Operating Procedures (SOPs). Since the medium of education is in English, the questionnaire was in the same language. The questionnaire was designed after researching previously validated questionnaires from a similar published study.[6] A pilot study was conducted among a group of students and the necessary changes were made accordingly.

The questionnaire comprised of questions related to the transition to online teaching platform and

their perspective on the issues. This was made possible via the 5-Point Likert Scale (where 1 was equal to strongly disagree and 5 was equal to strongly agree) that was implemented in questions that contained no scoring method. The Patient Health Questionnaire-9 (PHQ-9) scale was used to assess for depression. A total score of 1–4 translated as 'none', 5–9 as 'mild', 10–14 as 'Moderate', 15–19 as 'Moderately severe' and 20–27 as 'Severe'. The Coronavirus Anxiety Scale (CAS) was used to assess the level of anxiety with a cutoff score ≥9 was used to classify between no anxiety and anxiety.[7,8]

The sample size was estimated and increased by 56% to a final size of 600 participants using the software Raosoft with a 95% confidence level. Descriptive analyses were conducted using frequency and percentages. In the final analysis, depression was classified into a binary variable as "Yes" or "No". Univariate analyses were conducted to compare the impact of each variable of interest on COVID-19 related anxiety and depression. Factors with $p<0.2$ in the univariate analysis were adjusted in a multivariable logistic regression model to identify factors associated with anxiety and depression in medical students. $p<0.05$ was considered significant.

Data analyses was conducted using STATA v.15. The overall reliability of our questionnaire has been indicated by the Cronbach's Alpha test. That is overall 0.916 [95% C.I: 0.904 - 0.927]. The Cronbach's Alpha test for CAS and PHQ-9 computed as 0.902 [95% C.I: 0.887- 0.916] and 0.919 [95% C.I: 0.939- 14.098]. The Ethical Review Committee of Islamic International Medical College Riphah, Rawalpindi, Pakistan, approved of the study protocol and procedures of informed consent.

RESULTS

A total of 433 participants completed the online survey out of 600 surveys distributed, indicating a response rate of 72.6%. Participant characteristics are mentioned in table-1. Majority of the population was aged between 20–22 (66.3%) and belonged to urban areas (85.9%) (Table-1). Figure-1 and Table-2 depicts the several factors regarding students' education and COVID-19. About 59.8%, n=259 students were not satisfied with the online education platform and 67.2%, n=291 students agreed that COVID-19 has affected their educational performance. Participant history of mental disorders is presented in Table 2. We evaluated depression and anxiety among our study participants (Table-3). Majority of the students (68.2%) had some sort of depression ranging from mild to severe. While only 10.9% of participants had anxiety on the CAS scoring system. We conducted univariate and multivariable analyses to identify factors associated with anxiety and depression (Table-4). Gender was associated with depression, where males were less likely to be depressed during the pandemic compared to females (OR: 0.65, 95%CI: 0.43-0.99. As shown in table-5, students who have families with a steady income experienced less anxiety as compared to students who are struggling for financial aid. Overall, the results showed that most of the students were finding it difficult to acclimate to online classes Most of the students felt anxious, even though they did not have a family history or medical history of mental health disorders. In addition, the majority was found to be worried about their academic future because of the pandemic.

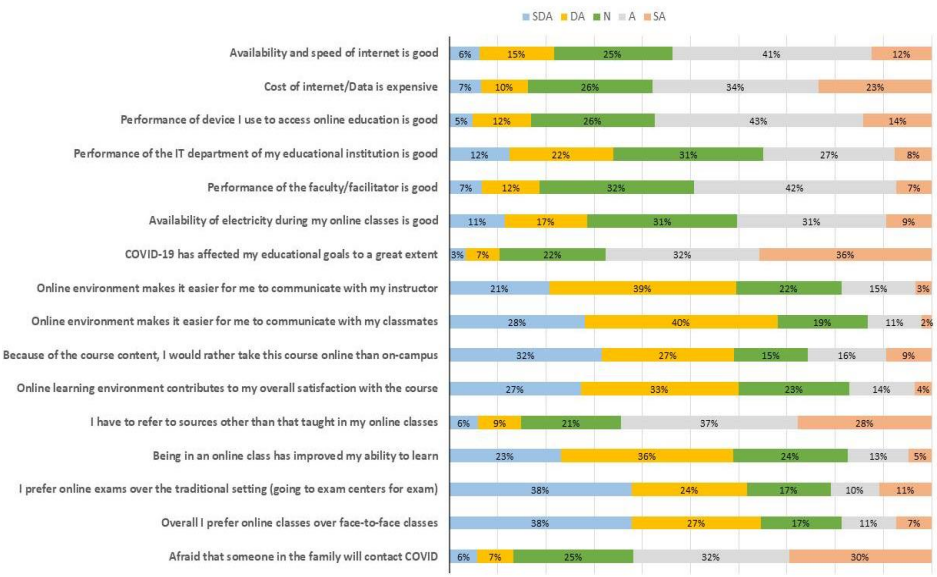

Figure-1: Factors regarding students' education and COVID-19

Table-1: Demographic Characteristics of Participants

Characteristics		Frequency	Percent (%)
Age	18	13	3
	19	38	8.78
	20	124	28.64
	21	93	21.48
	22	70	16.17
	23	54	12.47
	24	23	5.31
	25	8	1.85
	26	6	1.39
	27	4	0.92
Gender	Female	292	67.44
	Male	139	32.1
	Prefer not to say	2	0.46
Education	MBBS	406	93.8
	BDS	12	2.77
	Nursing	1	0.23
	Pharma	9	2.08
	Doctor of Physical Therapy	2	0.46
	Other/post-grad	3	6.93
MBBS	1st year	74	18.23
	2nd year	138	33.99
	3rd year	74	18.23
	4th year	65	16.01
	5th year	55	13.55
Province	Azad Jammu and Kashmir	37	8.55
	Baluchistan	3	0.69
	Gilgit Baltistan	1	0.23
	Khyber Pakhtunkhwa	13	3
	Punjab	213	49.19
	Sindh	166	38.34
Area	Rural	61	14.09
	Urban	372	85.91

Table-2: Factors regarding students' education and COVID-19

Characteristics		Frequency	Percent (%)
Willing to visit hospitals during the pandemic	Yes	237	57.8
Family history of mental disorders	Yes	70	16.17
Personal history of mental disorders	Yes	31	7.16
Steady family income	Yes	377	87.07
Receiving financial aid	Yes	39	9.01
Onset of COVID made participant feel nervous/anxious?	Yes	279	64.43
Participant previously infected by COVID	Yes	40	9.24
Thought of the pandemic made participant worry about their academic future	Yes	300	69.28

Table-3: Mental health among participants. Depression was measured using PHQ-9, and COVID-related anxiety was measured using the coronavirus anxiety scale (CAS).

Characteristics		Frequency	Percent (%)
Depression	No Depression	138	31.87
	Mild Depression	119	27.48
	Moderate Depression	73	16.86
	Moderately Severe Depression	60	13.86
	Severe Depression	43	9.93
COVID-related Anxiety	No anxiety	386	89.15
	Has anxiety	47	10.85

Table-4: Univariate analysis of factors associated with COVID-related anxiety and depression

	COVID-related Anxiety			COVID-related Depression		
	OR	*p*-value	95% CI	OR	*p*-value	95% CI
Gender	0.85	0.625	0.44-1.63	0.65	0.044*	0.43-0.99
MBBS year	0.89	0.371	0.70-1.15	0.73	<0.001*	0.62-0.86
Province	0.85	0.108	0.71-1.03	1.15	0.06*	0.99-1.32
Area (rural/urban)	0.93	0.866	0.40-2.18	1.47	0.178	0.94-2.57
Availability and speed of Internet is good	0.78	0.074	0.60-1.02	0.92	0.364	0.76-1.11
Cost of internet is expensive	1.39	0.032*	1.03-1.87	1.03	0.747	0.86-1.23
Internet device performance is good	0.76	0.055	0.57-1.01	0.78	0.017*	0.63-0.96
University IT department performance is good	1.27	0.093	0.96-1.67	0.97	0.775	0.82-1.16
Performance of faculty is good	0.9	0.485	0.67-1.21	0.88	0.239	0.72-1.09
Electricity availability during online class is good	1.02	0.892	0.78-1.33	0.87	0.142	0.73-1.05
COVID affected educational performance	1.44	0.029*	1.04-2.00	1.26	0.018*	1.04-1.51
Can communicate with instructor online	0.85	0.278	0.64-1.14	0.87	0.147	0.73-1.05
Can communicate with classmates online	0.85	0.278	0.64-1.14	0.87	0.147	0.73-1.05
Would rather take the course online	1.07	0.577	0.85-1.33	1.08	0.35	0.92-1.25
Satisfied with online education	0.99	0.919	0.75-1.29	1.02	0.84	0.85-1.22
Refer to other sources during online classes	0.86	0.264	0.67-1.11	1.32	0.002*	1.11-1.58
Ability to learn has improved during online classes	0.97	0.844	0.74-1.28	0.95	0.584	0.79-1.14
Prefer exams online over exam centers	1.17	0.159	0.94-1.44	1.04	0.619	0.89-1.21
Prefer online classes than in-person	1.12	0.345	0.89-1.40	1.11	0.202	0.95-1.31
Willing to visit hospitals during COVID	0.32	0.001*	0.17-0.62	0.61	0.025*	0.40-0.94
Family history of mental disorders	1.07	0.866	0.48-2.40	2.89	0.002*	1.46-5.69
Personal history of mental disorders	1.24	0.704	0.41-3.70	7.41	0.007*	1.74-31.53
Steady family income	0.33	0.002*	0.16-0.67	0.32	0.004*	0.15-0.69
Receiving financial aid	1.94	0.142	0.80-4.67	1.06	0.877	0.52-2.16
Afraid that someone in the family will contact COVID	1.3	0.080	0.97-1.75	1.51	<0.001*	1.26-1.81
Onset of COVID made participant feel nervous/anxious?	2.97	0.007*	1.35-6.52	4.76	<0.001*	3.09-7.34
Participant previously infected by COVID-19	1.52	0.379	0.60-3.83	0.97	0.929	0.48-1.94
Thought of the pandemic made participant worry about their academic future	2.33	0.35	1.06-5.14	2.03	0.001*	1.32-3.11

Information Technology (IT). *Statistically significant. p<0.05

Table-5: Multivariable analysis of factors associated with COVID-related anxiety and depression

	COVID-related Anxiety			COVID-related Depression		
	OR	*p*-value	95% CI	OR	*p*-value	95% CI
MBBS year	-	-	-	0.73	0.001	0.60-0.88
University IT department performance is good	1.39	0.043	1.01-1.91	-	-	-
COVID affected educational performance	1.51	0.025	1.05-2.17	1.38	0.007	1.09-1.74
Refer to other sources during online classes				1.27	0.028	1.02-1.56
Prefer exams online over exam centers	1.31	0.027	1.03-1.66	-	-	-
Willing to visit hospitals during COVID	0.60	0.001	0.43-0.82	-	-	-
Family history of mental disorders	-	-	-	2.97	0.014	1.24-7.09
Personal history of mental disorders	-	-	-	6.79	0.016	1.44-32.07
Steady family income	0.33	0.005	0.15-0.71	0.27	0.003	0.11-0.63
Onset of COVID made participant feel nervous/anxious?	3.01	0.014	1.26-7.21	4.26	<0.001	2.61-6.97

DISCUSSION

The COVID-19 outbreak has completely changed the normal day to day dynamics around the globe leading people to adapt to a new lifestyle suitable according to the pandemic. One such lifestyle that students are trying to adapt is the switch to virtual education. The severity of the 3rd wave of COVID-19 in Pakistan has led to another nation-wide lockdown where educational institutions continue to remain closed with regularly scheduled online classes.

Conducting online medical education is a phenomenon which requires a viable source of internet. A challenge faced by LMICs is the speed and cost of internet access. According to our study, 54.04% of the participants indicated availability and speed of internet is sufficient however, 58.2% agreed that the cost of internet is expensive. In addition to this, majority of students (61.44%) in the study preferred in-person exams since virtual learning has been linked with a decrease in grades.[9]

About 64.67% participants said that they would rather take the course in a classroom environment than online. Compromising medical education quality and retention of learning is concerning since it could lead to disastrous long-term consequences in the field of medical practice. Two other similar studies conducted in medical colleges in Pakistan also came to the same conclusion regarding

the satisfaction of students with online education being extremely low.[10]

Some students also showed doubts about the performance of their university's IT department as 61.44% participants disagreed to online exams over class exams. This is primarily since recommended online examination software and methods have not been introduced on a nation-wide scale making it difficult for students to receive merit-based grades and as a result demotivating student unable to exercise their academic potential.[11] This leads to prove that online medical education has not been very effective until proper procedures and methods have been tried and tested by the educational institutions.

The second part of our study was regarding the impact of COVID-19 on mental health of medical students. During the lockdown, students were sent back home developing a sense of uncertainty and anxiety. A study found that 60.9% of the students were concerned about their academic future and medical students in higher study years generally display greater stress and anxiety due to the increased work and study load.[12] 61.89% of the participants were afraid that someone in their family might contact COVID-19. This can be associated with the finding that most students felt that the onset of COVID-19 had made them feel nervous/anxious. Contrary to other studies by Elhadi *et al*. and Cao *et al*., our study reported absence of COVID-19 related anxiety with 89.15% of participants showing no sign of anxiety according to CAS scale.[13,14] The participants who did report moderate to severe anxiety associated with SARS-CoV-2 was like that seen in other studies.[15] This could be since other studies used the Generalized Anxiety Disorder (GAD-7) scale while our study implemented the CAS scale. The difference in results could also be due to the majority of our study participants had a stable source of family income (87.07%) which is linked with lower levels of anxiety in our study as well as other studies conducted.[13,16]

We also demonstrated the prevalence of depression amongst the medical students using the PHQ-9 scale which reported as 68.12% of participants having some form of depression, ranging from mild to severe depression. Males were reported to be less likely depressed compared to female candidates as this was consistent with other studies.[10,17] Certain measures can be taken by institutions to help students cope with mental health issues such as through counselling and services that will help students resolve their academic and financial issues.[17]

Our study covered a range of medical institutions across Pakistan with a good variation in demographics to give an approximate evaluation of the COVID-19 pandemic impact on education and mental health of students. However, since this a cross-sectional study, the data is representative of a single occurrence in time and the views of the participants can change over time. Another limitation of our study was that the population was mostly located within urban areas. This is since as per safety precautions of the outbreak we could only collect responses through online means limiting chances for people living in rural areas as they have limited access to internet and electricity.

CONCLUSION

Given the dissatisfaction shown towards the educational standards currently employed, drastic consequences are feared for patients in the near future. Countering such compromises in education is nonetheless achievable with the utilization of hybrid systems to maximize student expertise while maintaining SOPs. Apart from this, the deteriorating mental health of our future practitioners raises serious concerns that calls upon the attention of the institutions as well as policymakers to play their part.

Acknowledgements:
We would like to thank all the study participants for their contribution.

AUTHORS' CONTRIBUTION

SSA and MAQ are joint first authors. MAQ, SSA, RAD and MB were involved in study design. RAD, MUK, SS and QS performed data collection and data interpretation. MB and MAQ interpreted and analyzed the data. MAQ, SSA, RAD, MRAK, QS and SS were involved in article writing. SAA was involved in article writing and reviewed the final manuscript. All authors have read and approved the final manuscript.

Competing interests: None to disclose.
Funding: None.

Conflict of interest: The authors declare no conflicts of interest.

Informed consent: The Ethical Review Committee of Islamic International Medical College, Rawalpindi, Pakistan approved the study, and an acknowledgement of consent was appended within the online survey for every participant. The Ethical Review Committee approved the use of implied consent to participate upon completion of the questionnaire. (Ref No. Riphah/IIMC/IRC/144)

REFERENCES

1. Zhu X, Liu J. Education in and After Covid-19: Immediate Responses and Long-Term Visions. Postdigital Sci Educ 2020;2(3):695–9.
2. Kecojevic A, Basch CH, Sullivan M, Davi NK. The impact of the COVID-19 epidemic on mental health of undergraduate students in New Jersey, cross-sectional study.

PLoS One 2020;15(9):e0239696.
3. Sahu P. Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff. Cureus 2020;12(4):1–3.
4. Kearns LR. Student Assessment in Online Learning: Challenges and Effective Practices. J Online Learn Teach 2012;8(3):198.
5. Daroedono E, Siagian FE, Alfarabi M, Cing JM, Arodes ES, Sirait RH, *et al*. The impact of COVID-19 on medical education: our students perception on the practice of long distance learning. Int J Community Med Public Health 2020;7(7):2790–6.
6. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: Validity of a brief depression severity measure. J Gen Int Med 2001;16(9):606–13.
7. Lee SA. Coronavirus Anxiety Scale: A brief mental health screener for COVID-19 related anxiety. Death Stud 2020;44(7):393–401.
8. Bettinger EP, Fox L, Loeb S, Taylor ES. Virtual classrooms: How online college courses affect student success. Am Econ Rev 2017;107(9):2855–75.
9. Moutinho IL, Maddalena NC, Roland RK, Lucchetti AL, Tibiriçá SH, Ezequiel OD, *et al*. Depression, stress and anxiety in medical students: A cross-sectional comparison between students from different semesters. Rev Assoc Med Bras 2017;63(1):21–8.
10. Ansar F, Ali W, Khattak A, Naveed H, Zeb S. Undergraduate students' perception and satisfaction regarding online learning system amidst COVID-19 Pandemic in Pakistan. J Ayub Med Coll Abbottabad 2020;32(4 Suppl 1):S644–50.
11. Chandavarkar U, Azzam A, Mathews CA. Anxiety symptoms and perceived performance in medical students. Depress Anxiety 2007;24(2):103–11.
12. Elhadi M, Buzreg A, Bouhuwaish A, Khaled A, Alhadi A, Msherghi A, *et al*. Psychological Impact of the Civil War and COVID-19 on Libyan Medical Students: A Cross-Sectional Study. Front Psychol 2020;11(1):570435.
13. Cao W, Fang Z, Hou G, Han M, Xu X, Dong J, *et al*. The psychological impact of the COVID-19 epidemic on college students in China. Psychiatry Res 2020;287(1):112934.
14. Jungmann SM, Witthöft M. Health anxiety, cyberchondria, and coping in the current COVID-19 pandemic: Which factors are related to coronavirus anxiety? J Anxiety Disord 2020;73(1):102239.
15. Al Saadi T, Zaher Addeen S, Turk T, Abbas F, Alkhatib M. Psychological distress among medical students in conflicts: A cross-sectional study from Syria. BMC Med Educ 2017;17(1):173.
16. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. Acad Med 2006;81(1);354–73.
17. Zhai Y, Du X. Mental health care for international Chinese students affected by the COVID-19 outbreak. Lancet Psychiatry 2020;7(1):8–9.

Submitted: May 8, 2021	*Revised: July 7, 2021*	*Accepted: August 15, 2021*

Address for Correspondence:

Rubaid Dhillon, Medical College, Riphah International University, Rawalpindi-Pakistan
Email: rbazhar@hotmail.com