

Original Article

COVID-19: Impact, Concerns and Mental Health of Medical Students of CMH LMC

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ABSTRACT

Objective: The current study aimed to assess the concerns of the medical students regarding their studies and clinical rotations during this pandemic. Additionally, this study also explores the impact of this novel COVID-19 on different domains of medical student's life and on their mental well-being.

Methodology: We conducted cross-sectional survey. Questions focusing on concerns and impact of COVID-19 were included. Depression, Anxiety Stress Scale (DASS-21) was used to assess the mental wellbeing.

Results: The results of current survey revealed that 49.6 % medical students of their final years suffered from the mild to extremely severe range of anxiety, 39.6 % from depression and 16.8 % suffered from the stress. Findings also highlight that mostly travelling, studies and social life were affected. As observed that mostly, students highlight their concerns about availability of Personal Preventive Equipment (PPE) and about taking of preventive measures by patients. Almost 81.4 % agreed that e learning is not the alternative for classroom face-to-face lectures. It is also observed that 60.5 % showed satisfaction about teacher's adaptation to the e learning and 57.3 % highlight the competency of teachers about giving proper feedback and asking questions during online classes.

Conclusion: This survey exposed students concerns due to this pandemic on their studies and clinical rotations in the clinical settings. Additionally revealed about the huge impact of Covid-19 on mental health and daily functioning of medical students in different aspects of life.

Keywords: COVID-19, mental health, medical and dental students.

Introduction

The recent COVID-19 global pandemic has affected medical students 'lives on many different levels and had significant effects on delivery of the teaching curriculum across Pakistan. The speed at which the community lockdown and subsequent changes to the medical course occurred resulted in many students struggling to adjust to online learning and other curriculum changes that were implemented in response to government lockdown measures. The abrupt cancellation of previously timetabled face-to-face tutorials, clinical placements and patient contact further contributed to disruption of normal studies.¹

Simultaneously, as uncertainty continues among final year medical students, suspension in clinical exposure may cause harmful effect in their exam and future performance as a doctor.² Staying healthier in this time of pandemic is becoming a new aggravating factor of stress in medical students.³

In addition to teaching-related changes, other impacts such as loss of peer interaction and social connectedness, and financial stressors caused by the economic consequences of the pandemic have potential to impact negatively on student well-being and cause further psychological distress, disrupt daily life and medical studies. It is important to actively assess and monitor this to mitigate negative impacts and provide appropriate support to students. Lyons and colleagues (2020) conducted the online survey on the Australian medical students highlighted the findings that 68% students reported deterioration in mental health.¹ In Jordan Seeten and colleagues conducted study on mental health of medical students and results highlight that half of medical students suffered from the mental disorders during this pandemic.⁴ Dhahri and colleagues (2020) conducted the study on the impact of **COVID-19** on final year medical students

throughout the Pakistan and their findings highlight the psychological impact of pandemic on students and their willingness to serve the community.⁵ Imran and colleagues (2021) conducted study in five medical colleges in Punjab to assess their mental health during Covid-19, findings revealed prevalence of anxiety and depression 48.6 % and 48.1 % respectively and 8 % reported suicidal ideation (Imran et al, 2021).⁶ Hassnain and colleagues (2021) in medical colleges of Lahore that 62.6% students suffered from mild to severe range of depression and anxiety in 52 % because of Covid-19 pandemic reported similar pattern of finding.⁷ Waseem and Aziz (2021) also reported that majority of medical students reported their concerns about reopening of medical colleges, 91.5 % showed their loss of interest in studies and 85 % reported that they missed their class room environments.⁸ The present study aims to: (a) determine the impact of COVID-19 on mental wellbeing of the CMH LMC medical students and its effect on their daily life domains; (b) determine specific concerns of students in this COVID-19 situation on their studies and application of SOPs especially in clinical settings.

Methodology

The study was cross-sectional survey in nature, which encompasses the fourth and final year of MBBS and third and fourth year of BDS from the CMH LMC, Lahore. The study was conducted from July 15, 2021, until October 12, 2021. The sample size was based on the assertion made by Kline (2013) that indicated the ratio of sample must be at least 3:1 for the number of the items of scale.⁹

Participants

The sample was selected through the purposive non-probability sampling technique. The strata will be made based on variable of year of studies. The sample was comprised of 246 participants from

fourth and final year of medical, third, and fourth year of dentistry. The age range of sample was between 22 to 25 years.

Measurements

Demographic and Personal Information Form

An anonymous self-administered questionnaire covering basic demographic factors like age, gender, education year, birth order, residence, and their monthly income was used.

Depression Anxiety Stress Scale (DASS-21)

The DASS is a clinical evaluation tool that measures the three related states of depression,

anxiety and stress. DASS was developed by University of New South Wales in Australia by Lovibond & Lovibond (1995). The DASS-21 has commendable psychometric properties. It is reliable, valid and easy to administer. It has 21 questions and takes about 3 minutes to complete. The reliability of DASS-21 showed that it has excellent Cronbach's alpha values of 0.81, 0.89 and 0.78 for the subscales of depressive, anxiety and stress respectively. It has 4-point Likert scale ranging from 0 to 3, the 0 means participant believed the item "did not apply to me at all" and for 3 clients believed that item "applied to me very much, or most of the time".¹⁰

Survey Questionnaire

All the questions in a survey were mandatory and were drafted by three consultants and three undergraduate medical students. The questionnaire

was developed, on rating-scales items, which will focus on reopening of their institute, institutional preparedness for such crisis, confidence in becoming future doctor, risk of developing symptoms of COVID-19 during their academic classes and clinical rotations and impact of this pandemic on different domains of their life.

Procedure

The sample was collected from the CMH Lahore Medical College and Institute of Dentistry, Lahore. The Ethics Review Committee (ERC) approved research proposal. Informed consent in written form was obtained from the authorities of the educational institute and later consent was obtained from the participants on the individual level during data collection. The demographic form, questionnaire relevant to concerns and impact of COVID -19 and DASS-21 were administered on the participants.

Data was analysed using Statistical Package for Social sciences (SPSS, version 19.0). Descriptive statistics was used for the analysis of demographic characteristics and assessment relevant to the impact of COVID-19 on students 'life and concerns about the COVID-19 situation.

Results

The results in Table 1 showed depression in mild category was about 19.4 %, in moderate 15.2 % and in severe was only 4 %. Similarly, stress was also low 11.2 % in mild and 5.6 % in moderate range. Despite depression and stress anxiety manifestation was little higher 50% in normal range and 12.90 % falls in mild, 24.1 % falls in severe and 3 % falls in extremely severe range.

Table-1: Impact of Covid-19 on the Mental Health (Depression, Anxiety & Stress) of Students

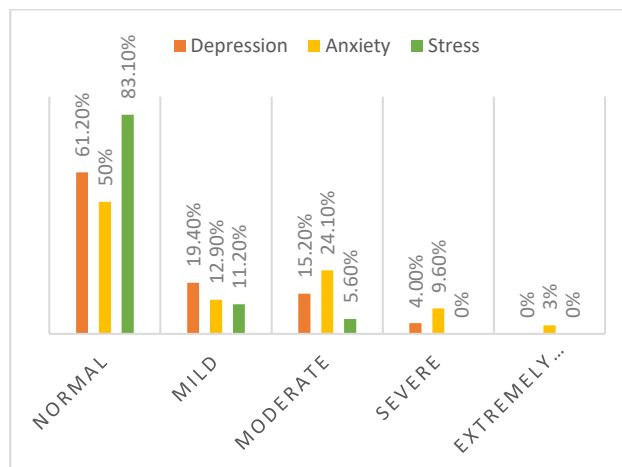
DASS	Normal	Mild	Moderate	Severe	Extremely Severe
Depression	61.20%	19.40%	15.20%	4.00%	0%
Anxiety	50%	12.90%	24.10%	9.60%	3%

Stress	83.10%	11.20%	5.60%	0%	0%
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Participants were asked to rate the impact of COVID-19 (badly effect, mild effect and no effect impact) on different aspects of their life. As shown in Table 2, the main badly effect were on travelling 71.7 %, studies 60.5 %, and social life 45.2 %, respectively. The mild effects were prominent in friendships 53.2 %, social relationships 47.6 % and family relations 44.4 % respectively. In diet, 46 % and sleep 3.5 % participants reported no effects at all.

Information taken from demographics data also revealed that 16.1 % students and 32.2 % students' family members suffered and recovered from Covid-19 in last months. Table 2 highlights the concerns of medical students relevant to implication of SOP's in clinical setting. Participants showed their satisfaction nearly 53.2% on re-opening of medical college and 66.6 % falls in agree and completely agree category regarding their professional role in health care during this pandemic after the long lock-down in Pakistan. Although participants showed their satisfaction on reopening of medical colleges but 66.1 % showed their concerns about completion of course and logbooks. Nearly 71.8 % students expressed their concerns relevant to application of Personal Protective Equipment (PPE) in clinical rotations. Mostly students 51.6 % were satisfied by the protective measures taken by them and their teachers during doctor-patient interaction but they were not satisfied 49.2 % by the preventive measure taken by the patients. Students are not satisfied 52.4 % by the SOP's taken by the college in the areas like café, library, hostel and mosque.

Fig 1. Impact of Covid-19 on the Mental Health (Depression, Anxiety & Stress) of Students



The last Table 3 assessed the concerns of medical students relevant to e-learning during lock down. Participants showed their dissatisfaction (65.3 %) with their adjustment with e learning and their lack of participation (57.3 %) in on-line classes as compared to their regular classes. Nearly 37.9 % students were optimistic about the examination that they will be held on time and 39.5 % were not certain about the on-time examination. Mostly students (65.4 %) were missing there in person communication with teachers and agreed (81.4 %) on it that e-learning is not alternative for practical education and seminars, but they agreed (53.2 %) about beneficence of online classes for their health and safety. Mostly students agreed (53.3 %) about availability of resources regarding e-learning at home. In items regarding concerns about teacher's efficiency in e-learning mostly students (42 %) showed their satisfaction that their teachers adapted to new e-learning and 60.5 % agreed that teachers hold classes according to planned schedules. Most of students agreed (57.3 %) that teachers took feedback and encourage students to ask questions. Although students showed satisfaction from the teachers regarding on-line teaching but their opinion regarding efficiency of organizing e-learning on the institutional level is not directional

33% showed satisfaction, 39.5 % showed dissatisfaction and 27.8 % were undecided.

Table-2: Impact of Covid-19 on daily life

Domains	Badly effect <i>f</i> (%)	Mild effect <i>f</i> (%)	No effect <i>f</i> (%)
Social Life	112 (45.2)	118 (47.6)	18 (7.3)
Studies	150 (60.5)	78 (31.5)	20 (8.1)
Family relationships	38 (15.3)	110 (44.4)	100 (40.3)
Friends' relationships	42 (16.9)	132 (53.2)	74 (29.8)
Exercise	82 (33.1)	80 (32.3)	86 (34.7)
Sleep	56 (22.6)	84 (33.9)	108 (43.5)
Diet	56 (22.6)	78 (31.5)	114 (46.0)
Travelling	178 (71.7)	46 (18.5)	24 (9.7)

Table 3. Frequency distribution of answers to questions relevant to SOPs in clinical settings during Covid-9

Questions	Completely disagree <i>f</i> (%)	Disagree <i>f</i> (%)	Neither agree nor disagree <i>f</i> (%)	Agree <i>f</i> (%)	Completely agree <i>f</i> (%)
1. Despite the pandemic am satisfied by re-opening of medical institutes and clinical rotations	42 (16.9)	30 (12.1)	44 (17.7)	86 (34.7)	46 (18.5)
2. Medical students should have suitable practical roles in health care, so they can help resolve the pandemic	8 (3.2)	22 (8.9)	54 (21.8)	122 (49.2)	42 (16.9)
3. I am worried that because of this pandemic, I will not be able to complete my log books	20 (8.1)	28 (11.3)	36 (14.5)	100 (40.3)	64 (25.8)
4. The Personal Protective Equipment (PPE) for students is available during clinical rotations.	110 (44.4)	68 (27.4)	30 (12.1)	34 (13.7)	6 (2.4)

5. The students and teachers wear masks and gloves during interaction with every patient.	40 (16.1)	50 (20.2)	30 (12.1)	90 (36.3)	38 (15.3)
6. The patients follow SOPs and do not remove mask until asked for dental examinations, ENT or such other problems.	48 (19.4)	74 (29.8)	48 (19.4)	62 (25)	16 (6.5)
7. During clinical rotations, the students are exposed to non-COVID patients only	46 (18.5)	56 (22.6)	62 (25)	66 (26.6)	18 (7.3)
8. All SOPs are followed by institute during labs and tutorials	54 (21.8)	68 (27.4)	48 (19.4)	70 (28.2)	8 (3.2)
9. Institute is following all SOPs adequately in library, cafe, hostels and mosque	64 (25.8)	66 (26.6)	50 (20.2)	54 (21.8)	14 (5.6)
10. Attendants follow the SOPs in wards during interaction with patient and hospital staff	46 (18.5)	66 (26.6)	62 (25)	62 (25)	12 (4.8)
11. Patient to be examined during ward test follow SOPs	38 (15.3)	70 (28.2)	60 (24.2)	64 (25.8)	16 (6.5)

Table 4. Frequency distribution of answers to questions relevant to E-learning during Covid-9

Questions	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)
1. I am satisfied with how fast I have adjusted to e-learning	72 (29)	90 (36.3)	44 (17.7)	38 (15.3)	4 (1.6)
2. I participate in the course with questions and comments, just like during regular classes	58 (23.4)	84 (33.9)	50 (20.2)	52 (21)	4 (1.6)
3. I think examination will be held on time	38 (15.3)	60 (24.2)	56 (22.6)	74 (29.8)	20 (8.1)
4. I miss in-person communication with teachers	28 (11.3)	24 (9.7)	34 (13.7)	80 (32.3)	82 (33.1)

5. E-learning cannot compensate for practical education and seminars	16 (6.5)	18 (7.3)	12 (4.8)	68 (27.4)	134 (54)
6. I have an access to all resources at home for e-learning	20 (8.1)	52 (21)	44 (17.7)	82 (33.1)	50 (20.2)
7. Online classes are good choice regarding our health in this pandemic	28 (11.3)	24 (9.7)	64 (25.8)	94 (37.9)	38 (15.3)
8. Teachers have generally organized themselves and adapted to e-learning well	32 (12.9)	50 (20.2)	62 (25)	82(33.1)	22 (8.9)
9. Most of the teachers hold classes according to the official schedule	28 (11.3)	46 (18.5)	38 (15.3)	124(50)	26(10.5)
10. The majority of teachers verifies whether we have understood the lessons by seeking feedback or encouraging us to ask questions	22 (8.9)	46 (18.5)	38 (15.3)	114 (46)	28 (11.3)
11. My institution has organized e-learning adequately	36 (14.5)	62 (25)	68 (27.4)	70 (28.2)	12 (4.8)

Discussion

The recent novel COVID-19 pandemic has affected our life and health, many lessons are as yet to be understood. What will be the long-term effect is still a mystery, but it has brought significant physical and psychological changes in the life of a future doctor.

Many governments around the world responded with lockdowns, cessation of classroom education, and the complete switch to distance learning. However, not all types of education can be successfully implemented via e-learning. This is particularly problematic for all aspects of practical education where experiences are crucial, and skills

need to be learned. Medical and health sciences students need contacts with patients to learn the necessary skills and to be personally exposed to patient care. Thus, warnings have been voiced about potential consequences of the COVID-19 pandemic for medical education, warning that medical students may be heavily deprived due to the lack of practical education and proposing that medical students could even help during the pandemic.¹¹ The current study focused on the concerns and impact of Covid-19 on the lives of fourth and fifth year of MBBS and third and fourth year BDS as their curriculum has clinical training, as crucial part and they are the most vulnerable population, having professional career ahead to start.

Impact of Covid-19 on mental health of medical students

Recent studies relevant to impact of this novel Covid-19 on the mental health of medical students highlighted the negative effect of this pandemic on the psychological aspect of students' especially medical students. Current survey findings revealed that anxiety was higher than depression and stress in medical students. These findings are supported by the recent survey conducted by Cao and colleagues (2020) in China indicated that due to this pandemic 24.9 % of medical students are suffering with mild to severe anxiety levels.¹² Correspondingly survey conducted in Brazil revealed 46.1 % of students demonstrated symptoms of moderate to severe level of anxiety and depression.¹³ In Bangladesh study on mental health of medical students revealed that 11.8 % students showed severe anxiety and 3.3% falls in severe depression category on HADS. Similarly, another research on physicians of Bangladesh highlights that 67.72 % showed anxiety symptoms from mild to severe and 48.5 % depression. All this relevant literature showed similar pattern of high prevalence of anxiety than depression, this might be due to uncertainty factor that belongs to this novel pandemic.^{14,15} In Pakistan Hussnain and colleagues (2021) conducted survey in Lahore on the medical students by using DASS-21, findings of their study revealed 52 % anxiety and these findings are in concordance with the results of current study where 50 % students suffered from mild to extremely severe form of anxiety.¹⁶

Impact of Covid-19 on different domains of life

In times of such uncertainty, there has been significant impact of Covid-19 in different aspects of our lives. In Pakistan, Punjab government banned unnecessary travel, quarantined citizens inside their homes and closed educational institutes.¹⁷ These restrictions due to Covid-19 gradually showed their

impact on medical students also. The findings of current study highlight the most impacted life domains, which were travelling, studies and social life as shown in graphic Figure1. Social life is also affected especially relationships with relatives and friends.

Concerns relevant to SOPs in clinical setting

Previous research literature revealed that most of the students preferred not to return to the clinical settings because of their perception about the risk of pandemic and inappropriate application of SOPs in health care system.^{18,19} Current survey revealed that most of the students expressed their satisfaction about re-opening of medical colleges, but they were worried and uncertain about the availability of Personal Protective Equipment (PPE) during clinical rotations. Students showed their satisfaction about following of SOPs by themselves and by their teachers, but they were worried about the implication of SOPs followed by the patients and their caregivers during their interaction with the patients in clinical setting. Major part of students showed their concern about the application of SOPs in college cafe, mosque, hostel and library.

Concerns relevant to e-learning

Due to sudden suspension of classes, it was a challenge for medical faculty to re-engage students in study. Covid-19 forced a rapid switch to technology to provide students a platform to certify their participation in study during pandemic. In current survey, mostly students showed their dissatisfaction with the e-learning, and they don't consider it alternative to live classes, practical education and seminars. These findings are supported by survey of Waseem and Aziz (2020) in Pakistan that students considered that e-learning cannot replace the physical mode of learning as done in the classrooms and this lack of interest in e-learning is because of this fact that they are not used

to it.⁸ Olu and colleagues conducted survey in Uganda on medical students highlight this fact that majority of students showed dissatisfaction with e-learning and in one of survey on the same dimension conducted in China students reported that increase of social media during lockdown decrease the study hours.^{20, 21}

Overwhelming number of students missed in person communication with teachers during classes. As there is long history of classroom teaching in Pakistan and students are habitual of it.⁸ Mostly students showed their satisfaction about teachers' adaptation and skilfully following the official schedules of classes and online assessments. These findings are supported by the survey conducted by Puljak and colleagues (2020) in Croatia on undergraduate health sciences students, which revealed that mostly students were satisfied by this fact that that majority of the teachers were engaging with students by video lectures on time and in line with the curriculum.¹¹

Mostly students have access to all resources required for e-learning but one third students reported difficulty in excess of e-learning resources as they belonged to rural areas where good quality of internet is not feasible. Waseem and Aziz reported similar outcomes during their survey, which they conducted throughout Pakistan.⁸

Limitations

The sample of current study only comprises of students only. It is suggested to include teachers also in future studies because teacher's perspective especially relevant to e-learning would be valuable and should be explored.

Conclusion

The current survey findings highlight the widespread impact of Covid-19 on the mental

wellbeing of medical students and on different domains of their life. This survey also provides valuable information about the concerns of medical students about e-learning and application of SOPs in medical colleges especially in the clinical settings. It is now essential that all stakeholders provide timely and culturally sensitive psychological support to medical students and administration of medical colleges resolve the concerns of the students relevant to their e-learning and application of SOPs in health care institutes to improve outcomes for future physicians.

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Conflict of Interest

The authors declare no conflict of interest.

References

1. Lyons Z, Wilcox H, Leung L, Dearsley O. COVID-19 and the mental well-being of Australian medical students: impact, concerns and coping strategies used. *Australasian Psychiatry*. 2020;28(6):649-652. <https://doi.org/10.1177/1039856220947945>. <https://journals.sagepub.com/doi/full/10.1177/1039856220947945>
2. Lee J. Mental health effects of school closures during COVID-19. *The Lancet Child & Adolescent Health*. 2020;4(6):421. DOI:[https://doi.org/10.1016/S2352-4642\(20\)30109-7](https://doi.org/10.1016/S2352-4642(20)30109-7). [https://www.thelancet.com/journals/lanchi/article/PIIS23524642\(20\)30109-7/fulltext](https://www.thelancet.com/journals/lanchi/article/PIIS23524642(20)30109-7/fulltext)
3. Ahmed H, Allaf M, Elghazaly H. COVID-19 and medical education. *The Lancet Infectious Diseases*. 2020;20(7):777-778. DOI:[https://doi.org/10.1016/S1473-3099\(20\)30226-7](https://doi.org/10.1016/S1473-3099(20)30226-7). [https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(20\)30226-7/fulltext](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(20)30226-7/fulltext)

4. Seetan K, Al-Zubi M, Rubbai Y, Athamneh M, Khamees AA, Radaideh T. Impact of COVID-19 on medical students' mental wellbeing in Jordan. *PLoS One*. 2021 16(6):e0253295. <https://doi.org/10.1371/journal.pone.0253295>. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0253295>
5. Dhahri AA, Arain SY, Memon AM, Rao A, Khan MM, Hafeez G, et al. The psychological impact of COVID-19 on medical education of final year students in Pakistan: A cross-sectional study. *Annals of Medicine and Surgery*. 2020;60:445-450. <https://doi.org/10.1016/j.amsu.2020.11.025>. <https://www.sciencedirect.com/science/article/pii/S2049080120304532>
6. Imran N, Haider II, Mustafa AB, Aamer I, Kamal Z, Rasool G, et al. The hidden crisis: COVID-19 and impact on mental health of medical students in Pakistan. *Middle East Current Psychiatry*. 2021;28(1):1-9. doi:10.1186/s43045-021-00123-7 <https://link.springer.com/article/10.1186/s43045-021-00123-7>
7. Hassnain S, Ahmad A, Qayyum MS, Farrukh MG, Nawaz UA, Ahmad H. Effects of COVID-19 Lockdown on mental health of medical students in Lahore, Pakistan. *Bangladesh Journal of Medical Science*. 2021;20(5):125-130. <https://doi.org/10.3329/bjms.v20i5.55406>. <https://www.banglajol.info/index.php/BJMS/article/view/55406>
8. Aziz N, Waseem M, Fatima A, Anwar A, Khalid F, Asghar T. IMPACT OF COVID-19 ON EDUCATION OF UNDERGRADUATE MEDICAL STUDENTS OF PAKISTAN. *Journal of University Medical & Dental College*. 2020;11(4):7-15. <https://doi.org/10.37723/jumdc.v11i4.448>. <http://www.jumdc.com/index.php/jumdc/article/view/448>
9. Kline P. *Handbook of psychological testing*. Routledge; 2013. <https://doi.org/10.4324/9781315812274>. <https://www.taylorfrancis.com/books/mono/10.4324/9781315812274/handbook-psychological-testing-paul-kline>
10. Lovibond PF, Lovibond SH. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour research and therapy*. 1995;33(3):335-343. [https://doi.org/10.1016/0005-7967\(94\)00075-U](https://doi.org/10.1016/0005-7967(94)00075-U). <https://www.sciencedirect.com/science/article/abs/pii/000579679400075U>
11. Puljak L, Civljak M, Haramina A, Mališa S, Cavic D, Klinec et al. Attitudes and concerns of undergraduate university health sciences students in Croatia regarding complete switch to e-learning during COVID-19 pandemic: a survey. *BMC medical education*. 2020;20(1):1-1. <https://doi.org/10.1186/s12909-020-02343-7>. <https://link.springer.com/article/10.1186/s12909-020-02343-7#citeas>
12. 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 research*. 2020;287:112934. <https://doi.org/10.1016/j.psychres.2020.112934>. <https://www.sciencedirect.com/science/article/pii/S0165178120305400>
13. Sartorao Filho CI, Rodrigues WC, de Castro RB, Marçal AA, Pavelqueires S, Takano L, et al. Impact of covid-19 pandemic on mental health of medical students: a cross-sectional study using GAD-7 and PHQ-9 questionnaires. *MedRxiv*. 2020. doi: <https://doi.org/10.1101/2020.06.24.20138925>. <https://www.medrxiv.org/content/10.1101/2020.06.24.20138925v1.full-text>
14. Hasan MT, Hossain S, Safa F, Anjum A, Khan AH, Koly KN, et al. Prevalence of anxiety and depressive symptoms among physicians during the COVID-19 pandemic in Bangladesh: a cross-sectional study. *MedRxiv*. 2020. <https://doi.org/10.1101/2020.12.08.20245>

- 829.<https://www.medrxiv.org/content/10.1101/2020.12.08.20245829v1>
15. Safa F, Anjum A, Hossain S, Trisa TI, Alam SF, Rafi MA, et al. Immediate psychological responses during the initial period of the COVID-19 pandemic among Bangladeshi medical students. *Children and Youth Services Review*. 2021;122:105912. <https://doi.org/10.1016/j.chilyouth.2020.105912>.<https://www.sciencedirect.com/science/article/pii/S0190740920323343>
 16. Hassnain S, Ahmad A, Qayyum MS, Farrukh MG, Nawaz UA, Ahmad H. Effects of COVID-19 Lockdown on mental health of medical students in Lahore, Pakistan. *Bangladesh Journal of Medical Science*. 2021:125-130. <https://doi.org/10.3329/bjms.v20i5.55406>.<https://www.banglajol.info/index.php/BJMS/article/view/55406>
 17. Waris A, Atta UK, Ali M, Asmat A, Baset AJ. COVID-19 outbreak: current scenario of Pakistan. *New Microbes and New Infections*. 2020 135:100681.<https://doi.org/10.1016/j.nmni.2020.100681>.<https://www.sciencedirect.com/science/article/pii/S2052297520300330>
 18. Compton S, Sarraf-Yazdi S, Rustandy F, Radha Krishna LK. Medical students' preference for returning to the clinical setting during the COVID-19 pandemic. *Medical education*. 2020;54(10):943-950.<https://doi.org/10.1111/medu.14268>.<https://onlinelibrary.wiley.com/doi/full/10.1111/medu.14268>
 19. Reddy RK, Palmer EG. Response to Medical students' preference for returning to the clinical setting during the COVID-19 pandemic. *Med Educ*. 2020;10. DOI: 10.1111/medu.14283. https://www.researchgate.net/profile/Emilia-Palmer/publication/342359047_Response_to_Medical_students'_preference_for_returning_to_the_clinical_setting_during_the_COVID-19_pandemic/links/5f5a3e4b92851c07895a1f96/Response-to-Medical-students-preference-for-returning-to-the-clinical-setting-during-the-COVID-19-pandemic.pdf
 20. Olum R, Kajjimu J, Kanyike AM, Chekwech G, Wekha G, Nassozi DR, et al. Perspective of medical students on the COVID-19 pandemic: survey of nine medical schools in Uganda. *JMIR public health and surveillance*. 2020;6(2):e19847. doi: 10.2196/19847. <https://publichealth.jmir.org/2020/2/e19847>
 21. Ismail NA, Lee JX, Azman AH, Ng JY. Reflection of connectivism in medical education and learning motivation 4 during COVID-19. Doi: 10.1101/2020.07.07.20147918. <https://pesquisa.bvsalud.org/portal/resource/pt/ppmedrxiv20147918>

Contributions of the Authors

IM conceptualized of the project and did statistical analysis, drafting, revision, and manuscript writing
KTK, MG, Z did data collection
ZH did statistical analysis
MAK did drafting and revision

