Title: Magnitude of Psychological Distress Among Medical and Non-Medical Students During the Late Phase of the COVID-19 Pandemic in West Bengal: A Cross-Sectional Study

Article type: Original Article

Author names:

1. Udisa Das
2. Arunima Ganguly
3. Dibakar Haldar
4. Asish Mukhopadhyay

Degrees and Affiliations:

1. Intern. Nilratan Sircar Medical College and Hospital, Kolkata, India.
2. Intern. Nilratan Sircar Medical College and Hospital, Kolkata, India.
3. Professor and Head of the Department. Department of Community Medicine, Nilratan Sircar Medical College and Hospital, Kolkata, India.
4. Professor and Head of the Department. Department of Psychiatry, Nilratan Sircar Medical College and Hospital, Kolkata, India.

ORCID (Open Researcher and Contributor Identifier):

https://orcid.org/0000-0002-9299-2988
https://orcid.org/0000-0002-8827-8810
https://orcid.org/0000-0002-3499-1717
https://orcid.org/0000-0002-5933-4537

About the author: Udisa Das is an Intern of Nilratan Sircar Medical College and Hospital, Kolkata, India in a five and a half year MBBS program. This article has secured 2nd Position in Inter-college Research Paper Presentation Competition – "SYMPOSIUM", conducted by NRSMC Festival Committee on 9th December, 2022.

Corresponding author email: mdaudisa14@gmail.com

Acknowledgment: We are grateful to every student who participated in our study.

Financing: The authors have no funding or financial relationships to disclose.

Conflict of interest statement by authors: The authors have no conflicts of interests to disclose.

Authors Contribution Statement: Conceptualization: UD. Data Curation: UD, AG. Formal Analysis: UD, AG, DH. Investigation: UD, AG, DH. Methodology: UD, AG, DH. Software: UD, AG, DH. Supervision: DH, AM. Validation: DH, AM. Writing - Original Draft: UD, AG, DH. Writing - Review Editing: UD, AG, DH, AM.

Manuscript word count: 4148

Abstract word count: 249

Number of Figures and Tables: 6

Personal, Professional, and Institutional Social Network accounts. Nil

ABSTRACT.

Background: COVID-19 pandemic led to drastic changes worldwide significantly affecting mental health of students. This study aimed to assess psychological distress due to COVID-19 in students during the late phase of pandemic and to establish correlation of academic course, socio-demographics and knowledge-attitude-practices (KAP) with depression and anxiety.

Methods: A cross-sectional study was conducted in Kolkata, from March to April 2022 among undergraduate medical students and undergraduate students from engineering and general science colleges, via purposive and snowball sampling. Survey questionnaire was circulated via Google forms through social media. It included Patient Health Questionnaire-9, Generalized Anxiety Disorder-7, Fear of COVID-19 scale 2020, KAP regarding COVID-19 and socio-demographics. Data were analyzed using SPSS(Version 22.0) by estimating mean, standard deviation, median, interquartile range and displayed by charts and tables. Mann-Whitney U test/non-parametric ANOVA and Chi-square tests were used for drawing statistical inferences. P-value of <0.05 was considered significant.

Results: Total 421 responses were included: 219 medical and 202 non-medical students. Most participants were male (58.67%). Prevalence of depression was 58.42% among non-medical students and 81.73% among medical students. Prevalence of anxiety was 50.99% among non-medical students and 76.25% among medical students. Medical students had significantly better scores for knowledge and attitude (p=0.001 in both). Anxiety was influenced by residence (p=0.018), mode of travel (p=0.012), and having relatives or friends affected by COVID-19 (p=0.03).

Conclusion: High prevalence of depression and anxiety among college students, especially medical students, highlights the need for student wellness activities and better mental health services in colleges across India.

Key Words: *COVID-19, pandemics, psychological distress, mental health services* (Source: MeSH-NLM).

Dates

Submission: 11/09/2023

Revisions: 05/07/2024, 08/10/2024, 10/2572024

Responses: 05/20/2024, 10/25/2024, 10/27/2024

Acceptance: 11/06/2024

Publication: 11/14/2024

INTRODUCTION.

COVID-19 began as an epidemic in China in December 2019 and was declared a pandemic by World Health Organization in March 11, 2020.[1] Due to severe transmissibility of the SARS-COV2 virus and its adverse outcomes in some cases, the main focus has been on physical effects of pandemic. This led to drastic lockdowns and strict quarantine measures worldwide. India implemented its lockdown in four phases from 25th March, 2020 to 31st May, 2020.[2] Since its discovery, fear of the virus has greatly affected mental health of individuals.[3] Studies conducted among general population identified huge rise in symptoms of depression and anxiety.[4] Meanwhile, medical students are already more prone to develop psychological distress because of highly demanding medical curriculum and other factors.[5] By March 2022, due to widely successful vaccination drive in India, 70% of the population had received at least one dose of vaccine. Thus, gradual resumption of normal activity was followed.[6] Schools, colleges and offices returned to physical mode. Public transport, restaurants and tourist attractions opened up. Given the current situation being greatly different from that during lockdown, factors determining mental health of the student population are also expected to change.

There are few studies conducted in India regarding impact of COVID-19 on mental health. Most of them focus on the initial phase of pandemic during early lockdown period and show different results for prevalence of depression and anxiety. In a study conducted in Karnataka,[7] depression in girls was found to be more than that in boys and anxiety did not differ between genders whereas, in a study conducted in Chennai,[8] depression increased in males and anxiety increased in females due to COVID-19. Another study conducted in West Bengal showed a significantly different prevalence of anxiety.[9] But there are few to no existing studies in this area to the best of knowledge of the authors which compared mental distress among undergraduate medical and non-medical students (engineering and general stream) in the late phase of the pandemic, when resumption of daily activities were being followed after the second wave of COVID-19. After withdrawal of lockdown, COVID-19 infection was still rampant, and the medical students were eager to join college activities including the encounter with patients in their ward clinics which was lagging behind for a long time. This type of hands-on practical training was also long due for the students of engineering and Bachelor of Science (non-medical) students of different colleges in Kolkata. The undergraduate students of these streams were a sizable section of the student fraternity in Kolkata, West Bengal, India. Psychological morbidity during and after lockdown, has some obvious bearing on the well-being and learning among these students. A systematic reliable and authentic database was the need of the hour for formulating strategy to tackle this type of dire condition in exigency like COVID-19 pandemic.

The objectives of this study were to estimate the prevalence of Depression and Generalized Anxiety Disorder (GAD) and their correlates, assess the Knowledge, Attitude, and Practice (KAP) regarding COVID-19, and to determine the relationship between these factors among medical and non-medical students during the late phase of the COVID-19 pandemic, to inform strategies to improve their mental well-being and learning ability.

METHODS

Study Design and Setting:

This was a cross-sectional study conducted among medical and non-medical students (Bachelor of Science and engineering) of Kolkata, during the late phase of the pandemic. The study was conducted in Department of Community Medicine and Department of Psychiatry of Nilratan Sircar Medical College and Hospital, Kolkata.

Sampling Method:

Study participants included third year undergraduate medical students (having clinical ward classes) and third year undergraduate non-medical students from four medical colleges, four engineering and eight science colleges out of various colleges in Kolkata. Purposive sampling was employed to choose the study participants with the above-mentioned specific characteristics for fair comparison. Snowball sampling was used to enable greater reach, as during the pandemic phase attending to each college for data collection seemed to be risky and many students were yet to attend colleges regularly. As mental health problems are still a stigmatized issue in India, the students who were suffering might not come to surface during any probability sampling and a bias might creep into the results in the form of under-representation of these groups. On the other hand, in snowball sampling different students shared the questionnaire to those with similar mindset and behavior. Thus, although statistically inferior, purposive and snowball sampling enabled in ensuring representative study samples.

Sample Size Calculation:

Using the prevalence (35.5%) explored by relevant research as 'P',[8] sample size has been calculated using formula $n= [Z^2PQ]/L^2$, where Z=1.96 (two-tailed) at 95% confidence interval (CI), Q=complement of P =100-P and L=7, absolute error around the reported prevalence. The sample size for the study has been estimated to be $(3.84*35.5*64.5)/7^2=180$. Being an online survey, after adding 20% non-response rate the sample size was 216. Thus, 220 medical students along with 220 non-medical students were considered adequate for the study.

Study period:

Data collection was conducted from March 8th, 2022, until April 6th, 2022.

Data Collection:

After obtaining informed digital consent, participants were asked to fill online Google forms distributed by social media platforms like, WhatsApp and Facebook. The online questionnaire was administered in English as English is the primary mode of education in most colleges of Kolkata including the ones considered for this study. Forms were accepted until responses reached 220 for both study groups. Total of 442 responses were received. After excluding incomplete and inappropriate responses, the final sample comprised 421 participants of whom 219 were medical and 202 were non-medical students.

Study tools:

A validated and pretested questionnaire containing information pertaining to socio-demographics was used.

To assess depressive symptoms, participants completed the nine-item Patient Health Questionnaire (PHQ-9).[10] PHQ-9 is a self-reported scale used to diagnose major and sub-threshold depression. Participants indicated how frequently they experienced depressive symptoms over the past two weeks on a four-point Likert scale, from 0 “not at all” to 3 “nearly every day”. The total score range is 0–27 which determines the severity of depression. It is interpreted as normal (0–4), mild (5–9), moderate (10–14), moderately severe (15-19) and severe (20-27) depression.

The seven-item Generalized Anxiety Disorder (GAD-7) was used to assess anxiety symptoms.[11] Participants indicated how frequently they experienced symptoms of anxiety over the last two weeks on a four-point Likert scale from 0 “not at all” to 3 “nearly every day”. Total score of the participants ranges from 0- 21. The severity of symptoms of anxiety is interpreted as normal (0–4), mild (5–9), moderate (10–14), and severe (15–21) anxiety.

PHQ-9 and GAD-7 scales have sound psychometric properties and have good validity and reliability. Both these scales have been used in similar settings, both in India and other countries, to establish the prevalence of depression and anxiety. A study, conducted to measure invariance of the scales in Indian population, by De Man J et al., found that the psychometric properties were comparable to studies in western settings.[12]

To assess Fear of COVID-19, Fear of COVID-19 Scale, 2020 (FCV-19S) was used.[13] This is a reliable, valid self-report scale developed recently to assess fear of COVID-19 pandemic. A study conducted by Ahorsu et al.,[13] reported internal consistency (alpha = 0.82) and test-retest reliability (ICC = 0.72) for this scale which were acceptable reliability. The participants indicated their level of agreement with the statements using a seven-item questionnaire on a five-point Likert scale, from 1 to 5. Answers included “strongly disagree,” “disagree,” “neutral”, “agree” and “strongly agree”. Total score was calculated by adding up each item score (ranging from 7 to 35). Higher score (score >18) corresponded to greater fear, according to a similar study conducted in India using this scale.[14]

The predesigned and pre-validated Knowledge, Attitude and Practices regarding COVID-19 questionnaire adopted from relevant study,[15] was modified by faculty of the Department of Community Medicine as the subject matter experts (SMEs) to suit the local context. The Knowledge section consisted of six questions related to mode of transmission, symptoms, management options and preventive strategies. The questions had answers as “Yes”, “No” and “Do not know”. Participants, who answered 50%, two-third or more and less than 50% of the questions correctly, were respectively graded as “Average”, “Good” and “Poor”. The Attitude section had four questions related to possibility, severity of infection, attitude towards practising personal hygiene and avoiding crowded places. These were graded by five-point Likert scale. Those who attained median Attitude score of 11, more than 11 and less than 11 were respectively, graded as “Average”, “Good” and “Poor”. The Practice section had three questions related to exercising preventive strategies which were graded by four-point Likert scale. Participants who attained median Practice score of ten, more than ten and less than ten were graded as “Average”, “Good” and “Poor”, respectively.

Data Analysis:

Collected data was compiled in Microsoft Excel. Continuous data was described by mean, median, standard deviation (SD), and interquartile range (IQR); and categorical data by proportion and percentage. Normality of dataset was checked by charts like histogram, stem-leaf, P-P and Q-Q plot and Shapiro-Wilk normality test. Results were displayed using charts and tables. Inferential statistical tests like 'Unpaired t' test, Pearson correlation coefficient (r) (for normally distributed data) and Mann-Whitney U test (for skewed data) were used for continuous variables. Chi-square test was used for categorical variables. The Statistical Package for Social Science (SPSS Version 22.0) was used for analysis. P-value of less than 0.05 was considered as significant.

Ethical Approval:

The study was carried out after obtaining approval of the Institutional Ethics Committee of Nilratan Sircar Medical College and Hospital, Kolkata on February 23rd, 2022, with Memo no: NRSMC/IEC/03/2022 and conducted according to the World Medical Association Declaration of Helsinki on Ethical Principles for Medical Research Involving Humans. Informed online consent was obtained from each study participant after explanation of the study and confirming confidentiality.

RESULTS.

A total of 442 responses were received. After excluding incomplete and inappropriate responses, the final sample comprised 421 participants, of whom 219 were medical students and 202 were non-medical students. The majority of the participants were male (58.67%), with an average (mean±SD) age of 22.42±0.99 years. Other socio-demographic characteristics are depicted in (**Table 1**).

The overall prevalence of depression (PHQ-9 score >4) was 81.73% among medical students and 58.42% among non-medical students. The overall prevalence of anxiety (GAD-7 score >4) was 76.25% among medical students and 50.99% among non-medical students. The mean PHQ-9 score was 8.37±5.16 for medical students and 7.62±5.86 for non-medical students, with a statistically significant difference (p=0.017, Mann-Whitney U: 19136.000, **Figure 1**). The mean GAD-7 score was 7.96±4.65 for medical students and 7.20±5.63 for non-medical students, also showing a significant difference (p=0.008, Mann-Whitney U: 18801.000) **(Figure 2)**. Overall prevalence of depression (PHQ-9 score >4) was 67.21% in males and 75.29% in females whereas, overall prevalence of anxiety (GAD-7 score >4) was 57.89% in males and 72.98% in females. However, both depression and anxiety did not vary significantly with the genders (p=0.135).

According to the Fear of COVID-19 Scale (FCV-19S), non-medical students had scores of 12.00 (8.00) [median (IQR)], while medical students had scores of 13.00 (5.00) [median (IQR)]. Medical students had higher knowledge scores regarding COVID-19 than non-medical students, with mean scores of 4.24±1.04 and 3.80±1.28, respectively (p=0.001, Mann-Whitney U: 16396.00). Attitude scores were significantly different between non-medical and medical students, with means of 10.64±2.26 and 11.63±1.93, respectively (p=0.001, Mann-Whitney U: 15207.500). Practice scores for non-medical and medical students were 9.85±1.92 and 9.44±1.74, respectively, showing no statistical significance (p=0.147, Mann-Whitney U: 19714.00, **Table 2**).

Grades of Attitude were found to significantly influence Depression scores (p=0.033). Participants with an average attitude towards COVID-19 had a higher mean depression score than those with poor or good attitudes, as shown by Post-Hoc analysis with p-values of 0.009 and 0.036, respectively. However, attitude grades did not have influence on GAD-7 scores (p=0.135, **Table 3**).

Depression did not vary significantly in participants with a previous history of psychiatric illness (p=0.09). Anxiety varied significantly based on residence (p=0.018), mode of travel to college (p=0.012), and having a family member, close relative, or friend who suffered or died from COVID-19 (p=0.03). Participants who travelled by their own car had a higher mean anxiety score than those using public transport, according to Post-Hoc analysis. No significant relationship was found between fear of COVID-19 and the aforementioned factors (**Table 4**).

DISCUSSION.

The present study found an overall prevalence of depression (PHQ-9 score >4) of 81.73% and 58.42% among medical and non-medical students, respectively. Overall prevalence of anxiety (GAD-7 score >4) was 76.25% and 50.99% among medical and non-medical students, respectively. In an online survey conducted among Indian medical students in 2020; mild, moderate, and severe anxiety were found in 27%, 24%, and 16% students.[16] In this study, prevalence of mild to severe symptoms of depression and anxiety in MBBS students was observed to be higher as compared to other studies.[17] This variation might be due to methodological and socio-cultural differences. Comparable values of prevalence of depression but a higher prevalence of anxiety among non-MBBS students was found in a study conducted among university students in India.[14]

The mean PHQ-9 and GAD-7 scores for non-MBBS participants were significantly lower than that of MBBS participants. This might be due to physical mode of classes, encounters with patients in wards and examinations which had already started for MBBS students during the study period. Also, the presence of higher prevalence of psychological distress in the medical students might be because, they are typically subjected to various challenges like, demanding curriculum, long study hours, fear of failure, as reported in an 18 month follow-up study conducted among medical students in Kerala.[5] However, in an online survey was conducted in 2020 among 486 non-medical and 468 medical students from three universities of Shandong Province, non-medical college students had higher prevalence of depression (53.9 vs. 46.4%; p=0.020) and insomnia (28.0 vs. 22.4%, p=0.049), as well as higher total scores on PHQ-9 (p = 0.03) and Insomnia Severity Index (p <0.01) compared to the medical counterpart.[18] These variations might be due to methodological, socio-cultural differences, force of COVID-19 infection, implementation of COVID-19 containment measures and compliance of the people towards COVID-19 prevention.

The 2016 National Mental Health Survey reported 2.7% prevalence of depressive disorder and 3.1% prevalence of anxiety in Indian population.[19] Prevalence of depression and anxiety were found to be 27.2% and 33.8% respectively, among medical students before onset of COVID-19 pandemic.[20,21]

A study conducted during lockdown in India among non-medical students found 85.51% and 62% of students had symptoms of depression and anxiety.[22] Similar findings were reported among university students in Bangladesh.[23] In another online study conducted among university students in USA with recruitment of participants through email, text messaging, and snowball sampling, 71% indicated increased stress and anxiety due to COVID-19 pandemic.[24] An online survey reported a prevalence of 20.6% of perceived stress during the pandemic which was significantly higher (p=0.001) than pre-pandemic (11.6%) having positive correlation with worries regarding the possible disruption of education/examinations, excessive news exposure, apprehension of COVID-19 infection, effects of strict isolation and social distancing.[25]

In our study, prevalence of both depression and anxiety were found to be lower than that during lockdown for non-MBBS students, whereas among medical students, depression was found to be lower than that during lockdown.[22] This decline in distress is supported by other studies conducted after first lockdown in India.[14,17]

The progressive decline in prevalence of distress is in accordance with another longitudinal study.[26] However, levels of anxiety and depression were still higher than that before the pandemic among both MBBS and non-MBBS students, which is compliant with a similar study by Imran N et al.[3]

At the time of study, the pandemic did not come to end and still there was an apprehension about the chance of COVID-19 infection. Many students and their relatives might have been suffering from long-Covid. For medical students, the apprehension might be more due to their exposure to patients during ward clinics which was resumed after a long gap with a huge back log. Non-medical students didn't have this type of apprehension arising out of the encounter with patients.

MBBS students had higher knowledge scores (p=0.001) than their non-MBBS counterparts. This may be because COVID-19 has lately been incorporated in the MBBS curriculum in India, leading to greater awareness.

Non-MBBS students had a lower mean score of attitudes than their MBBS counterparts (p=0.001). The knowledge of the non-MBBS participants was based on mass-media which, at the time of this study, showed decreased number of COVID-19 cases. Moreover, they had no clinical ward exposure. Thus, less perceived possibility and severity of infection might have led to lesser mean scores of attitudes.

Although, mean score of practice was slightly higher among the non-MBBS participants, it was not statistically significant (p=0.147). This might be because, practices like wearing masks, physical distancing and handwashing had been integrated into the daily lives of the population for two years since the start of the pandemic. Social demand and legal enforcement might be the likely explanations of similar practice scores among both study groups.

At the start of the pandemic, little was known about transmission, pathogenesis, complications of COVID-19 and there was high amount of unverified information, leading to uncertainty that may have led to strict protective measures and thus, higher attitudes and practices despite poor knowledge, as found in a study conducted in Indonesia during early stages of the pandemic.[27] During this study conducted in late phase of the pandemic, extensive research followed by mass media campaigning has led to increased knowledge scores. The difference in attitude and practice with earlier studies might be due to decrease in hospitalisation and deaths due to COVID-19 and the pan-India vaccination drive, reducing associated fear. Two years have passed since the start of the pandemic and people have become complacent with their practices, leading to relatively lower practice scores, supported by another study.[28]

Participants having average attitude towards COVID-19 had greater mean score of depression than those having good attitude. This may be because most of the participants having good attitude also showed average to good practices, thereby having less perceived risk of contracting COVID-19, leading to lower depression scores. Positive attitude towards COVID-19 has been found to negatively correlate with psychological distress.[29] However, poor attitude during the late phase of pandemic also had significantly fewer mean scores of depression. This is most probably because those participants were reckless regarding the pandemic and so experienced a false sense of wellbeing and denial thereby, less symptoms of depression.

In this study, depression was not found to be higher in those having prior history of psychiatric illness, contrary to a study conducted in Pakistan.[3]

Participants staying in hostel had significantly greater mean scores of anxiety. This might be because proper attention is often not paid to maintenance of hygiene and sanitation in hostels. Moreover, it is not expected that all hostel-boarders would follow COVID-19 appropriate behavior. Social distancing is impractical in hostels, where three or four boarders have to share rooms. Staying away from home might also have added to their distress. Therefore, hostel-boarders are at an increased perceived risk of COVID-19 infection and hence their increased anxiety, corroborating with a study conducted in China.[30]

The current study also found that participants travelling to their colleges by own car had significantly greater scores for anxiety than those availing public transport. Those travelling by own cars were probably following avoidant coping mechanism by avoiding the crowd of public transport. However, those availing public transport were more accepting of the 'new normal' and were likely following acceptant coping mechanism. This is consistent with a study which found that psychological burden was higher with students having avoidant coping styles.[17,31]

GAD-7 scores were significantly higher in participants who had themselves suffered or had experienced their family members or relatives suffering or dying from COVID-19.[14,26] It might be partly due to the apprehension of re-infection as well as some of them or their relatives might have been suffering from long-COVID.

Substance use and presence of comorbidities were not significantly associated with psychological distress, contradicted by earlier studies.[17,32] Present study found no significant difference in symptoms of depression and anxiety among males and females, similar to a study in Bangladesh.[23] However, some studies have found females to be more prone to psychological distress.[3] These differences might be due to difference in characteristics of the study population based on country and culture.

The mean FCV-19S score for both study groups were lower as compared to a study conducted in India one month post lockdown.[14] Fear of COVID-19 was neither significantly impacted by any of the socio-demographic correlates nor by academic course, compliant with other studies.[31] This is most likely because of the time elapsed since start of the pandemic. The decrease in number of hospitalizations, deaths due to COVID-19 and pan-India vaccination might have helped in allaying fear of getting infected. However, raised levels of depression and anxiety can be attributed to the indirect effects of COVID-19 or long-Covid.[33] The pandemic had led to several drastic changes. Students were subjected to uncertainties regarding academics and even, their household economic condition.[29] With gradual resumption of offline mode of teaching, the shift from their quiet life at home to hectic life at campus was hard to bear for many.[34] This might have led students to face other sources of mental distress or amplified their existing problems. Student wellness activities, interpersonal support groups and specific policy interventions are therefore, the need of the hour.

Limitations and Recommendations

Since this study employed a cross-sectional study design, trends of mental distress in the student population due to COVID-19 could not be assessed. Cause and effect relationships could not be established due to lack of an analytical study design. Being a web-based, self-reported survey there could have been response bias. Non-probability sampling methods like, purposive and snowball sampling were used in this study to locate a specific student sample for comparison. However, these techniques are subjective and might have led to community bias and limited generalizability. Although standardized questionnaires were used, full diagnostic interviews were not conducted. PHQ-9 and GAD-7 questionnaires belonging to the pre-COVID era were used to assess distress during COVID-19. Information about COVID-19 vaccination was not collected. As the study was conducted among university students, its results cannot be extrapolated to the general population and healthcare professionals. Additionally, while the questions asked about COVID-19 worries touched on clinical, academic and health concerns, they were not exhaustive. Thus, broader impact of the pandemic on the minds of students might have been missed. Future studies should employ better analytical study design and aim for better generalizability of the sample by using probability sampling. A more detailed questionnaire including other stressors and relieving factors of the pandemic can be employed to further enhance the understanding of the effect of the pandemic on mental health.

Conclusion

Although direct harm caused by COVID-19 on mental health has been shown to improve over time,[26] the present study has found higher prevalence of depression and anxiety than that before the pandemic in students especially, among medical students. This is likely attributed to the indirect and long-term consequences of the pandemic.[33] This calls for adequate awareness and intervention, as psychological distress has been shown to affect academic performance apart from general wellbeing of the students.[35] Student wellness activities like, regular sleep, balanced diet, time management, yoga, recreational activities; should be advocated in colleges across India.[36] Positive family support is also beneficial.[37] As students benefit most by discussing their distress with their colleagues and teammates, colleges can conduct interpersonal support groups. Student mentoring programs by faculty has also shown reduced relative prevalence of depression and anxiety in a study conducted among Indian medical students.[17]

As per the directives of National Medical Commission (NMC), India, yoga classes were arranged in two weeks of Foundation course at the starting of MBBS course and sports are to be conducted on regular basis. Each college may develop mentoring policy towards students, faculty and physicians. As second line of defense, each faculty may be allocated to certain number of students for mentoring who should respectfully interact with students at regular intervals for monitoring their mental wellbeing, encouraging to adapt to coping mechanisms like, planning, acceptance, humor, active coping, adequate sleep, use of instrumental and emotional social support instead of gambling, substance use, avoidant coping and behavioral disengagement; which was found helpful in maintaining well-being.[31] Strict implementation of policy interventions such as, anti-ragging, regular mental health checkups and student grievance cells, can also help address the problem. Around the world and especially in India, seeking help from mental health professionals is met with a lot of stigma.[21] Provision of confidential and affordable access to psychiatrists and psychologists either online or on campus, may help in mitigating this problem.

SUMMARY - ACCELERATING TRANSLATION

Title: Magnitude of Psychological Distress among Medical and Non-medical Students during the Late Phase of COVID-19 Pandemic in West Bengal: A Cross-sectional Study

Main Problem to Solve: COVID-19 led to drastic changes worldwide which has affected mental health especially, of the vulnerable student population. Very few studies have been conducted to assess mental health of university students during the pandemic. Probably, studies comparing mental distress among medical and non-medical students in the late phase of the pandemic in West Bengal have not been conducted.

Aim of Study: This study aimed to assess psychological distress due to COVID-19 in students during the late phase of pandemic and to establish correlation of academic course, socio-demographics and knowledge-attitude-practices (KAP) with depression and anxiety. It would also help assess the long-term psychological burden of the pandemic, if any and help the college authorities to develop strategies to improve the mental well-being and thereby, learning ability of students.

Methodology: Survey questionnaire was circulated via Google forms through social media. It included Patient Health Questionnaire-9, Generalized Anxiety Disorder-7, Fear of COVID-19 scale 2020, KAP regarding COVID-19 and socio-demographics. Data were analysed using appropriate statistical methods in Statistical Package for Social Science (Version 22.0). P value of less than 0.05 was considered significant. P values were adjusted by Bonferroni method to take into consideration any Type-1 error that might occur due to testing of multiple comparisons.

Results: Overall prevalence of depression (PHQ-9 score>4) was 58.42% in non-MBBS and 81.73% in MBBS students. Whereas the overall prevalence of anxiety (GAD-7 score >4) was 50.99% in non-MBBS and 76.25% in MBBS students. Prevalence of depression and anxiety were found to be lower than that during the first lockdown however, they were still higher than that before the pandemic. Medical students had significantly better scores for knowledge and attitude towards the pandemic. Anxiety was influenced by residence, mode of travel to college, history of relatives or friends affected by COVID-19.

Conclusion: Prevalence of depression and anxiety in college students, especially among medical students, was higher in present study mainly due to long-term indirect effects of the pandemic. This calls for employing student wellness activities like, building interpersonal support groups, practicing yoga and other hobbies; and provision of better, cheap, and confidential mental health services across colleges in India.

REFERENCES.

1. Cucinotta D, Vanelli M. WHO Declares COVID-19 a Pandemic. Acta Biomed. 2020;91(1):157-60.
2. Gettleman J, Schultz K. Modi orders 3-week total lockdown for all 1.3 billion Indians. Available from:https://www.nytimes.com/2020/03/24/world/asia/india-coronavirus-lockdown.html ISSN 0362-4331. Last updated Mar 24, 2020; cited Nov 9, 2022.
3. 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 Curr Psychiatry. 2021;28(1):45.
4. Ettman CK, Abdalla SM, Cohen GH, Sampson L, Vivier PM, Galea S. Prevalence of Depression Symptoms in US Adults Before and During the COVID-19 Pandemic. JAMA Netw Open. 2020;3(9):e2019686.
5. Mohammed S, Tharayil H, Gopakumar S, George C. Pattern and Correlates of Depression among Medical Students: An 18 Month Follow-Up Study. Indian J Psychol Med. 2020;42(2):116-21.
6. India Briefing. How India is Managing COVID-19 in 2022: Transition to the Workplace, Vaccine Program Expanded. Available from:https://www.india-briefing.com/news/india-COVID-19-vaccine-program-best-practice-employers-2022-23998.html/.Last updated Mar 24, 2022 ; cited Nov 9, 2022.
7. Shailaja B, Singh H, Chaudhury S, Thyloth M. COVID-19 pandemic and its aftermath: Knowledge, attitude, behavior, and mental health-care needs of medical undergraduates. Ind Psychiatry J. 2020;29(1):51-60.
8. Saraswathi I, Saikarthik J, Senthil Kumar K, Madhan Srinivasan K, Ardhanaari M, Gunapriya R. Impact of COVID-19 outbreak on the mental health status of undergraduate medical students in a COVID-19 treating medical college: a prospective longitudinal study. PeerJ. 2020;8:e10164.
9. Bhowmick S, Parolia S, Jana S, Kundu D, Choudhury D, Das N, et al. A Study on the Anxiety Level and Stress during Covid19 Lockdown among the General Population of West Bengal, India- A Must Know for Primary Care Physicians. J Family Med Prim Care. 2021;10(2):978-84.
10. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: Validity of a Brief Depression Severity Measure. J Gen Intern Med. 2001;16(9):606-13.
11. Spitzer RL, Kroenke K, Williams JB, Lowe B. A Brief Measure for Assessing Generalized Anxiety Disorder: the GAD-7. Arch Intern Med. 2006;166(10):1092-7.
12. De Man J, Absetz P, Sathish T, Desloge A, Haregu T, Oldenburg B, et al. Are the PHQ-9 and GAD-7 Suitable for Use in India? A Psychometric Analysis. Front Psychol. 2021;12:676398.
13. Ahorsu DK, Lin CY, Imani V, Saffari M, Griffiths MD, Pakpour AH. The Fear of COVID-19 Scale: Development and Initial Validation. Int J Ment Health Addict. 2022;20(3):1537-45.
14. Chaudhary AP, Sonar NS, TR J, Banerjee M, Yadav S. Impact of the COVID-19 Pandemic on the Mental Health of College Students in India: Cross-sectional Web-Based Study. JMIRx Med. 2021;2(3):e28158.
15. Lee M, Kang BA, You M. Knowledge, Attitudes, and Practices (KAP) toward COVID-19: A Cross-sectional Study in South Korea. BMC Public Health. 2021;21(1):295.
16. Shreevastava AK, Mavai M, Mittal PS, Verma R, Kaur D, Bhandari B. Assessment of the psychological impact of COVID-19 pandemic on undergraduate medical students in India. J Edu Health Promot 2022;11:214.

17. Mishra J, Samanta P, Panigrahi A, Dash K, Behera MR, Das R. Mental Health Status, Coping Strategies during COVID-19 Pandemic among Undergraduate Students of Healthcare Profession. Int J Ment Health Addict. 2023;21(1):562-74.
18. Zheng X, Guo Y, Yang H, Luo L, Ya B, Xu H, et al. A Cross-Sectional Study on Mental Health Problems of Medical and Nonmedical Students in Shandong During the COVID-19 Epidemic Recovery Period. Front. Psychiatry 2021;12:1-9.
19. Pradeep BS, Gururaj G, Varghese M, Benegal V, Rao GN, Sukumar GM. National Mental Health Survey of India, 2016 - Rationale, Design and Methods. PLoS ONE. 2018;13(10):e0205096.
20. Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, et al. Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students: A Systematic Review and Meta-Analysis. JAMA. 2016;316(21):2214–36.
21. Quek TT, Tam WW, Tran BX, Zhang M, Zhang Z, Ho CS, et al. The Global Prevalence of Anxiety Among Medical Students: A Meta-Analysis. Int J Environ Res Public Health. 2019;16(15):2735.
22. Verma H, Verma G, Kumar P. Depression, Anxiety, and Stress during Times of COVID-19: An Analysis of Youngsters Studying in Higher Education in India. Rev Socionetwork Strateg. 2021;15(2):471-88.
23. Islam MA, Barna SD, Raihan H, Khan MNA, Hossain MT. Depression and Anxiety among University Students during the COVID-19 Pandemic in Bangladesh: A Web-based Cross-sectional Survey. PLoS ONE. 2020;15(8) :e0238162.
24. Son C, Hegde S, Smith A, Wang X, Sasangohar F, et al. Effects of COVID-19 on College Students' Mental Health in the United States: Interview Survey Study. J Med Internet Res. 2020;22(9):e21279.
25. Awadalla NJ, Alsabaani AA, Alsaleem MA, Alsaleem SA, Alshaikh AA, Al-Fifi SH, et al. Increased Mental Stress among Undergraduate Medical Students in South-Western Saudi Arabia during the COVID-19 Pandemic. PeerJ 2022;10:e13900.
26. Gallagher MW, Zvolensky MJ, Long LJ, Rogers AH, Garey L. The Impact of COVID-19 Experiences and Associated Stress on Anxiety, Depression, and Functional Impairment in American Adults. Cognit Ther Res. 2020;44(6):1043-51.
27. Adli I, Widyahening IS, Lazarus G, Phowira J, Baihaqi LA, Ariffandi B, et al. Knowledge, Attitude, and Practice related to the COVID-19 Pandemic among Undergraduate Medical Students in Indonesia: A Nationwide Cross Sectional Study. PLoS ONE. 2022;17(1):e0262827.
28. Chan SS, So WK, Wong DC, Lee AC, Tiwari A. Improving Older Adults' Knowledge and Practice of Preventive Measures through a Telephone Health Education during the SARS Epidemic in Hong Kong: A Pilot Study. Int J Nurs Stud. 2007;44:1120–7.
29. Moore KA, Lucas JJ. COVID-19 Distress and Worries: The Role of Attitudes, Social Support, and Positive Coping during Social Isolation. Psychol Psychother. 2021; 94(2):365-70.
30. Khan K, Li Y, Liu S, Li C. Psychological Distress and Trust in University Management Among International Students During the COVID-19 Pandemic. Front. Psychol. 2021;12:679661.
31. Saali A, Stanislawski ER, Kumar V, Chan C, Hurtado A, Pietrzak RH, et al. The Psychiatric Burden on Medical Students in New York City Entering Clinical Clerkships during the COVID-19 Pandemic. Psychiatr Q. 2022;93(2):419-34.

32. Horwitz AG, Hill RM, King CA. Specific Coping Behaviors in Relation to Adolescent Depression and Suicidal Ideation. J Adolesc. 2011;34(5):1077-85.
33. Arjun MC, Singh AK, Roy P, Ravichandran M, Mandal S, Pal D, et al. Long COVID Following Omicron Wave in Eastern India—A Retrospective Cohort Study. J Med Virol. 2022;95:e28214.
34. Steimle LN, Sun Y, Johnson L, Besedes T, Mokhtarian P, Nazzal D. Students' Preferences for Returning to Colleges and Universities during the COVID-19 Pandemic: A Discrete Choice Experiment. Socioecon Plann Sci. 2022;82:101266.
35. Mandal A, Ghosh A, Sengupta G, Bera T, Das N, Mukherjee S. Factors Affecting The Performance Of Undergraduate Medical Students: A Perspective. Indian J Community Med. 2012;37(2):126-9.
36. Woolery A, Myers H, Sternlieb B, Zeltzer L. A Yoga Intervention for Young Adults with Elevated Symptoms of Depression. Altern Ther Health Med. 2004;10(2):60-3.
37. Haglund ME, aan het Rot M, Cooper NS, Nestadt PS, Muller D, Southwick SM, et al. Resilience in the Third Year of Medical School: A Prospective Study of the Associations between Stressful Events Occurring during Clinical Rotations and Student Well-being. Acad Med. 2009;84(2):258–68.

FIGURES AND TABLES.

Figure 1. Distribution of Participants According to Academic Course and Grades of Depression (PHQ-9), West Bengal, 2022

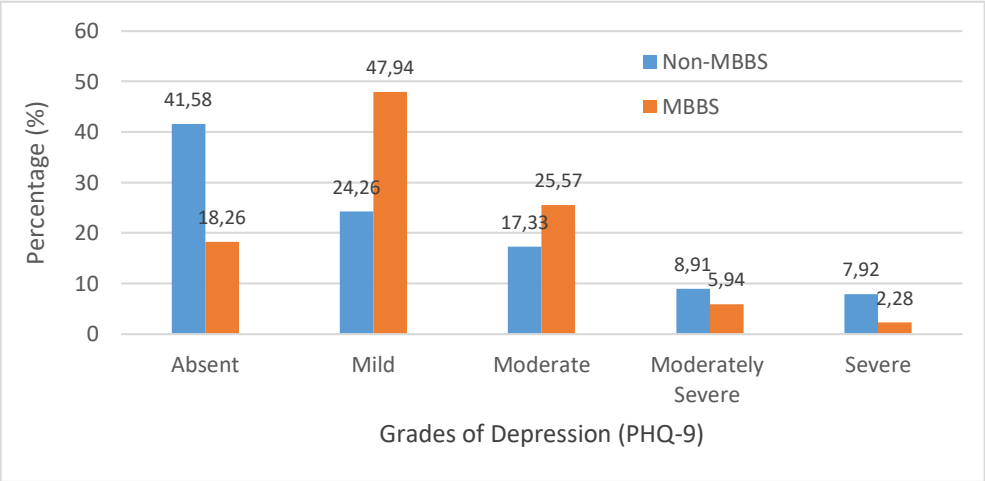

Figure 2. Distribution of Participants According to Academic Course and Grades of Anxiety(GAD-7), West Bengal, 2022

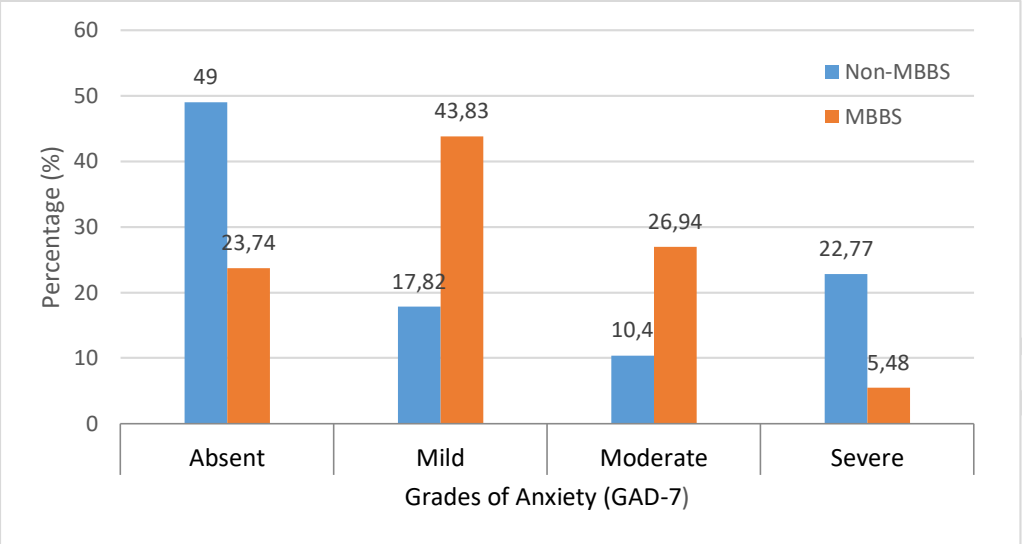

Table 1. Distribution of Participants According to Socio-demographic Characteristics, West Bengal, 2022

Variable	Attribute	Number	%
Gender	Male	247	58.67
	Female	174	41.33
Age in years (Mean±SD)		22.42±0.99	
Course	MBBS	219	52.02
	Non-MBBS	202	47.98
Residence during Late Phase of Pandemic	Home	203	48.22
	Hostel	162	38.48
	Paying Guest	56	13.3
Mode of Travel to College	Hostel-boarder	162	38.48
	Public Transport	204	48.46
	Hired Car	27	6.41
	Own Car	28	6.65
History of Addiction	Alcohol	6	1.43
	Tobacco	28	6.65
Previous History of Psychiatric Illness	Depression	5	1.19
	Anxiety neurosis	3	0.71
	Obsessive Compulsive Disorder	4	0.95
Presence of comorbidities	Yes	81	19.23
	No	340	80.76
If any family member/ close relative or friend, suffered/died from COVID-19	Yes	250	59.38
	No	171	40.62
If any family member is working in health care system	Yes	93	22.09
	No	328	77.91

Table 2. Distribution of Participants according to Academic Course and Knowledge, Attitude and Practices regarding COVID-19, West Bengal, 2022

	Course	Median (IQR)	Mann-Whitney U	P- value	Adjusted P values*
Knowledge	Non-MBBS	4.0 (1.0)	16396.00	**0.000**	**0.001**
	MBBS	5.0 (2.0)			
Attitude	Non-MBBS	10.0 (3.0)	15207.50	**0.000**	**0.001**
	MBBS	12.0 (3.0)			
Practice	Non-MBBS	9.50 (3.0)	19714.00	0.049	0.147
	MBBS	10.0 (3.0)			

Significant results have been marked in bold

IQR= Interquartile range

*By Bonferroni method [p'i={pi × m,1} (1≤i≤m)

Table 3. Distribution of Participants as per Knowledge, Attitude and Practices along with their Depression, GAD and Fear of COVID-19 Scores, West Bengal, 2022

Grades	PHQ-9 Score (mean±SD)	H (Kruskal Wallis ANOVA), p/p' values	GAD-7 Score (mean±SD)	H (Kruskal Wallis ANOVA), p/p' values	Fear of COVID-19 Score (mean±SD)	H (Kruskal Wallis ANOVA), p/p' values
Knowledge						
Poor	6.98±0.85	2.753, 0.253*	7.57±0.77	0.159, 0.923*	13.66±0.96	0.780, 0.677*
Average	8.08±0.74		7.53±0.71		14.89±0.89	
Good	8.14±0.31		7.62±0.29		14.21±0.34	
Attitude						
Poor	7.56±0.39	8.984, **0.011/0.033***	6.98±0.36	6.185, **0.045***/0.135	14.02±0.42	0.227, 0.893*
Average	9.75±0.71		8.27±0.57		13.62±0.75	
Good	7.94±0.43		8.03±0.42		14.69±0.52	
Practice						
Poor	7.76±0.37	2.797, 0.247*	7.60±0.36	2.804, 0.246*	13.97±0.42	2.909, 0.234*
Average	8.81±0.61		8.02±0.50		13.20±0.57	
Good	7.89±0.50		7.34±0.48		15.31±0.62	

*df=2

Significant results have been marked in bold

p'=By Bonferroni Adjustment only in cases of significant independent variables

Table 4. Distribution of Participants according to Depression, Generalised Anxiety Disorder, Fear of COVID-19 and Socio-demographics, West Bengal, 2022

Variable	Attributes	PHQ-9 Score (mean±SD)	p/p' values	GAD-7 Score (mean±SD)	p/p' values	Fear of COVID-19 Score (mean±SD)	p/p' values
Gender	Male	7.72(5.42)	0.135*	7.26(5.08)	0.065*	14.10(6.23)	0.524*
	Female	8.38(5.64)		8.03(5.19)		14.46(6.35)	
Place of Residence	Home	7.98(5.67)	0.116†	7.53(5.29)	**0.003†**/0.018	14.19(6.59)	0.546†
	Hostel	8.41(5.38)		8.34(5.09)		14.42(6.04)	
	Paying Guest	7.00(5.37)		5.79(4.37)		13.93(5.83)	
Mode of Travel to College	Hostel-boarder	8.30(5.31)	0.329‡	8.33(5.05)	**0.002‡**/0.012	14.48(6.09)	0.108‡
	Public Transport	7.58(5.56)		6.81(5.11)		13.83(6.24)	
	Hired Car	8.56(4.88)		6.85(4.39)		13.52(5.44)	
	Own Car	8.96(6.84)		9.82(5.65)		16.79(7.72)	
Previous History of Psychiatric Illness	No	7.90(5.50)	**0.015***/0.090	7.57(5.14)	0.522*	14.31(6.29)	0.331*
	Yes	11.07(5.28)		8.47(5.55)		12.87(5.58)	
If any family member/ close relative or friend, suffered/died from COVID-19	Not suffered/died	7.59(5.42)	0.134*	6.75(4.92)	**0.005*/0.030**	14.02(5.92)	0.771*
	Suffered/died	8.30(5.57)		8.18(5.23)		14.42(6.51)	
If any family member is	No	7.76(5.37)	0.073*	7.45(5.15)	0.193*	14.11(6.26)	0.207*

working in health care system	Yes	8.89 (5.95)		8.12(5.15)		14.76(6.31)	

*According to Mann-Whitney U test,
†According to Kruskal Wallis ANOVA at df=2,
‡According to Kruskal Wallis ANOVA at df=3,
Significant results have been marked in bold
p'=By Bonferroni Adjustment only in cases of significant independent variables

Supplementary Material

Study Questionnaire:

Consent: The nature and purpose of the study and its potential risks/benefits and other relevant details of the study have been suitably explained to me in detail by the investigators. All the personal information provided by me will be kept confidential. Anonymity will be maintained. My name and email-id will not be collected. After analysis, if the result of the study be published in any article, under any circumstances, my name and identity will not be disclosed. My digital consent form indicates that I agree to participate in the study.

Yes, I agree.

A. Socio-demographic Characteristics

1. What is your age?

( ) years

2. What gender do you identify as?

- Male
- Female
- Other

3. What is your family size (total family members)?

_____

4. Which of these describes your current residence?

- Home
- Hostel
- PG (paying guest)

5. Mention your course

- MBBS
- Other courses (mention:_____)

6. What is the name of your college?

_____

7. Mention your year of study

_____

8. How do you travel to your college?

- Public transport
- Hired car
- Own car
- Not applicable (hostel-boarder)

9. Mention what addiction do you have?

- Tobacco
- Alcohol

- Other (specify……)

10. Do you have any prior history of psychiatric illness?
    - No
    - Yes

11. Please specify the disease, if you answered 'Yes' regarding prior history of psychiatric illness. If not, type 'No'.

    _____

12. Have you/any family member/close relative or friend, suffered from COVID-19/died of it?
    - Yes (suffered/died)
    - No

13. Do you have any family member who is working in health care system?
    - Yes
    - No

14. What morbidity do you have? (May choose more than one)
    - Cardiovascular
    - Respiratory e.g. Asthma
    - Kidney/liver diseases
    - Endocrinal/metabolic e.g. Diabetes mellitus/ thyroid dysfunction
    - Cancers for which you are taking treatment/medicines
    - Others (specify……..)
    - Nil

B. Specific Information:

1. Baseline [Knowledge, Attitude and Practice relating to COVID-19]

	Knowledge items	Yes	No	Do not know
Sl No.	**Are the following facts correct?**			
K1	The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and myalgia (muscle pain).	1	2	3
K2	There currently is no effective cure for COVID-2019, but early symptomatic and supportive treatment can help most patients recover from infection.	1	2	3
K3	Not all persons with COVID-2019 will develop severe cases. Only those who are elderly have chronic illnesses are more likely to be in severe cases.	1	2	3
K4	Eating or contacting wild animals would result in infection by the COVID-19 virus.	1	2	3
K5	The COVID-19 virus spreads via respiratory droplets of infected individuals.	1	2	3
K6	Ordinary residents can wear general medical masks to prevent infection by the COVID-19 virus.	1	2	3

[Attitudes]

	Perceived Risk of COVID-19 infection Items	Very low		Neither low nor high		Very high
A1	What do you think is the possibility of your COVID-19 infection?	1	2	3	4	5
A2	What do you think will be the severity if COVID-19 infects you?	1	2	3	4	5

	Efficacy beliefs Items	Not at all			Extremely
To what extent do you think the precautionary behaviour is an effective way to reduce the risk of COVID-19 infection?					
A3	Practicing personal hygiene such as wearing facial masks and hand hygiene'	1	2	3	4
A4	Social distancing such as avoiding crowded places.	1	2	3	4

[Practices]

	Practices of preventive behaviour	Never	Sometime	Often	Always
	In the last week, how often did you practice the following?				
P1	Wearing face shield/facial masks	1	2	3	4
P2	Washing hands frequently and or using hand sanitizer	1	2	3	4
P3	Avoiding visit to crowded places	1	2	3	4

2. FEAR OF COVID-19 SCALE, 2020

Please respond to each item by ticking (√) one of the five (5) responses that reflects how you feel, think or act toward COVID-19.

	Fear of COVID-19 Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I am most afraid of Corona					
2	It makes me uncomfortable to think about Corona					
3	My hands become clammy when I think about Corona					
4	I am afraid of losing my life because of Corona					
5	When I watch news and stories about Corona on Social media, I become nervous or anxious.					
6	I cannot sleep because I'm worrying about getting Corona.					
7	My heart races or palpitates when I think about getting Corona.					

3. PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems? (Use '√'eto indicate your answer)

S.no		Not at all	Several days	More than half the days	Nearly every day
1	Little interest or pleasure in doing things	0	1	2	3
2	Feeling down, depressed, or hopeless	0	1	2	3
3	Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4	Feeling tired or having little energy	0	1	2	3
5	Poor appetite or overeating	0	1	2	3
6	Feeling bad about yourself- or that you are a failure or have let yourself or your family down	0	1	2	3
7	Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8	Moving or speaking so slowly that other people could have noticed. Or the opposite- being so fidgety or restless that you have been moving a lot more than usual	0	1	2	3
9	Thoughts that you would be better off dead, or hurting yourself	0	1	2	3

10. If you have checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all Somewhat difficult Very difficult Extremely difficult

4. **GENERALIZED ANXIETY DISORDER SCALE (GAD-7)**

Over the last two weeks, how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid, as if something awful might happen	0	1	2	3

If you checked any problems, how difficult have they made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all Somewhat difficult Very difficult Extremely difficult