RICHTMANN
P U B L I S H I N G

Research Article

Impact of COVID-19 Pandemic on Mental Health Among Pharmacy Students at King Abdulaziz University, Jeddah, Saudi Arabia

Aisha F. Badr

Department of Pharmacy Practice,
Faculty of Pharmacy,
King Abdulaziz University,
Jeddah 21589, Saudi Arabia

Lenah S. Binmahfouz

Department of Pharmacology and Toxicology,
Faculty of Pharmacy,
King Abdulaziz University,
Jeddah 21589, Saudi Arabia

Abstract

Coronavirus disease (COVID-19) has spread from China to the world since December 2019. In addition to being a pandemic with mortality risk, COVID-19 affected global mental health. This study is the first to address the mental health aspects among Saudi pharmacy students during this pandemic and to explore the potential effect on their academic development. An online cross-sectional survey was distributed among 677 students from the Faculty of Pharmacy at King Abdulaziz University, Jeddah, Saudi Arabia. Participants were assessed with demographic information, the validated Generalized Anxiety Disorder 7-item (GAD-7) scale, the validated Patient Health Questionnaire-2 (PHQ-2), and multiple stress factors and motivators that might influence their academic development. Collected data were statistically analyzed. Results demonstrated that 32% of the participants were experiencing mild anxiety, 22% moderate anxiety, and 19% severe anxiety. Statistical significance in anxiety level was seen in students living alone, previously diagnosed with mental illness, and within their 4th pharmacy academic year. 49.5% of the participants were PHQ-2 positive and maybe showing symptoms of depressions. Major academic stressor for students with anxiety was their grades while major academic motivator was the coordination of each course studied. Over 70% of pharmacy students had anxiety, and half of them were PHQ-2 positive. We recommend universities to address all students' psychological needs more often in the future, especially during a crisis like this pandemic and look into the possibility of having a Pass/Fail outcome rather than a grade-based GPA.

Keywords: Coronavirus Disease; mental health; academic development; Pandemic; Pharmacy students

1. Introduction

At the end of December 2019, an outbreak of coronavirus disease 2019 (COVID-19) began in Wuhan city (Hubei province, China), causing acute infectious pneumonia (Lu et al., 2020; Wang et al., 2020). COVID-19 has spread rapidly throughout China and multiple other countries, including the Kingdom

of Saudi Arabia. On March 11 of 2020, the World Health Organization (WHO) declared COVID-19 as a pandemic (Barry et al., 2020; *Coronavirus*, n.d.). In addition to the risk of death from the infection, this pandemic has brought unbearable psychological pressure (Duan & Zhu, 2020; Xiao, 2020).

When the first case of COVID-19 emerged in Saudi Arabia (March 2 of 2020), the government took immediate stringent decisions to prevent the spread of the virus, including lockdown of all educational institutions on March 8 of 2020 and initiated a gradual curfew in different cities across the kingdom (Education, n.d.). Importantly, Saudi Arabia's Minister of Education directed that education shall be presumed through distance learning using virtual classrooms and the Blackboard system (Education, n.d.). According to UNESCO, schools have been suspended in 188 countries nationwide since April 8 of 2020 (https://plus.google.com/+UNESCO, 2020). Over 1.5 billion young people (90% of enrolled learners) worldwide are now out of education (Lee, 2020).

To date, the psychological aspects of COVID-19 on Saudi students have not been yet investigated in detail. A study in China looked into the psychological impact of the COVID-19 on college students before it was declared a pandemic (Cao et al., 2020). This study showed that 24.9% of college students experienced different levels of anxiety because of COVID-19 and suggested that student mental health should be monitored during the outbreak (Cao et al., 2020). Moreover, stress was previously studied during the Middle East Respiratory Syndrome-Corona Virus (MERS-CoV) pandemic among 200 medical students in Riyadh, with 18.4% and 4.6% of the students showing mild and moderate anxiety, respectively (Al-Rabiaah et al., 2020).

In the current study, therefore, we aimed to evaluate the immediate impact of the COVID-19 on mental health among pharmacy students at King Abdulaziz University (KAU) in Jeddah, Saudi Arabia and to assess its effect on their academic development (Kroenke et al., 2003; Rutter & Brown, 2017).

2. Methods

2.1 Study design

We conducted a cross-sectional study via an electronic google form survey that included items collected from reviewing previously published articles and assessed both anxiety and depression using validated questionnaires. Student-leaders (male and female) of each academic year, enrolled at KAU, College of Pharmacy, Jeddah, Saudi Arabia; were emailed the link to the voluntary survey and were asked to share it with their classmates. The objective of the study was explained to students before they proceed to answer survey items. Their voluntary participation was documented with their written consent on the first page of the questionnaire. Respondents were assured anonymity and confidentiality of gathered data. Data were collected over one week during the COVID-19 outbreak; starting from 04/22/2020 to 04/29/2020. This study was approved by the Research Ethics Committee at KAU, Faculty of Pharmacy (Reference No. PH-131-41).

2.2 Questionnaire items

The questionnaire comprised of structured sections that inquired the following:

(1) Demographic information; including gender, living arrangement, marital status, current academic year, GPA, previous mental illness and economic status. (2) Anxiety and depression assessment using: the validated anxiety questionnaire (General Anxiety Disorder 7-item) GAD-7 scale and the validated depression questionnaire (Patient Health Questionnaire-2) PHQ-2 (Kroenke et al., 2003; Rutter & Brown, 2017). Each student had to answer these nine questions by inquiring the frequency with which respondents suffered from specific symptoms within the past two weeks, using a 4-item Likert rating scale ranging from 0 (not at all) to 3 (nearly every day). (3) Academic stressors for student during the pandemic were examined using a 5-item rating scale ranging from 1 (not stressful at all) to 5 (very stressful). (4) Academic motivators were also assessed using a 5-item rating scale ranging from 1 (not important at all) to 5 (very important).

ISSN 2039-2117 (online)
ISSN 2039-9340 (print)

Mediterranean Journal of Social Sciences
www.richtmann.org

Vol 11 No 6
November 2020

2.3 Data and statistical analysis

Before data analysis, the questionnaire was carefully coded and verified by both researchers. The coded data were then entered and analyzed using SPSS (V 27.0) software. To illustrate the demographics, analysis of descriptive statistics was conducted. A univariate analysis was used to test the significant association between students' demographics and anxiety level during the COVID-19 pandemic. P values <0.05 were considered significantly different. Possible academic stress factors and motivators were represented by frequency counts from students suffering from anxiety.

3. Results

3.1 Levels of anxiety and depression among pharmacy students during the pandemic

The study questionnaire had an overall 44.5% response rate; where 301 students completed the survey out of 677 enrolled pharmacy students. Using the GAD-7 scale, only 27% of students had normal anxiety score, and the remaining 73% had various levels of anxiety (Figure 1). Although most students had mild anxiety level 96 (32%), moderate anxiety was reported in 67 students (22%), and severe anxiety was reported in 58 students (19%). In addition, half of the surveyed students, 149 (49.5%) were PHQ-2 positive (Figure 2).
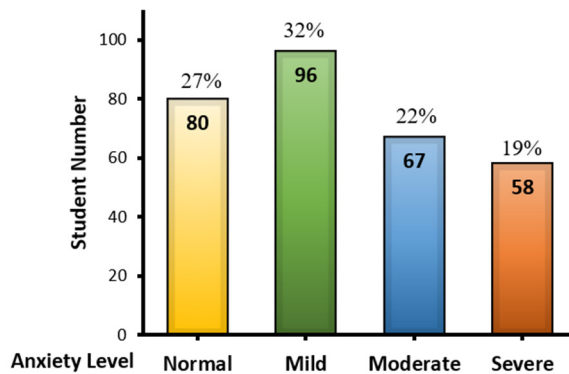

Figure 1: Anxiety level of pharmacy students at King Abdulaziz University, Jeddah, KSA during COVID-19 pandemic. Distribution of students who presented with different levels of anxiety using the General Anxiety Disorder 7-item scale (n=301).
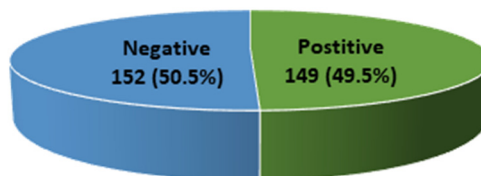

Figure 2: Depression screening among pharmacy students at King Abdulaziz University, Jeddah, KSA during COVID-19 pandemic. Screening of students for depression using the validated Patient Health Questionnaire-2 (n=301).

3.2   *Univariate analysis of pharmacy students' anxiety level and their demographics*

Table 1 shows the correlation between student's demographic variable and anxiety level. Out of the 301 respondents, over half were females 190 (63.1%), with the majority living with their parents 274 (91%) and single 291 (96.6%). Furthermore, a notable 123 (40.8%) had affected family income by COVID-19 pandemic. Despite having the majority of students (86%) with no history of diagnosed mental health disease; 27 students (8.9%) had diagnosed depression, and 15 students (4.9%) had anxiety.

Significant effect on anxiety level was seen on students who lived alone (P <0.001) compared to those living with their parents. Moreover, students with previously diagnosed anxiety and depression were statistically significant to report higher stress levels compared to students with no diagnosed mental illness (P<0.001). Finally, 4th academic year students were more likely to be severely anxious compared to others (P<0.001).

Table 1: Univariate analysis of pharmacy students' anxiety during the COVID-19 pandemic

Variable	Total	Anxiety level				P-value
		None	**Mild**	**Moderate**	**Severe**	
Gender						0.825
Female	190 (63.1)	43 (22.6)	71 (37.3)	42 (22.1)	34 (17.8)	
Male	111 (36.8)	37 (33.3)	25 (22.5)	25 (22.5)	24 (21.6)	
Living with parents						0.001[***]
No	27 (8.9)	2 (7.4)	7 (25.9)	8 (29.6)	10 (37.0)	
Yes	274 (91.0)	78 (28.4)	89 (32.4)	59 (21.5)	48 (17.5)	
Marital status						0.305
Married	10 (3.3)	4 (40.0)	4 (40.0)	0	2 (20.0)	
Single	291 (96.6)	76 (26.1)	92 (31.6)	67 (23.0)	56 (19.2)	
Mental illness						0.001[***]
None	259 (86.0)	76 (29.3)	86 (33.2)	54 (20.8)	43 (16.6)	
Anxiety	15 (4.9)	0	8 (53.3)	5 (33.3)	2 (13.3)	
Depression	27 (8.9)	4 (14.8)	2 (7.4)	8 (29.6)	13 (48.1)	
Affected income						0.128
No	178 (59.1)	52 (29.2)	59 (33.1)	35 (19.6)	32 (17.9)	
Yes	123 (40.8)	28 (22.7)	37 (30.0)	32 (26.0)	26 (21.1)	
Current academic year						0.001[***]
2nd Year	55 (18.2)	16 (29.0)	15 (27.2)	10 (18.1)	14 (25.4)	
3rd Year	68 (22.5)	17 (25.0)	23 (33.8)	17 (25.0)	11 (16.1)	
4th Year	68 (22.5)	12 (17.6)	20 (29.4)	18 (26.4)	18 (26.4)	
5th Year	78 (25.9)	18 (23.0)	27 (34.6)	20 (25.6)	13 (16.6)	
6th Year	32 (10.6)	17 (53.1)	11 (34.3)	2 (6.25)	2 (6.25)	
Overall GPA						0.418
A (4.5-5)	130 (46.1)	33 (25.3)	50 (38.4)	27 (20.7)	20 (15.3)	
B (3.75-4.5)	114 (37.8)	34 (29.8)	28 (24.5)	29 (25.4)	23 (20.1)	
C (2.75-3.75)	53 (17.6)	12 (22.6)	18 (33.9)	10 (18.8)	13 (24.5)	
F	4 (1.3)	1 (25.0)	0	1 (25.0)	2 (50.0)	

3.3   *Identified academic stress factors for pharmacy student's with anxiety*

Figure 3 shows anxiety level in relation to identified academic stressors. For this part of the study, students who had normal GAD-7 score were excluded (n=221). The bar-graph lists six stress factors where students with different levels of anxiety select a range from 1 (not stressful at all) to 5 (very stressful). The total score for each stress factor was then divided into three columns to reflect on each student's anxiety level (mild, moderate or severe).

A cut off score of 663 for each stress factor was selected to be identified as "stressful", 884 for

"fairly stressful" and 1105 for "very stressful". Based on that, GPA was a significant stressor with a score of 795, followed by uncertainty of future and jobs (680), and finally, the stability of internet connection (656). Other factors that were below 663 included: lack of applied knowledge (566), not being surrounded by their classmates (561), and not physically seeing faculty members (409).
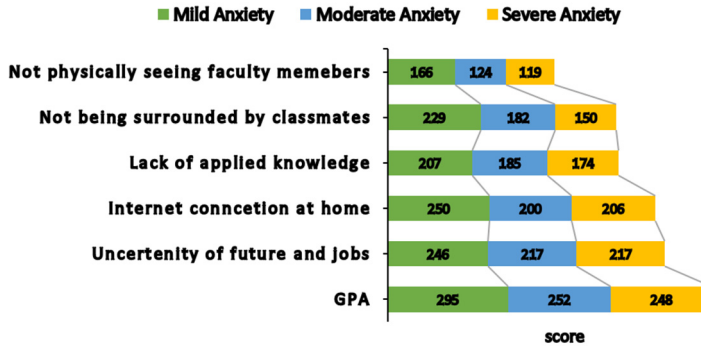

Figure 3: Identified academic stressors reported by pharmacy students at King Abdulaziz University, Jeddah, KSA during COVID-19 pandemic (n=221).

3.4 Identified academic motivators for pharmacy student's with anxiety

Figure 4 shows identified academic motivators in relation to student anxiety level. Students who had normal GAD-7 score were similarly excluded (n=221). Here, the bar-graph lists six motivators to academic development where students with different levels of anxiety select a range from 1 (not important at all) to 5 (very important). The total score for each motivator is then divided into three columns to reflect on each student's anxiety level (mild, moderate and severe).

A cut off score of 663 for each motivator was selected to be identified as "important", 884 for "fairly important" and 1105 for "very important". Hence, course coordination/organization was the most important factor (786), followed by virtual learning (763), the continuum of education (755), summative-graded-assessment (724), and academic mentorship (664). The least important factor for academic development was formative-ungraded-assessment (610).
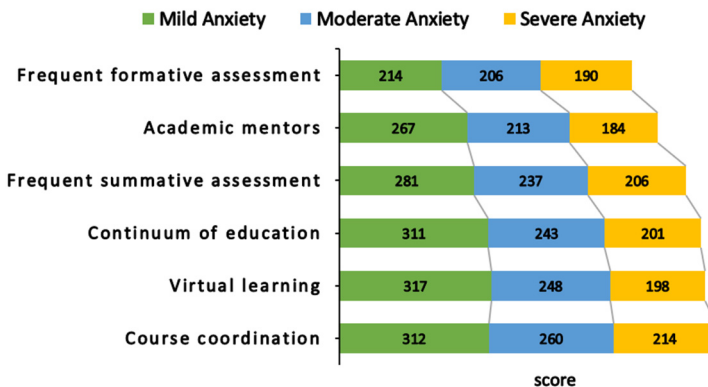

Figure 4: Identified academic motivators reported by pharmacy students at King Abdulaziz University, Jeddah, KSA during COVID-19 pandemic (n=221).

4. Discussion

Since the beginning of COVID-19, limited studies were published on this disease and its effect on mental health. Studies have suggested that public health emergencies can have many psychological effects on college students, including anxiety and depression (Cao et al., 2020). COVID-19 pandemic is probably the most challenging threat to national health in the last few decades. Students, in particular, were significantly impacted due to the immediate suspension of schools/universities due to lockdown and disruption of routine (Cao et al., 2020). While distressing their overall psychological health, this situation can also adversely affect the whole learning process (Ahmed et al., 2020). The previous pandemic MERS-CoV in 2014 was associated with tremendous public anxiety in affected countries. Moreover, research had shown a high grade of psychological stress in students within the medical field during an outbreak, despite having less contact with patients (Al-Rabiaah et al., 2020; Khalid et al., 2016; Loh et al., 2006; Wong et al., 2004)**.**

To our knowledge, this study was the first to investigate the immediate impact of COVID-19 pandemic on the mental health of pharmacy students and further explore stressors and motivators to their academic development in Jeddah, Saudi Arabia. Although this study was done while the pandemic is not over yet, it is vital to investigate anxiety and depression level in students who are affected by the shift of physical to virtual learning. Psychological effects of an outbreak on students require thorough studying. It is essential to mitigate these effects actively in any unfortunate future events, especially if such distress may affect the student overall academic development (Sahu & P, 2020).

The Saudi government and authorities represented by the Ministry of Education and Ministry of Health, have taken many strict measures to avoid the spread of COVID-19 pandemic. These included self-isolation, lockdown and closing of all schools and universities across the country. Many countries did not pursue continuum of education; however, the Ministry of Education in Saudi Arabia saw the importance of not disrupting the learning process by using virtual tools that are available to all national universities including KAU (Education, n.d.). An extensive training program by KAU was given for faculty members to assure that everyone is well trained on the virtual Blackboard system. On the other hand, all this may have caused stress for students as it is known that in the absence of interpersonal communication, anxiety disorders are more likely to occur or worsen (Cao et al., 2020). The aim of this study was, therefore, to evaluate the psychological impact of COVID-19 pandemic on pharmacy students during the continuum of education.

This study used two validated screening tools for anxiety and depression. The GAD-7 was used for anxiety disorder, as reported previously by Cao *et al.* (2020) in China. The current study indicated that 73% of pharmacy students had anxiety due to COVID-19 outbreak where the majority of students had the mild form (41%) followed by moderate (22%) and severe (19%) forms. These results differed significantly from the Chinese study; where only 24.9% of college students had anxiety with 0.9% experiencing the severe form (Cao et al., 2020). Results also showed that half surveyed students (49.5%) had a positive PHQ-2, suggesting that some of these students could be depressed and require further assessment via administration of PHQ-9 for depression diagnosis.

The different results between China and Saudi Arabia may be due to the fact that first of all, the Chinese study was done when COVID-19 was an epidemic and not a pandemic. It is possible that the word "pandemic" and the international panic it caused resulted in such spike in results. Secondly, the timeline at which the current study was conducted, which was 1–2 weeks before the final virtual exams. Thirdly, the Chinese study looked at college students in general, and it is explained in some studies that medical health students are more prone to stress than others (Cao et al., 2020).

Consistent with previous studies in the literature, there was no significant gender difference in reported anxiety among pharmacy students during the current pandemic (Bergeron & Sanchez, 2005; Wong et al., 2004). Whereas, statistical significance was seen with anxiety levels and students who lived alone (P <0.001) compared to those living with their parents. This might be due to the added responsibility, domestic conflict and lack of overall economic and moral support. Another statistical

significance was seen with students who were previously diagnosed with anxiety and depression. These students were more prone to report higher stress levels compared to students with no mental health disease (P<0.001). Despite that this was expected, these students have more risk of deterioration, and continuous follow up should be emphasized on them. This study also demonstrated significantly higher stress levels in 4th academic year students compared to others (P<0.001).

Next, the possible stressors and motivators that would affect the academic development of pharmacy students who experienced anxiety were studied. Stressors and motivators were based on literature review (Laws & Fiedler, 2012). Most significant stressor for students was the effect of virtual learning on their overall GPA, followed by the uncertainty of jobs and future, and the unsteady internet connection. All these were considered stressful, fairly stressful and very stressful. Other factors considered slightly stressful or not stressful included lack of applied knowledge and not physically seeing or interacting with their teachers and classmates. These findings suggest either the preparedness of students for virtual learning or their high adaptability to the current situation. Faculty members can now give virtual lectures and test students using Blackboard and other technologies. Virtual labs, objective structured clinical examination (OSCE) and other assessment tools should be investigated for future implications along with their outcomes in academic development compared to traditional assessment methods.

Finally, students with mild, moderate and severe anxiety have considered all listed factors important, fairly important and very important, except for one; which was formative assessment. Formative assessment is an assessment method used by faculty members to assess student's development by implementing exams or home-works that are not graded. Although they may seem not relevant to students, these assessment tools help faculty members determine student's understanding and grasping to a specific topic or course. The most important academic factors for pharmacy students were course coordination and organization, followed by virtual learning, the continuum of education, summative-graded-evaluation, and academic mentors. These factors, therefore, might have helped to reduce the stressful impact of the COVID-19 pandemic on the continuation of education.

4.1 Recommendations

With the high percentage of students having anxiety and a positive PHQ-2 response, it is highly recommended to periodically assess the mental health status of students during the pandemic and after it not to affect their academic development. Moreover, the role of academic mentors during these times is vital. Due to the nature and anonymity of study respondents, it was not possible to reach out to students who were deemed anxious or were positive for PHQ-2. However, the university's protocol mandated all mentors to follow up with their mentees and further assess if they needed any help, including mental health support. Additionally, a mental health campaign was initiated on the university's official Twitter account. Students were all asked to contact their academic mentors if they had any symptoms for anxiety or depression. This step was simple yet essential to reach out to these students.

5. Conclusion

In conclusion, half pharmacy students were PHQ-2 positive and maybe showing symptoms of depression, and over 70% had anxiety. Significant predictors in this model were for students living alone and had a history of mental illness. The primary stressor for students with anxiety was their overall GPA, and the least important factor for academic development was formative assessment. Grades seemed the main caliber setting for their anxiety. We recommend universities and the ministry of education to address all students' psychological needs more often in the future, especially during a crisis like this pandemic and look into the possibility of having a Pass/Fail outcome rather than a grade-based GPA.

References

Ahmed, H., Allaf, M., & Elghazaly, H. (2020). COVID-19 and medical education. *The Lancet Infectious Diseases*, *0*(0). https://doi.org/10.1016/S1473-3099(20)30226-7

Al-Rabiaah, A., Temsah, M.-H., Al-Eyadhy, A. A., Hasan, G. M., Al-Zamil, F., Al-Subaie, S., Alsohime, F., Jamal, A., Alhaboob, A., Al-Saadi, B., & Somily, A. M. (2020). Middle East Respiratory Syndrome-Corona Virus (MERS-CoV) associated stress among medical students at a university teaching hospital in Saudi Arabia. *Journal of Infection and Public Health*. https://doi.org/10.1016/j.jiph.2020.01.005

Barry, M., Ghonem, L., Alsharidi, A., Alanazi, A., Alotaibi, N., Al-Shahrani, F., Majid, F., & BaHammam, A. (2020). Coronavirus disease-2019 pandemic in the Kingdom of Saudi Arabia: Mitigation measures and hospital preparedness. *Journal of Nature and Science of Medicine*, *0*(0), 0. https://doi.org/10.4103/JNSM.JNSM_29_20

Bergeron, S. L., & Sanchez, A. L. (2005). Media effects on students during SARS outbreak. *Emerging Infectious Diseases*, *11*(5), 732–734. https://doi.org/10.3201/eid1105.040512

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research*, *287*, 112934. https://doi.org/10.1016/j.psychres.2020.112934

Coronavirus. (n.d.). Retrieved May 19, 2020, from https://www.who.int/emergencies/diseases/novel-coronavirus-2019

Duan, L., & Zhu, G. (2020). Psychological interventions for people affected by the COVID-19 epidemic. *The Lancet Psychiatry*, *7*(4), 300–302. https://doi.org/10.1016/S2215-0366(20)30073-0

Education, M. of. (n.d.). المملكة العربية السعودية—وزارة التعليم Retrieved May 19, 2020, from https://www.moe.gov.sa:443/en/Pages/default.aspx

https://plus.google.com/+UNESCO. (2020, March 4). *COVID-19 Educational Disruption and Response*. UNESCO. https://en.unesco.org/covid19/educationresponse

Khalid, I., Khalid, T. J., Qabajah, M. R., Barnard, A. G., & Qushmaq, I. A. (2016). Healthcare Workers Emotions, Perceived Stressors and Coping Strategies During a MERS-CoV Outbreak. *Clinical Medicine & Research*, *14*(1), 7–14. https://doi.org/10.3121/cmr.2016.1303

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2003). The Patient Health Questionnaire-2: Validity of a two-item depression screener. *Medical Care*, *41*(11), 1284–1292. https://doi.org/10.1097/01.MLR.0000093487.78664.3C

Laws, T. A., & Fiedler, B. A. (2012). Universities' expectations of pastoral care: Trends, stressors, resource gaps and support needs for teaching staff. *Nurse Education Today*, *32*(7), 796–802. https://doi.org/10.1016/j.nedt.2012.04.024

Lee, J. (2020). Mental health effects of school closures during COVID-19. *The Lancet Child & Adolescent Health*, *0*(0). https://doi.org/10.1016/S2352-4642(20)30109-7

Loh, L.-C., Ali, A. M., Ang, T.-H., & Chelliah, A. (2006). Impact of a Spreading Epidemic on Medical Students. *The Malaysian Journal of Medical Sciences : MJMS*, *13*(2), 30–36.

Lu, H., Stratton, C. W., & Tang, Y.-W. (2020). Outbreak of pneumonia of unknown etiology in Wuhan, China: The mystery and the miracle. *Journal of Medical Virology*, *92*(4), 401–402. https://doi.org/10.1002/jmv.25678

Rutter, L. A., & Brown, T. A. (2017). Psychometric Properties of the Generalized Anxiety Disorder Scale-7 (GAD-7) in Outpatients with Anxiety and Mood Disorders. *Journal of Psychopathology and Behavioral Assessment*, *39*(1), 140–146. https://doi.org/10.1007/s10862-016-9571-9

Sahu, P., & P, S. (2020). Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff. *Cureus Journal of Medical Science*, *12*(4). https://doi.org/10.7759/cureus.7541

Wang, D., Hu, B., Hu, C., Zhu, F., Liu, X., Zhang, J., Wang, B., Xiang, H., Cheng, Z., Xiong, Y., Zhao, Y., Li, Y., Wang, X., & Peng, Z. (2020). Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected Pneumonia in Wuhan, China. *JAMA*, *323*(11), 1061–1069. https://doi.org/10.1001/jama.2020.1585

Wong, J. G. W. S., Cheung, E. P. T., Cheung, V., Cheung, C., Chan, M. T. Y., Chua, S. E., McAlonan, G. M., Tsang, K. W. T., & Ip, M. S. M. (2004). Psychological responses to the SARS outbreak in healthcare students in Hong Kong. *Medical Teacher*, *26*(7), 657–659. https://doi.org/10.1080/01421590400006572

Xiao, C. (2020). A Novel Approach of Consultation on 2019 Novel Coronavirus (COVID-19)-Related Psychological and Mental Problems: Structured Letter Therapy. *Psychiatry Investigation*, *17*(2), 175–176. https://doi.org/10.30773/pi.2020.0047