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The impact of quarantine and isolation during COVID-19 lockdown on the mental health of affected students at the University of Limpopo, South Africa

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ABSTRACT

Background

The COVID-19 pandemic has caused widespread problems with the general psychological state, including signs of depression and anxiety among the population. Although the COVID-19 effects on the general community have been widely documented, little is known about the psychological disorders of students who went through quarantine and isolation within the institutions of higher learning in South Africa. To close this gap, this study assessed the impact of quarantine and isolation during COVID-19 on the mental health of affected students at the University of Limpopo.

Methods

A cross-sectional descriptive research design was adopted. Purposive sampling was employed to select students (N=424) that were in quarantine and isolation between July 2020 to December 2021. Depression Anxiety Stress Scale was used. Data was collected through an online (anonymous), self-administered survey.

Results

A total of 167 students completed the survey. The proportion of students who reported moderate to severe symptoms of anxiety, depression, and stress was 78%, 60.3%, and 33.8%, respectively. The study found that COVID-19 pandemic caused an unparalleled harm to students' mental health while they were in quarantine and/or isolation.

Conclusion

The overall impact at the end of the lockdown as highlighted in this study included mental health issues of depression, anxiety and stress for the students. Such impact may require follow-ups in order to assist the students to readjust to the new normal of use of multimodal methods of teaching and learning. There is a need for institutional awareness to assist those who are affected to adapt academically. Further research is needed to tap into students' levels of trauma and also their coping skills to be able to make relevant adjusted assistance for the progress in their careers.

Key-words: Mental health, COVID-19, Quarantine, Isolation, Depression, Anxiety, Stress, Students.

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INTRODUCTION

The COVID-19 pandemic is a global public health issue that endangers people's physical and mental wellbeing.[1] Not only has the pandemic increased the likelihood of viral infection-related deaths, but it has also caused widespread issues with the general psychological state, including signs of anxiety and depression among different communities.[2,3]

In the pre-pandemic period, more than one third of students reported having some type of mental health condition, indicating that mental health concerns are prevalent among students.[4] Despite being a socially privileged group, students have a higher risk of depression than the overall population, even during the pre-academic phase.[5] During the COVID-19 pandemic, young individuals were found to be more susceptible to mental health problems.[6] According to research, university students in particular had increased anxiety and depression as a result of the psychological strain brought on by the pandemic and the quarantine.[7,8] According to different studies[7,9], substantial incidence rates of depressive and anxiety symptoms were observed following the outbreak of COVID-19. Indicators of mental health, such as depression, anxiety, and stress, are vital for the community at large and university students in particular.[10] In addition, university students frequently experience physical, psychological, social, and intellectual pressures that raise their risk and susceptibility to psychological distress such as depression, anxiety, and stress.[11] Even though psychological symptoms were widely documented since the outbreak of COVID-19, few research have specifically addressed depression, anxiety, and stress among university students.[12,13,14] According to earlier research[12,15], the outbreak of COVID-19 caused post-traumatic stress disorder, as well as fear, anger, nervousness, sadness, and psychological disorders among the university students.

Students have been demonstrated to have higher incidence of mental health problems than the general community even before the outbreak of COVID-19.[16,17] Academic pressure, disagreements over work-life balance, peer competitiveness, financial difficulties, family obligations, and exposure to human suffering are some of the identified sources of stress for students.[18] According to lessons learned from various studies[19,20], infectious disease outbreaks like those caused by the Ebola virus, Middle East Respiratory Syndrome (MERS), severe acute respiratory syndrome (SARS), and COVID-19 can result in mental health challenges. Wong et al.[21] corroborate with the above findings by indicating that students experience heightened stress during pandemics like the SARS outbreak in China, underscoring the need for additional care for this population during public health crises. Additionally, findings from studies[22,23] demonstrates that SARS and the Ebola virus disease and increased the risk of depression among different communities.

According to the literature, alterations in lifestyle and students' perceptions of the risk of contracting COVID may raise their risk of anxiety and depression.[24] If such issues are not resolved by appropriate psychological interventions throughout adolescence, they frequently continue into adulthood and increase the risk of developing new mental health issues and illnesses.[25] Several nations used isolation and quarantine measures during the COVID-19 outbreak to keep their citizens under control and slow the outbreak's spread.[14,15,26,27] However, in implementing them, the least restrictive and intrusive means must be used and should legally and ethically be justifiable under certain circumstance.[28,29] In South Africa, the Minister of Higher Education, Science, and Innovation, enacted regulations under the Disaster Management Act on June 8, 2020, which were published in the Government Gazette No. 43414.[30] Institutions have started implementing their return-student plans into practice as of July 2020 in accordance with their campus preparedness plans. To contain the virus, the University of Limpopo like other institutions of higher learning, started implementing disaster response measures, including the establishment of quarantine and isolation sites for COVID-19 suspects and for students who test positive.[31]

Objective of the study

To assess the psychological impact of quarantine and isolation during COVID-19 on the mental health of affected students at the University of Limpopo.

METHODOLOGY

Study design & setting

A cross sectional study design was adopted to assess the impact of quarantine and isolation

during COVID-19 on the mental health of affected students. A cross-sectional descriptive method was chosen because it is easier to manage, quicker, and more affordable.[32] The study was conducted at the University of Limpopo, situated in Polokwane under Capricorn District municipality of Limpopo Province in South Africa. The University of Limpopo had one designated quarantine site with bed occupancy of 24 and four isolation sites with a bed capacity of 28 to monitor those students who needed to be quarantined or isolated during the COVID-19 outbreak. The other quarantine centres consisted of normal students' residence for students who had to go into forced quarantine as part of the requirements by the department of health as these were medical students who were recalled back to campus to assist with the pandemic whilst doing their clinical practice in the hospital.

Population, sampling, and sample size

The population of this study consisted of students who underwent quarantine and isolation from 1st of July 2020 to December 2021. In accordance with the University of Limpopo COVID-19 database, 424 students were quarantined during the mentioned period and 48 of the 424 students were isolated. All quarantined and isolated students were considered for participation regardless of their gender, age, faculty, degree enrolled for, or the level of study. Therefore, probability sampling technique was used which highlights the fact that every student had an equal likelihood of being selected to participate in the study. The Yamane's statistical formula[33] was used to determine the desired sample size. Therefore, the sample size based on Yamane's formula was 206 students. Students who were quarantined and isolated and gave consent (through the link) were included in the study. Students who were quarantined or isolated at home or facilities outside the University of Limpopo's designated sites were excluded from the study.

Data collection and analysis

Data was collected from October 2021 to December 2021 after ethical approval. During this period, a fourth wave of COVID-19 infections was occurring in South Africa. Collection of data was through an online (anonymous), self-administered survey. The potential study respondents were invited through an e-mail (student Keyaka e-mail). The respondents were automatically redirected to the section detailing the study's goal after opening the provided link. The survey was available for all participants to complete at their own convenience utilizing personal devices like computers or smartphones. The link allowed the respondents the opportunity to participate or opt out. Respondents who opted out were redirected to a custom ending point. Alternatively, respondents who consent to participate were redirected to the section A of the survey which collected the demographic details. After completion of the demographic details, a set of several questions appeared sequentially, which the respondents had to answer. The online survey remained open for three months, with a reminder e-mail send every month after its inception. After closing the survey, the data was downloaded and captured in a Microsoft Excel™ spread sheet.

The Depression Anxiety Stress Scale (DASS-21) was adopted to measure the students' levels of depression, anxiety, and stress.. It has three components of stress, anxiety, and depression, and stress, each one with seven questions. The scale comprises 21 questions, each of which is self-rated at a 4-point Likert scale with a range of 0 (did not apply to me at all) to 3 (applied to me very much or most of the time). The total score was calculated by multiplying the subscale scores of each individual item by two. The depression subscale consisted of seven questions. Therefore, the overall depression subscale rating is split into the following categories: normal (0-9), followed by mild depression (10-12), then moderate depression with a range of 13-20, severe depression (21-27), and lastly, extremely severe depression (28-42). The overall anxiety score was classified into the following categories: normal (0-6), mild (7-9), moderate (10-14), severe (15-19), and extremely severe anxiety (20-42). There were five categories for the total stress subscale score: normal (0-10), mild (11-18), moderate (19-26), severe (27-34), and extremely severe (35-42).

Data was captured and collated using a Microsoft Excel™ spreadsheet and analysed using Social Packages for the Social Sciences (SPSS) version 25. The descriptive statistics were used to present demographic information and the relationship

between subscales was assessed using Fisher exact test. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

The Turfloop Research and Ethics Committee reviewed and approved the study (TREC/200/2021: IR). Contact information for psychosocial support was made available for students who were encountering emotional discomfort as a result of COVID-19.

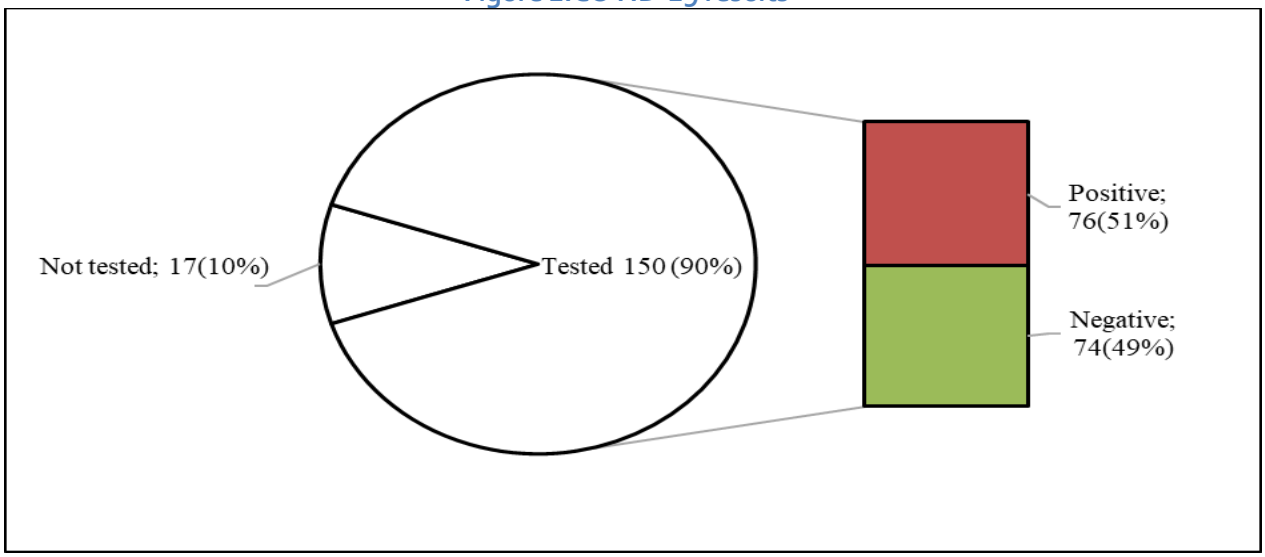
RESULTS

A total of 180 students participated in the study of which 167 consented to participate in the survey. Thirteen students refused to consent and were excluded from the study. Most 65(39%) of the participants were in Health Sciences of which 40(62%) were in the School of Healthcare Science and only 25(38%) were in the School of Medicine. Slightly more than half 89(53%) of the participants were females and 95(57%) were in the age group 20-30 years. More than two-thirds 149(89%) were undergraduate students. **Table 1** shows a detailed description of the demographic characteristics of the study participants.

Table 1: The demographic information of the participants n=167

	Number	%
Faculty		
Health Sciences	65	39
Humanities	51	31
Management and Law	24	14
Science and Agriculture	27	16
Gender		
Male	78	47
Female	89	53
Age		
≤20	65	39
21-30	95	57
>30	7	4
Level of study		
Undergraduate	149	89
Hon Degree	7	4
Master/Doctoral	11	7

Figure 1:COVID-19 results



Hundred and fifty (90%) participants were tested for COVID-19 of which 76(51%) tested positive and 74(49%) tested negative (Figure 1). Of those who tested positive (n=76), 63(83%) said they were the only person in the family who tested positive for COVID-19. Seventeen participants were not tested as they were asymptomatic and therefore they did not qualify to be tested as per COVID-19 guidelines.

The most common reasons mentioned by the study participants (n=167) for quarantine were presented with symptoms (55%) and contact with a confirmed COVID-19 case (35%). Few (10%) participants said that they were quarantined for precautionary measures.

As shown in Table 2, a significantly higher proportion of the participants not tested for COVID-19 said that they were quarantined for precautionary measures, whereas a greater proportion of those who tested negative were quarantined because they were in contact with a confirmed COVID-19 case (p<0.05).

Table 2: Reason for Quarantine and Lost family member by COVID-19 status

	COVID-19 results			p-value
	Negative, n=74 (%)	Positive, n=76 (%)	Not Tested, n=17 (%)	
Reason for Quarantine				
Contact of a confirmed COVID-19 case	41(56)	18(24)	-	<0.001
Presented with symptoms	32(43)	58(76)	1(6)	
Quarantined for precautionary measures	1(1)	-	16(94)	
Lost family member				
Yes	15(20)	15(20)	4(24)	0.091
No	53(72)	61(80)	13(76)	
Unspecified	6(8)	-	-	

Overall, only 34 (20%) of the study participants said that they lost their family member due to COVID-19. There was no statistically significant relationship between COVID-19 status and the loss of a family member (p>0.05), however, a greater proportion of those not tested had lost a family member as compared to the other groups. As illustrated in Figure 2, the percentage of the study participants who had mild to extremely severe symptoms of anxiety, depression, and stress were 70%, 54%, and 51%, respectively.

Figure 2: Prevalence of Depressive, Anxiety and Stress Symptoms

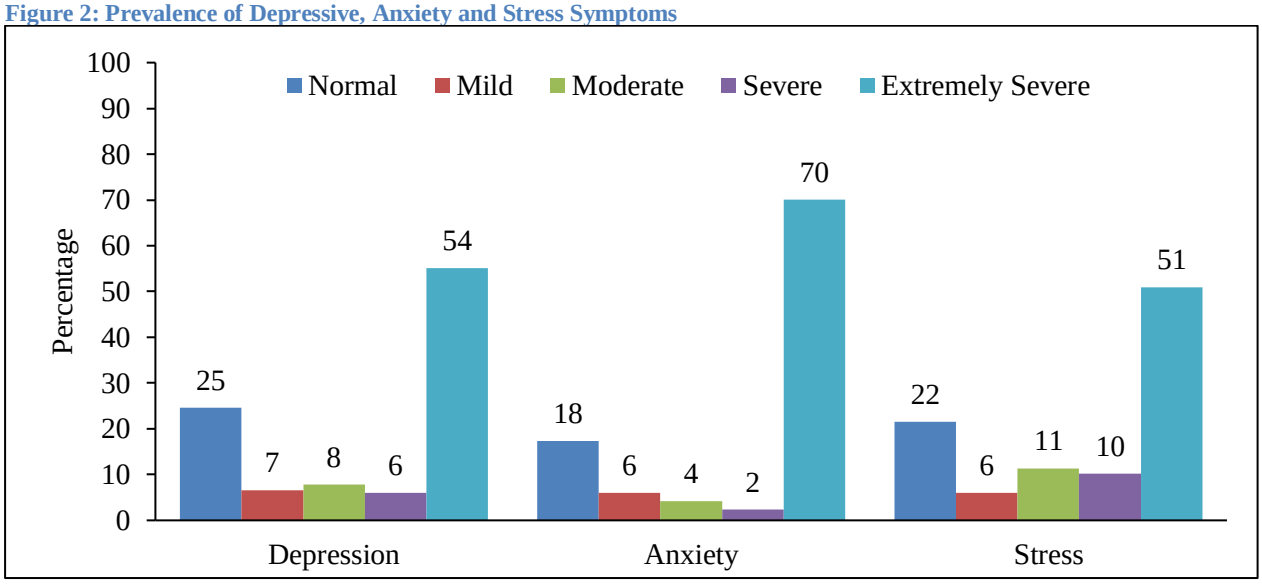


Table 3: Relationship between age, gender, faculty, level of education and depression

Characteristics	n	Depressive symptoms					p-value
		Normal	Mild	Moderate	Severe	Extremely Severe	
Age group							
≤20 years	65	11	3	4	4	43	0.453
20-30 years	95	28	8	8	5	46	
> 30 years	7	2	0	1	1	3	
Gender							0.497
Male	78	23	4	5	6	40	
Female	89	18	7	8	4	52	
Level of study							
Undergraduate	149	37	8	11	10	83	0.308
Hon Degree	7	1	2	0	0	4	
Master/Doctoral	11	3	1	2	0	5	
Faculty							
Health Sciences	65	24	2	8	4	27	0.049
Humanities	51	9	6	2	5	29	
Management/Law	24	3	1	1	1	18	
Science/Agriculture	27	5	2	2	0	18	

Table 3 shows that extremely severe depressive symptoms were significantly more common among the study participants in the faculty of Management and Law than in the other faculties (p=0.049). The results of the study revealed no significant relationship between gender, age, level of study, and depressive symptoms, but students of the female gender, those aged less than 20 years, and undergraduate and honours degrees were likely to experience extremely severe depressive symptoms.

Table 4: Relationship between age, gender, faculty, level of education and anxiety

Characteristics	n	Anxiety symptoms					p-value
		Normal	Mild	Moderate	Severe	Extremely Severe	
Age group							
≤20 years	65	9	2	3	2	49	0.796
20-30 years	95	19	8	4	2	62	
> 30 years	7	1	0	0	0	6	
Gender							0.386
Male	78	15	2	3	1	57	
Female	89	14	8	4	3	60	
Level of study							
Undergraduate	149	24	8	6	4	107	0.190
Hon Degree	7	1	2	0	0	4	
Master/Doctoral	11	4	0	1	0	6	
Faculty							
Health Sciences	65	15	7	3	3	37	0.248
Humanities	51	6	2	3	0	40	
Management/Law	24	3	0	0	0	21	
Science/Agriculture	27	5	1	1	1	19	

As shown in Table 4, there was no statistically significant association between faculty, gender, age, level of study, and anxiety symptoms, however, those in the faculty of Management and Law, male gender, aged older than 30 years, and undergraduate were likely to experience extreme anxiety symptoms.

Table 5: Relationship between age, gender, faculty, level of education and stress

Characteristics	n	Stress symptoms					p-value
		Normal	Mild	Moderate	Severe	Extremely Severe	
Age group							
≤20 years	65	10	1	12	6	36	0.041
20-30 years	95	25	9	5	11	45	
> 30 years	7	1	0	2	0	4	
Gender							0.161
Male	78	22	4	5	7	40	
Female	89	14	6	14	10	45	
Level of study							
Undergraduate	149	32	8	17	16	76	0.905
Hon Degree	7	2	1	0	0	4	
Master/Doctoral	11	2	1	2	1	5	
Faculty							

Health Sciences	65	19	6	9	9	22	0.098
Humanities	51	10	3	4	6	28	
Management/Law	24	3	1	2	0	18	
Science/Agriculture	27	4	0	4	2	17	

Table 5 shows that a significantly higher proportion of those aged ≤30 years and >30 years were likely to have extremely severe stress than those aged between 21 and 30 years (p=0.041). Again, the study participants in the faculty of Management and Law experienced more extreme stress symptoms than their counterparts in other faculties but the result was not statistically significant (p>0.05).

DISCUSSION

This study focused on students who were quarantined and isolated during the COVID-19 pandemic at the University of Limpopo. In order to comprehend their situation, we assessed the impact of COVID-19 during their quarantine and isolation periods and determined the prevalence of depression, anxiety and stress amongst them. Students at universities make up a population that is believed to be more susceptible to mental health issues.[37,38] The results of our study thus highlight the impact of pandemic-related challenges on student's mental health during the mentioned period. The demographic distribution of the participants reflects that most of the participants were in faculty of Health Sciences 65(39%) followed by faculty of Humanities with 51(39%). However, no significant association was observed between faculty, anxiety (p=0.248) and stress (p=0.098). Previous research[9,39] has demonstrated that the impact of COVID-19 on students from different disciplines is particularly challenging because of the perceived impact of the virus on their educational pursuits. The impact on the students varies by faculty as well as levels of study. These differences could be related to the different demands put on the students at the different levels of study or within the faculties. The extremely severe depressive symptoms were significantly more common in the participants in Management and Law than in the other faculties (p=0.049). No significant association was observed between faculty, anxiety (p=0.248) and stress (p=0.098). Our findings are consistent and comparable to those of previous studies which employed DASS-21 questionnaires [35,36]. Numerous studies have examined the prevalence of anxiety among students in various academic years, but their results haven't always been consistent.[40,41]

It would have been expected that more anxiety would be found among the medical students who had to come back early in the lockdown in line with the request by the education minister that the final year medical students could be utilised to add on the much-needed human resources as they could assist with the medical intervention in the wards at their training hospitals. The results indicated that there was less anxiety, depression and stress among that group as compared to the other schools in the different faculties. The reasons for such differences could be perhaps that the students in this faculty are involved in working with patients in the hospitals as part of their training but more research could be done to find out the cause for such a group. The faculty of management and law had the highest number of students affected and less in the other faculties. In comparison to management and law students, medical students may have benefited from having better access to both formal and informal psychosocial help, support networks with healthcare professionals and other medical students, and from receiving more first-hand medical data about the outbreak. Our findings are in line with those of earlier pandemic research studies. For instance, Chinese investigations[42] found that medical students had greater psychological wellness throughout the pandemic than non-medical students did. Contrary to our findings, other researchers found that at the beginning of the COVID-19 outbreak, French health sciences students had significant rates of self-reported psychological disorders and a low quality of life linked to their mental health[43].

With regards to gender, females were found having extremely severe depressive symptoms than males, whereas males presented with extremely severe anxiety symptoms compared to females. This could be in line with literature that highlights that females are more open to talk about their problems and males less so. That could be a trend for male not being very upfront with the expression of mental states as it

is taken as been weakness. This could require more in-depth work to assist all the genders as needed. Similar to our findings[44], discovered that females engage in more in-depth conversation because they are more willing to communicate their issues and stress. They also discovered that females had more social connections, more places to turn for help, and higher levels of friend satisfaction than males. This outcome is consistent with earlier study that suggested that women appeared to have more mental discomfort than men, such as those conducted in Alexandria and Egypt, where females were nearly twice as likely to experience depressive symptoms as men.[45]

n this study, there was no statistically significant association between depressive (p=0.308), anxiety (p=0.190) and stress (p=0.905) and level of education but extremely severe symptoms decrease as the level of study increases. The reason for this could be perhaps students in the higher study level had more knowledge of COVID-19 and better coping strategies as compared to those in the lower level. This commensurate with a study by Atta and Almilaibary[46] who found no connection between the level of study and stress levels. On the other hand, Alshehri et al.[47] discovered that students in the first year had higher levels of depression and anxiety symptoms than fifth-year students, and that the distinction was particularly significant for depressive symptoms. Again, there was no significant relationship between age, depressive (p=0.453) and anxiety symptoms (p=0.796) but those aged ≤20 years were found to have extremely severe depressive symptoms, while those aged >30 years had extremely severe anxiety symptoms. In our study, a significant proportion of those aged ≤30 years and >30 years were likely to having extremely severe stress than those aged between 21 and 30 years (p=0.041), which supports the theoretical arguments that young students who are undergoing significant developmental stages while also dealing with academic study pressures are disproportionately vulnerable to psychological distress[48].

Limitations and strengths

The results of this study should be cautiously extrapolated as there are both weaknesses and strengths in the data. The results cannot be generalized to other universities because it was limited to the University of Limpopo. Responses were anonymous to uphold the university's confidentiality policy, therefore the researchers had to rely only on monthly email reminders. As a result, low response rates could possibly be attributed to the fact that invitation to participate was done via students' email and students might have seen the emails after the closing date. Nevertheless, despite all these limitations, this study offers essential baseline data that will guide future investigations and initiatives for public health within this field. The inclusion of university students from all the institution's faculties provides strong evidence about the impact of isolation and quarantine during the COVID-19 lockdown on the mental health of students. The scale employed in this investigation has been validated in numerous studies involving students[49]. Although it is not intended for diagnostic use, its usage may help to understand how many students may eventually develop mental problems.

conclusion and recommendations

The COVID-19 pandemic caused an unparalleled harm to students' mental health while they were in quarantine and/or isolation. Such impact may require follow-ups to assist the students with their mental health needs as they also require to change their old ways of class attendance and learning which is also an additional stressor during the academic processes. Coping with impact on mental health should be prioritised especially in assisting the students to readjust to the new normal and the new normal of use of multimodal methods of teaching and learning. There is a need for institutional awareness to assist those who are affected to adapt academically.

Future work includes focus on grief issues since that was a huge part of the challenges during lockdown and the pandemic. Further research is needed to tap into students' levels of trauma and their coping skills to be able to make relevant adjusted assistance for the progress in their careers. The same applies to how the pandemic affected lecturers and the healthcare professionals who provided the assistance to the students whilst in quarantine as all that could have exposed them to compassion fatigue and vicarious trauma of their patients.

REFERENCES

1. Halperin SJ, Henderson MN, Prenner S, Grauer JN. Prevalence of Anxiety and Depression Among Medical Students During the Covid-19 Pandemic: A Cross-Sectional Study. Journal of Medical Education and Curricular Development. 2021 Feb 15;8:1-7.
2. Huang Y, Zhao N. Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. Psychiatry Research . 2020 Jun;288:1-6.
3. Elbay RY, Kurtulmuş A, Arpacıoğlu S, Karadere E. Depression, anxiety, stress levels of physicians and associated factors in Covid-19 pandemics. Psychiatry Research. 2020 Aug;290:1-6.
4. Zivin K, Eisenberg D, Gollust SE, Golberstein E. Persistence of mental health problems and needs in a college student population. Journal of Affective Disorders. 2009 Oct;117(3):180-185..
5. Lim GY, Tam WW, Lu Y, Ho CS, Zhang MW, Ho RC. Prevalence of Depression in the Community from 30 Countries between 1994 and 2014. Scientific Report. 2018 Feb 12;8(1):2861.
6. Elmer T, Mepham K, Stadtfeld C. Students under lockdown: Comparisons of students' social networks and mental health before and during the COVID-19 crisis in Switzerland. PLoS One. 2020 Jul 23;15(7):1-22.
7. Peng M, Mo B, Liu Y, Xu M, Song X, Liu L, Fang Y, Guo T, Ye J, Yu Z, Deng Q, Zhang X. Prevalence, risk factors and clinical correlates of depression in quarantined population during the COVID-19 outbreak. Journal of Affective Disorders. 2020 Oct 1;275:119-124.
8. Zhang K, Wu S, Xu Y, Cao W, Goetz T, Parks-Stamm EJ. Adaptability Promotes Student Engagement Under COVID-19: The Multiple Mediating Effects of Academic Emotion. Frontiers in Psychology. 2021 Jan 6;11:1-8.
9. Xiong P, Ming WK, Zhang C, Bai J, Luo C, Cao W, Zhang F, Tao Q. Factors Influencing Mental Health Among Chinese Medical and Non-medical Students in the Early Stage of the COVID-19 Pandemic. Frontiers in Public Health. 2021 May 20;9:1-9.
10. Tee M, Wang C, Tee C, Pan R, Reyes PW, Wan X, Anlacan J, Tan Y, Xu L, Harijanto C, Kuruchittham V, Ho C, Ho R. Impact of the COVID-19 Pandemic on Physical and Mental Health in Lower and Upper Middle-Income Asian Countries: A Comparison Between the Philippines and China. Frontiers in Psychiatry. 2021 Feb 9;11:1-15.
11. Hamaideh SH, Al-Modallal H, Tanash M, Hamdan-Mansour A. Depression, anxiety and stress among undergraduate students during COVID-19 outbreak and "home-quarantine". Nursing Open. 2022 Mar;9(2):1423-1431.
12. Liu N, Zhang F, Wei C, Jia Y, Shang Z, Sun L, Wu L, Sun Z, Zhou Y, Wang Y, Liu W. Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. Psychiatry Research. 2020 May;287:1-7.
13. Zheng W. Mental health and a novel coronavirus (2019-nCoV) in China. Journal of Affective Disorder. 2020 May 15;269:201-202. doi: 10.1016/j.jad.2020.03.041.
14. Sahu P. Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff. Cureus. 2020 Apr 4;12(4):1-6.
15. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, Rubin GJ. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet. 2020 Mar 14;395(10227):912-920.
16. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. Academic Medicine. 2006 Apr;81(4):354-373.
17. Mousa OY, Dhamoon MS, Lander S, Dhamoon AS. The MD Blues: Under-Recognized Depression and Anxiety in Medical Trainees. PLoS One. 2016 Jun 10;11(6):1-10.
18. Hill MR, Goicochea S, Merlo LJ. In their own words: stressors facing medical students in the millennial generation. Medical Education Online. 2018 Dec;23(1):1-10.
19. Jeong H, Yim HW, Song YJ, Ki M, Min JA, Cho J, Chae JH. Mental health status of people isolated due to Middle East Respiratory Syndrome. Epidemiology and Health. 2016 Nov 5;38:1-7.
20. Lee SM, Kang WS, Cho AR, Kim T, Park JK. Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. Comprehensive Psychiatry. 2018 Nov;87:123-127.
21. Wong JG, Cheung EP, Cheung V, Cheung C, Chan MT, Chua SE, McAlonan GM, Tsang KW, Ip MS. Psychological responses to the SARS outbreak in healthcare students in Hong Kong. Medical Teacher. 2004 Nov;26(7):657-659.
22. Mak IW, Chu CM, Pan PC, Yiu MG, Chan VL. Long-term psychiatric morbidities among SARS survivors. General Hospital Psychiatry. 2009 Jul-Aug;31(4):318-326.
23. Keita MM, Taverne B, Sy Savané S, March L, Doukoure M, Sow MS, Touré A, Etard JF, Barry M, Delaporte E; PostEboGui Study Group. Depressive symptoms among survivors of Ebola virus disease in Conakry (Guinea): preliminary results of the PostEboGui cohort. BMC Psychiatry. 2017 Apr 4;17(1):1-9.
24. Xiang YT, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, Ng CH. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. Lancet Psychiatry. 2020 Mar;7(3):228-229.
25. World Health Organization. (2021, November 17). Mental health of adolescents. https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health (accessed 13 August 2023)
26. Meo SA, Abukhalaf AA, Alomar AA, Sattar K, Klonoff DC. COVID-19 Pandemic: Impact of Quarantine on Medical Students' Mental Wellbeing and Learning Behaviors. Pakistan Journal of Medical Sciences. 2020 May;36(COVID19-S4):S43-S48.
27. Singh JA. COVID-19: Mandatory institutional isolation v. voluntary home self-isolation. South African Medical Journal. 2020 Apr 23;110(6):453-455.
28. Moodley K, Obasa AE, London L. Isolation and quarantine in South Africa during COVID-19: Draconian measures or proportional response? South African Medical Journal. 2020 Apr 23;110(6):456-457.
29. Botes WM, Thaldar DW. COVID-19 and quarantine orders: A practical approach. South African Medical Journal. 2020 Apr 22;110(6):469-472.
30. South Africa. (2020). Risk-adjusted strategy for the COVID-19 pandemic for public and private higher education: Criteria for return to campuses. R652, in terms of the Disaster Management Act, 2002 (Act no 57, 2002, as amended). Government Gazette, vol.652, no. 43414, 08 June 2020.

Available From: https://www.gov.za/sites/default/files/gcis_document/202006/43414gon652.pdf (assessed 13 August 2023)
31. Masipa MD, Ramoshaba DJ, Mabasa LT, Maponyane KA, Monnye KN, Mampa S, Chuene TA, Kgarose MF, Motloutse KJ. An Assessment of Covid-19 pandemic quarantine and isolation programmes: A case study of the University of Limpopo. Journal of Student Affairs in Africa. 2022;10(2):17-30.
32. Brink H, Van der Walt C. Fundamentals of research methodology for health care professionals. Juta and Company Ltd; 2006.
33. Yamane T. Statistics, An Introductory Analysis, 1967. New York Harper and Row CO. USA. 1967;213:25.
34. National Institute for Communicable Disease. (2020, May 05). Guidelines for quarantine and isolation in relation to covid-19 exposure and infection. Available from: https://www.nicd.ac.za/wp-content/uploads/2020/05/Guidelines-for-Quarantine-and-Isolation-in-relation-to-COVID-19.pdf. (accessed 10 August 2023)
35. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, Ho RC. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. International journal of environmental research and public health. 2020 Mar;17(5):1729.
36. Shah SM, Mohammad D, Qureshi MF, Abbas MZ, Aleem S. Prevalence, psychological responses and associated correlates of depression, anxiety and stress in a global population, during the coronavirus disease (COVID-19) pandemic. Community Mental Health Journal. 2021 Jan;57:101-10.
37. Stewart-Brown S, Evans J, Patterson J, Petersen S, Doll H, Balding J, Regis D. The health of students in institutes of higher education: an important and neglected public health problem? Journal of Public Health Medicine. 2000 Dec;22(4):492-499. doi:
38. Son C, Hegde S, Smith A, Wang X, Sasangohar F. Effects of COVID-19 on college students' mental health in the United States: Interview survey study. Journal of Medical Internet Research. 2020 Sep 3;22(9):1-4.
39. Saddik B, Hussein A, Sharif-Askari FS, Kheder W, Temsah MH, Koutaich RA, Haddad ES, Al-Roub NM, Marhoon FA, Hamid Q, Halwani R. Increased Levels of Anxiety Among Medical and Non-Medical University Students During the COVID-19 Pandemic in the United Arab Emirates. Risk Management and Healthcare Policy. 2020 Nov 3;13:2395-2406.
40. Odriozola-González P, Planchuelo-Gómez Á, Irurtia MJ, de Luis-García R. Psychological effects of the COVID-19 outbreak and lockdown among students and workers of a Spanish university. Psychiatry Research. 2020 Aug;290:113108.
41. Padrón I, Fraga I, Vieitez L, Montes C, Romero E. A Study on the Psychological Wound of COVID-19 in University Students. Front Psychol. 2021 Jan 26;12:1-15.
42. Chang JJ, Ji Y, Li YH, Pan HF, Su PY. Prevalence of anxiety symptom and depressive symptom among college students during COVID-19 pandemic: A meta-analysis. Journal of Affective Disorders. 2021 Sep 1;292:242-254.
43. Leaune E, Vieux M, Marchal M, Combes C, Crandall S, Haesebaert J, Poulet E. Self-reported mental health symptoms, quality of life and coping strategies in French health sciences students during the early stage of the COVID-19 pandemic: An online survey. Encephale. 2022 Dec;48(6):607-614.
44. Guo K, Zhang X, Bai S, Minhat HS, Nazan AINM, Feng J, Li X, Luo G, Zhang X, Feng J, Li Y, Si M, Qiao Y, Ouyang J, Saliluddin S. Assessing social support impact on depression, anxiety, and stress among undergraduate students in Shaanxi province during the COVID-19 pandemic of China. PLoS One. 2021 Jul 23;16(7):1-10.
45. Abbas J, Aqeel M, Abbas J, Shaher B, A J, Sundas J, Zhang W. The moderating role of social support for marital adjustment, depression, anxiety, and stress: Evidence from Pakistani working and nonworking women. Journal of affective disorders. 2019 Feb 1;244:231-238.
46. Atta IS, Almilaibary A. The prevalence of stress among medical students studying an integrative curriculum during the COVID-19 pandemic. Advances in Medical Education and Practice. 2022 Jan 11:35-45.
47. Alshehri A, Alshehri B, Alghadir O, Basamh A, Alzeer M, Alshehri M, Nasr S. The prevalence of depressive and anxiety symptoms among first-year and fifth-year medical students during the COVID-19 pandemic: a cross-sectional study. BMC Medical Education. 2023 Jun 6;23(1):1-8.
48. Dusselier L, Dunn B, Wang Y, Shelley MC 2nd, Whalen DF. Personal, health, academic, and environmental predictors of stress for residence hall students. Journal of American College Health. 2005 Jul-Aug;54(1):15-24
49. Hernández-Yépez PJ, Muñoz-Pino CO, Ayala-Laurel V, Contreras-Carmona PJ, Inga-Berrospi F, Vera-Ponce VJ, Failoc-Rojas VE, Pereira-Victorio CJ, Valladares-Garrido MJ. Factors Associated with Anxiety, Depression, and Stress in Peruvian University Students during the COVID-19 Pandemic. International Journal of Environmental Research and Public Health. 2022 Nov 7;19(21):14591.