https://doi.org/10.35845/kmuj.2024.23472

ORIGINAL ARTICLE

Prevalence and factors associated with anxiety and depression among undergraduate nursing students amid COVID-19: a mixed-method study

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Date Submitted: September 07, 2023
Date Revised: January 10, 2024
Date Accepted: January 27, 2024

ABSTRACT

OBJECTIVES: To investigate the prevalence of anxiety and depression among undergraduate nursing students during the COVID-19 pandemic and identify associated factors.

METHODS: This study employed a concurrent mixed methodology, comprising a quantitative analytical cross-sectional web-based survey and a qualitative descriptive exploratory study using focus group discussions. The study was conducted at two university-based schools of nursing, one public and one private, in Karachi, Pakistan, from May to September 2021, during the third wave of the COVID-19 pandemic. Two questionnaires were employed: The Aga Khan University Anxiety and Depression Scale and COVID-19 related stressors.

RESULTS: Among the study participants (n=300) 74%, were female. The 76.3% individuals' age between 20 to 29 years and 97.3% were single. The study reported 51% prevalence of anxiety and depression in COVID-19 were associated with females (OR=2.56, 95% CI:1.34-4.88), hostel residents (OR=1.9, 95% CI:1.02-3.52), final year students (OR=1.36, 95% CI:1.002-1.870), e-learning (OR=1.74, 95%CI: 1.28-2.37), and those who had COVID-19 academic apprehensions and transition as future nurses (OR=1.13, 95% CI: 1.0-1.29). The qualitative analysis highlighted the theme, *the realities of students' academic life amid COVID-19*. This theme was emerged from three categories, *lack of preparedness, range of emotions and humble submissions*.

CONCLUSION: This study revealed a high prevalence (51%) of anxiety and depression among nursing students during the COVID-19 pandemic, particularly among females, hostel residents, and final-year students. Qualitative analysis highlighted challenges in academic adaptation amid COVID-19, revealing themes of lack of preparedness, a range of emotions, and humble submissions, stressing the need for targeted interventions and support systems.

KEYWORDS: COVID-19 (MeSH); Anxiety (MeSH); Depression (MeSH); Students, Nursing (MeSH); Pakistan (MeSH)

THIS ARTICLE MAY BE CITED AS: Noreen N, Karamaliani R, Ghazal L, Hasnani FB, Humera S, Abdullah M. Prevalence and factors associated with anxiety and depression among undergraduate nursing students amid COVID-19: a mixed-method study. Khyber Med Univ J 2024;16(1):52-60. https://doi.org/10.35845/kmuj.2024.23472

INTRODUCTION

The global health crisis sparked by the COVID-19 pandemic has exacerbated existing challenges in mental health, particularly among vulnerable populations such as university students. The World Health Organization (WHO) has underscored the severity of mental health conditions, with an estimated 264 million individuals affected worldwide, including anxiety and depression.[1] The pandemic, declared by the WHO in March 2020, has intensified these concerns, compelling individuals into social isolation and triggering a cascade of adverse effects on psychological, physical, financial, academic, and work-related aspects.[2] Research suggests that the pandemic and social distancing significantly worsened global mental health, leading to increased anxiety and depression across various pandemic waves.[3]

University students, particularly young adults, are highly vulnerable to mental health issues.[4] This vulnerability is attributed to the transitional phase they undergo, marked by uncertainty and challenges in transitioning to adulthood and adult learning. A longitudinal study in the USA found that 53% of undergraduates experienced depression and 49% reported anxiety during the COVID-19 pandemic.[5]

Globally, medical and nursing students have a higher prevalence of anxiety and depression, with about one in three medical students experiencing these issues. This is due to the demanding nature of health sciences courses and the high expectations placed on students for patient care.[6] The COVID-19 pandemic has significantly impacted undergraduate health sciences programs, leading many universities to transition to online learning. However, this shift was particularly challenging for nursing students, as the curriculum heavily relies on hands-on experience for developing psycho-motor skills to develop psycho-motor skills, which online learning cannot adequately provide.[6-8]

Prior to the COVID-19 pandemic, studies have reported mental health related issues in nursing students.[9,10] The

pandemic has further exacerbated stress levels among healthcare workers, particularly nurses.[11] This period has also brought to light significant concerns regarding the prevalence and impact of anxiety and depression among nursing students. Multiple studies have shed light on these mental health issues, revealing variable findings regarding their prevalence among nursing students during the pandemic. Savitsky B, et al.,[7] found that 42.8% of nursing students experienced moderate anxiety during the pandemic. Sakai M, et al., documented that 30.5% of nursing students experienced anxiety symptoms, while 31.1% exhibited depressive symptoms.[12] Saeed R, et al., reported a prevalence of 25.7% for depression among healthcare workers during the pandemic.[13] Mosteiro-Diaz MP, et al., reported higher rates among nursing students specifically during the COVID-19 lockdown, with 56.4% experiencing anxiety symptoms and 38.2% showing depressive symptoms.[14]

In Pakistan, 40% of nursing students were reported to experience anxiety and depression before the pandemic.[15] However, there has been no research addressing the prevalence of anxiety and depression among undergraduate nursing students during the pandemic. It is hypothesized that in developing countries like Pakistan, nursing students may face an increased risk of anxiety and depression amid COVID-19 due to cultural, economic, geographical, and resource-related factors. Furthermore, individuals with these mental disorders are at a heightened risk of suicide, emphasizing the importance of timely screening and effective treatment.[8] The literature also identified various stressors experienced by undergraduate nursing students during e-teaching and learning amid COVID-19, including challenges related to resources such as the unavailability of personal computers, internet connectivity issues, and electricity problems.[8,15] Additionally, students faced personal and family-related stressors, such as fear of contracting COVID-19, social isolation, and economic difficulties.[8]

Therefore, nursing students have encountered challenges in virtual learning during the pandemic, alongside other difficulties. Now that they have returned to traditional learning after passing through the e-learning phase of the pandemic, it is crucial to understand the factors contributing to anxiety and depression among undergraduate nursing students in the local context. This study aimed to recommend activities and strategies for future pandemics to promote mental well-being. Thus, the research was designed to determine the prevalence and factors associated with anxiety and depression among undergraduate nursing students in public and private nursing schools in Karachi, Pakistan amid COVID-19.

METHODS

This study employed a concurrent mixed methodology, comprising a quantitative analytical cross-sectional web-based survey and a qualitative descriptive exploratory study using Focus Group Discussions (FGDs). This approach was deemed appropriate for comprehensively addressing the complexities of the phenomenon under investigation.[16] The study was conducted from May 2021 to September 2021, in two university-based schools of nursing, one public and one private in Karachi, Pakistan. Ethical approval was obtained from the Ethics Review Committees, with reference numbers 2021-5998-17603/AKU and IRB-1971/DUHS at the selected study settings.

The study population comprised 797 Bachelor of Science in Nursing (BSN) students. Sample size calculation using OpenEpi indicated that 286 participants, with a 10% attrition rate, would be sufficient at a 95% confidence level. Using consecutive sampling, 300 volunteers were enrolled in the study. Proportionate sampling was employed to recruit undergraduate nursing students, with 197 from the private university and 103 from the public university, resulting in a total of 300 participants for the quantitative part of the study. For the qualitative component, purposive sampling was utilized to recruit 38 participants for four FGDs. Initially, two virtual FGDs were conducted (one in each public and private institute), each involving nine participants (n=18), due to limited data exploration caused by the third wave of COVID-19. Subsequently, two face-to-face FGDs were conducted (one in each public and private institute), each involving ten participants (n=20).

Inclusion Criteria

- All undergraduate nursing students (BScN) enrolled during the pandemic period who were willing to participate in the study. All undergraduate nursing students (BScN) enrolled during the pandemic period who were willing to participate in the study.
- Both hostellites and day scholars were eligible.

Exclusion Criteria

- Visiting students (students from other institutes, not affiliated with the selected study setting).
- Students enrolled in diploma in nursing and Post Registered Nursing (PRN) program.

Following institutional and ERC approval, both quantitative and qualitative data were collected simultaneously. A Google Docs link containing the consent form and study questionnaire was distributed to students via email or WhatsApp accounts. Data collection took place during the third wave of COVID-19, necessitating the use of an online self-administered questionnaire accessible to volunteer students.

For the qualitative component, purposive sampling was employed for the FGDs, and the date and time were scheduled based on mutual consensus. Regarding the quantitative aspect, the self-reported questionnaire covered socio-demographic data (19 items) and stressors related to COVID-19 (12 items), including General Apprehension (GA, 5 items) and Academic Apprehension (AA, 4 items). Responses were evaluated on a Likert scale ranging from 1 to 5.[17] The higher scoring revealed higher apprehension levels. The Content Validity index of this tool was 1, the S.CVI 0.8, and the Cronbach's alpha was 0.89. In addition, anxiety and depression were assessed through another self-reported Aga Khan

University Anxiety Depression Scale (AKUADS) included somatic symptoms (13 items) and psychiatric symptoms (12 items) with a score range of 0 to 3 (never happens, sometimes, often, and always happens). Furthermore, at a cut-off score of AKUADS >19, the literature verified a sensitivity of 74%, a specificity of 81% and a Cronbach alpha of 0.88.[18] The literature has demonstrated that these two self-reported questionnaires are valid and reliable tools for the initial screening of anxiety and depression. Additionally, they are culturally valid for the regional population.[17,18] Moreover, a pilot test was done on 10% of the study population. Similarly, for the qualitative arm, a semi-structured interview guide containing six broad questions with probes was used for the FGDs also the pilot test conducted. Following Guba and Lincoln's criteria,[16] the researcher assumed the primary responsibility within the research team for maintaining and ensuring the study's findings and rigor.

The data was analyzed in SPSS version 25.0 for continuous variables. Mean and standard deviation were calculated while frequency and percentages were recorded for the categorical variables. The confidence interval (CI 95%) and non-adjusted and adjusted odds ratio (OR) were reported by using univariate and multivariate logistic regression respectively. Meanwhile, for qualitative data via the Creswell approach, the content analysis and coding of the data were done to define the data. The second-order analysis was done by constructive reduction of the data in the form of subcategories, and categories, and the recurrent theme was consolidated.[19] Finally, the concurrent triangulation strategy was used to analyze the study results of both arms and conclude the findings.

RESULTS

Quantitative Result

As illustrated in Table I, the majority of participants (n=300) were females (74%); 76.3% of participants were aged between 20 to 29 years, and 97.3% of the participants were single. Moreover, 9% reported having suicidal thoughts sometimes, 2.3% reported often, and 0.35% reported always (finding taken from AKUADS). Of the participants tested for COVID-19 64.7%; among them, 5.7% screened positive. A small number of students were tested for COVID-19 because at the time of data collection students were attending their classes virtually due to unavailability of the vaccination.

The prevalence of anxiety and depression was assessed through AKUADS. Of the 300 participants, at the cut-off of >19, 51% were screened positive for anxiety and depression. The total score of AKUADS was 75; hence, the lowest score was zero, the highest was 50, and the mean score was 19.34±9.25. Moreover, the mean score of GA COVID-19 and AA COVID-19 was 12.14±4.607 and 13.15±4.753, respectively.

In univariate logistic regression analysis at the cut-off p-value of 0.2, 11 variables appeared significant. Moreover, in the multi-variable model illustrated in Table II, five variables were found to have a significant association (p-value <0.05). The most significant odds of anxiety and depression among female students were 2.5 times greater than the male undergraduate nursing students (p-value=0.004, 95% CI: 1.345-4.880). Likewise, the 4th-year students' had 1.3 times more odds of anxiety and depression than the 1st-year students (p- value=0.048, 95% CI: 1.002-1.870). Moreover, the hostel residents had 1.9 times more odds of anxiety and depression (p-value=0.040, 95% CI: 1.029-3.529) than those who lived with their parents. Similarly, unsatisfied students from current studies had 1.7 times more odds of anxiety and depression than those who were satisfied with the studies (p-value= 0.040, 95% CI: 1.288-2.375). Moreover, AA COVID-19 has odds of 1.1 of anxiety and depression (p-value= 0.042, 95% CI: 1.005-1.290).

Qualitative Result and Triangulation

"The realities of students' academic life amid COVID-19" the theme emerged from three categories and ten sub-categories as shown in Figure 1.

Lack of Preparedness: The first category that emerged from the data analysis was lack of preparedness for the virtual-education system which is significantly supported by the quantitative data variable lack of student satisfaction (p=0.040) with virtual studies.

Similarly, in qualitative data, a participant stated, "Different scheduling disturbs our daily life routine, as one day the university announces face-to-face classes, the next day the decision is changed…. that also affects our parents' schedule." (University B, p.37)

Quantitative data found AA (p = 0.043) COVID-19; likewise, qualitative data revealed that most of the participants emphasized that e-learning was the least effective in terms of education. "There is no advantage of online learning." (University B, p.18)

Environmental Element: *Constraints of Pakistan.* In remote areas of Pakistan, the unavailability of electricity and the internet were major challenges for students to take e-classes or to communicate with their teachers and peers. "I belong to the Northern Areas (GB), where electricity is a big issue; we have very limited electricity 24/7…. Then how can we connect to the internet?" (University A, p. 3). Similarly, in quantitative data, 39% of students were found to have severe anxiety about hindrances in the acquisition of theoretical knowledge.

Student Elements: The adoption of technology in education was a major challenge for students."Since childhood, I learned from books… now from laptop and mobile phone. I feel easily distracted ... from other social sites, this wastes my time and drains attention, also affects my eyes, ears and develops a headache."(University A, p.2)

Parent Elements: Parents were unable to understand the demands of e-education; they expected a student to do domestic chores during e-classes, and the student felt a role conflict in this situation. "Hang clothes on the roof, buy groceries… my parents did not understand that the online class needs concentration and students need privacy." (University B, p. 28)

Teacher Elements: Most of the participants articulated that teachers

Table I: Sociodemographic and COVID-19 variable of study participants (n=300)

Variables		Frequency	Percentage	Variables		Frequency	Percentage
Gender	Female	222	74	Family Suicidal History	No	291	97
	Male	78	26		Yes	9	3
Age (years)	≤19	71	23.7	Last Six Month Major Life Stressors	No	217	72.3
	20 to 29	229	76.3		Yes	74	24.7
Marital Status	Single	292	97.3	Self-Past Mental Illness History	No	293	97.7
	Married	8	2.7		Yes	7	2.3
Geographical Area	Sindh	153	51	Sleeping Habits	1-3 Hours	06	2
	Gilgit-Baltistan	113	37.7		4-6 Hours	104	34.6
	Khyber Pakhtunkhwa	26	8.7		>06 Hours	190	63.3
	Punjab	8	2.7	Current Residency	Home with parents	160	53.3
Earning Members in Family	1	161	53.7		Living with relative	81	27
	2	85	28.3		Living in apartment alone	43	14.3
	≥ 3	54	18%		Living in hostels	16	5.3
Study Program (Bachelor of Science in Nursing)		300	100	Financial Assistance System for Study	Parents	209	69.7
Nature of Institute	Private	197	65.7		University FA	73	24.3
	Public	103	34.3		Others (relative)	18	6
Study Year	1st year student	108	36	Leisure Time Activities	Music	144	48
	2nd year student	99	33		Watching Television	58	19.3
	3rd year student	52	17.3		Sleeping	60	20
	4th year student	41	13.7		Playing sports	38	12.7
Satisfaction from Studies	Satisfied	192	64	Smoking Status	Yes	6	2
	Neutral	72	24		No	294	98
	Not satisfied	36	12				
Family History of Mental Illness	No	288	96				
	Yes	12	4				

were incompetent in handling e-learning technology and unable to engage students in the learning process. "Our teacher uses power point slides on Zoom and reads them... not enough for active participation… We sleep sometimes… This decreases our motivation." (University B, p. 25)

Institutional Factors: The quantitative data showed, that 53.3% had severe anxiety about hindrances in their skills and clinical learning with patients amid COVID-19. The qualitative findings also supported the use of unsuccessful e-learning strategies with regards to skills and clinical "It is unrealistic to do e-clinical. We have done virtual cyber patient clinical skillsactivities even if we get 100% … we are unsatisfied with our clinical learning." (University A, p. 12).

Additionally, 53.6% of the participants had severe anxiety about COVID-19 affecting their grades in the examination. Likewise, the students reported fear of failing the virtual assessment. "In online quizzes…. if a student attempted few questions and his internet connection is lost, it means he fails in that quiz." (University A, p. 9)

Range of Emotions: Most participants felt mental stress, anxiety, fear, and helplessness when they had to go

Table II: Multivariate logistic regression of potential risk factors associated with anxiety and depression (n=300)

Variables		AOR	95%CI	p value
Gender	Female	1		
	Male	2.562	1.345-4.880	0.004***
Study Year	1st year student	1		
	2nd year student	0.937	0.377-2.332	0.889
	3rd year student	1.055	0.559-1.989	0.869
	4th year student	1.369	1.002-1.870	0.048***
Current Residency	At Home with parents	1		
	Living with others	1.375	0.541-3.482	0.504
	Living in apartment alone	.673	0.518-1.727	0.855
	Living in hostels	1.922	1.029-3.529	0.040***
Smoking Status	No	1		
	Yes	.152	.013-1.760	0.100
Last six month major life stressors	No	1		
	Yes	.597	.324-1.097	0.097
Satisfaction with current studies	Satisfied	1		
	Neutral	0.937	0.377-2.332	0.096
	Not satisfied	1.749	1.288-2.375	0.040***
Test Result	No	1		
	Yes	0.892	.499-1.593	0.699
	Do Not Know	0.592	.416-1.474	0.667
Direct interaction with COVID-19 patients	No	1		
	Yes	.989	.690-1.417	0.953
	Do Not Know	.822	.421-1.612	0.753
General Apprehension amid COVID-19		.921	.791-1.073	0.079
Academic Apprehension amid COVID-19		1.138	1.005-1.290	0.042***

***p < 0.05

through e-learning amid COVID-19. All these led to students' dissatisfaction with the current studies (p = 0.04), which is also supported by the quantitative results.

"It was good that the holidays started …. As online classes started, I was unable to understand the lectures [helplessness] … anxious about my future, what will happen [fear of incompetency on clinicals]. Repeated thoughts of uncertainties [delayed graduation] came to my mind frequently". (University B, p. 7)

Anxiety, Fear and Helplessness: In quantitative data, 51.7% of the students had severe anxiety about their future nursing profession. Similarly, students reported that during e-learning the lack of valid assessments obstructed their future practice life. "We were assessed for only theoretical component whereas most of us got 4.0 GPA; however, in clinical we do not know basic nursing skills like we don't know how to insert a cannula…how we will do exemplary patient care" (University B, p. 15).

Moreover, in quantitative data, 53.7% of the participants had only one earning member in their family. Similarly, in qualitative data "During corona, my father lost his job… to purchase data packages for my study…was difficult." (University B, p. 15)

The Feeling of Ambivalence: When e-education was started, most of the students felt happy at the closure of the university, however, due to scarce resources, students were not able to understand the e-lectures and they felt frustrated. "In the beginning, we were excited to continue online education from home; however, as time passed due to scarce resources we got frustrated." (University A, p. 7)

The Feeling of Inadequacy: Most of the participants articulated the inadequacy of in-depth learning during e-learning because they did not get an opportunity to integrate the theoretical concept into clinical. "I did not want to take classes, then I left classes; because a nursing degree needs practical work; online courses are not enough …." (University B, p. 21)

Humble Submissions: Students suggested e-learning system improvement in institution facilities, like physical classes for theory and practical for their in-depth learning and integration into practice. "Injecting to a patient is not possible in an online class." (University A, p. 11) Students requested the provision of e-mental health facilities as well as capacity building for both teachers and students.

DISCUSSION

An undergraduate degree in nursing is regarded as one of the most rigorous programs.[20] The current study revealed a high prevalence of anxiety and depression (51%) among undergraduate nursing students during the COVID-19 pandemic. A study conducted by Rehmani N, et al., at a private university (in a similar setting)

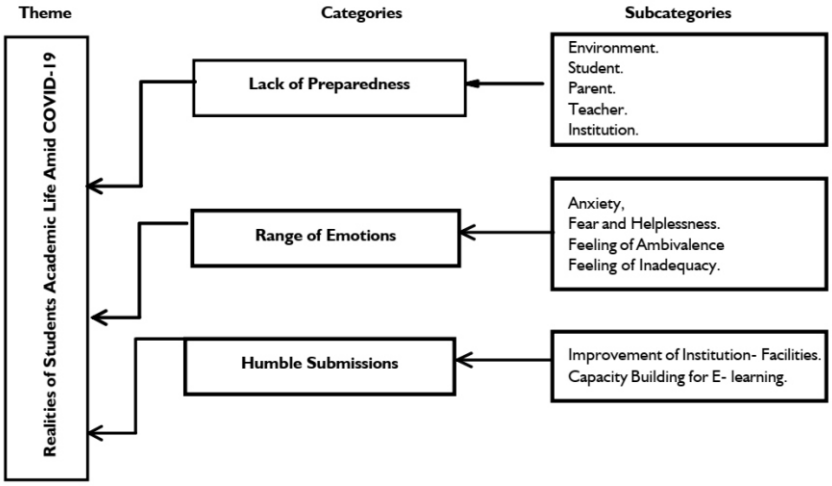

Figure I: Content Analysis of Qualitative Data

before the pandemic, using the AKUADS reported a 40% prevalence of anxiety and depression among undergraduate nursing students.[15] However, the current study, conducted during the third wave of COVID-19, reported a higher prevalence using the same scale. While during the pandemic a study conducted in Lahore Pakistan among undergraduate students reported a prevalence of anxiety of (35%) and depression (45%).[21] The population of this study was non-nursing students, so their psychomotor curriculum is less than the nursing curriculum. Hence, the prevalence is comparatively lower than the current study results

Another study conducted among Indian medical undergraduate students reported the prevalence of depression at 35.5% and 33.2% anxiety amid COVID-19; however, this study reported otherwise when compared to other regional studies because the nursing degree has a curriculum that contains 60% hands-on experience while medical student's curriculum contains 45-50%. During e-learning it was difficult for nursing students to go for direct patient care.[17] It is anticipated that 1.5% of mortality is due to suicide among young adults, the fourth leading cause of death.[19] Similarly, the current study reported that 11.6% of undergraduate nursing students had suicidal ideation history. This finding is aligned with the study which reported 1.57 OR of suicidal thoughts among undergraduate students.[22] Therefore, it is proposed to introduce e- mental health services along with physical services as mandatory because nursing school platforms were not prepared for e-mental health services during this pandemic. As per the demand of the digital era and to overcome the huge prevalence of mental health issues at the nursing institutional level, mental health services are an obligatory part of the system. Moreover, further studies are recommended after the implementation of the current study findings, and future researchers could use a tool that can measure anxiety and depression as an independent domain.

In the current study, 40.7% of female and 10.3% of male students were screened positive for anxiety and depression amid COVID-19. Consistent results are found in local and international studies.[4,7,21,23] The researcher believes that significantly high odds of anxiety and depression among females possibly can be the stereotypical belief that females are more negative emotional respondents towards unpleasant experiences compared to males.[24] While minimal prefrontal action in stressful conditions enables greater efficiency in regulating negative emotions in males.[24]

A less reported and novel associated factor in this study is that the final year was significantly associated with anxiety and depression among undergraduate nursing students. These results are contrary to some studies.[17,23] The qualitative analysis revealed that final-year students felt their capstone theoretical and clinical courses were not well covered while e-learning amid COVID-19. Hence, they develop feelings of fear to become incompetent professionals. While junior-year students were less anxious about their studies and becoming incompetent professionals because they have time in academia to compensate for their theoretical and clinical loss.

It was found that hostel resident students were significantly associated with anxiety and depression; these results were consistent with other studies.[20,25] The association between hostel residence and anxiety as well as depression can be explained by several factors. During the first year of study, adjusting to residence away from home, it was difficult for the freshmen to interact with the new environment and people; socializing and homesickness were the other factors. Moreover, during the pandemic, the unemployment of family breadwinners also contributes to hostel residents' mental well-being.

Pandemic COVID-19 and its unprecedented measures, like the rapid transition from traditional face-to-face to e-learning, increased students' apprehensions as evidenced by the high prevalence in the current study. The students were not satisfied with e-learning because of the lack of preparedness of parents, teachers, students, and institutions.

The family plays a vital role in mental wellbeing, if the parenting role is flawed, then it negatively impacts adult mental health.[26] In this regard a novel finding highlighted by participants about the issue of authoritarian parenting style, parents felt that during e-learning students stick to their laptops and phones which is highly discouraged and disliked by Pakistani families; therefore, awareness-raising sessions are proposed to enhance understanding of parents about e-learning support at home.

In addition, internet connection unavailability in remote areas of Pakistan, internet instability in the urban areas, hurdles in handling electronic gadgets, an amorphous environment at home, electricity, and the financial burden to buy data and internet services

were challenging.[27] Moreover, jobs loss of earning members in the family and students paying their institutional hostel fees, and transport fees even though they were living in the home during the pandemic lockdown were some issues. All these were major challenges for nursing students during e-learning.[4,5]

Furthermore, amid COVID-19, e-learning had a limitation on student-centered learning, because of lack of supervision of teachers, lack of entertainment of questions, and lack of valid assessments, compared to traditional teaching. Because of these challenges, students preferred face-to-face learning instead of e-learning. Similarly, analysis of student transcripts showed that during the pandemic, their sleep time further increased because they did not need to wake up to travel to the university; they could take classes while in bed; and they could even sleep during class because there was a no monitoring system and lack of active involvement of the students in the studies.[28]

Likewise, the e-learning was quite tedious that it had a lot of physical health issues such as headaches, eyesight, and hearing issues due to increased screen time and headphones.[4,29,30] To replace real-time skill-based and clinical learning during the pandemic educators use different virtual activities such as cyber patient, online simulation, videos, and multiple assignments. However, these all strategies were found not alternatives to hands-on experience at a clinical site in real-life settings.[27] Therefore, it is proposed that the existing educational policies need to be reviewed to overcome the feeling of inadequacy in education. There could be a hybrid education system at the national level and accessibility of the internet and electricity to move toward the digital world. The nursing institute could struggle for gradual improvement of infrastructure, and capacity-building training for teachers and students for e-learning. Moreover, the institutes could use them as alternatives for clinical during the pandemic, but the hands-on experience can be encouraged by the utilization of a maximum skill lab and small groups at a clinical site with proper SOPs.

The lack of teacher preparation to handle e-learning was a major contributor to students being dissatisfied with their studies. Moreover, the students thought that teacher facilitation and supervision were necessary for their active learning.[4,29] Students at the undergraduate level have not developed enough adult learning skills; they still need to be observed during class for their learning. These findings are in contrast with Saraswathi study.[17,30] However, the possible explanation for the variation of anxiety and depression related to academic apprehension amid COVID-19; are differences in the level of development of virtual education systems, economic constraints, and differences in terms of accessibility and availability of resources.

In the national context, it was the first time that online teaching and learning was being conducted, the Higher Education Commission approved the guidelines for the online system. However, the nursing institutes in the national context had deficiencies in planning and teaching psychomotor skills and e-assessments through virtual mode. Educational policymakers can make necessary changes to develop efficient e-platform at nursing educational institutes. Furthermore, the institutions lacked COVID-19 screening planning; if one student became positive for COVID-19, the whole class was supposed to go for screening; which also increased the economic burden and contribute to students' stressors.

There is a need for a strategic plan for screening to overcome the financial burden at the institutional level. Especially as the e- learning capacity building in nursing institutes where's 60% curriculum based on psychomotor skills. Instead of online skills learning, there can be the use of proper SOPs in a clinical setting for the adequacy of learning in future pandemics.

LIMITATIONS OF THE STUDY

The researcher was involved in all FGDs to explore and understand the student stressors amid COVID-19. The researcher's observation and participant's participation were limited to online FGDs; then, physical FGDs were conducted.

CONCLUSION

The current study reported a high prevalence of anxiety and depression among undergraduate nursing students; with significant factors including being female, in the final year of study, and residing in hostels. The rapid shift from traditional teaching to e-learning and transition as future nurses with limited hands on practice due to the COVID-19 pandemic was also identified as a contributing factor to increased psychological distress. To overcome these issues in future pandemics, there is a need to develop strategies to overcome these at institutional, teacher, parent, and student levels. The study reported only 2.3% of the students sought mental rehabilitation services. This has significant implications for mental health promotion and mental health issue prevention among undergraduate nursing students.

ACKNOWLEDGMENT

We acknowledge the intellectual input of Psychologist Sadia Noreen. Many thanks to the advisory group Miss Yasmin Parpio, Mr. Badil, Miss Wajiha Amin, Ms. Sajjida Nusrrat Bhatti, administration staff and participating students.

REFERENCES

1. World Health Organization. Depression. 2020. [Accessed on: May 08, 2021]. Available from URL: https://www.who.int/news-room/fact-sheets/detail/depression
2. World Health Organization. Covid-19 Dashboard. 2021. [Accessed on: May 12, 2021]. Available from URL: https://covid19.who.int/
3. McCormick-Baw C, Morgan K, Gaffney D, Cazares Y, Jaworski K, Byrd A. Saliva as an alternate specimen source for detection of SARS-CoV-2 in symptomatic patients using Cepheid Xpert Xpress SARS-CoV-2. J Clin Microbiol 2020;58(8):e01109-20.https://doi.org/10.1128/jcm.01109-20
4. Adnan M, Anwar K. Online learning

amid the COVID-19 pandemic: Students' perspectives. J Pedagogical Sociol Psychol 2020;2(1):45-51. https://doi.org//10.33902/JPSP.%2020202061309

5. Zhang B, Zaman A, Silenzio V, Kautz H, Hoqu E. The relationships of deteriorating depression and anxiety with longitudinal behavioral changes in Google and YouTube use during covid-19: observational study. JMIR Ment Health 2020;7(11):e24012. https://doi.org/10.2196/24012

6. 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. https://doi.org//10.3390/ijerph16152735

7. Savitsky B, Findling Y, Ereli A, Hendel T. Anxiety and coping strategies among nursing students during the COVID-19 pandemic. Nurse Educ Pract 2020;46:102809. https://doi.org/10.1016/j.nedt.102809.

8. Toquero CM. Challenges and opportunities for higher education amid the COVID-19 pandemic: the Philippine context. Pedagogical Res 2020;5(4):1-5. https://doi.org/10.29333/pr/7947

9. Chen CJ, Chen YC, Sung HC, Hsieh TC, Lee MS, Chang CY. The prevalence and related factors of depressive symptoms among junior college nursing students: a cross-sectional study. J Psychiatr Ment Health Nurs 2015;22(8):590-8. https://doi.org/10.1111/jpm.12252

10. Cheung T, Wong SY, Wong KY, Law LY, Ng K, Tong MT, et al. Depression, Anxiety and Symptoms of Stress among Baccalaureate Nursing Students in Hong Kong: a Cross-Sectional Study. Int J Environ Res Public Health 2016;13(8):779. https://doi.org/10.3390/ijerph13080779

11. Sampaio F, Sequeira C, Teixeira L. Impact of COVID-19 outbreak on nurses' mental health: A prospective cohort study. Environ Res 2021;194:110620.https://doi.org/10.1016/j.envres.2020.110620.

12. Sakai M, Nakanishi M, Yu Z, Takagi G, Toshi K, Wakashima K, Yoshii H. Depression and anxiety among nursing students during the COVID-19 pandemic in Tohoku region, Japan: a cross-sectional survey. Jpn J Nurs Sci 2022;19(3):e12483. https://doi.org/10.1111/jjns.12483

13. Saeed R, Amin F, Talha M, Randenikumara S, Shariff I, Durrani N, Salman S. COVID-19 Pandemic prevalence and risk factors for depression among health care workers in South Asia. Asia Pac J Public Health 2021;33(8):935-9. https://doi.org/10.1177/10105395211002324

14. Mosteiro-Diaz MP, Baldonedo - Mosteiro C, Baptista PCP, Gamez-Fernandez A, Franco-Correia S. Anxiety and depression among nursing students during the COVID-19 lockdown: a cross-sectional correlational study. J Clin Nus 2023;32(15-16):5065-75. https://doi.org/10.1111/jocn.16758

15. Rehmani N, Khan QA, Fatima SS. Stress, anxiety and depression in students of a private medical school in Karachi, Pakistan. Pak J Med Sci 2018;34(3):696-701. https://doi.org/10.12669%2Fpjms.343.14664

16. Peretti-Watel P, Alleaume C, Leger D, Beck F, Verger P, COCNEL Group. Anxiety, depression and sleep problems: a second wave of COVID-19. Gen Psychiatr 2020;33(5):e100299. https://doi.org/10.1136/gpsych-2020-100299

17. Saraswathi I, Saikarthik J, Kumar KS, Srinivasan KM, 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. Peer J 2020;8:e10164.https://doi.org/10.7717/peerj.10164

18. Ali BS, Amanullah S. A comparative review of two screening instruments: The Agha Khan Private University Anxiety and Depression Scale and the self-reporting questionnaire. J Pak Med Assoc 1998;48(3):79-82.

19. Arsandaux J, Montagni I, Macalli M, Texier N, Pouriel M, Germain R, et al. Higher risk of mental health deterioration during the COVID-19 lockdown among students rather than non-students. 2022;16(3):920-6.https://doi.org/10.1101/2020.11.04.20225706

20. Salman M, Asif N, Mustafa ZU, Khan TM, Shehzadi N, Tahir H, et al. Psychological impairment and coping sar A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. Global Health 2020;16(1):57.https://doi.org/10.1186/s12992-020-00589

21. World Health Organization (WHO). Suicide.2021. [Accessed on: June 08, 2021]. Available from URL: https://www.who.int/news-room/fact-sheets/detail/suicide

22. Cici R, Yilmazel G. Determination of anxiety levels and perspectives on the nursing profession among candidate nurses with relation to the covid-19 pandemic. Perspect Psychiatr Care 2021;57(1):358-62. https://doi.org/10.1111/ppc.12601

23. Dangal MR, Bajracharya LS. Students' anxiety experiences during covid-19 in Nepal. Kathmandu Univ Med J 2020;18(70):53-7. https://doi.org/10.3126/kumj.v18i2.32957

24. Salari N, Hosseinian-Far A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, et al. Prevalence of stress, anxiety, depression among the general population during the covid-19 pandemic: A systematic review and meta-analysis. Global Health 2020;16(1):57. https://doi.org/10.1186/s12992-020-00589

25. Rathnayake S, Ekanayaka J. Depression, anxiety, and stress

among undergraduate nursing students in a public university in Sri Lanka. Int J Caring Sci 2016;9(3):1020-32

26. Das JK, Salam RA, Lassi ZS, Khan MN, Mehmood W, Patel V, et al. Interventions for adolescent mental health: an overview of systematic reviews. J Adolescent Health 2016;59(4):S49-S60. https://doi.org/10.1016/j.jadohealth.2016.06.020

27. Fogg N, Wilson C, Trinka M, Campbell R, Thomson A, Merritt L, et al. Transitioning from direct care to virtual clinical experiences during the COVID-19 pandemic. J Prof Nurs 2020;36(6):685-91. https://doi.org/10.1016/j.profnurs.2020.09.012

28. Moreira DP, Furegato AR. Stress and depression among students of the last semester in two nursing courses. Rev Lat Enfermagem 2013;155-62. https://doi.org/10.1590/s0104-11692013000700020

29. Majrashi A, Khalil A, Nagshabandi EA, Majrashi A. Stressors and coping strategies among nursing students during the covid-19 pandemic: scoping review. Nurs Rep 2021;11(2):444-59. https://doi.org/10.3390/nursrep11020042

30. Kecojevic A, Basch CH, Sullivan M, Davi NK. The impact of the covid-19 epidemic on mental health of undergraduate students in New Jersey, cross- sectional study. PLoS ONE 2020;15(9):e0239696. https://doi.org/10.1371/journal.pone.0239696

AUTHORS' CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

NN, RK & MA: Concept and study design, acquisition of data, drafting the manuscript, critical review, approval of the final version to be published

LG, FBH & SH: Acquisition, analysis and interpretation of data, drafting the manuscript, approval of the final version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest, whether financial or otherwise, that could influence the integrity, objectivity, or validity of their research work.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

Authors declared no specific grant for this research from any funding agency in the public, commercial or non-profit sectors

DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request