



Original Article

Fear of COVID-19, stress, anxiety, depression, and insomnia among undergraduate nursing students in Oman

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ABSTRACT

Background & Aim: The emergence of COVID-19 has created fears, worries, and anxiety among individuals worldwide. This study aimed to describe the prevalence of mental health problems (fear, stress, anxiety, depression, and insomnia) and their contributing factors among undergraduate nursing students in Oman two years after the start of the pandemic.

Methods & Materials: A cross-sectional study was employed for this study. The questionnaire was distributed electronically via Qualtrics® Online survey software. It consisted of items relating to detailed demographics, background history, and standard scales, including the Fear of COVID-19 Scale, the Perceived Stress Scale, the Hospital Anxiety and Depression Scale, and the Insomnia Severity Index.

Results: The sample comprised 548 nursing students. The participants had a mean FVC-19 score of 16.39, with a standard deviation of 6.04. The overall prevalence of stress, anxiety, depression, and insomnia among nursing students was 94%, 70%, 53%, and 38%, respectively. There was a significant relationship between fear of COVID-19 ($p < 0.05$) and stress, anxiety, depression, and insomnia.

Conclusion: Fear of COVID-19, stress, anxiety, depression, and insomnia pose notable challenges for undergraduate nursing students. Identifying these mental health issues early is crucial as well as introducing preventive and supportive interventions tailored to the specific contributing factors. This is essential to mitigate the potential for more severe psychological consequences among nursing students.

Introduction

In December 2019, the novel coronavirus disease (COVID-19) emerged in Wuhan City, Hubei Province, China, and spread worldwide (1). COVID-19 has posed a serious threat to human health. On 30 January 2020, the World Health Organization (WHO) declared COVID-19 to be a pandemic (2). As of 20 August 2023, the World Health Organization (WHO) has recorded over 770 million confirmed COVID-19 cases on a global scale, resulting in almost six million fatalities (3). In response to this staggering toll, COVID-19 vaccination campaigns have been launched on a

global scale, with millions of doses administered to curb the pandemic, marking one of the largest and most ambitious vaccination efforts in history.

Mental health among nursing students is a critical concern within the healthcare education system. Nursing programs are rigorous and demanding, requiring students to juggle a heavy workload, clinical rotations, and the responsibility of patient care. The stress and pressure of these academic and clinical requirements can take a toll on the mental well-being of nursing students. Additionally, nursing

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students often witness the emotional and challenging aspects of healthcare first hand during their clinical experiences, which can contribute to compassion fatigue and emotional exhaustion. The COVID-19 pandemic further intensified these challenges by disrupting educational routines, increasing fear, stress, anxiety, depression, and insomnia about exposure to the virus and creating uncertainty about future job prospects (4, 5). As a result, there is a growing recognition of the importance of providing mental health support and resources to nursing students to help them navigate the unique stressors they face while pursuing their education and training in healthcare.

In response to the high risk of COVID-19, governments worldwide have implemented measures, including quarantine, social distancing, travel restrictions, and lockdowns to reduce the transmission rate (6). Consequently, most higher education institutions have shifted to remote modes of educational delivery (7). While this affected nursing students in terms of a reduction in classroom-based learning, many were also affected because they continued their experiential placement-based learning in health services that were themselves seriously affected by the pandemic. The successful development of several effective COVID-19 vaccines and their mass roll-out in many countries have been significantly associated with reductions in both hospital admissions and deaths (8). As a result, several countries have started to remove restrictions, which has meant the return of face-to-face lectures for students.

The mental health of college students has been affected during the COVID-19 pandemic, as evidenced by reports of negative emotions, fear, confusion, pessimism, insomnia, and an increasing number of psychological problems (9). A systematic review and meta-analysis of 27 studies involving 706,415 student participants conducted by Li et al. (10) reported that the most prevalent symptoms were depression (39%) and anxiety (36%).

Regarding undergraduate nursing students, in particular, several studies measured their levels of anxiety, stress, and fear during the early period of the COVID-19 pandemic up to

March 2020. They reported that undergraduate nursing students were suffering from stress, anxiety, depression, and insomnia (13-15).

There are numerous good reasons to conduct further research into the mental health of undergraduate nursing students during the current phase of the COVID-19 pandemic. First, the vaccination program and subsequent preparation of colleges to return to face-to-face teaching may affect their mental health. Second, nursing students indicate that difficult learning materials, stringent examinations, long hours of study, the challenges of clinical placements, and the physical and emotional demands of programs can lead to mental health problems such as stress, anxiety, and depression (14). This can lead to nursing students dropping out of nursing education.

To the best of our knowledge, there has been insufficient attention given to and, consequently, a lack of available data regarding the way in which the COVID-19 pandemic has influenced the levels of fear, stress, anxiety, depression, and insomnia experienced by nursing students in Oman. It is crucial to assess the prevalence of fear, stress, anxiety, depression, and insomnia and investigate the contributing factors. This study will, therefore, help elucidate the mental health status of nursing students, which is crucial in enabling better planning for interventions to prevent and manage the mental health problems of students in the event of similar diseases emerging.

The overall aim of this study was to describe the prevalence of mental health problems (fear, stress, anxiety, depression, and insomnia) and their contributing factors among undergraduate nursing students in Oman after two years of the COVID-19 pandemic.

Methods

A cross-sectional survey design was employed for this study. The sample size was determined based on certain assumptions: a 5% margin of error, a 95% confidence level, a population size of 1400, and an expected response distribution of 50%. Using an online sample size calculator (Raosoft), it was calculated that a sample size of 302 was needed. The participants were recruited from the Oman

College of Health Sciences. The inclusion criteria were an ability to speak and write in English, being above 18 years of age, and being an undergraduate nursing student registered in the Oman College of Health Sciences. The exclusion criteria for participants were those with preexisting mental health conditions and individuals who were not enrolled in a nursing undergraduate program during the COVID-19 lockdown.

The questionnaire encompassed items pertaining to comprehensive demographics, historical background, and standard scales, which included the Fear of COVID-19 Scale, the Perceived Stress Scale (PSS), the Hospital Anxiety and Depression Scale (HADS), and the Insomnia Severity Index (ISI). The questionnaire developed was entered into *Qualtrics*[®] survey software for electronic distribution. The data was gathered from November to December 2021.

The participants' demographics, including age, sex, marital status, academic year level, and type of learning (online only, face-to-face only, online, and face-to-face), were collected through the survey. Participants were also asked the following two questions: (a) Have you confirmed COVID-19? (b) Have you received vaccines? Last question, participants were asked if they had any suggestions to improve the response of the college during the pandemic. This question aimed to gather specific suggestions and feedback from participants on how the college could better address the challenges posed by the pandemic, which is crucial for the institution to adapt and improve its pandemic-related policies and support systems.

The Fear of COVID-19 Scale (FCV-19S), comprises a set of 7 items that assess an individual's level of fear concerning the COVID-19 pandemic (15). These items are usually positively worded statements related to COVID-19 fears. Respondents are asked to rate their agreement with these statements on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Total scores range from 7 to 35, with higher scores indicating higher levels of COVID-19-related fear. The scale has demonstrated good internal reliability

(Cronbach's $\alpha = 0.82$) (15). In this study, the Cronbach's α was 0.85.

The Perceived Stress Scale (PSS) (16) was used to measure post-traumatic stress disorder. It consists of 10 items on a 4-point response scale ranging from 0 (never) to 4 (very often), with overall scores ranging 0-40. Scores ≥ 14 indicate the presence of stress (17). The PSS-10 version is reported to have an acceptable internal consistency ($\alpha = .70$) (18). In this study, the Cronbach's α coefficient was determined to be 0.82.

The Hospital Anxiety and Depression Scale (HADS) comprises 14 items assessing anxiety (7 items) and depression (7 items). Each is rated on a 4-point response scale (0-3). The scores in each subscale are computed by summing the corresponding items (possible scores of 0-21 for each subscale). A score of 0-7 is considered normal, 8-10 a borderline case, and 11-21 a case exhibiting anxiety or depression (19). The HADS has demonstrated very good internal consistency (Cronbach's $\alpha = .83$) (20). In the current study, the scale exhibited a total Cronbach's alpha coefficient of 0.85.

The Insomnia Severity Index (ISI) is a 7-item self-report questionnaire assessing the nature, severity, and impact of insomnia (21). A 5-point scale is used to rate each item (e.g., 0= no problem; 4= very severe problem), yielding a total score ranging from 0 to 28. A cut-off value of 15 has been used as a threshold for clinically relevant insomnia. Previous research has reported adequate psychometric properties of the ISI (Cronbach's $\alpha = .90$) (21). In this research, the overall Cronbach's alpha coefficient for the scale yielded a value of 0.79.

The data were exported to the Statistical Package for Social Science (SPSS) version 25. To answer the research questions, descriptive statistics were calculated in the form of means, standard deviations and errors, frequencies, and percentages of all the scales, subscales and participant variables. An independent *t*-test and one-way ANOVA were performed to test whether the fear of COVID-19, stress, depression, anxiety, and insomnia differed in terms of demographic variables. Multiple linear regression was then performed, which is a

statistical technique used to understand the relationships between the multiple independent variables. To identify associations, multiple linear regression was applied using Fear of COVID-19 as the dependent variable. The independent variables included age, sex, marital status, academic year level, type of learning, participants' COVID-19 confirmation status, vaccination status, presence of stress, anxiety, depression, and insomnia. $P < .05$ was considered statistically significant for all analyses. Free text data from the open-ended question will be analyzed through content analysis using the Nvivo software.

The benefits and risks of the research were taken into consideration to protect the participants and the researcher. Ethical approval was obtained from the research and ethical review and approval Committee at the Oman College of Health Science (OCHS/REC/PROPOSAL_APPROVED/1/2021). Participants in the study had the freedom to withdraw at any point without facing any repercussions, and their privacy was rigorously safeguarded in this voluntary and confidential research. Consent was obtained from participants, which was presented on the initial screen of the survey tool. The study adhered to the principles outlined in the Declaration of Helsinki. Amid the COVID-

19 pandemic, the college established a helpline for students experiencing psychological and emotional challenges, including feelings of depression, anxiety, and stress.

Results

A total of 548 valid questionnaires were received through the online survey. The majority of the participants were female (84.7%, $n = 464$), and single (91.4%, $n = 501$). The largest age group was those aged 21 to 22 years (48.4%, $n = 91.4$). Students were in the following academic years: fourth (33.9%), third (30.1%), second (24.3%), and first (11.7%). Approximately 60% of the participants were involved in a combination of both online and face-to-face learning methods. Most had received two doses of the COVID-19 vaccination (95.6%, $n = 524$). However, only 23.5% of students had been infected by COVID-19. Overall, the prevalence of stress was 94% ($n = 515$), anxiety was 70.3% ($n = 385$), depression was 53.5% ($n = 293$), and insomnia was 38.3% ($n = 210$).

Overall, the mean of fear of COVID-19 was 16.39 (SD 6.04, 7-35). There were no differences in terms of gender, age, marital status, academic year, type of learning, vaccine status, and placement taken ($P > 0.05$) (Table 1).

Table 1. Demographic and clinical characteristics of undergraduate nursing students (N=548)

Demographic and clinical characteristics	N	%	COVID-19 fear Score		P value
			Mean	SD	
Gender					
Male	84	15.3	16.95	6.49	.35
Female	464	84.7	16.29	5.96	
Age					
18-20	175	31.9	16.91	6.13	.29
21-22	265	48.4	16.28	6.15	
More than 23	108	19.7	15.81	5.61	
Marital status					
Married	42	7.7	15.90	5.39	.38
Single	501	91.4	16.46	6.08	
Others	5	0.9	13.00	7.87	
Academic year					
First	64	11.7	16.70	5.47	.06
Second	133	24.3	17.19	6.10	
Third	165	30.1	16.66	6.15	
Fourth	186	33.9	15.47	6.03	
Type of learning at present time					
Face-to-Face	213	38.9	16.14	5.83	.72
Online	5	0.9	15.80	5.81	
Mixed/Online and face-to-face	330	60.2	16.56	6.19	
Have you had a confirmed case of COVID-19?					.02
Yes	129	23.5	15.32	5.87	
No	419	76.5	16.72	6.07	

Have you taken any of the COVID-19 vaccines?					
Yes, two doses	524	95.6	16.41	6.04	.67
Yes, one Dose	23	4.2	15.87	6.14	
Are you assigned to be on placement during the pandemic period from March 2020 until the present?					
Yes	219	40	16.63	6.24	.43
No	329	60	16.22	5.92	
PSS					
No stress (PSS<14)	33	6	14.39	4.39	.05
Stress (PSS≥14)	515	94	16.52	6.12	
HADS anxiety					
No anxiety (HADS(A) <8)	163	29.7	14.76	5.46	.00
Anxiety (HADS(A) ≥8)	385	70.3	17.08	6.15	
HADS depression					
No depression (HADS(D) <8)	255	46.5	15.55	5.56	.002
Depression (HADS(D) ≥8)	293	53.5	17.12	6.36	
ISI					
No insomnia (ISI <14)	338	61.7	15.80	5.66	.005
Insomnia (ISI ≥14)	210	38.3	17.34	6.52	

PSS= Perceived Stress Scale; HADS= Hospital Anxiety and Depression Scale; ISI= Insomnia Severity Index

The results indicate that fear among students decreased significantly ($P=0.02$) if they had been infected with COVID-19 ($M=15.32$, $SD=5.87$) compared with those non-infected ($M=16.72$, $SD=6.07$). Participants with stress reported higher mean scores ($M=16.52$, $SD=6.12$) for fear compared with non-stressed students ($M=14.36$, $SD=4.39$) ($P>0.05$). Fear differed significantly ($P>0.001$) in relation to anxiety, with anxious students more likely to be afraid ($M=17.08$, $SD=6.15$) than non-anxious students. Depression was significantly ($P=0.002$) associated with fear ($M=17.12$, $SD=6.36$). The insomnia group reported significantly ($P=0.005$) higher mean (SD) scores for fear ($17.34(6.52)$) than the non-insomnia group.

All the variables were selected to form a regression model. Table 2 indicated that fear

of COVID-19 was negatively associated with having received two doses of a vaccine (β (95%CI):-0.11(-2.73,-0.36), $P=0.01$). Fear was positively associated with anxiety (β (95%CI):0.13(0.44,2.92), $P=0.01$).

Participants were asked if they had any suggestions to improve the response of the college during the pandemic (Table 3). 284 participants answered this open-ended question. Five major themes were identified. The majority proposed reducing the academic workload (38%); 31% wished to keep the online system until the end of the pandemic; 21% wanted more information to be provided about the pandemic and to keep students updated; 20% wanted an improved online education system, and 16% wanted psychological support to be provided for students.

Table 2. Linear regression analyses of factors associated with fear of COVID-19 among undergraduate nursing students

	B	SE	β	t	P	95%CI
Taken 2 doses of vaccine	-1.54	0.60	-0.11	-2.56	0.01	-2.73 to -0.36
Anxiety	1.68	0.63	0.13	2.66	0.01	0.44 to 2.92

Table 3. Suggestions to improve college response (n=284)

Suggestions	N	%
Reduce academic workload	107	38
Keep online learning	88	31
Provide more information about the pandemic	61	21
Improve online system	56	20
Provide psychological support	45	16

Discussion

To the best of our knowledge, this is the first study to examine the prevalence of fear of COVID-19 in a Middle Eastern country after two years of the pandemic. The main findings demonstrated that the level of fear of COVID-19 was 16.39 (SD = 6.04) out of a possible score of 35, indicating a moderate fear level among the 548 participants. This is consistent with a study from Norway, which reported a mean COVID-19 fear score of 17.15 (22). However, results were lower than those reported in Mexico (25.71) (23) and Thailand (25.6) (24) among nursing students. However, these studies were conducted at the beginning of the pandemic when there was still uncertainty about the effects of COVID-19 on humans. Other possible reasons for such differences are the diversity of the healthcare systems, population characteristics, and lifestyles between the countries.

In addition, 94%, 70%, 53%, and 38% of undergraduate nursing students reported having stress, anxiety, depression, and insomnia. Those results were high compared with meta-analyses of 17 studies including 13,247 nursing students, which reported prevalence rates of 30% (stress), 32% (anxiety), 52% (depression), and 27% (insomnia) during the COVID-19 pandemic (25). For comparison with a general population, a recent systematic review and meta-analyses of 999 studies involving 1,074,438 participants reported prevalence rates of 32% (stress), 28% (anxiety), 27% (depression), and 32% (insomnia) (26). These differences may be partially explained by the different isolation measures that were applied by countries to reduce the spread of COVID-19. In addition, population characteristics and variations in cultural norms, beliefs, and values between countries may have affected the extent of stress, depression, anxiety, and insomnia experienced. In our sample, most of the participants were Muslims, which may have influenced the extent to which mental health symptoms are acceptable and spoken about. Another possible reason could be the number of COVID-19 waves, as this study was

conducted between November - December 2021. This is important as the timing and strictness of measures employed in each country to reduce the spread of COVID-19 may have increased or decreased those symptoms.

In this study, undergraduate students having had a confirmed case of COVID-19 (23.5%) were significantly associated with a low fear of COVID-19. This could be explained by the fact that these students may have realized that infection would probably develop their immunity, which may reduce the risk of recurrence or re-infection (27). Importantly, undergoing the experience of COVID-19 symptoms may have helped to reduce their fear.

The results indicate a significant association between stress, anxiety, depression, insomnia, and fear of COVID-19. Participants with these symptoms reported higher levels of fear. This is similar to previous studies, which have indicated a direct influence of anxiety, depression, and insomnia on the level of fear among undergraduate nursing students (28, 29).

Regarding vaccination status, the findings suggest that fear among nursing students decreased after having taken two doses of the COVID-19 vaccination. This emphasis on the importance of vaccination is one strategy that can be used to reduce the level of fear among undergraduate students.

Alternative management strategies were suggested by participants to improve the support provided by the college during the pandemic. The majority of participants suggested reducing the academic workload as this is a major stressor for students. Several qualitative studies have reported that the workload during the COVID-19 pandemic was increased, and this needs to be taken into consideration by faculty (30). The academic workload includes taking and preparing for exams, which involves acquiring a large amount of knowledge in a short period of time.

Emerging problems during the COVID-19 pandemic meant that most higher

education in Oman moved online. However, with the pandemic still ongoing, this study shows that students still have a moderate level of fear and higher levels of anxiety. This may be due to the lack of knowledge or awareness of the pandemic situation among nursing students.

Despite being the first study to investigate the level of fear, stress, anxiety, depression, and insomnia among nursing students in Oman, this study has several limitations that need to be addressed. Firstly, it employed a cross-sectional approach, which means it cannot establish a cause-and-effect relationship. To address this, future studies could consider longitudinal investigations. Secondly, the use of self-reported questionnaires in the research may have introduced bias because individuals may interpret and assess survey items differently based on their personal understanding and judgment. Thirdly, the utilization of convenience sampling could limit the representativeness of the study's sample and the ability to generalize the research findings. Fourthly, its scope is limited to Oman, which may constrain its broader applicability to other countries. The participants were also recruited via online platforms and email, which may have reduced limit the response rate as they may not answer emails routinely.

The current study identified the need for psychological support for the students. Therefore, higher education institutions must provide counseling support services or online workshops and training material to enable students to overcome any psychological problems. In addition, the current education program for nursing focuses on the cultivation of theoretical knowledge and clinical practices; it does not cultivate the ability to cope with crises. This highlights the need to improve students' ability to cope with a crisis in nursing programs. Further research is needed to investigate the psychological interventions that are suitable for supporting nursing students during a pandemic.

Conclusion

This is the first known study to investigate the level of fear, stress, anxiety, depression, and insomnia among undergraduate

nursing students in Oman regarding the COVID-19 pandemic. The study found that fear of COVID-19 was associated with moderate levels of stress, anxiety, depression, and insomnia among nursing students. This study improves our understanding of the psychological status of undergraduate nursing students exposed to the outbreak of a fast-spreading, life-threatening infectious disease and strengthens preparations for responding to possible future outbreaks or pandemics. The results highlight the need to improve the online education system, reduce academic workloads, and increase psychological interventions to reduce the level of fear and ameliorate mental health problems among nursing students. Furthermore, it provides a solid foundation for the next step of the research, which aims to identify appropriate interventions to improve the psychological well-being of undergraduate students.

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Conflict of interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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