

Research Article

The Anxiety and Depression of International Medical Students during COVID-19 Pandemic: A Cross-Sectional Study

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The COVID-19 pandemic has inflicted physical harm and exacerbated a significant mental health crisis, warranting greater attention. This study investigated the prevalence of anxiety and depression among international medical students (IMs) during the pandemic and explored its correlation with demographic factors. Participants completed a comprehensive questionnaire encompassing demographic details, the Zung self-rating anxiety scale, and the Zung self-rating depression scale. The findings revealed that 23.27% of IMs reported anxiety, while 48.52% experienced symptoms of depression. Multivariate logistic regression analysis identified poor health conditions and limited access to the family as independent risk factors for anxiety. At the same time, depression was associated with both compromised health and notable financial burdens. This study provides crucial insights for policymakers, college administrators, and government authorities, urging proactive measures to support and manage the wellbeing of IMs during pandemic situations.

1. Introduction

The outbreak of large-scale epidemics, such as the MERS epidemic in the Middle East in 2012 and the Ebola outbreak in West Africa in 2014, poses not only a risk of death but also exacerbates mental health issues [1]. Research suggests that the physiological damage caused by these public health emergencies can be recovered quickly, but the psychological effects may persist longer [2]. Therefore, it is crucial to provide early psychological intervention to the public. In 2020, the COVID-19 outbreak was declared a pandemic by the World Health Organization (WHO) [3, 4], with subsequent reports highlighting adverse effects on the mental well-being of the general population [5]. Additionally, the pandemic has significantly affected various sectors, notably higher education, thereby influencing the performance of students and aggravating social challenges they faced [6, 7]. Also, colleges implemented lockdown measures and shifted to online teaching to prevent the spread of COVID-19 to campuses [8]. However, these measures amplified the

psychological burden on students, leading to increased levels of anxiety, depression, and stress [9–12]. Moreover, COVID-19 restrictions contributed to their uncertainty about the future [13, 14], and improper management of personal time and space [6, 15]. All these conditions, plus inadequate communication between students and institutions further exacerbated mental health issues [16, 17].

The international medical students (IMs), as a special group, were among the most vulnerable categories [18]. During the pandemic, some IMs were confined to campus, while others were stuck in their homelands as many countries prohibited foreigners from entering in order to avoid cross infection [19]. Numerous studies have documented that medical students experienced more anxiety and depression compared to their peers in other majors due to massive academic pressure and other factors [20–22]. Furthermore, the suspension of clinical practice and laboratory activities during the pandemic further disrupted their educational process and daily routines [23]. As future healthcare professionals, medical students also grappled

with the added stress of potential frontline involvement in pandemic response efforts. Therefore, their mental health deserved more attention [24]. However, little research on the mental health status of IMs facing the pandemic has been conducted so far [25].

2. Methods

2.1. Design and Participants. This cross-sectional, online questionnaire-based study for IMs at Xuzhou Medical University (China) was done from June 16, 2020 to June 23, 2020. Participants were eligible to participate if they were international students of Xuzhou Medical University who had not been diagnosed with psychological or mental illnesses before the pandemic. Students meeting the inclusion criteria received a message about the study in class online groups. They were informed about the study's goal, and their participation was entirely optional. The questionnaires were completed anonymously, and confidentiality was ensured. The study was authorized by Xuzhou Medical University's Ethics Committee and was carried out following the Helsinki Declaration (as revised in 2013). Consent from each student was obtained at the beginning of the online survey.

2.2. Research Tools. The self-report questionnaire used in this study comprised three sections, including demographic information, the Zung Self-Rating Anxiety Scale (Zung SAS), and the Zung self-rating depression Scale (Zung SDS).

2.2.1. General Condition Questionnaire. The general condition questionnaire consisted of demographic information of IMs, including gender, age, grade, major, marital status, financial burden, health condition, physical exercise, time spent on study per day, the continent of origin, current location, clinical practice experience, and protective equipment condition for the pandemic.

2.2.2. The Zung Self-Rating Anxiety Scale (Zung SAS). The psychological anxiety among IMs was measured via the SAS, a 20-item self-report scale with items rated on a 4-point Likert scale (from 1 "a little of the time" to 4 "most of the time"), which was developed by Zung in 1971 [26]. The total score of each item is the raw score, which is then multiplied by 1.25 to obtain the standard score. The cutoffs for the SAS standard scores were classified as less than 50, no anxiety; 50–59, minimal to mild anxiety; 60–69, moderate to marked anxiety; and greater than 70, severe anxiety [27].

2.2.3. The Zung Self-Rating Depression Scale (Zung SDS). The SDS is a self-rating scale with 20 questions assessing emotional symptoms in the past week. Each item is scored on a Likert scale that ranges from 1 to 4 according to the frequency of symptoms in the past 7 days. The score from each question is calculated to obtain the raw score, and the standard score is equivalent to the raw score multiplied by 1.25. A standard score ≥ 50 indicates "psychological depression"; 50–59, minimal to mild depression; 60–69,

moderate to marked depression; and greater than 70, severe depression. [28] In this study, the SDS scale was used to evaluate the prevalence and level of depression of IMs [27].

2.2.4. Statistical Analysis. Statistical analysis was performed using the Statistical Package for Social Science (SPSS Inc., version 22.0, IBM). Descriptive analysis was used to describe the status of anxiety and depression and the distributions of the demographic characteristics of students. The SAS and SDS scores were expressed as mean \pm standard deviation. After the normality test of variables, a *t*-test or ANOVA was used if meeting the parametric test requirements. Otherwise, non-parametric tests (Mann–Whitney *U*-test) were performed as appropriate. A *t*-test or ANOVA was used for normally distributed data, whereas a Mann–Whitney *U*-test was applied for non-normally distributed data. All demographic data were analyzed and presented as frequency and percentage. A univariate analysis (chi-squared test) and multivariate logistic regression analysis were used to explore the associations between sample characteristics and anxiety as well as depression symptoms. Test level $\alpha = 0.05$, $P < 0.05$ was considered statistically significant.

3. Results

3.1. Distributions of Anxiety and Depression Scores among IMs during the COVID-19. In the current study, a total of 211 students completed the questionnaire. At the end, 202 questionnaires (95.73%) were fully filled out and considered valid. Among them, 57 students were in China, 145 were in their home countries, 131 were Asian, and 71 were from Africa. Levels of anxiety and depression of participants are demonstrated in Table 1. The prevalence rates of anxiety and depression symptoms among the IMs in this study were 23.27% (SAS index score ≥ 50) and 48.52% (SDS index score ≥ 50), respectively, though the mean scores of SAS and SDS indexes were 46.9 ± 7.7 points and 51.9 ± 10.1 points separately. For anxiety and depression status, the prevalence of each classification was 12.87% and 21.29% (minimal to mild), 6.93% and 19.31% (moderate to marked), and 3.47% and 7.92% (severe).

3.2. The Differences between the Demographic Variables and Anxiety as Well as Depression among IMs during the COVID-19 Pandemic. Anxiety and depression scores were related to different demographic characteristics of students, which are presented in Table 2. Students with financial burdens were more prone to be anxious and depressed than those with good financial situations ($P = 0.002$; $P = 0.001$). However, there was no significant difference in anxiety and depression levels by sex, age, major, and marital status. In addition, poor health condition was associated with more anxiety ($P < 0.001$) and depression ($P < 0.001$). Also, short exercise and study time had a significant effect on anxiety ($P = 0.044$; $P = 0.038$) and depression ($P = 0.011$; $P = 0.007$). IMs with short exercise and study time had increased anxiety and depression, respectively. However, clinical practice experience had no significant difference on

TABLE 1: Number of students with different levels of anxiety and depression ($n = 202$).

Level	n (%)	
	Anxiety	Depression
Normal (range ≤ 50)	155 (76.73)	104 (51.48)
Minimal to mild (range, 50–59)	26 (12.87)	43 (21.29)
Moderate to marked (range, 60–69)	14 (6.93)	39 (19.31)
Severe (range ≥ 70)	7 (3.47)	16 (7.92)

n : number.

TABLE 2: Differences in anxiety and depression based on students' demographic characteristics.

Variables	Total	SAS ($\bar{x} \pm s$)	Statistics	P value	SDS ($\bar{x} \pm s$)	Statistics	P value
<i>Gender</i>			4692.5	0.494 ^a		4287	0.094 ^a
Male	85 (42.08)	43.324 \pm 1.613			48.165 \pm 1.646		
Female	117 (57.92)	42.863 \pm 1.051			51.529 \pm 1.247		
<i>Age</i>			0.183	0.908 ^d		0.784	0.504 ^d
≤ 18	5 (2.48)	44.000 \pm 4.766			45.000 \pm 6.580		
19–21	96 (47.52)	43.581 \pm 1.449			51.604 \pm 1.477		
22–24	82 (40.59)	42.241 \pm 1.308			48.988 \pm 1.559		
> 24	19 (9.41)	43.684 \pm 2.720			48.790 \pm 3.248		
<i>Major</i>			–1.785	0.076 ^c		–0.391	0.696 ^c
MBBS	186 (92.08)	42.567 \pm 0.922			49.994 \pm 1.021		
Nursing	16 (7.92)	48.382 \pm 3.890			51.412 \pm 4.491		
<i>Marital status</i>			3846	0.070 ^a		4297.5	0.510 ^a
Single	134 (66.34)	41.595 \pm 0.996			49.508 \pm 1.151		
Have boyfriend/girlfriend	68 (33.66)	45.938 \pm 1.819			51.309 \pm 1.945		
<i>Financial situation</i>			6.878	0.002 ^b		6.758	0.001 ^d
Good	42 (20.79)	38.631 \pm 1.681			43.952 \pm 2.093		
Normal	123 (60.89)	42.449 \pm 0.993			50.675 \pm 1.189		
Poor	37 (18.32)	50.101 \pm 2.901			55.243 \pm 2.690		
<i>Health condition</i>			23.341	< 0.001 ^b		15.963	< 0.001 ^b
Good	161 (79.70)	40.512 \pm 0.823			47.926 \pm 1.017		
Normal	36 (17.82)	50.556 \pm 2.110			56.806 \pm 2.218		
Poor	5 (2.48)	71.000 \pm 3.337			72.400 \pm 5.844		
<i>Physical exercise length per day</i>			2.754	0.044 ^d		3.820	0.011 ^d
0	48 (23.76)	47.240 \pm 2.241			55.125 \pm 2.326		
0–0.5 h	79 (39.11)	42.453 \pm 1.138			50.430 \pm 1.533		
0.5–1 h	58 (28.71)	40.216 \pm 1.567			45.983 \pm 1.691		
> 1 h	17 (8.42)	43.750 \pm 2.770			48.588 \pm 3.097		
<i>Study length per day</i>			8.449	0.038 ^b		12.060	0.007 ^b
≤ 2 h	40 (19.80)	49.469 \pm 2.922			58.175 \pm 2.907		
2–4 h	89 (44.06)	41.924 \pm 1.097			48.888 \pm 1.276		
4–6 h	45 (22.28)	42.333 \pm 1.635			49.156 \pm 1.907		
> 6 h	28 (13.86)	38.660 \pm 2.064			43.036 \pm 2.313		
<i>Continent of origin</i>			4086.5	0.208 ^a		–1.990	0.048 ^a
Asian countries	131 (64.85)	41.748 \pm 0.984			48.703 \pm 1.138		
African countries	71 (35.15)	45.335 \pm 1.819			52.887 \pm 1.942		
<i>Current location</i>			3086.500	0.005 ^a		3.032	0.003 ^a
China	57 (28.22)	48.114 \pm 2.155			54.877 \pm 2.203		
Homeland	145 (71.78)	41.069 \pm 0.895			48.241 \pm 1.065		
<i>Clinical practice experience</i>			0.777	0.438 ^a		–0.318	0.751 ^a
Yes	32 (15.84)	44.688 \pm 1.999			49.375 \pm 2.177		
No	170 (84.16)	42.750 \pm 1.014			50.253 \pm 1.123		
<i>Protective equipment sufficiency</i>			11.719	0.008 ^b		15.727	0.001 ^b
Sufficient	92 (45.54)	39.837 \pm 1.094			45.620 \pm 1.273		
Basically sufficient	83 (41.09)	44.111 \pm 1.226			52.675 \pm 1.392		
Insufficient	20 (9.90)	46.438 \pm 3.296			54.550 \pm 3.492		
Terribly insufficient	7 (3.47)	63.214 \pm 11.005			66.193 \pm 10.936		

^a t -test. ^bANOVA. ^cMann–Whitney test. ^dKruskal–Wallis test.

student's anxiety or depression. Furthermore, those who stayed on campus and those with insufficient protective equipment were more likely to report anxiety ($P = 0.005$; $P = 0.008$) and depression ($P = 0.003$; $P = 0.001$). Although no significant differences were found in the continent of origin with respect to symptoms of anxiety, African students did show greater symptoms of depression as compared to Asian students ($P = 0.048$).

3.3. Factors Influencing IMSs' Anxiety and Depression during the COVID-19 Pandemic. After performing a univariate analysis for factors according to the personal number of IMSs' anxiety and depression (Table 3), multivariate logistic regression analysis was used to further investigate the factors that influenced students' anxiety and depression during the COVID-19 crisis (Table 4). The results indicated that two independent variables significantly predicted anxiety symptoms: health condition (odds ratio = 3.264, $p = 0.001$) and current location (odds ratio = 0.202, $p = 0.024$). Additionally, financial situation (odds ratio = 1.892, $p = 0.010$) and health condition (odds ratio = 2.365, $p = 0.015$) are independent predictors of students' depression symptoms.

3.4. Correlation between IMSs' Anxiety and Depression When Facing the Pandemic. Another finding of the study suggested a significant positive correlation between anxiety and depression (Table 5). This finding is supported by previous studies which revealed that people with high anxiety were more likely to be more depressed [29]. And among the general population, major depressive disorders are highly comorbid with various anxiety disorders [30].

4. Discussion

The findings of the survey indicated that the pandemic affected 23.27% and 48.52% of IMS with anxiety and depression respectively. This figure is lower than the percentage reported in earlier studies of Chinese college students, which was 41.1% and 60.5% for anxiety and depression, respectively [31, 32]. This difference may be because most of the international students at Xuzhou Medical University come from West Asia and Africa and have several siblings. In contrast, most Chinese college students are only children. Siblings can provide social support and help with emotional regulation, whereas only children may experience more anxiety and depression due to a lack of social support [33]. Additionally, cross-cultural experiences can activate and further enhance their adaptability and facilitate adaptation to new environments, which enabled IMSs to better cope with the pandemic's sudden changes [34]. All these reasons may lead to lower rates of anxiety and depression compared to local Chinese students during the pandemic.

The survey revealed that the anxiety of IMSs regarding this pandemic was related to their financial situation, health condition, length of exercise and study every day, current location and sufficiency of protective equipment. On the other hand, the financial situation, health condition, daily duration of exercise and study, continent of origin, current

location, and adequacy of protective equipment were associated with the depression of IMSs during the pandemic. Nevertheless, there were no significant differences in gender, age, major, marital status, or clinical practice experience on negative emotions and psychological issues when facing the pandemic.

Health condition was a significant factor influencing IMSs' anxiety and depression. Those with poor health conditions exhibited more anxiety and depression. The results were supported by Wang et al. who found that physical symptoms, very poor self-rating of health status, and chronic illness history were significantly associated with higher anxiety or depression level [25]. Another study also indicated that poor health condition such as having organic disease was a common risk factor for anxiety, depression, and other mental health problems among medical health workers. Excessive health concerns may lead to psychological problems for these people [35, 36]. In the face of the pandemic, they tend to be more anxious and worried about becoming vulnerable groups.

Another factor contributing to IMSs' depression during the COVID-19 pandemic was financial hardship. Some families lost their source of income, and students were anxious about their tuition and living expenses. A previous study in Germany also showed that expected financial hardships were greatly correlated to psychological disorders and psychosomatic symptoms among medical students [37]. Thus, colleges should pay more attention to these groups and help them by addressing some modifiable factors. For example, information about a healthy lifestyle and its effect on mental health can be introduced frequently to IMSs by holding themed class meetings, sending emails, etc. Additionally, teachers can communicate more with IMSs identified as financially burdened (e.g., students on tuition loans or financial aid) to determine if they require additional financial help in time.

The current location was also a main factor that affected IMSs' anxiety. Those who stayed in China and were unable to contact their families during the pandemic experienced greater anxiety than those who remained at home. This may be because many of the IMSs in China were concerned about their families' well-being, as the COVID-19 pandemic continued to be severe in their homeland. Furthermore, college students are still young and have not yet reached psychological maturity [38]. Family is an crucial support source, economically and psychologically, for most of college students [39, 40]. As such, a lack of family support can negatively impact their psychological status, leading to increased levels of anxiety and depression [8, 41]. It is recommended that colleges provide more support to IMSs by organizing various extracurricular activities, such as online singing competitions, speech competitions, medical comic competitions, etc. to improve their well-being and reduce feelings of loneliness.

There are several limitations to current study. First, the scope was confined to IMSs enrolled in a single Chinese medical university, thereby constraining the generalizability of the findings to broader contexts. Second, participation in the study was voluntary for IMSs, potentially introducing

TABLE 3: The relationship between students' anxiety and depression and demographic characteristics about the pandemic.

Variable	Total	Anxiety classification			Chi square test	P value	Depression classification			Chi square test	P value
		Normal	Minimal to mild	Moderate to marked			Normal	Minimal to mild	Moderate to marked		
Gender					3.076	0.380				8.656	0.034
Male	85 (42.08)	65 (32.18)	9 (4.46)	6 (2.97)	5 (2.48)		46 (22.77)	14 (6.93)	22 (10.89)	3 (1.49)	
Female	117 (57.92)	90 (44.55)	17 (8.42)	8 (3.96)	2 (0.99)		58 (28.71)	29 (14.36)	17 (8.42)	13 (6.44)	
Age					6.078	0.732				3.413	0.946
≤18	5 (2.48)	4 (1.98)	0	1 (0.50)	0		3 (1.49)	1 (0.50)	1 (0.50)	0	
19–21	96 (47.52)	73 (36.14)	11 (5.45)	7 (3.47)	5 (2.48)		48 (23.76)	20 (9.90)	18 (8.91)	10 (4.95)	
22–24	82 (40.59)	65 (32.18)	11 (5.45)	4 (1.98)	2 (0.99)		45 (22.28)	16 (7.92)	16 (7.92)	5 (2.48)	
>24	19 (9.41)	13 (6.44)	4 (1.98)	2 (0.99)	0		8 (3.96)	6 (2.97)	4 (1.98)	1 (0.50)	
Major					3.353	0.340				1.526	0.673
MBBS	186 (92.08)	145 (71.78)	22 (10.89)	12 (5.94)	6 (7.92)		96 (47.52)	38 (18.81)	37 (18.32)	14 (6.93)	
Nursing	16 (7.92)	10 (4.95)	4 (4.95)	2 (0.99)	1 (0.50)		8 (3.96)	5 (2.48)	2 (0.99)	2 (0.99)	
Marital status					6.737	0.072				2.488	0.478
Single	134 (66.34)	111 (54.95)	13 (6.44)	7 (3.47)	4 (1.98)		71 (35.15)	31 (15.35)	23 (11.39)	9 (4.46)	
Have boyfriend/ girlfriend	68 (33.66)	44 (21.78)	13 (6.44)	7 (3.47)	3 (1.49)		33 (16.34)	12 (5.94)	16 (7.92)	7 (3.47)	
Financial situation					13.065	0.014				13.216	0.040
Good	42 (20.79)	35 (17.33)	5 (2.48)	2 (2.48)	0		30 (14.85)	4 (1.98)	7 (3.47)	1 (0.50)	
Normal	123 (60.89)	97 (48.02)	16 (7.92)	8 (3.96)	2 (0.99)		61 (30.20)	30 (14.85)	22 (10.89)	10 (4.95)	
Poor	37 (18.32)	23 (11.39)	5 (2.48)	4 (1.98)	5 (2.48)		13 (6.44)	9 (4.46)	10 (4.95)	5 (2.48)	
Health condition					68.260	<0.001				35.139	<0.001
Good	161 (79.70)	135 (66.83)	16 (7.92)	8 (3.96)	2 (0.99)		93 (46.04)	34 (16.83)	26 (12.87)	8 (3.96)	
Normal	36 (17.82)	18 (8.91)	10 (4.95)	6 (7.92)	2 (0.99)		9 (4.46)	9 (4.46)	13 (6.44)	5 (2.48)	
Poor	5 (2.48)	2 (0.99)	0	0	3 (1.49)		2 (0.99)	0	0	3 (1.49)	
Physical exercise length per day					11.732	0.229				12.472	0.188
0	48 (23.76)	33 (16.34)	9 (4.46)	3 (1.49)	3 (1.49)		17 (8.42)	14 (6.93)	10 (4.95)	7 (3.47)	
0–0.5 h	79 (39.11)	60 (29.70)	13 (6.44)	4 (1.98)	2 (0.99)		42 (20.79)	15 (7.43)	15 (7.43)	7 (3.47)	
0.5–1 h	58 (28.71)	48 (23.76)	4 (1.98)	4 (1.98)	2 (0.99)		36 (17.82)	10 (4.95)	11 (5.45)	1 (0.50)	
>1 h	17 (8.42)	14 (6.93)	0	3 (1.49)	0		9 (4.46)	4 (1.98)	3 (1.49)	1 (0.50)	

TABLE 3: Continued.

Variable	Total	Anxiety classification			Severe	Chi square test	P value	Depression classification			Severe	Chi square test	P value
		Normal	Minimal to mild	Moderate to marked				Normal	Minimal to mild	Moderate to marked			
Study length per day						21.437	0.011					37.500	<0.001
≤2 h	40 (19.80)	23 (11.39)	9 (4.46)	2 (0.99)	5 (2.48)			14 (6.93)	9 (4.46)	5 (2.48)	12 (5.94)		
2–4 h	89 (44.06)	72 (35.64)	11 (5.45)	6 (2.97)	0			48 (23.76)	19 (9.41)	21 (10.40)	1 (0.50)		
4–6 h	45 (22.28)	37 (18.32)	2 (0.99)	5 (2.48)	1 (0.50)			24 (11.88)	9 (4.46)	9 (4.46)	3 (1.49)		
>6 h	28 (13.86)	23 (11.39)	4 (1.98)	0	1 (0.50)			18 (8.91)	6 (2.97)	4 (1.98)	0		
Continent of origin						4.126	0.233					10.227	0.017
Asian countries	131 (64.85)	106 (52.48)	15 (7.43)	7 (3.47)	3 (1.49)			71 (35.15)	27 (13.37)	28 (13.86)	5 (2.48)		
African countries	71 (35.15)	49 (24.26)	11 (5.45)	7 (3.47)	4 (1.98)			31 (15.35)	18 (8.91)	11 (5.45)	11 (5.45)		
Current location						13.905	0.003					12.246	0.007
China	57 (28.22)	34 (16.83)	12 (5.94)	6 (2.97)	5 (2.48)			22 (10.89)	14 (6.93)	11 (5.45)	10 (4.95)		
Homeland	145 (71.78)	121 (59.90)	14 (6.93)	8 (3.96)	2 (0.99)			82 (40.59)	29 (14.36)	28 (13.86)	6 (2.97)		
Clinical practice experience						9.466	0.024					6.966	0.073
Yes	32 (15.84)	22 (10.89)	8 (3.96)	0	2 (0.99)			33 (16.34)	9 (4.46)	7 (3.47)	1 (0.50)		
No	170 (84.16)	133 (65.84)	18 (8.91)	14 (6.93)	5 (2.48)			71 (35.15)	34 (16.83)	32 (15.84)	15 (7.43)		
Protective equipment sufficiency						42.672	<0.001					29.073	0.001
Sufficient	92 (45.54)	77 (38.12)	9 (4.46)	6 (2.97)	0			58 (28.71)	20 (9.90)	13 (6.44)	1 (0.50)		
Basically sufficient	83 (41.09)	62 (30.69)	13 (6.44)	5 (2.48)	3 (1.49)			36 (17.82)	19 (9.41)	20 (9.90)	8 (3.96)		
Insufficient	20 (9.90)	14 (6.93)	2 (0.99)	3 (1.49)	1 (0.50)			8 (3.96)	4 (1.98)	4 (1.98)	4 (1.98)		
Terribly insufficient	7 (3.47)	2 (0.99)	2 (0.99)	0	3 (1.49)			2 (0.99)	0	2 (0.99)	3 (1.49)		

TABLE 4: Multivariate logistic regression analysis of factors influencing students' anxiety and depression.

		B	SE	Wald	P	OR	OR (95% CI)
Anxiety ($R^2 = 0.090$, $p < 0.001$)	Health condition	1.184	0.351	11.363	0.001	3.264	1.642–6.509
	Current location	−0.856	0.379	5.098	0.024	0.202	0.202–0.893
	Constant	−1.304	0.876	2.217	0.136	0.271	
Depression ($R^2 = 0.052$, $p = 0.001$)	Financial situation	0.637	0.249	6.560	0.010	1.892	1.161–3.081
	Health condition	0.861	0.354	5.923	0.015	2.365	1.182–4.729
	Constant	−2.364	0.613	14.887	0.001	0.094	

SE: Std. error, OR: Odds ratio, and CI: Confidence interval.

TABLE 5: Correlation analysis between IMSs' anxiety and depression when facing the pandemic.

	SAS		SDS	
	<i>R</i>	<i>p</i>	<i>R</i>	<i>p</i>
SAS			0.620**	<0.001
SDS	0.620**	<0.001		

r: Correlation coefficient.

a self-selection bias whereby individuals with heightened levels of anxiety or depression may have been less inclined to participate or, conversely, more likely to engage due to the relevance of the topic to their experiences.

In summary, the study revealed that IMSs who experienced poor health, financial strain, or separation from family during the pandemic reported elevated levels of anxiety and depression. These outcomes underscore the profound impact of the pandemic on the mental wellbeing of IMSs. It is recommended that governmental bodies and educational institutions should prioritize the mental health of IMSs and devise comprehensive intervention strategies tailored to their needs during stressful situations [42–44].

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

Xiaoqing Chen was responsible for methodology, formal analysis, and investigation and wrote the original draft. Hong Sun was responsible for conceptualization, validation, reviewing, editing, and supervision. All authors have approved the manuscript for submission.

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