

Prevalence of Depression, Anxiety among International Students in the Health Professions at Southern Medical University, P. R. China

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Abstract

Introduction: International students experience acculturative stress during the adaptation period into a new country, leading to the development of mental health issues such as depression and anxiety. This issue may be particularly important for international students in the health professions who are exposed to more stressors than usual. This study aims to determine the prevalence of depression, anxiety, and associated factors among international students in the health professions. **Methods:** This study employed a descriptive cross-sectional research design. A sample of 114 international students from Southern Medical University (SMU) was screened for depression and anxiety using the Hospital Anxiety and Depressive Scale (HADS) during the 2019-2020 academic year. Descriptive statistics, including percentages and frequencies, were performed to determine the prevalence of depression and anxiety. Multiple linear regression analysis was utilized to examine associations between depression and anxiety and socio-demographic characteristics. **Results:** Overall, the prevalence of depression and anxiety was found to be 36% and 52.63%, respectively. Undergraduate students studying medicine and postgraduates pursuing master's degrees in Plastic Surgery and Laboratory Science had the highest levels of anxiety (60%), while Ph.D. students had the highest level of depression (50%). The period of study in China ($p = 0.037$), the discipline of study ($p = 0.004$), and the level of preparedness for coming to China ($p = 0.037$) were significant predictors of depression, while the discipline of study ($p = 0.004$) and socialization ($p = 0.040$) were significant predictors of anxiety. **Conclusion:** The prevalence of depression and anxiety among the study population was relatively high. The length of time in China and the level of preparedness before coming to China were significant

predictors of depression, while socialization was a significant predictor of anxiety. The discipline of study was a predictor of both depression and anxiety. Provision of key information before students arrive in the host country, access to multilingual interactions with school counselors and current students, and social and academic contacts with domestic students are recommended to mitigate the adverse effects of stress faced by international students in the health professions.

Keywords

Depression, Anxiety, Prevalence, International Students, Health Science Students

1. Introduction

Depression and anxiety are common mental illnesses among students in the health professions. Recognition of the factors that cause stress among this population has gained more traction in recent years. Two recently published meta-analyses reported that the global prevalence of depression and anxiety among medical students was 27.0% (Tam, Lo, & Pacheco, 2019) and 33.8% (Quek et al., 2019). According to a systematic review by Ngasa et al. (2020), the prevalence of depressive symptoms among medical students in Africa is between 23.3% and 76.5%. Among medical students in China, the mean prevalence of depression and anxiety was 32.74% and 27.22% respectively (Mao et al., 2019). Studies from various parts of the world conclude that the prevalence of depressive symptoms is higher among students in the health professions than in individuals in the same age group in the general population (AlFaris, Irfan, Qureshi, Naeem, Alshomrani, Pon-namperuma et al., 2016; Felicilda-Reynaldo et al., 2019; Gomathi, Ahmed, & Sreedharan, 2012; Kebede, Anbessie, & Ayano, 2019; Rotenstein, Ramos, Torre, Segal, Peluso, Guille et al., 2016). However, the majority of these studies focused on domestic medical students and generally overlooked international students in the health professions.

While crucial mental health and well-being concerns for international students have been identified, factors influencing the mental health of international students enrolled in health degree courses have yet to be fully determined. Unlike domestic students, international students are likely to have unique characteristics in that they are away from home, and may face several negative experiences during the adjustment process into a new country and culture. International students may develop feelings of hopelessness, depression, and anxiety due to acculturative stress (Deb, McGirr, & Sun, 2016; Philip, Colburn, Underwood, & Bayne, 2019; Sümer, Poyrazli, & Grahame, 2008; Wen & Hu, 2018).

Furthermore, the environment of health professional education institutions provides unique and significant stressors for students in the health professions. This may be particularly important for international students in the health pro-

fessions who are exposed to more stressors than usual that could cause them to develop depression and anxiety. If left unchecked, the consequences of depression and anxiety will not only have a noticeable negative effect on students' function in school but also later on in their careers as they deliver services to individuals, families, and communities (Deb et al., 2016; Pan, Wen, Zhao, Hu, Li, Zhang et al., 2016). Considering the challenges faced by international students in the health profession, their mental health condition needs further investigation (Moutinho et al., 2017). Moreover, China has a growing population of international students, but only a few studies on depression and anxiety among this population are covered in the English language literature (Liu et al., 2016). Therefore, it is essential to bring more attention to this topic to understand the extent and severity of the problem. This study aims to determine the prevalence of depression, anxiety, and the associated socio-demographic factors among international students in the health professions studying at Southern Medical University (SMU) in Guangzhou, China.

1.1. Review of Literature

1.1.1. International Students in China

Individuals travel overseas for multiple reasons, including holidays, study, and business interests. However, in the past two decades, there has been a significant rise in the number of international students pursuing higher education in various developed countries (McKenna, Robinson, Penman, & Hills, 2017). In the past twenty years, the number of international students flocking into China has grown exponentially (Yu et al., 2014). There are approximately 328,000 students from more than 200 countries and regions across the globe in China (Yu et al., 2014). With the rise in the number of international students in China, there is a need to examine and evaluate the mental health issues developed by these students as they adapt to China's culture, norms, and expectations (Yu et al., 2014).

1.1.2. Depression and Anxiety among International Students

Studies show that due to adjustment problems, international students face a higher risk of developing mental health problems such as depression and anxiety (Dao, Lee, & Chang, 2007; Liu et al., 2016; Sümer et al., 2008; Hu & Zhang, 2013). A study among international students in a United States university revealed that 45% of the students had depressive symptoms, while 24% were suffering from anxiety (Shadowen, Williamson, Guerra, Ammigan, & Drexler, 2019). Another study carried out on a sample of international students in northern Japan indicated that 41% of the participants had depressive symptoms (Eskanadrieh et al., 2012). Several authors have demonstrated that unlike domestic students, international students are faced with several challenges that hinder their adjustment and affect their mental health (Ogunsanya, Bamgbade, Thach, Sudhapalli, & Rascati, 2018; Skromanis et al., 2018; Yeh & Inose, 2003). A study carried out in Japan indicated that the prevalence of depressive symptoms among international students was 37.1%, which was higher than that of domes-

tic students at 29% (Nguyen, Le, & Meirmanov, 2019). Influential factors such as language competency, lack of preparedness, lower income, lower educational attainment, and high anxiety affect their mental health and well-being (Ogunsanya et al., 2018).

1.1.3. Mental Health Challenges among International Students in the Health Professions

Health professional education institutions around the globe have long been considered stressful environments for students entering tertiary education due to the long hours of study, and the stress associated with the high workload (Haldorsen, Bak, Dissing, & Petersson, 2014). For international students pursuing health professional courses, their stress is further compounded by learning difficulties, acculturative stress, cultural stress, financial burdens, and the fact that they are required to engage in complex communication in foreign languages (Malau-Aduli, 2011; McKenna et al., 2017; Yeh & Inose, 2003). This complex situation is true for both undergraduate and postgraduate international students. However, for international graduate students, the combination of a rigorous postgraduate education with the challenges of dealing with a different environment and culture could add even more stress that could lead to mental health issues (Ogunsanya et al., 2018).

Language barriers, poor social adjustment, and stigma on mental health prevent most international students, especially from Asian and African countries from seeking much needed psychological assistance (Hyun, Quinn, Madon, & Lustig, 2007; Iskra, 2017; Poyrazli et al., 2004). The level of social adjustment depends on the international student's ability to interact with members of the host country (Poyrazli, Kavanaugh, Baker, & Al-Timimi, 2004). Reduced levels of social interaction with the members of the host country can lead to cultural stress (Iskra, 2017; Poyrazli et al., 2004). Depression and anxiety amongst students in the health profession students not only affects students' lives but may perhaps also have ramifications on patient care in the end (Puthran, Zhang, Tam, & Ho, 2016).

1.1.4. Variables Related to Depression and Anxiety

Studies show that socio-demographic factors influence the manifestation of mental health issues in university students; however, there are inconsistent associations between factors such as age, marital status and religion, and the indication of mental health issues such as depression and anxiety (Gulec Oyekcin, Sahin, & Aldemir, 2017). Furthermore, inconsistencies are present in studies assessing factors such as gender and ethnicity that contribute to depression and anxiety in university students (Gulec Oyekcin et al., 2017; Jasso-Medrano & López-Rosales, 2018; Sarokhani et al., 2013; Shamsuddin, Fadzil, Ismail, Shah, Omar, Muhammad et al., 2013). A study in Malaysia showed a noteworthy correlation between gender, age, and mental health issues in university students (Shamsuddin, Fadzil, Ismail, Shah, Omar, Muhammad et al., 2013). A study in Kenya indicated a significant link between religion, age, and depressive symptoms among univer-

city students (Othieno, Okoth, Peltzer, Pengpid, & Malla, 2014).

Studies among international students also show inconsistent relationships between socio-demographic factors and levels of depression and anxiety. A study in the United States on international students showed a significant correlation between age, English proficiency to both depression and anxiety, but no association was found between gender and student's depression and anxiety levels (Sümer et al., 2008). Another study in northern Japan indicated a correlation between gender and depression (Eskanadrieh et al., 2012), while another study in southern Japan found no association between age, gender, and depression among international students, but noted a positive relationship between the length of stay and depression (Nguyen et al., 2019). Reports also indicated that international students face financial constraints that have a significant impact on their mental health (Akhtar, Herwig, & Faize, 2019; AlFaris, Irfan, Qureshi, Naeem, Alshomrani, Pon-namperuma et al., 2016; Han, Han, Luo, Jacobs, & Jean-Baptiste, 2013).

Studies show that poor English language proficiency while studying in English speaking developed countries affects academic performance, leading to stress and mental health issues for international students in the health professions (Mori, 2000; Yeh & Inose, 2003). There is little research to ascertain whether this is true for international students studying in China. Universities in China offer courses in both English and Chinese. A majority of international students in the health professions in China's higher education intuitions are enrolled in English-taught courses. However, these students still face language barriers and difficulties navigating with little to no Chinese proficiency on University campuses.

It is important to ascertain whether these factors pertain to international students in the health professions studying at SMU. Therefore, the study aims to examine the variables covered in literature such as age, gender, socio-economic status, the discipline of study, length of stay in the country, including preparedness, socialization, and Chinese language proficiency and their relation to the manifestation of depressive symptoms and anxiety among international students in the health professions in this setting.

1.2. Research Questions

- 1) What is the prevalence of depressive and anxiety symptoms among international students in the health professions at SMU?
- 2) Is there a relationship between socio-demographic characteristics and mental health among the study population?
- 3) What are the socio-demographic predictors of depression and anxiety among the study population?

2. Methodology

2.1. Setting and Population

This study was carried out on both graduate, and undergraduate international

students without Chinese citizenship enrolled at SMU, pursuing medicine and healthcare science degrees. SMU is one of China's premier institutes of higher learning situated in Guangzhou, the capital city of Guangdong Province, with a population of 1,043 international students from over 60 countries. SMU offers English-taught medical programs including bachelor's, master's, and doctoral degree courses. The majority of the international students at SMU are undergraduate students pursuing a medical degree, which takes five years plus a one-year internship. The university has a growing population of international master's and doctoral degree students pursuing two to three-year programs in a variety of specialization areas including clinical medicine, public health, nursing, and surgery, among other medicine and healthcare science-related courses.

The study targeted undergraduate international students attending the schools of Medicine and Clinical Medicine, and graduate students attending the schools of Medicine, Clinical Medicine, Health Management, and Public Health of all academic years during the fall semester of the 2019-2020 academic year. The undergraduate participants were majoring in Bachelor of Medicine and Bachelor of Surgery (MBBS). The master's and doctorate students were majoring in public health, plastic surgery, surgery, nursing, laboratory sciences, and cardiovascular diseases.

2.2. Study Design and Sampling

This study employed a descriptive cross-sectional research design. Participants of the study were requested to complete an online-based questionnaire containing items about their socio-demographic characteristics and mental health status at the end of the fall semester in the 2019-2020 academic year (January 2020). A Sample of 114 international students from SMU participated in this study by completing an online survey.

Students who agreed to participate in the study were screened according to the following inclusion and exclusion criteria.

Inclusion criteria

- Students of foreign nationality.
- Came to China to obtain a formal education.
- All international graduate and undergraduate students pursuing medicine and healthcare science degrees, where English is the primary medium of instruction.

Exclusion criteria

- Refusal to participate in the study.
- Students with Chinese Citizenship.

2.3. Description of the Procedure

The study obtained approval from the Ethics Committee involved in research at SMU before subject recruitment and data collection. The questionnaire was distributed online through class monitors on the students' specific WeChat class

groups. A detailed introduction of the research was given on the online platform for this study. Participation was voluntary and the anonymity of participants was assured.

2.4. Data Collection Instrument

2.4.1. Socio-Demographic Data

The questionnaire used in the study comprised of self-designed questions on the socio-demographic characteristics of the study population. Data collected included age, gender, marital status, religion, country of origin, educational level (undergraduate or graduate), the discipline of study, social-economic status, length of stay in China, and proficiency in the Chinese language. An item measuring the student's social contact patterns was included to assess which groups of people they socialized with the most—Chinese or non-Chinese students.

2.4.2. Hospital Anxiety and Depressive Scale (HADS)

Depressive and anxiety symptoms were measured using the Hospital Anxiety and Depressive Scale (HADS). HADS is a commonly used scale to assess depression and anxiety levels in an individual (Djukanovic, Carlsson, & Årestedt, 2017). The questionnaire contains 14 questions, with seven items related to depression and another seven related to anxiety. Each item has a score ranging from 0 - 3. Thus, depending on the level of depression and anxiety, the scores can vary from 0 - 21 (Bocerean & Dupret, 2014). The cut-off score for each subscale is a score greater or equal to 8 (Kebede et al., 2019; Tesfaw et al., 2016). HADS has been widely used and validated for use among the general population including the medical student population in various countries (El-Gilany, Amr, & Hammad, 2008; Francis, Gill, Yit Han, Petrus, Azhar, Ahmad Sabki et al., 2019; Kebede et al., 2019; Waqas et al., 2015).

2.4.3. Data analysis and Management Procedures

Statistical Package for Social Sciences (SPSS) version 25 was used to tabulate and analyze data obtained. Descriptive statistics including percentages, frequencies, means, and standard deviations were utilized to analyze the variables concerning the study participants. The study used multiple linear regression analysis to examine associations between depression and anxiety and socio-demographic characteristics.

3. Result

3.1. Socio-Demographic Characteristics of the Students

Out of the 114 students that participated, 49.12% identified as female and 50.88% identified as male (see **Table 1**). A majority (70.18%) of the participants were undergraduate students and the rest were students pursuing their master's and Doctor of Philosophy (Ph.D.) degrees. All the undergraduate participants were majoring in MBBS (70.18%). At the graduate level, the majority (21.93%) of the students were pursuing master's degrees in public health, 4.38% were pursuing

Table 1. Socio-demographic characteristics of international students.

Characteristics	Frequency	%
Age groups		
18 - 24 years old	82	71.93
25 - 34 years old	21	18.42
35 - 44 years old	11	9.65
Mean Age		20.15 ± 1.9
Gender		
Female	56	49.12
Male	58	50.88
Marital status		
Single	95	83.33
Married, Divorced, Separated	19	16.67
Place of Origin		
Asian Countries	66	58.30
African Countries	42	37.40
Countries in Europe, America, and Oceania	5	4.50
Years in China		
<6 months - 1 year	36	31.58
1 - 2 years	51	44.74
2 - 4 years	22	19.30
4 - 5 years	5	4.39
Religion		
Christian	31	27.19
Islam	44	38.60
Hinduism	30	26.32
Buddhism	4	3.51
None	4	3.51
Other	1	0.88
Discipline of Study		
Bachelor of Medicine and Bachelor of Surgery (MBBS)	80	70.18
Masters of Public Health (MPH)	25	21.93
Master's Degree (Plastic Surgery, Laboratory Science)	5	4.38
Doctorate (Ph.D.) (Public Health, Surgery, Nursing, and Cardiovascular diseases)	4	3.51
Highest educational achievement		
Undergraduate	107	93.86
Graduate	7	6.15
Socio-economic level		

Continued

Low-income	15	13.16
Middle-income	76	66.67
High-income	23	20.17
Level of preparedness before coming to China		
Not well prepared	78	68.42
Well prepared	36	31.58
Pattern of socialization		
Chinese students	14	12.28
Non-Chinese students	100	87.72
Chinese language proficiency		
Not/somewhat proficient	83	72.81
Proficient	31	27.19

a. Sample of a Table footnote (*Table footnote is dispensable*).

master's degrees in laboratory sciences and plastic surgery, and 3.51% were Ph.D. students majoring in public health, surgery, nursing, and cardiovascular diseases. The majority of the students were unmarried (83.33%). Over a third (38.60%) of the students were Muslims, 27.19% were Christians, and 26.32% were Hindu. Over half (58.30%) were from Asian countries, 37.40% were from African countries and the rest (4.5%) were from countries in Europe, America, and Oceania. The percent of students from low and middle socio-economic backgrounds represented majority (79.83%) of the students. Almost half (44.74%) of the students were enrolled for one to two years. Approximately a third (31.58%) were enrolled for less than six months to a year, 19.30% had been studying at the school for 2 to 4 years, while the rest (4.39%) were enrolled for 4 to 5 years. The findings captured by the study indicated that most students (72.81%) rated themselves as not proficient in the Chinese language. In comparison, less than a third (27.19%) rated themselves as proficient in the Chinese language. In terms of socialization, the majority of the students (87.72%) socialized with non-Chinese students, while only 12.28% socialized with Chinese students.

3.2. Prevalence of Depression and Anxiety

Overall, the prevalence of depression and anxiety was found to be 36% (n = 41) and 52.63% (n = 60), respectively (see **Figure 1**). Findings show that the mean score for anxiety was 7.69 with a standard deviation of 4.25, while the mean score for depression was 6.49 with a standard deviation of 3.98. Two-thirds (64%) of the students fell within the normal range (0 - 7) for depression, however less than half (48.2%) scored within the normal range for anxiety. Those that fell within the mild range (8 - 11) were 22% and 24.6%, those within the moderate range (11 - 14) were 9.6% and 21.1%, and those within the severe range (15 - 21) were 4.4% and 6.1% for depression and anxiety respectively.

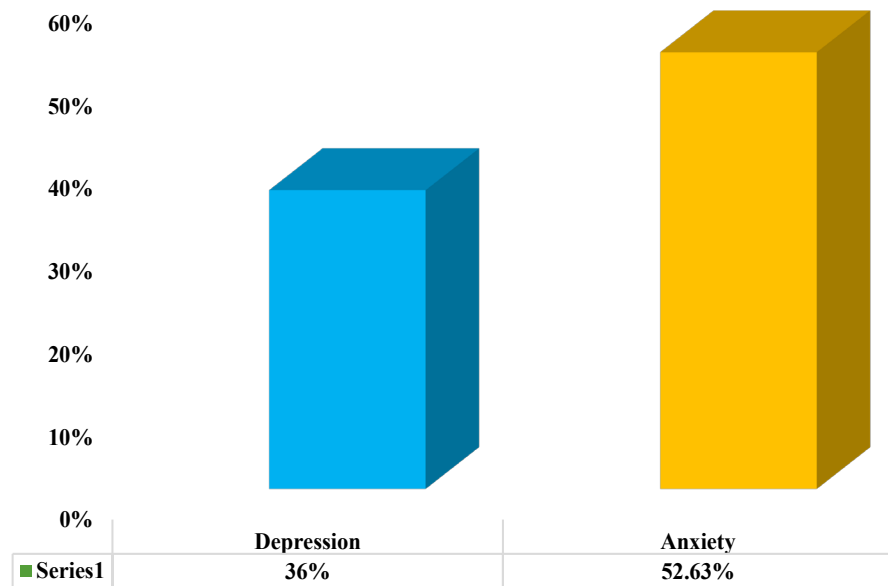


Figure 1. Prevalence of depression and anxiety, among students.

The study revealed that the prevalence of depression was highest among older students above 35 years of age ($n = 11$, 46%), while anxiety was highest among students between 18 to 24 years old ($n = 48$, 59%) (see **Table 2**). Female students showed higher levels of anxiety ($n = 32$, 57%) compared to male students ($n = 28$, 48%), while depression levels were the same for both genders (36%). Students from Europe, the United States, and Oceania countries were found to have higher scores for anxiety ($n = 3$, 60%). Whereas African students had higher scores for depression ($n = 18$, 42%), but the lowest scores for anxiety ($n = 19$, 45%).

Prevalence of depression and anxiety was highest for students who had been in China for one to two years ($n = 21$, 41%, and $n = 28$, 55% respectively) and lowest among students who had been in China for more than two years ($n = 8$, 31%, and $n = 8$, 31% respectively). Both first-year and second-year students, had a higher prevalence of anxiety ($n = 15$, 42% and $n = 28$, 55%) compared to third, fourth and fifth-year students ($n = 8$, 31%).

Students enrolled in MBBS and those pursuing master's degrees in Plastic Surgery and Laboratory Science had the highest level of anxiety ($n = 48$, 60% and $n = 3$, 60% respectively), while Ph.D. students scored higher for depression ($n = 2$, 50%). Students from low socio-economic backgrounds had a significantly higher prevalence of depression compared to other socio-economic backgrounds ($n = 10$, 67%), however, those from middle-income socio-economic backgrounds scored higher for anxiety ($n = 42$, 55%). Prevalence of depression and anxiety was highest among students who did not prepare well before coming to China ($n = 31$, 40%, and $n = 47$, 60% respectively). Higher scores for anxiety were also reported from students who socialize with non-Chinese students ($n = 55$, 55%). Students who were not proficient in the Chinese language scored higher for depression ($n = 39$, 47%).

Table 2. Cases of depression and anxiety according to socio-demographic characteristics.

Characteristics	Depression			Anxiety			N
	Yes	No	%	Yes	No	%	
Age groups							
18 - 24 years old	29	53	35	48	34	59	82
25 - 34 years old	7	14	33	8	13	38	21
35 - 44 years old	5	6	46	4	7	36	11
Gender							
Female	20	36	36	32	24	57	56
Male	21	37	36	28	30	48	58
Marital status							
Single	33	62	35	52	43	55	95
Married, Separated, Divorced	8	11	42	8	11	42	19
Place of origin							
African Countries	18	24	42	19	23	45	42
Asian Countries	22	44	33	38	28	58	66
Countries in Europe, America, and Oceania	1	4	20	3	2	60	5
Years in China							
<6 months - 1 year (Year 1)	12	24	33	15	21	42	36
1 - 2 years (Year 2)	21	30	41	28	23	55	51
2 - 5 years (Year 3, 4, and 5)	8	18	31	8	18	31	26
Religion							
Christian	9	22	29	15	16	48	31
Islam	24	20	55	27	17	61	44
Hinduism	4	26	13	14	16	47	30
Buddhism	1	3	25	1	3	25	4
None	3	1	75	3	1	75	4
Other	0	1	0	0	1	0	1
Discipline of Study							
MBBS	28	52	35	48	32	60	80
MPH	9	16	36	7	18	28	25
Master's Degree (Plastic Surgery, Laboratory Science)	2	3	40	3	2	60	5
Doctorate (Ph.D.) (Public Health, Surgery, Nursing, and Cardiovascular diseases)	2	2	50	2	2	50	4
Highest educational achievement							
Undergraduate	38	69	36	57	50	53	107
Graduate	3	4	43	3	4	43	7

Continued

Socio-economic level							
Low-income	10	5	67	7	8	47	15
Middle-income	24	52	32	42	34	55	76
High-income	7	16	30	11	12	48	23
Level of preparedness before coming to China							
Not well prepared	31	47	40	47	31	60	78
Well prepared	10	26	28	13	23	36	36
Pattern of socialization							
Chinese students	6	8	43	5	9	36	14
Non-Chinese students	35	65	35	55	45	55	100
Chinese language proficiency							
Not/somewhat proficient	39	44	47	44	39	53	83
Proficient	10	21	32	16	15	52	31

3.3. Multiple Linear Regression

Multiple linear regression was calculated to predict depression based on socio-demographic factors including socialization, Chinese proficiency, and period of study in China. The multiple linear regression revealed that the model accounted for 21.4% ($R^2 = 0.214$) of the variance (see **Table 3**). The F value of the model, $F(12, 100) = 2.264$ was statistically significant at p -value = 0.014. The period of study in China ($p = 0.037$), the discipline of study ($p = 0.004$), and level of preparedness before coming to China ($p = 0.037$) were significant predictors of depression. Length of study was negatively correlated with depression ($\beta = -0.104$, p -value < 0.05). Thus, the longer international students lived in China, the less likely they were to suffer from depression. The discipline of study was also found to be a significant predictor of depression ($\beta = -0.284$, p -value < 0.05). The findings suggest that students who pursued Ph.D. were more likely to have higher levels of depression.

Likewise, a multiple linear regression was calculated to predict anxiety based on socio-demographic factors, including factors mentioned earlier. A significant regression equation was found $F(12, 100) = 1.930$, $p = 0.039$, with an R^2 of 0.188 (see **Table 4**). The multiple linear regression revealed that the discipline ($p = 0.004$) and socialization ($p = 0.040$) were significant predictors of anxiety. The discipline of study and socialization were negatively correlated with anxiety ($\beta = -0.331$, p -value < 0.05, and $\beta = -0.255$, p -value < 0.05). The findings suggest that students who pursued MBBS and master's degrees in Plastic Surgery and Laboratory Science were more likely to have a higher severity of anxiety. The results also indicate that international students who socialized with Chinese students were less likely to report anxiety symptoms.

Table 3. Multiple linear regression analysis for variables predicting depression (N = 114).

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.462 ^a	0.214	0.119	0.66081

a. Predictors: (Constant), Socialization, Age, Gender, Preparation for coming to China to study, Religion, Family monthly income, Period of studying in China, Marital status, Discipline of study, Chinese skills, Place of origin, Highest degree before coming to China.

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.861	12	0.988	2.264	0.014 ^{b*}
	Residual	43.667	100	0.437		
	Total	55.528	112			

b. Dependent Variable: Depression; c. Predictors: (Constant), Socialization, Age, Gender, Preparation for coming to China to study, Religion, Family monthly income, Period of studying in China, Marital status, Discipline of study, Chinese skills, Place of origin, Highest degree before coming to China.

Coefficients ^a					
Explanatory variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.662	0.651		4.087	0.000
Age	-0.117	0.168	-0.107	-0.698	0.487
Gender	-0.050	0.129	-0.036	-0.386	0.700
Place of origin	0.103	0.149	0.082	0.693	0.490
Religion	-0.029	0.067	-0.043	-0.436	0.664
Study period	-0.104	0.049	-0.207	-2.111	0.037*
Discipline of study	-0.284	0.096	-0.344	-2.941	0.004*
Marital status	-0.008	0.127	-0.007	-0.064	0.949
Highest degree attained	0.225	0.163	0.222	1.380	0.171
Family monthly income	0.016	0.059	0.025	0.269	0.788
Preparedness	0.173	0.082	0.211	2.115	0.037*
Chinese skills	0.088	0.084	0.124	1.043	0.299
Socialization	-0.107	0.106	-0.096	-1.012	0.314

a. Dependent Variable: Depression; b. * $p < 0.05$.

Table 4. Multiple linear regression analysis for variables predicting anxiety (N = 114).

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.434 ^a	0.188	0.091	0.76570

a. Predictors: (Constant), Socialization, Age, Gender, Preparation for coming to China to study, Religion, Family monthly income, Period of studying in China, Marital status, Discipline of study, Chinese skills, Place of origin, Highest degree before coming to China.

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.579	12	1.132	1.930	0.039 ^{b*}
	Residual	58.630	100	0.586		
	Total	72.209	112			

a. Dependent Variable: Anxiety; b. Predictors: (Constant), Socialization, Age, Gender, Preparation for coming to China to study, Religion, Family monthly income, Period of studying in China, Marital status, Discipline of study, Chinese skills, Place of origin, Highest degree before coming to China.

Coefficients ^a					
Explanatory variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.251	0.755		2.983	0.004
Age	0.340	0.194	0.272	1.747	0.084
Gender	0.077	0.150	0.048	0.515	0.608
Place of origin	-0.038	0.173	-0.026	-0.220	0.826
Religion	0.022	0.078	0.029	0.287	0.774
Study period	-0.044	0.057	-0.077	-0.775	0.440
Discipline of study	-0.331	0.112	-0.352	-2.963	0.004 [*]
Marital status	-0.105	0.148	-0.081	-0.711	0.479
Highest degree attained	0.299	0.189	0.259	1.579	0.117
Family monthly income	-0.023	0.068	-0.033	-0.341	0.734
Preparedness	0.054	0.095	0.058	0.573	0.568
Chinese skills	0.142	0.097	0.175	1.455	0.149
Socialization	-0.255	0.122	-0.201	-2.080	0.040 [*]

a. Dependent Variable: Anxiety; b. ^{*} $p < 0.05$.

4. Discussion

4.1. Prevalence of Depression and Anxiety

This study sought to determine the prevalence of depression and anxiety among international students in the health professions and their socio-demographic predictors. The study results indicate that the proportion of the students who had anxiety was higher than those who had depression. Over half (52.63%) of the students were found to have anxiety. The results of this study are in line with study results from Germany among international medical students, where about half (49%) were found to have moderate to severe levels of anxiety (Akhtar et al., 2019). Similarly, a study in Bahrain found that the magnitude of medical students with anxiety was (51%) (Mahroon et al., 2018), using Beck's Anxiety Inventory (BAI) scale. The prevalence of anxiety in the current study was lower than studies undertaken among medical students in Egypt (73%) (Fawzy &

Hamed, 2017) using the Depression Anxiety Stress Scale (DASS 21) and higher than the global prevalence of 33.8% (Quek et al., 2019). Literature shows that the prevalence of anxiety was consistently higher among medical students compared to other students pursuing humanities and the general public, irrespective of the measuring scale utilized (Dyrbye, Thomas, & Shanafelt, 2006; Sahoo & Khess, 2010).

The prevalence of depression (36%) in the current study is similar to outcomes reported in Ethiopia among medical students (30.1% - 35.54%) (Kebede et al., 2019) using the HADs scale, in Cameroon (30.6%) (Ngasa et al., 2017), using the 9-Item-Patient Health Questionnaire (PHQ-9), and in Germany (34.92%) among medical students (Seweryn et al., 2015), using the Beck Depression Inventory (BDI). Studies in China (19.9%) (Pan, Wen, Zhao, Hu, Li, Zhang et al., 2016), Portugal (26.03%) (Seweryn et al., 2015), and in the United Kingdom (2.7% - 10.5%) (Quince, Wood, Parker, & Benson, 2012) reported lower outcomes among medical students. The disparity in the outcomes for depression and anxiety in these studies could be due to the different scales such as BAI, DASS 21, HADs, and PHQ-9 used to measure depressive symptoms.

4.2. Predictors of Depression and Anxiety

The current study revealed that the period of study in China was a predictor of depression. The prevalence of depression was highest among students in their first and second year in China. The results of this study are echoed in other literature that indicates that international students were more depressed in their first year compared to the domestic students in the same academic year (Sümer et al., 2008). In contrast, other studies indicate that medical students in their third year had a higher likelihood of reporting symptoms of depression compared to students in the first year (Nguyen et al., 2019). The possible explanation for the higher rate of depression among first and second-year international students is due to the adjustment difficulties they experienced during their first two years in the host country, coupled with demanding coursework and feelings of loneliness while dealing with culture shock. A related factor is the level of preparation done by the students before coming to China. Findings from our study indicate inadequate preparation before coming to China is associated with depression. Students should be encouraged to learn as much about their new host country before leaving their home country. International education institutions can strengthen their provision of information and resources to new students before their arrival (Liu et al., 2016).

The study results indicate that the discipline of study is a predictor of depression and anxiety. Undergraduate students pursuing MBBS and postgraduates pursuing master's degrees in Plastic Surgery and Laboratory Science had a higher prevalence of anxiety, compared to students seeking master's degrees in public health, while depression symptoms were higher among Ph.D. students. This outcome is in line with other research indicating that the discipline of study

among students in the health profession was one of the main factors associated with symptoms of depression (AlFaris, Irfan, Qureshi, Naeem, Alshomrani, Pon-namperuma et al., 2016). The courses' distinctive rigorous nature contributes to the stressful environment, depressive symptoms, and anxiety the students face throughout their training.

In this study, socialization is a predictor of anxiety. Students who socialized with Chinese students were less likely to have depression and anxiety. However, the majority of the students indicated that they socialize with non-Chinese Students. The main underlying issue that hinders students from socializing with Chinese domestic students could be the language barrier. A study regarding acculturative and depression among international students in China conducted by Liu, Y., et al. (2016) pointed out that international students who spoke English as their second language faced fewer challenges adjusting in English-speaking countries. The study continued to note that the social adjustment of these students might be more challenging in China since most Chinese are less likely to speak English as a second language (Liu et al., 2016). Programs to teach incoming international students the Chinese language go a long way in aiding the adjustment of international students into China. In addition to these programs, encouraging interactions between Chinese and international students could mitigate the social adjustment problems encountered by these students.

Regarding other socio-demographic factors, this study did not support previous studies indicating that age, gender, religion, financial constraints, language, and ethnicity as predictors of depression and anxiety (Eskanadrieh et al., 2012; Ogunsanya et al., 2018; Othieno et al., 2014; Shamsuddin, Fadzil, Ismail, Shah, Omar, Muhammad et al., 2013).

4.3. Limitations

There are several limitations to our study. First, the sample used in the study represents the total population of international students enrolled in the university taking courses where English is the primary medium of instruction. However, since the data was collected online, the return rate is only 11%. The main reason is data collection was carried out at the end of the fall semester, in the middle of January 2020, before news of the coronavirus disease 2019 (COVID-19) outbreak in Wuhan, China. To avoid response bias, we decided not to send further reminders of the online survey to the students since news of the outbreak would have affected students' perception of their anxiety and depression. Secondly, the correlational nature of the study examining the socio-demographic predictors of depression and anxiety may not infer causation. The higher prevalence of anxiety and depression among students in the health profession could also emanate from academic workload, lack of sleep, language barriers during interactions with patients during clinical practice, challenges adapting to different healthcare systems, discrimination, exposure to deaths of patients, and receiving saddening news from home (McKenna et al., 2017; Quek et al., 2019).

5. Implications and Recommendations

The results of this study will assist educators and school counselors to identify international students in the health professions at risk of developing depression and anxiety. The long-term effects of depression and anxiety amongst these students have negative implications that extend to the individuals, households, and communities they will serve later in their careers. Therefore, early detection of depression and anxiety symptoms among this population is paramount and has a greater impact on our society as a whole.

The results of this study illustrate how inadequate preparation of international students before coming to China is associated with depression. To increase the level of preparedness of students before coming to China, education institutions can strengthen the provision of information on culture, norms and standards of the host university/institution and country including general information such as weather, school and local community maps with key locations to new students before and after their arrival. The provision of information before and after arrival into the host country reduces stress encountered by international students during the adaptation process into a new culture.

The study also found that the discipline of study is a predictor of depression and anxiety. We suggest education institutions increase awareness of and access to psychological support for students pursuing courses that are rigorous in nature since there are more susceptible to developing depressive symptoms and anxiety during their training.

The results of this study illustrate how inadequate preparation of international students before coming to China is associated with depression. To increase the level of preparedness of students before coming to China, education institutions can strengthen the provision of information on culture, norms and standards of the host university/institution and country including general information such as weather, school and local community maps with key locations to new students before and after their arrival. The provision of information before and after arrival into the host country reduces stress encountered by international students during the adaptation process into a new culture. Furthermore, we suggest institutions provide access to multilingual interactions with school counselors and current students who can assist, guide, and mentor students after they arrive and during their stay in the host country.

Social and academic interactions between Chinese and international students and cross-cultural communication training programs should be encouraged. This would have a favorable impact on the students' adjustment process and thereby alleviating acculturative stress and the development of mental health issues. Further research is needed to evaluate the potential reasons for the high rate of anxiety and depression and their associated factors among international students in the health professions.

6. Conclusion

The prevalence of depression (36%) and anxiety (52.63%) among the study pop-

ulation was relatively high. The length of time in China and the level of preparedness before coming to China were significant predictors of depression, while socialization was a significant predictor of anxiety. The discipline of study was a predictor of both depression and anxiety. The findings of this study highlight the growing need to shed more light on the mental health issues facing international students in the health professions.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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