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Research

Mental health and coping strategies among international health science students during the COVID-19 pandemic: A cross-sectional study



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ABSTRACT

Background: Amidst the challenges brought about by the COVID-19 pandemic, international students face significant mental health burdens.

Aim: This study aimed to explore international health science students' mental health and coping abilities during the coronavirus disease 2019 pandemic.

Methodology: A survey was conducted between May and September 2022 using an online questionnaire with the Kessler Psychological Distress Scale and Coping Self-Efficacy Scale.

Findings: A total of 105 international students from 3 Australian universities were recruited with 84% of the participants being nursing students. There was no comparison group of local/Australian-born students. Psychological distress was reported by 67% of respondents. Problem-focused coping prevailed with higher scores than emotional-focused and social support coping. Financial struggles with rent increased psychological distress likelihood, while social support mitigated it. Social support coping was significantly associated with psychological distress, clinical placement, and problem-focused and emotional-focused coping. Emotional-focused and Problem-focused coping was associated with participants' age.

Discussion: The study underscores the need for affordable housing and support networks while recognizing the interdependence of coping dimensions for enhancing students' overall well-being.

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Introduction

Australia is one of the world's leading destinations for international students seeking quality education and better employment prospects (Australian Government, 2021). A total of 622,032 international students were studying in Australia in the first half of 2023 (Australian Government Department of Education, 2023). International students contribute billions of dollars annually to the Australian economy through tuition fees, accommodation, and daily expenses (Australian Government, 2021; Hong et al., 2023; Nguyen &

Hartz, 2020). For example, In 2019, it was estimated that international students contributed about 40.3 billion dollars to the Australian economy, marking it the third largest export (Australian Government, 2021; Hong et al., 2023).

Aside from the economic contribution, international students foster multiculturalism (Australian Government, 2021). Australia's multicultural society is strengthened by the coming in of international students who bring with them a rich array of languages, traditions, and perspectives (University of South Australia, 2019). This creates an environment that promotes cross-cultural understanding and tolerance. International students also engage in cultural exchange activities, which include sharing their heritage and traditions with domestic students and local communities

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(University of South Australia, 2019). This promotes a deeper understanding of different cultures and fosters mutual respect among diverse groups.

About 8% of international students enroll in health-related fields such as nursing, medicine, public health and others (Norton et al., 2018). Most of these students prefer to work in Australia after graduation (McGrail et al., 2019). The Australian immigration policy allows international health science students to apply for registration with the regulatory body and work as skilled migrants (Rumsey et al., 2016; Tran et al., 2020). This policy has led to an increase in the number of international students working in different settings where there is a high demand for healthcare workers. Between 2010 and 2015, about 35% of international students who graduated from Australian universities were in full-time jobs. Furthermore, evidence shows that 70% of graduating international nursing and medical students enter the Australian workforce (Australia Health Workforce, 2014; McGrail et al., 2019). Although there has been a high demand for health science students to enter the Australian workforce for many years, COVID-19 has increased this demand further due to the critical skills shortage within the health industry (Bourgeault et al., 2020).

While international students bring significant contributions, they also challenges including issues related to mental health, accommodation, and employment opportunities (Weng et al., 2021). These challenges have been exacerbated by the COVID 19 pandemic (Agu et al., 2021; Van de Velde et al., 2021). Creating a supportive environment for international students will ensure their continued positive impact on Australia's society and economy.

Literature Review

University students are often at the age (early adulthood) when concerns about mental health are particularly salient (Browne et al., 2017; Pascoe et al., 2020). It is estimated that around 20% of university students experienced mental health issues yearly, a higher rate than nonstudent peers. New and unfamiliar social and academic environments may compound the incidence (Stallman, 2010). The COVID-19 pandemic has had a major impact on the mental well-being of university students since it started in 2019 (Dash et al., 2022). As the COVID-19 pandemic spread globally, students in the higher education sector were among the first to be significantly affected, especially those in Australia due to hard border closures and travel restrictions to other countries (Dash et al., 2022; Sidhu et al., 2021). While international students may feel a sense of privilege at studying abroad in developed countries like Australia, this feeling may be quickly consumed by feelings of isolation and segregation from their communities (Belford, 2017; Dash et al., 2022). Therefore, many international students developed second thoughts about studying abroad (Raja et al., 2023), and returned to their origin country during the pandemic. However, some remained in Australia to continue their university studies (Van de Velde et al., 2021).

Forbes-Mewett, and Sawyer (2019) summarized three common behaviors displayed by international students studying in Australia: (1) adapting to an unfamiliar academic environment, (2) the shock of independency, and (3) hesitations to engage in help-seeking behaviors. These behaviors can have a detrimental effect on students' mental health and well-being. Other studies have also highlighted symptoms of loneliness and isolation as detrimental factors affecting many international students, especially during the early stages of their studies (Brooks et al., 2020; Dash et al., 2022; Forbes-Mewett & Sawyer, 2019; Sawir et al., 2008). While people experiencing a crisis are generally open to seeking help, international students described feelings of shame, stigma and fear, and the reluctance to seek help may exacerbate their personal crisis (Liao et al., 2023). To add to their stress during the pandemic, international students had reduced

support from families and friends due to the travel restrictions or lockdowns, and could only access them by phone or online (Aslan & Pekince, 2021; King et al., 2020). The loneliness and physical distancing from loved ones experienced by international students during the pandemic have potentially increased their stress, anxiety, and sadness, leading to the risk of long-term psychological issues and reduced levels of mental health and well-being (Aslan & Pekince, 2021). Some international students, especially those from nonwestern countries, have also reported facing discrimination and isolation due to being deemed as potential coronavirus carriers. This has been viewed as damaging their sense of belonging and self-esteem, leading to some of them experiencing poorer mental health and well-being (Ding et al., 2020; King et al., 2020).

Sociological researchers have found that cultural factors significantly influence social engagement and support expectations (Humphrey & Forbes-Mewett, 2021). For instance, students from highly collectivistic cultures, like China and India tend to have strong expectations of social engagement, connectivity, and support from education providers to enhance their learning experience. These cohorts make up the majority of international students numbers in Australia, yet universities find it challenging to meet these expectations, resulting in many students feeling a sense of disappointment (Gan & Forbes-Mewett, 2018; Humphrey & Forbes-Mewett, 2021; Owens, 2008). The COVID-19 pandemic has exacerbated the challenges further by causing disruptions to learning and teaching, inadequate technology and internet access, and changes in assessment formats (Agu et al., 2021; Van de Velde et al., 2021). This reinforces the importance of ongoing social support and tailored orientation and academic programs for international students, especially those from collectivistic cultures studying in individualistic environments like Australia (Humphrey & Forbes-Mewett, 2021).

Although Australia has been less affected by the pandemic and has a strong economy compared to other nations, the government initially did not include international students in their relief packages (Nguyen & Balakrishnan, 2020; O'Sullivan et al., 2020). As such, many have had to work during this period to support their studies and maintain food and housing security (Hari et al., 2023). Financial hardship has forced many students to work long hours to reduce the financial burdens on their families back home. However, working long hours could negatively impact students' academic performance and consequently leading to profound shame and guilt for failing their families (Hari et al., 2023; Van de Velde et al., 2021). Students whose jobs were terminated during lockdowns experienced higher levels of stress as they needed to secure new employment to maintain their lifestyle and meet their expenses (Van de Velde et al., 2021).

Many international university students have developed personal common strategies to improve their learning experience despite facing various barriers, including financial hardship caused by COVID-19. These strategies include developing a routine, creating study space, maintaining social connections, engaging in physical activity, practicing mindfulness, and seeking support from university resources such as counselling services (Lai et al., 2020; Xia & Duan, 2020). However, persistent barriers such as cultural and language differences, threats of racism, and political tensions may potentially impede the efficacy of these coping strategies (Weng et al., 2021).

Theoretical Framework

The study will be guided by Folkman and Lazarus' (1984) Problem-Focused and Emotion-Focused model which describes what individuals in stressful situations need to do to cope with the stress (Lazarus & Folkman, 1984). According to Folkman and Lazarus people cope with stress by altering the problem that is causing stress, (this is known as problem-focused coping) and/or regulating their emotional responses to stressful events (this is known as emotion-focused

coping) (Lazarus & Folkman, 1984). Within this meta-theory, details of social support-focused coping will be operationalized using the Social Support Model (Thoits, 1995). According to Thoits (1995), the coping structure requires another coping dimension known as social-focused coping. Social support coping refers to the instrumental, informational and emotional assistance that an individual receives from significant others. According to Thoits (1995), Social Support Coping reduces the effects of stress on an individual's physical and mental health outcomes (Thoits, 1995).

Purpose of the Study

To date, limited research has examined factors associated with mental health and coping abilities of international health sciences students residing in a foreign country during the COVID-19 pandemic. This study aimed to explore international health science students' mental health and coping abilities during the COVID-19 pandemic. Specifically, the study answered the following research questions: (1) What is the prevalence of mental health issues among international health science students during the COVID-19 pandemic? (2) What type of coping mechanisms are commonly used by international health science students during the COVID-19 pandemic? (3) What factors are associated with mental health among international health science students during the COVID-19 pandemic? (4) What factors are associated with coping abilities adopted by international health science students during the COVID-19 pandemic?

Methodology

Study Population, Design, and Recruitment Procedure

A cross-sectional study was conducted that involved international health sciences students. Participants were recruited from three Australian universities: (Blinded for peer review) between May to September 2022. The recruitment materials were made available on the online learning management systems, and flyers were placed on the notice boards of each university. In addition, emails were sent to students inviting them to participate in the study. Participants completed the questionnaire online through Qualtrics. The recruitment materials had a link to the questionnaire and participant information sheet. Those who expressed interest to participate in the study reviewed the participant information sheet before completing the questionnaire. Informed consent was inferred when the participant proceeded to answering the questions. Students were recruited in the study if they met the following criteria: they were international students who had a valid student visa, they were enrolled in the faculty of health sciences at any of the three universities between 2020 and 2022, they remained in Australia throughout the pandemic, and they completed at least one semester of their course. No incentives were provided to encourage participation in the study.

Sampling and Sample Size

A convenient sample of international health sciences students enrolled across three universities between 2020 and 2022 was approached to participate in the study. We used an online sample size calculator to determine the sample size for this study (Raosoft, 2020). We estimated that the three universities had approximately 1000 students that fits the inclusion criteria. Based on the estimated population and setting the margin error and confidence level at 0.05 and 95% respectively, a sample size of 278 students was needed (Raosoft, 2020).

Data Collection Tools

A questionnaire with three sections was developed to collect data. The sections included (1) participants' sociodemographic information, (2) mental health, and (3) coping self-efficacy.

Sociodemographic Information

This section of the questionnaire had questions related to the participant's age, race/ethnicity, gender, marital status, country of origin, employment status, income per week, having responsibility as a caregiver, frequency of contacting their families per week, duration of studying in Australia and having one or more relatives living in Australia.

Kessler Psychological Distress Scale - K10

The mental health of participants were assessed by a validated instrument, Kessler Psychological Distress Scale (K10) (Kessler, 1979; Kessler et al., 2003). The K10 scale, created with backing from the U.S. National Center for Health Statistics for the revamped U.S. National Health Interview Survey (NHIS), is freely available for research use and doesn't necessitate formal authorization. The K10 authors' research article, in accordance with their stipulations, has been appropriately cited, and the copyright details have been included in the bibliography.

The K10 scale consists of 10 items on emotional states each with a 5-level response scale. The total score is 50 with 10–19 being "likely to be well" and 30–50 being "likely to have a severe disorder." The K10 scale has been reported to have good reliability with a Cronbach's alpha of 0.88 in a previous study (Sampasa-Kanyinga et al., 2018).

Coping Self-efficacy Scale

The perceived ability of students to cope with challenges were assessed by the coping self-efficacy (CSE) Scale (Chesney et al., 2006). The CSE scale measures a person's perceived ability to cope effectively with life challenges, containing 26 items rated on a Likert scale from 0 to 10; and it captures three components, namely problem-focused coping, receiving social support (social focused coping) and stopping unpleasant emotions and thoughts (emotional-focused coping). This instrument has been validated with reported good reliability and a Cronbach's alpha ranged from 0.8 to 0.91 (Chesney et al., 2006).

Data Analysis

The main outcome measures of this study included mental health and coping self-efficacy. The three subscales of coping self-efficacy (social support, emotional and problem-focused coping) were assessed independently. Characteristics of participants were summarized using descriptive statistics. The chi-square test was used to identify factors that are associated with mental health and independent t-test was used to examine the relationship between psychological distress and coping self-efficacy. Factors that were significant at $p < 0.05$ in bivariate analysis were entered into the multivariate logistic regression and general multivariate linear model to identify factors that are independently associated with mental health and coping self-efficacy respectively. The significance level was set at $p < 0.05$. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 28.

Ethical Concerns

Ethical approval for this research project was obtained from the Human Research Ethics Committees of three universities (names blinded for peer review). The researchers maintained transparent

and open communication with the student participants throughout the research process. Participants were provided with comprehensive information about the study's objectives and potential implications. They were also informed about their rights as research participants, including the option to decline participation or exit the survey at any point without facing any consequences.

The survey was conducted online, and participants' consent was implied when they chose to progress through the survey. The invitation email sent to potential participants included a participant information sheet, which provided detailed information about the study. Participants were not obligated to answer any specific questions; they had the freedom to skip any question they did not wish to answer. Additionally, no personally identifiable information was collected, ensuring complete anonymity for all participants.

No incentives or rewards were offered to participants for their involvement in the study. Prior to data collection, formal permission was obtained from the management of the three universities to gather data from their students.

All hard-copy data have been and will be securely stored in a lockable cabinet within the researcher's office at the University for a duration of 7 years. Electronic data will be safeguarded on the researcher's password-protected computer and University's password-protected research drive.

Results

Participant demographics: Our data analysis only included completed surveys as the participants were only able to submit the completed questionnaire after they have answered all the questions. Participants were prompted to complete any questions that they have missed and this ensured that there were no questionnaire with

missing data. The authors recruited 1000 students (by email), spanning three different universities of whom only 105 completed the survey. Therefore, a total of 105 students participated in the study (n=105). **Table 1** shows sociodemographic characteristics of the participating students. More than three-quarters of the participants (84%) were from (blinded for peer review), and the remaining proportion (16%) were from the (blinded for peer review). The majority of the students (71%) were between the ages of 18 and 29 with a preponderance of females (83%). About 84% of the participants were enrolled from the school of nursing, while the remaining from either allied health, occupational health or medical schools. Nine in 10 students reported that their course had a clinical placement component. The proportion of postgraduate students was three time higher than undergraduate (76% and 24% respectively). The majority of the students (80%) had been living in Australia over a year, while the rest 20% was less than 12 months. More than half of the study participants (64%) studied in Australia for longer than a year.

Prevalence of Mental Health Issues Among International Health Science Students During COVID-19

Regarding mental health issues, most students (67%) experienced some level of psychological distress.

Coping Abilities Commonly Used by International Health Science Students During COVID-19

Regarding self-perceived coping ability, students reported a higher mean of problem focused coping (68.20 ± 21.08) compared to the emotional-focused (45.93 ± 18.14) and social-support coping (24.60 ± 10.42).

Table 1
General Characteristics of Participants' (N=105)

Characteristics	n (%)	Characteristics	n (%)/*M (SD)
Gender		Live With Family/Relatives	
Female	87 (83)	Yes	32 (31)
Male	17 (16)	No	73 (69)
Age		Contact Family in a week	
18–29 yrs	74 (71)	Once or less than once	22 (21)
30 yrs and above	31 (29)	Every day or several times	67 (64)
University		Caregiver responsibilities	
Curtin University	88 (84)	Yes	28 (27)
University of Queensland/Southern Queensland	17 (16)	No	77 (73)
Academic discipline		Engaged in paid work	
* Nursing	88 (84)	Yes	89 (85)
* AH/PH/MS	17 (16)	No	16 (15)
Practicum component		Hours of paid work	
Yes	94 (90)	1–20hrs/week	60 (67)
No	11 (10)	≥ 20hrs/week	29 (23)
Education level		Income per week	
Studying UG degree	25 (24)	≤\$499	43 (48)
Studying PG degree	80 (76)	≥\$500	46 (52)
Time in Australia		Rent affordability	
More than 1 yr	84 (80)	Mild-moderate struggle	64 (61)
≤1yr	21 (20)	Can easily pay rent	41 (39)
Studying in Australia		Psychological distress	
More than a year	67 (64)	Likely to be well	35 (33)
≤1yr	38 (36)	Likely to have some level of distress	70 (67)
Family/relatives in Australia		Problem focused coping	68.20 (21.08)
Yes	59 (56)	Emotional focused coping	45.93 (18.14)
No	46 (44)	Social support coping	24.60 (10.42)

*Nursing, midwifery, nurse practitioner, diabetes educator

*AH - Allied Health (social work, physiotherapy, occupational therapy); PH - Population Health (public health, epidemiology, psychology, health administration); MS- Medical School

*M - Mean; SD - Standard Deviation

Table 2
Association Between Sociodemographic Factors and Psychological Distress (N=105)

Variables	Mild/moderate to Severe Distress (%)	Likely to be Well (%)	Unadjusted Odds Ratio	95% CI	* p Value
<i>Rent affordability</i>					
Mild-moderate struggle	48 (75)	16 (25)	2.5	1.16–5.99	0.034
Can easily pay rent	22 (54)	19 (46)	Reference		
<i>Education level</i>					
Studying UG degree	17 (68)	8 (32)	1.0	0.41–2.82	1.000
Studying PG degree	53 (66)	27 (33)	Reference		
<i>Academic discipline</i>					
* Nursing	60 (68)	28 (32)	1.5	0.51–4.35	0.575
* AH/PH/MS	10 (59)	7 (41)	Reference		
<i>Time in Australia</i>					
More than 1 yr	59 (70)	25 (30)	2.1	0.81–5.68	0.130
≤1yr	11 (52)	10 (48)	Reference		
<i>Contact Family in a week</i>					
Once or less than once	16 (73)	6 (27)	1.9	0.66–5.49	0.313
Every day or several times	39 (58)	28 (42)	Reference		
<i>Gender</i>					
Female	60 (69)	27 (31)	1.5	0.53–4.52	0.412
Male	10 (59)	7 (41)	Reference		
<i>Caregiver responsibilities</i>					
No	55 (71)	22 (29)	2.1	0.79–5.29	0.104
Yes	15 (53)	13 (46)	Reference		
<i>Engaged in paid work</i>					
Yes	60 (67)	29 (33)	1.2	0.41–3.74	0.776
No	10 (63)	6 (37)	Reference		
<i>Hours of paid work</i>					
1–20hrs/week	44 (73)	16 (27)	2.2	0.88–5.65	0.097
≥ 20hrs/week	16 (55)	13 (45)	Reference		
<i>Studying in Australia</i>					
More than a year	46 (69)	21 (31)	1.2	0.33–1.80	0.667
≤1yr	24 (63)	14 (37)	Reference		
<i>Practicum component</i>					
Yes	65 (69)	29 (31)	2.6	0.75–9.52	0.174
No	5 (46)	6 (54)	Reference		
<i>Family/relatives in Australia</i>					
No	33 (72)	13 (28)	1.5	3.57–0.67	0.406
Yes	37 (63)	22 (37)	Reference		
<i>Live with family/relatives</i>					
No	51 (70)	22 (30)	1.6	3.84–0.67	0.369
Yes	19 (59)	13 (41)	Reference		

*Nursing, midwifery, nurse practitioner, diabetes educator

*AH - Allied Health (social work, physiotherapy, occupational therapy); PH - Population Health (public health, epidemiology, psychology, health administration); MS- Medical School

*All values shown for psychological distress are statistically significant at a p-value of ≤0.05

Factors Associated With Mental Health Among International Health Science Students During COVID-19

Sociodemographic Factors Associated With Psychological Distress in Bivariate Analysis

Table 2 shows sociodemographic factors associated with psychological distress in bivariate analysis. The results show that students who experienced mild to moderate struggle with paying rent were 2.5 times more likely to experience psychological distress than students who were able to pay the rent (Odds ratio [OR] =2.5, 95% confidence interval [CI]: 0.16–0.88, $p=0.034$). None of the other

sociodemographic variables was significantly associated with psychological distress.

Association Between Students Coping Self-efficacy and Psychological Distress in Bivariate Analysis

Table 3 shows the association between students coping and psychological distress in bivariate analysis. The results show that students with psychological distress had statistically significant lower mean scores across the three self-perceived coping abilities (problem focused, emotional focused and social support

Table 3
Association Between Students Coping Self-efficacy and Psychological Distress in Bivariate Analysis

	Mild/Moderate/Severe		Likely to be well		t-test	df	p value
	M	SD	M	SD			
Problem Focused Coping	62.66	21.14	79.25	16.25	-4.08	103	0.001
Emotional Focused Coping	41.04	17.28	55.80	15.88	-4.24	103	0.000
Social Support Coping	21.27	9.56	31.35	8.80	-5.17	102	0.000

Note. M = mean; SD = standard deviation.

* All values shown for psychological distress are statistically significant at a p-value of ≤0.05

Table 4
Factors Associated With Psychological Distress in Multivariate Analysis (N=105)

Variables	B	Adjusted Odds Ratio (aOR)	95% CI	p Value
<i>Rent affordability</i>				
Mild-moderate struggle	1.9	3.2	1.21–8.81	0.019
Can easily pay rent		Reference		
<i>Social Support Coping</i>				
	-0.1	0.9	0.85–0.99	0.019

coping) compared to those without psychological distress ($p = 0.001$).

Table 4 presents factors associated with psychological distress in multivariate analysis. The results shows that rent affordability and social support coping were significantly associated with psychological distress. The odds for psychological distress were significantly higher for students who experienced difficulty in paying rent ($aOR = 3.2$; 95% CI [1.21,8.81]; $p = 0.019$); whereas students who reported having social support were less likely to have psychological distress ($aOR = 0.9$; 95% CI [0.85,0.99]; $p = 0.019$).

Factors Associated With Coping Abilities Adopted by International Health Science Students During COVID-19

Table 5 presents factors associated with coping abilities in multivariate analysis. A statistically significant association was found between psychological distress and social focused coping abilities; international students experiencing higher psychological distress were 4.5 times more likely to report lower social coping ($\beta = -4.5$, $p = 0.006$). However, students engaged in clinical placements within their courses are 5.6 times more likely to exhibit strong social focused coping compared to those in courses without clinical placements ($\beta = 5.6$, $p = 0.013$). Similarly, students with stronger problem-focused

and emotion-focused coping are 0.2 times more likely to demonstrate enhanced social focused coping ($\beta = 0.2$, $p = 0.003$; $\beta = 0.2$, $p = 0.005$). The four variables retained in the model explain 59% of the variability of the students' social coping abilities.

Furthermore, Table 5 also shows that students aged 18–29 were associated with lower emotionally focused coping. Students in this age category had 4.7 units lower coping than those who were 30 or older ($\beta = -4.7$, $p = 0.026$). Students with stronger problem-focused and social focused coping abilities are 0.5 and 0.4 times more likely to demonstrate enhanced emotional coping ($\beta = 0.5$, $p < 0.001$; $\beta = 0.4$, $p = 0.001$). The three variables retained in the model explained 73% of the variability of the students' emotional focused coping abilities. The multivariate findings also highlights a similar age-related risk factor for problem-focused coping, where students aged 18–29 have 4.7 units lower coping abilities than their older counterparts ($\beta = -4.7$, $p = 0.026$). Additionally, students with stronger emotional-focused coping and social coping are 0.8 and 0.5 times more likely to demonstrate enhanced problem focused coping ($\beta = 0.8$, $p < 0.001$; $\beta = 0.5$, $p = 0.003$). The three variables retained in the model explained 71% of the variability of the students' problem focused coping abilities.

International Nursing Students

The study focused on health science students, with a majority (84%) being nursing students.

To gain insights specific to nursing students, the research team conducted a targeted statistical analysis to compare international health science students and international nursing students. When we compared the two groups using chi-square test, only one significant difference was identified. The nursing students were six times more likely to have clinical placements in their courses compared to other health science students (Odds ratio [OR] = 6, 95% confidence interval

Table 5
Factors Associated With Coping Skills in Multivariate Analysis (N=105)

A: Social Support				
Variables	β coefficient	SE	95% CI	p Value
Psychological distress (Likely=1)	-4.5	1.6	-7.63 - 1.34	0.006
Psychological distress (Not likely=2)	Reference			
Clinical placement (Yes=1)	5.6	2.2	1.21 9.95	0.013
Clinical placement (No=2)	Reference			
Problem focused coping	0.2	0.1	0.06 0.29	0.003
Emotional focused coping	0.2	0.1	0.05 0.32	0.005
*All values shown for psychological distress are statistically significant at a p-value of ≤ 0.05 R Squared = 0.59				
B: Emotional Focused				
Variables	β coefficient	SE	95% CI	p Value
Age (18–29 yrs = 1)	-4.7	2.1	-8.79 -0.59	0.026
Age (30 yrs and above = 2)	Reference			
Problem focused coping	0.5	0.1	0.42 0.67	0.000
Social support coping	0.4	0.1	0.19 0.69	0.001
*All values shown for psychological distress are statistically significant at a p-value of ≤ 0.05 R Squared = 0.73				
C: Problem Focused				
Variables	β coefficient	SE	95% CI	p Value
Age (18–29 yrs = 1)	-4.7	2.1	-8.79 -0.59	0.026
Age (30 yrs and above = 2)	Reference			
Emotional focused coping	0.8	0.1	0.60 0.94	0.000
Social support coping	0.5	0.2	0.16 0.76	0.003
*All values shown for psychological distress are statistically significant at a p-value of ≤ 0.05 R Squared = 0.71				

[CI]: 1.50–21.58, $p = <0.016$). This disparity suggests that clinical placements are more integral to nursing education compared to other health science disciplines. No other factors were significant.

When we separately analyzed the nursing students dataset, we found that nursing students had the same significant multivariate factors associated with psychological distress and coping abilities as those of the health science students.

Discussion

Overall the prevalence of psychological distress reported in this study is similar to those reported in Australian (Mihirshahi et al., 2022) and French studies (Husky et al., 2020). The study conducted by Mihirshahi and colleagues reported that 66.6% of the international student sample reported psychological distress. Furthermore, the authors highlighted a statistically significant difference in psychological distress experiences between domestic and international students; the average psychological distress score for international students was 5.05 points higher than that of domestic students. Husky and colleagues indicated that two third of their sampled student population experienced psychological distress since the beginning of COVID-19 isolation period. In contrast, the prevalence of psychological distress in this study is higher than that reported in a Chinese study (4%) (Cao et al., 2020) and is lower than that reported in another Chinese study (80%) (Lai et al., 2020). The variation in the prevalence of psychological distress reported in our study compared to other studies is likely to be due to methodological and cultural factors. The high prevalence of psychological distress identified in this study might be attributed to many factors experienced by students during COVID-19 pandemic including financial constraints (Cao et al., 2020; Dodd et al., 2021; Husky et al., 2021; Lai et al., 2020).

Globally, the COVID-19 pandemic has placed many international students in a financially vulnerable position, where they face uncertainty regarding food and housing security (Negash et al., 2021). Our study supported this predicament, as we found a significant association between financial difficulties and psychological distress among the sampled students. Specifically, our research revealed that students who struggled to pay rent were 3.2 times more likely to experience psychological distress ($aOR = 3.2$; $p = 0.019$; 95% CI [1.21, 8.81]). Struggling with rent payments remained a significant predictor of psychological distress, even after controlling for other variables suggesting that the impact of financial difficulties on mental health is robust and warrants attention in intervention efforts. This finding is consistent with the results of a previous study which showed a significant positive association of financial hardship with increased risk of psychological distress among students during COVID-19 (ElTohamy et al., 2022; Goldrick-Rab, 2020; Nguyen & Balakrishnan, 2020). Universities and colleges could consider implementing financial aid programs, scholarships, or financial counselling services to assist students in managing their financial burdens and reducing the likelihood of psychological distress.

In addition to financial hardship, social isolation compounds the decline in students' mental health and disrupts their social support systems (Nguyen & Balakrishnan, 2020). This is similar to what we found in our study which revealed that social support (social-focused coping) was a protective factor against psychological distress ($aOR = 0.9$; $p = 0.019$; 95% CI [0.85, 0.99]). Additionally, our research demonstrated that psychological distress adversely affects students' ability to seek and utilize social support networks, indicating lower coping in this area which is evident in previous studies (Sullivan et al., 2020; Thompson et al., 2016).

Studies have shown that nursing and other health related course students develop better social coping abilities and resilience to stress through engaging in clinical placements and working in a

trustworthy culture that provides support from educators and peers (Amsrud et al., 2019; Lopez et al., 2018). Our study aligns with these findings, as it reveals that clinical placements have a positive impact on social support (social focused coping abilities). This study found that students enrolled in a course with clinical placement had 5.6 units higher mean social focused coping abilities than those without clinical placement. In contrast to the findings of our study, some studies have highlighted that while clinical placements did offer opportunities for social interaction and support, the increased worries about potential exposure to COVID-19 for both the students and their families hindered students' ability to cope effectively. Consequently, students pursuing health-related courses experienced lower coping and higher levels of distress and anxiety symptoms when compared to students in other fields (Moxham et al., 2022; Yang et al., 2021). It is important to note that being in training and lacking professional experience, the ever changing nature of clinical placements during COVID-19 could serve as a significant and unique stressor for students possibly due to ineffective coping strategies. This highlights the importance of having effective coping strategies in place to support students' resilience and mental health.

The research conducted by Zhao et al. (2015) emphasized the importance for nursing students to identify effective coping strategies in order to enhance their learning experience during clinical placements and alleviate stress (Zhao et al., 2015). Our study supported this notion because the results indicated that students with no psychological distress were associated with significantly higher coping abilities than students with psychological distress. Moreover, our findings demonstrated that the majority of students predominantly utilized problem-focused as their primary coping mechanism, as opposed to emotion-focused and social-focused coping. This finding is consistent with a similar study conducted in India among medical, dental and nursing students (Mishra et al., 2023). However, a study by Kamble (2017) reported that students who employed emotion-focused coping strategies during the examination period exhibited better stress management compared to those who relied only on problem-focused strategies, illustrating the interrelatedness of coping strategies (Kamble, 2017). This is further supported by Mahfoud and colleagues who reported that adults who possess higher problem-focused and emotion-focused coping abilities are more likely to utilize and benefit from social support (Dwyer & Cummings, 2001; Mahfoud et al., 2023). Finally, the positive associations found in this study between social support and problem-focused and emotion-focused coping strengthen the interconnected nature of the coping dimensions discussed above. This suggests that interventions targeting multiple coping dimensions and emphasizing the development of holistic coping strategies may be particularly beneficial for students' overall well-being.

Finally, age was identified as a significant ($p = 0.026$) risk factor for problem-focused and emotion-focused coping. The students aged 18–29 were identified as having a significant risk factor for lower problem-focused and emotionally focused coping. Students in this age category had 4.7 units lower coping abilities than those who were 30 or older.

The findings raise questions about the potential influence of developmental factors on coping strategies. In consistence with our results, earlier studies have shown that older students owing to their seniority and maturity might be able to handle the situation more effectively whereas newcomers and young students might face difficulty adjusting between the curriculum and the COVID-19 situation (Mishra et al., 2023; Vungkhanching et al., 2017). Younger individuals may have less experience in dealing with stressors and may require additional support and guidance to develop effective coping abilities. Targeted interventions tailored to the needs of different age groups could help promote adaptive coping strategies among students.

Limitations

The study had few limitations. The study's findings may not be generalizable to all international students, as the sample size was small and consisted of students enrolled in the Faculty of Health Sciences only. Additionally, the study suffered from a low response rate (10%), which affected its statistical power. It's important to note that the data collection spanned from 2020 to 2022, during the COVID-19 pandemic, which could have influenced the survey response rate (Zuvekas & Kashiwara, 2021). Furthermore, the cross-sectional design of the study limits the ability to establish causal relationships between variables. Future research could employ longitudinal designs to examine the directionality of relationships between socio-demographic variables, coping abilities, and psychological distress among students. The study relied on self-reported measures for assessing psychological distress, coping abilities, and other variables hence could be influenced by response biases, such as social desirability and cultural factors. The study did not include a comparison group of noninternational nursing students or students from other disciplines. A comparison group would have allowed for a better understanding of the unique experiences and challenges faced by international nursing students during the pandemic. Furthermore, the study faced a limitation regarding the enforcement of questionnaire completion in Qualtrics (Forced Response), which hindered monitoring of clicks and unfinished surveys. This may have led to response bias and survey abandonment resulting in the loss of valuable insights.

Conclusion

Our study provides valuable insights into the relationship between psychological distress, coping abilities, and various factors among international nursing students during the COVID-19 pandemic. Financial difficulties and social isolation have significant impacts on mental health, while social support and other effective coping can mitigate the negative effects. Age and developmental factors also influence coping abilities. The interconnected nature of coping dimensions emphasizes the importance of interventions that address multiple aspects of coping for promoting students' overall well-being.

Author contribution statement

Ms Ambili Nair – Co-investigator, lead writer of the article, data collection, data analysis; Dr Fatch Kalembo – Co-investigator, article writer, data collection, data analysis; Dr Zhou Huaqiong – Co-investigator, data collection, reviewer; Dr Linda Ng – Co-investigator, data collection, reviewer; Dr Glenda Hawley – Co-investigator, data collection, reviewer; Mr Aaron Grogan – Co-investigator, data collection, reviewer; Associate Professor Leo Ng – Co-investigator, data collection, reviewer; Professor Wai Chen – Co-investigator, data collection, reviewer; Dr Judith Daire – Co-investigator, data collection, reviewer; Dr Eric Lim – Chief investigator, data collection, reviewer.

Declaration of Competing Interests

The authors declare that they have no conflicts of interest related to this manuscript. They have no financial, personal, or professional relationships that could influence the work presented in this manuscript or bias its interpretation.

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