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Exploring the Impact of Depression, Stress, and Sleep Disturbances on Academic Success in International College Students

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ABSTRACT

Depression, stress, and sleep issues significantly affect international college students' academic success. This study examines the associations between depression and various academic, mental health, and demographic factors. Secondary data analysis was conducted for 13,242 international students from the 2022 American College Health Association's National College Health Assessment (ACHA-NCHA). A total of 92.7% of the students with moderate to high stress reported depression ($\chi^2 = 677.038$, OR = 6.477 [95% CI (5.532, 7.585)], $p < 0.001$), and 52.2% reported sleep issues linked to depression ($\chi^2 = 2075.076$, OR = 8.250 [95% CI (7.468, 9.113)], $p < 0.001$). Academic stress affected 82.7% and anxiety affected 79.8% of the students ($p < 0.001$). Higher depression rates were found among female students (67.9% versus 32.1% for males; $p < 0.001$), and 20.9% of those facing COVID-19 challenges reported depression. This study underscores the importance of culturally sensitive mental health interventions in addressing stress, sleep issues, and academic pressures faced by international students, thereby promoting their success and overall well-being.

Keywords: academic impediments, anxiety, COVID-19, depression, international college students, mental health, sleep disturbances

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INTRODUCTION

International college students in the U.S. face distinct mental health challenges that significantly affect their academic performance. Among the top concerns are depression, stress, and sleep issues, which prior research has linked to negative impacts on cognitive abilities, academic participation, and overall wellness (Rajkumar, 2020; Salari et al., 2020). The COVID-19 pandemic has worsened these issues, increased psychological distress, and disrupted educational experiences (Xiong et al., 2020). In contrast to domestic students, international students encounter additional pressures, including cultural adaptation difficulties, language barriers, and financial limitations, all of which contribute to heightened anxiety and depression levels (Cao et al., 2020).

Depression and anxiety are among the most common mental health issues affecting international students, with significant implications for their academic performance (Wagner, Wagner, Kolanisi, Makuapane, Masango, & Gómez-Olivé, 2022). Research indicates that between 18.8% and 24.5% of international college students experience moderate to severe depression, and approximately 20.6% to 20.7% report symptoms of anxiety (Abukhalaf et al., 2023; Lin et al., 2022). These mental health problems can impair concentration, motivation, and cognitive function, leading to lower academic engagement and poorer academic performance (Chaliawala, Vidourek, & King, 2024; Sümer, Poyrazli, & Grahame, 2008). Students with severe symptoms often hinder their academic progress (Kim et al., 2022). Anxiety may also hinder students' participation in class, timely completion of assignments, and exam performance (Sümer et al., 2008). A significant proportion of students reported that mental health concerns directly interfere with academic functioning, 73% reported academic challenges linked to mental health, 82% expressed concern about their impact on educational progress, and 89% struggled with concentration due to anxiety and stress (Olatunji et al., 2023; Son et al., 2020).

The mental health challenges of international students differ substantially according to sex. Compared with their male counterparts, female international students consistently report higher levels of depression, anxiety, and stress (Roberts, Bell, & Meyer, 2023; Pieh, Budimir, & Probst, 2020). This disparity may be attributed to differential coping mechanisms; women are more likely to

internalize stress, thereby increasing susceptibility to mood disorders, whereas men often externalize stress through behavioral coping, potentially leading to underreporting of psychological distress (Chang, 2018; Liu, Zhang, Yang, & Yu, 2020). During the COVID-19 pandemic, these gender disparities were exacerbated, with women reporting greater emotional distress, loneliness, and general declines in mental health during lockdown periods (Findlay & Arim, 2020).

Mental health challenges also vary by academic level, as suggested by Berry's Model of Acculturation (Berry, 1997), which states how the processes of cultural adaptation and integration can significantly impact international students' mental health and academic performance. First-year undergraduate international students often encounter cultural shock, homesickness, and language barriers, hindering academic and social integration (Muller & Morales, 2023). In contrast, upper-level undergraduate students may face heightened academic pressure as they approach graduation and encounter postgraduate limitations (Ahmed & Dheer, 2024). These academic level-specific stressors contribute to the complexity of mental health among international students and underscore the need for interventions tailored by academic standing (Auerbach et al., 2018; Mori, 2000).

Cultural perceptions of mental illness significantly influence help-seeking behaviors among international students (Boafo-Arthur, & Boafo-Arthur, 2016). The cultural perceptions of mental health challenges can be explained through stress-coping theory (Lazarus & Folkman, 1984), which highlights how individuals' perceptions of stress and their coping strategies critically mediate their psychological outcomes and academic performance. In many cases, international students come from cultures where mental health issues are highly stigmatized, which discourages the use of professional counseling services (Boafo-Arthur, & Boafo-Arthur, 2016; Modir et al., 2020). Moreover, the lack of culturally sensitive mental health services further limits access to support systems that could alleviate academic distress (Qin, 2018). Financial strain compounded by international tuition rates and limited employment opportunities also serves as a structural barrier, intensifying psychological stress and making it difficult to access needed care (Qin, 2018).

The COVID-19 pandemic may have exacerbated preexisting mental health conditions among international students, and between 79% and 82% reported significant difficulties adjusting to online learning, citing technological challenges, reducing instructor interaction, and causing course disruptions as key barriers (Olatunji et al., 2023; Son et al., 2020). Many students also experience job loss and financial insecurity, complicating their ability to afford tuition and living expenses (Martirosyana et al., 2022). The abrupt transition to emergency remote instruction, changing academic expectations, and increased uncertainty about plans all contribute to elevated stress and impaired academic performance (Samawi & Al-Kreimeen, 2022; Tasso et al., 2021). Additionally, health concerns regarding themselves or family members have emerged as significant stressors, detracting from academic focus (Son et al., 2020; Tasso et al., 2021).

Sleep disturbances are another critical factor influencing academic outcomes among international students. Between 69% and 86% report experiencing sleep issues, which impair concentration, memory, and other cognitive abilities essential for academic success (Olatunji et al., 2023; Son et al., 2020). Disrupted sleep patterns are often attributed to time zone differences, late-night course work, and environmental adjustments (Lin et al., 2022; Al Salmani et al., 2020). Female students appear particularly vulnerable, with higher rates of insomnia and excessive daytime sleepiness, both of which are linked to diminished academic performance (Al Salmani et al., 2020). Nevertheless, the direct relationship between sleep disturbances and academic outcomes remains under researched and warrants further empirical investigation (Nguyen et al., 2025; Tan & Greenwood, 2022).

Although past research has provided significant insights into the mental health struggles of international students, there are gaps in fully understanding the academic consequences of these issues (Cao et al., 2020; Tasso et al., 2021). The combined effects of depression, stress, anxiety, sleep disturbances, and disruptions caused by the pandemic on student success have yet to be extensively investigated (Lin et al., 2022; Tasso et al., 2021). Furthermore, existing studies often lack grounding within explicit theoretical frameworks that could clarify underlying mechanisms. For example, stress-coping theory (Lazarus & Folkman, 1984) highlights how individuals' perceptions of stress and their coping strategies critically mediate their psychological outcomes and academic performance; however, self-determination theory (Deci & Ryan, 2000) emphasizes how the fulfillment of basic psychological needs (autonomy, competence, relatedness) can influence student motivation and well-being. Recent studies have underscored the importance of these frameworks by demonstrating that coping strategies, institutional support, and psychological need satisfaction significantly influence the adjustment and academic persistence of international students (Clarke, 2023; Prasath, Xiong, Zhang, & Jeon, 2022; Tan & Greenwood, 2022). Additionally, there is a notable gap in the literature concerning under researched subgroups, such as students enrolled in universities under F-1 student visas, first-year undergraduate students transitioning into a new educational system, and graduate students experiencing distinct academic and professional pressures (Brunsting, Zachry, & Takeuchi, 2018; Heng, 2018; Hirai, Frazier, & Syed, 2015).

The current research addresses these gaps by quantitatively examining the prevalence and interaction of these variables among international students in U.S. higher education, thereby advancing the literature beyond a sole focus on psychological distress toward quantifiable academic impacts.

Research Questions

The research questions are as follows:

1. What is the prevalence of academic impediments due to mental health problems such as stress, anxiety, and depression among international college students in the U.S.?

2. What is the prevalence of academic impediments due to COVID-19 and sleep disturbances among international college students in the U.S.?
3. Does depression differ based on academic stress, 30-day stress levels, anxiety, COVID-19, sleep disturbances, and individual factors such as biological sex and grade level among international college students in the U.S.?

METHOD

Study Design

This study involved a secondary analysis of the American College Health Association's National College Health Assessment (ACHA-NCHA) 2022 dataset, which was approved by the Institutional Review Board (IRB). Given the anonymity and public accessibility of the data, the authors specifically sought ethical clearance for research involving non-human subjects, as approved by the university IRB (2023-0755).

Participants

The dataset included $N = 102,905$ college students nationwide. The current analysis focused on international students ($n = 13,242$) who reported their experiences.

Procedure

The American College Health Association's National College Health Assessment (ACHA-NCHA) is a nationwide survey that collects comprehensive data on students' health behaviors, activities, and perceptions. The 2022 dataset was selected for this analysis due to its thoroughness and the significant context it provides for international students in that year. Notably, the 2022 dataset marks a record number of international students in the U.S., with 1,362,157 F-1 and M-1 visa holders, indicating a remarkable recovery to pre-pandemic levels following a decline in 2020 (Boundless, 2023; IIE, 2022). This rebound is crucial for understanding the experiences and mental health dynamics of international students, particularly as universities adapt their support systems in response to the COVID-19 challenges. Data collection involved distributing the NCHA survey to partner academic institutions in the Spring and Fall of 2022. The survey was conducted digitally, allowing students to participate and complete it once they voluntarily provided consent. It was self-reported, ensuring confidentiality and participants' approval for data usage. Highlighting this crucial period, the 2022 dataset offers valuable insights into the psychological well-being and resilience of international students as they navigate the complexities of reentering academic life after significant disruptions.

Instrument

This study employed various ACHA-NCHA variables to evaluate academic challenges related to depression, anxiety, stress, COVID-19, sleep disturbances, and 30-day stress levels. Additionally, sociodemographic factors such as sex, age, visa status, and grade level were analyzed among international students. The relevant questions for each variable are detailed in the following sections:

Academic Impediments Due to Mental Health Concerns

The participants were asked to evaluate whether specific mental health concerns had impacted their academic performance within the past 12 months. Five sub-questions were analyzed: (1) anxiety, (2) COVID-19, (3) depression, (4) sleep difficulties, and (5) stress. The participants responded, “*Within the last 12 months, have any of the following factors affected your academic performance? (Please select the most serious outcome for each item below)*”. The responses were recorded on a four-point ordinal scale: (1) I did not experience this issue/not applicable; (2) I have experienced this issue, but my academics have not been affected; (3) I have experienced this issue, and it negatively impacted my performance in a class; (4) I have experienced this issue, and it has delayed progress toward my degree.

30-Day Stress Levels

The participants were asked to rate their overall stress within the past 30 days via a four-point Likert scale. The question posed was “*Within the last 30 days, how would you rate the overall level of stress you have experienced?*” Response options included (1) no stress, (2) low stress, (3) moderate stress, and (4) high stress.

International Student Status

The participants were asked if they had a visa (F-1 or M-1) to study or work in the United States. (No (1), Yes (2)).

Socio-demographics

The participant demographics were analyzed as follows: 1) “*What sex were you assigned at birth?*” (Female (1), Male (2) Intersex (3)), 2) “*How old are you?*” (years), 3) “*What is your year in school?*” (1st-year undergraduate (1), 2nd-year undergraduate (2), 3rd-year undergraduate (3), 4th-year undergraduate (4), 5th year or more undergraduate (5), Master’s (MA, MS, MFA, MBA, MPP, MPA, MPH, etc.) (6), Doctorate (PhD, EdD, MD, JD, etc.) (7), Not seeking a degree (8), Other (please specify) (9)).

Data Analysis

After receiving approval from the Institutional Review Board (IRB # 2023--0755), data analysis was conducted via the Statistical Package for the Social Sciences (SPSS) Version 26.0. To enhance the primary data analysis, participants were grouped based on their responses to the visa status question, differentiating those who answered “yes” from those who did not. This technique enables the analysis of only international student health behaviors. Continuous variables were split into dichotomous categories via a median split for analysis (DeCoster et al., 2011; Rucker, McShane, & Preacher, 2015). This method enables the classification of participants according to whether their values fall above or below the median. The dichotomization was aimed at facilitating univariate and multivariate logistic regression analyses suitable for binary predictors. While this technique may lead to information loss, simplifying interpretation and ensuring group comparability remain standard research practices (DeCoster et al., 2011; Rucker, McShane, & Preacher, 2015). The use of a median split was based on its practical usefulness in determining significant thresholds and everyday use in similar studies (DeCoster et al., 2011). Missing data were assessed prior to analysis. Cases with excessive missing values for key study variables were excluded listwise. Owing to the low percentage of missing data (below 5% across all variables), imputation methods were not applied, in line with best practices for handling minimal missing data (Tabachnick & Fidell, 2019). Descriptive statistics were employed to analyze background information. The first and second research questions were addressed via frequency distributions and descriptive statistical techniques. For the third research question, a univariate logistic regression analysis was conducted, and the significant variables identified in this analysis were further evaluated using a multivariable logistic regression model.

RESULTS

Descriptives

The study sample consisted of $N = 102,905$ college students, among whom 13,242 reported possessing an F-1 or M-1 student visa, categorizing them as international students. Among these participants, 57.8% ($n = 7,633$) were identified as female at birth, whereas 42.1% ($n = 5,568$) were identified as male. A minor percentage (0.1%, $n = 9$) identified as intersex. The mean age of the participants was $M = 23.84$ years, with a standard deviation of $SD = 5.9$. The majority were undergraduate students, accounting for 55.4% ($n = 7,235$), followed by graduate students, accounting for 44.6% ($n = 5,828$). Within the graduate student cohort, 25.7% ($n = 3,396$) were enrolled in master’s programs, whereas 18.4% ($n = 2,432$) were pursuing doctoral degrees.

Table 1 presents detailed frequencies and percentages regarding the prevalence of academic challenges caused by mental health issues among international college students in the U.S. Specifically, 27.7% ($n = 3603$) of the students indicated that stress negatively affected their classroom performance,

although 5.9% ($n = 766$) experienced delays in their degree progression. Anxiety had a comparable effect, impacting 22.6% ($n = 2926$) of the students' class performance, with 4.1% ($n = 535$) reporting delays in their academic progress. Furthermore, depression significantly affected students, with 14.7% ($n = 1906$) reporting negative impacts on class performance and 4.0% ($n = 526$) experiencing delays in earning their degree.

Table 1: Academic Performance Issues Across Different Stressors

Stressor	Did Not Experience This Issue/Not Applicable %(n)	Experienced, but Not Affected %(n)	Experienced, Negatively Impacted Performance in a Class %(n)	Experienced, Delayed Progress Toward Degree %(n)
Stress	33.8 (4402)	32.6 (4249)	27.7 (3603)	5.9 (766)
Anxiety	46.5 (6016)	26.8 (3461)	22.6 (2926)	4.1 (535)
Depression	66.5 (8644)	14.7 (1914)	14.7 (1906)	4.0 (526)
COVID-19	66.9 (3257)	22.3 (1087)	9.1 (443)	1.7 (82)
Sleep Difficulties	59.6 (7750)	21.1 (2751)	16.7 (2179)	2.6 (334)

Note: The valid percentages are based on a total sample size of $N = 13,242$, as some responses may be missing due to nonparticipation.

With respect to COVID-19-related challenges, 9.1% ($n = 443$) of the students stated that it adversely influenced their class performance, and 1.7% ($n = 82$) faced delays in degree progress. Sleep issues also emerged as a significant source of academic impairment, affecting 16.7% ($n = 2179$) of the students' performance and delaying degree completion for 2.6% ($n = 334$) of the participants. In terms of stress levels reported over the past 30 days, a significant proportion of international students reported experiencing moderate stress (46.9%, $n = 6,182$), followed by those reporting low stress (25.5%, $n = 3,357$) and high stress (24.2%, $n = 3,191$).

Univariate Logistic Regression

Table 2 shows the odds ratios of the univariate logistic regression analysis with significant associations between depression and various factors, including anxiety, sleep difficulties, stress related to academic performance, COVID-19, and demographic variables. Anxiety was strongly correlated with depression ($\chi^2 = 4242.257, p < .001, \phi = 0.574$). Among participants reporting depression, 79.8% (1917) reported experiencing anxiety, whereas only 20.2% (484) did not. Sleep issues were also significantly connected with depression ($\chi^2 = 2075.076, p < .001, \phi = 0.400$). Within the group reporting depression, 52.2% (1262) faced sleep difficulties, whereas 47.8% (1156) did not. Academic stress was strongly

associated with depression ($\chi^2 = 3234.787, p < .001, \phi = 0.500$). Among students reporting depression, 82.7% (2002) reported high levels of academic stress, whereas 17.3% (420) did not. Furthermore, depression was also related to the challenges arising from the COVID-19 pandemic ($\chi^2 = 115.681, p < .001, \phi = 0.155$). Among those reporting depression, 20.9% (181) mentioned experiencing academic challenges related to COVID-19, whereas 79.1% (683) did not.

Table 2: Univariate Logistic Regression Analysis

Variables	Odds Ratio (95% CI)	χ^2	Phi (Effect Size)
Anxiety (No/Yes)	23.193 (20.704, 25.982)	4242.257	0.574
Sleep Difficulties (No/Yes)	8.250 (7.468, 9.113)	2075.076	0.400
Stress (Academic) (No/Yes)	16.739 (14.923, 18.775)	3234.787	0.500
COVID-19 (No/Yes)	2.865 (2.349, 3.493)	115.681	0.155
Sex (Male/Female)	0.591 (0.538, 0.649)	122.999	0.097
Year (Undergraduate/Graduate)	0.657 (0.599, 0.720)	81.484	0.080
Stress (Low/High)	6.477 (5.532, 7.585)	677.038	0.228

Note: All the variables were significant at $p < 0.001$

Demographic factors, including biological sex and year of study, were significantly correlated with depression. Compared with 32.1% (779) of the female students, 67.9% (1646) of the female students reported greater depression ($\chi^2 = 122.999, p < .001, \phi = 0.097$) and identified as males. Similarly, undergraduate students are more likely to report depressive symptoms than their graduate counterparts are ($\chi^2 = 81.484, p < .001, \phi = 0.080$), with 63.7% (1530) of the participants being undergraduates and reporting depression, as opposed to 36.3% (871) being graduate students. Furthermore, 30-day stress levels were significantly associated with depression ($\chi^2 = 677.038, p < .001, \phi = 0.228$). Among the participants with low to moderate stress levels, 7.3% (178) reported experiencing depression, whereas 92.7% (2254) of those with high stress levels reported experiencing depression. It is essential to consider the intersectionality between biological sex and academic level, as these factors may interact to compound vulnerability to depression among international students. Female undergraduate students may face heightened mental health risks due to the

combined pressures of gender-based stressors and the transitional challenges of early academic adjustment. This intersectional lens suggests that the elevated prevalence of depression among female students (67.9%) and undergraduates (63.7%) may not be independent phenomena but rather reflect an overlapping set of stressors that disproportionately affect female undergraduates.

Final Logistic Regression Model

All variables were included in the logistic regression analysis, with depression used as the dependent variable and the other factors used as independent variables. The overall model was statistically significant, $\chi^2(7) = 1621.568, p < .001$, indicating that the predictors explained a considerable amount of variance in depression. The Nagelkerke R^2 value was 0.480, indicating that approximately 48% of the variability in depression was explained by the model. The Hosmer–Lemeshow test was significant, $\chi^2(8) = 47.791, p < .001$, indicating a good fit for the model. The model's classification accuracy was 85.9%, with a sensitivity of 66.7% and a specificity of 90.1%. *Table 3* presents the variables included in the final logistic regression model with the adjusted odds ratios, p values, and confidence intervals.

DISCUSSION

The current findings indicate that mental health factors, particularly depression, stress, anxiety, and sleep issues, significantly impact the academic performance of international students. Strong associations were established among these factors through logistic and final regression analyses, highlighting the importance of mental health for academic success. These results are consistent with previous research suggesting that international students often experience increased psychological distress due to academic pressures, cultural adjustments, and financial challenges (Abukhalaf et al., 2023; Auerbach et al., 2018).

Depression was strongly linked to anxiety, with anxious students having 23.19 times greater odds of also experiencing depression ($OR = 23.19, 95\% CI [20.70, 25.98]$). This underscores the interconnected nature of mental health challenges and their cumulative impact on the well-being of international students. Previous studies have identified anxiety as a significant predictor of depression in this population, impairing their academic challenges (Chaliawala, Vidourek, & King, 2024). Additionally, an association between sleep disturbances and depression was observed, with students experiencing sleep issues having 8.25 times higher odds of reporting depression ($OR = 8.25, 95\% CI [7.47, 9.11]$).

Table 3: The final logistic regression model with depression as the outcome.

Variables	β	SE	Wald	df	p	Adjusted Odds Ratio	95% CI	
							Lower	Upper
Anxiety (No/Yes)	2.202	0.111	390.593	1	<0.001	9.043	7.269	11.249
Sleep Difficulties (No/Yes)	0.520	0.111	21.757	1	<0.001	1.681	1.352	2.091
Academic Stress (No/Yes)	1.283	0.124	106.768	1	<0.001	3.608	2.829	4.603
COVID-19 (No/Yes)	0.372	0.129	8.261	1	0.004	1.451	1.126	1.870
Stress Levels (No/Yes)	0.575	0.153	14.129	1	<0.001	1.778	1.317	2.399
Year (Undergraduate/Graduate)	0.162	0.099	2.667	1	0.102	0.851	0.701	1.033
Sex (Male/Female)	0.060	0.104	0.331	1	0.565	1.062	0.866	1.302

Note: The overall model was statistically significant, $\chi^2(7) = 1621.568, p < 0.001$. The bold denotes significant values at $p < 0.05$.

The effect sizes of academic year and biological sex were weak, which made them nonsignificant in the final regression model.

Research has thoroughly documented the harmful effects of sleep disorders on university students' cognitive ability and academic performance (Al Salmani et al., 2020). Additionally, academic stress emerged as another critical factor, with students reporting that stress interferes with their coursework, resulting in 16.74 times greater odds of experiencing depression ($OR = 16.74$, 95% $CI [14.92, 18.77]$). This aligns with findings that excessive stress can hinder concentration, motivation, and overall academic engagement (Barbayannis et al., 2022). Students reporting moderate to high stress levels in the past 30 days had 6.48 times greater odds of also indicating depression ($OR = 6.48$, 95% $CI [5.53, 7.59]$), demonstrating how persistent stress profoundly impacts students' mental health. According to the American College Health Association (2023), stress ranks among the most common barriers to academic success for college students, confirming the present findings.

The COVID-19 pandemic intensified academic and mental health issues among international students (Kivelä, Mouthaan, van der Does, & Antypa, 2024). Pre-pandemic research indicates that international students already face significant mental health challenges due to academic pressures, cultural adjustments, and social isolation (Forbes-Mewett & Sawyer, 2016; Humphrey & Forbes-Mewett, 2021; Sawir, Marginson, Deumert, Nyland, Ramia, 2008). For example, prior to the pandemic, international students presented relatively good mental health compared with domestic students (Shiratori, Ogawa, Ota, Sodeyama, Arai, Tachikawa, 2024). However, during the COVID-19 pandemic, studies have revealed an increase in depressive symptoms among international students, highlighting the exacerbating effect of the pandemic on existing stressors (Lu, Wang, Wang, Guo, & Pan, 2022). This comparison underscores the unique impact of COVID-19 on the mental health of international students, which intensifies preexisting vulnerabilities. In the present study, those reporting a negative impact on their academic performance due to COVID-19 had 2.87 times greater odds of experiencing depression ($OR = 2.87$, 95% $CI [2.35, 3.49]$). This finding aligns with prior research indicating that the pandemic has led to increased stress, financial uncertainties, and disruptions in academic routines, all of which contribute to deteriorating mental health (Martirosyana et al., 2022; Olatunji et al., 2023). The disruption of academic settings, along with feelings of social isolation, heightened the existing stress faced by international students (Elmer, Mepham, & Stadtfeld, 2020). Additionally, studies have highlighted that the psychological impacts of COVID-19 are especially pronounced for students from marginalized backgrounds, including international students, who face more significant barriers in accessing institutional support services (Findlay & Arim, 2020).

In the univariate logistic regression analysis, notable differences in depression rates were observed based on sex and academic level. Compared with their male counterparts, female students were 1.38 times more likely to report depression ($OR = 1.38$, 95% $CI [1.30, 1.47]$), which is consistent with earlier studies suggesting that women are more vulnerable to anxiety and depression due to various social, psychological, and biological factors (Liu et al., 2020; Chang,

2018). The increased prevalence of depressive symptoms among female students has been associated with heightened academic demands, societal expectations, and coping strategies that tend to internalize emotions (Pieh, Budimir, & Probst, 2020). Academic level also played a critical role in the univariate analysis, where undergraduate students were 1.28 times more likely to experience depression than graduate students were ($OR = 1.28$, 95% $CI [1.21, 1.36]$). This suggests that early academic transitions may increase stress levels, contributing to mental health challenges (Muller & Morales, 2023). Research has demonstrated that first-year international students are especially vulnerable to mental health issues stemming from cultural transitions, academic loads, and limited social support (Mori, 2000). In contrast, graduate students may have better coping strategies and greater access to institutional resources, helping them mitigate some academic and personal adaptation stressors (Qin, 2018).

The findings from the final logistic regression model indicate that various variables, including anxiety, sleep difficulties, academic stress, COVID-19-related academic disruptions, and overall stress, are strongly associated with depression. These results align with the literature that emphasizes the multifaceted nature of mental health challenges among international students (Liu et al., 2020). Anxiety was the strongest predictor of depression, with an adjusted odds ratio (AOR) of 9.043 (95% $CI: 7.269-11.249$), suggesting that students experiencing anxiety were more than nine times more likely to report depressive symptoms. This finding supports prior research indicating a high degree of comorbidity between anxiety and depression among college students (Ibrahim et al., 2013). Similarly, academic stress was another significant predictor ($AOR = 3.608$, 95% $CI: 2.829-4.603$), reinforcing studies emphasizing academic pressure as a major contributor to international students' mental health struggles (Lu et al., 2022).

Sleep difficulties also emerged as a factor in line with research demonstrating the bidirectional relationship between sleep disturbances and depression (Lu et al., 2022). Additionally, COVID-19-related academic performance issues are significantly associated with depression, suggesting that pandemic-induced disruptions exacerbate mental health challenges, a trend observed in recent studies (Son et al., 2020; Tasso et al., 2021). Overall, stress levels also significantly predict depression ($AOR = 1.778$, 95% $CI: 1.317-2.399$), reinforcing previous findings that stress, particularly when persistent, increases vulnerability to mental health disorders (Lazarus & Folkman, 1984). However, the results for sex and student classification (undergraduate vs. graduate) were not statistically significant, suggesting that depression risk was not meaningfully different across these demographic variables, in contrast with several earlier studies that reported gender disparities in mental health outcomes (American College Health Association, 2022).

The current study confirms that depression, stress, anxiety, and sleep disturbances are prevalent among international students and significantly impact their academic performance (Alhamed, 2023). Using stress-coping theory (Lazarus & Folkman, 1984), these findings highlight how students' perceptions of stressors and their coping strategies directly mediate their psychological outcomes and subsequent academic engagement. Self-determination theory (Deci & Ryan,

2000) further contextualizes these results by suggesting that fulfilling students' basic psychological needs for autonomy, competence, and relatedness can mitigate these adverse mental health outcomes and enhance academic motivation and performance. Additionally, Berry's model of acculturation (Berry, 1997) underscores the critical role of cultural adaptation strategies in influencing psychological adjustment and academic outcomes. The strong associations identified underline the urgent need for targeted interventions, particularly culturally sensitive support systems, which address both stressors and psychological needs. Moreover, the worsening effects of the COVID-19 pandemic, especially among those already vulnerable to stress-related challenges, emphasize the necessity of comprehensive, theory-driven approaches to student mental health and academic support (Rajkumar, 2020; Son et al., 2020; Tasso et al., 2021). These findings align with the literature advocating institutional strategies grounded in theoretical frameworks to create supportive academic environments for international student success and well-being (Ahmed & Dheer, 2024; Modir et al., 2020).

Implications

The results of this study, coupled with previous research findings, highlight the urgent necessity for comprehensive and culturally sensitive strategies to address the complex mental health challenges experienced by international students (Sümer et al., 2008; Tasso et al., 2021). These issues are often intensified by cultural adjustment, language obstacles, academic stresses, social isolation, and worries about immigration status (Mori, 2000; Sümer et al., 2008). The long-lasting effects of the COVID-19 pandemic have further worsened these stressors by disrupting social networks, altering academic routines, and limiting access to mental health resources (Kivelä et al., 2024; Lin et al., 2022). Therefore, a multitiered approach involving educational institutions, policymakers, and the students themselves is vital for effectively addressing these challenges and enhancing the welfare of international students.

Educational institutions play a pivotal role in safeguarding international students' mental health. To be effective, mental health services need to be culturally sensitive and accessible (Sakız & Jencius, 2024). This requires hiring counselors who comprehend the distinct experiences of international students and who can offer support that recognizes cultural differences in mental health perceptions (Sakız & Jencius, 2024). Institutions should provide counseling services in multiple languages and strive to diminish the stigma associated with mental health by fostering an environment where students feel at ease seeking help (Modir et al., 2020).

Moreover, universities should concentrate on building a supportive community for international students. Peer mentoring programs, social events, and workshops aimed at mental health awareness and cultural adaptation can provide crucial emotional support and help alleviate feelings of isolation (Rajkumar, 2020; Tasso et al., 2021). By cultivating strong peer relationships and offering resources that enhance cultural understanding, universities can help

international students feel more at home and be more equipped to address their mental health issues (Cao et al., 2020; Rajkumar, 2020). Faculty and staff should also receive training to identify and respond to signs of mental health difficulties, especially among international students, who may be less inclined to seek help independently (Sümer et al., 2008).

Policymakers must play an essential role in reducing the systemic hurdles contributing to mental health challenges for international students (Qin, 2018). One critical issue is access to affordable mental health services. Governments should facilitate access to high-quality mental health care that is culturally appropriate and financially viable for international students. This could involve extending health insurance coverage to encompass comprehensive mental health services and forming alliances with local healthcare providers (Qin, 2018). Additionally, policymakers should aim to alleviate uncertainties and anxieties related to immigration status. Creating policies that streamline visa processes and clarify pathways for international students to remain in their host countries can mitigate anxiety and instill a sense of security (Qin, 2018; Sümer et al., 2008). Financial support for mental health initiatives within universities is also essential to ensure that these institutions can meet the varied demands of international students and provide adequate care and assistance (Qin, 2018).

For international students, prioritizing mental health and seeking help when necessary is crucial for academic success and overall wellness. Many students might hesitate to ask for assistance because of cultural stigmas surrounding mental health (Modir et al., 2020). Thus, students must be encouraged to utilize available resources, such as counseling services and peer support programs (Modir et al., 2020; Rajkumar, 2020). The development of self-care practices, such as maintaining healthy sleep habits, engaging in social activities, and utilizing stress management techniques, can significantly help counteract anxiety, depression, and sleep issues (Alhamed, 2023; Barbayannis et al., 2022). Combining programs that offer coping mechanisms and resilience-building skills tailored to the specific experiences of international students can significantly improve their capacity to manage stress and excel academically (Tasso et al., 2021). Furthermore, international students should actively pursue opportunities to connect with others, participate in social activities, and build support systems to buffer against feelings of isolation and homesickness (Rajkumar, 2020; Tasso et al., 2021). Ultimately, international students' mental health and academic achievements hinge on the collaborative efforts of educational institutions, policymakers, and students themselves (Ahmed & Dheer, 2024; Cao et al., 2020; Modir et al., 2020; Qin, 2018; Sakız & Jencius, 2024).

Educational institutions must proactively address the mental health requirements of this group by providing culturally competent services, cultivating inclusive environments, and promoting social connections (Modir et al., 2020; Sakız & Jencius, 2024). Policymakers need to ensure that barriers are removed, including accessibility to healthcare and uncertainty related to immigration. Finally, international students should be encouraged to prioritize their mental health and seek assistance (Ahmed & Dheer, 2024; Cao et al., 2020; Modir et al., 2020; Qin, 2018; Sakız & Jencius, 2024). Addressing these challenges

comprehensively is critical not only for the well-being of international students but also for their academic performance and long-term adaptation to life in a new country (Alhamed, 2023; Al Salmani et al., 2020; Mori, 2000; Sümer et al., 2008). By acknowledging and responding to the specific stressors faced by international students, an environment that supports not only academic success but also the mental and emotional health of this vulnerable demographic should be constructed (Martirosyana et al., 2022; Lin et al., 2022).

Limitations and Future Research

The current research provides critical insights into the mental health challenges faced by international students, yet several explicit limitations should be acknowledged. First, widespread reliance on cross-sectional designs restricts the ability to establish causality between stressors and mental health outcomes. Although academic stress, sleep disturbances, and depression symptoms frequently correlate, cross-sectional data cannot demonstrate whether one factor directly affects the other or whether both are influenced by another underlying variable (Alhamed, 2023; Liu et al., 2020). Future research employing longitudinal methods is essential to determine causal relationships and the evolution of these mental health issues over time.

Another explicit limitation is the dependence on self-reported measures, which introduces potential biases such as social desirability and recall bias. International students, particularly those from cultural backgrounds where mental health stigma is prevalent, might underreport psychological distress due to fears of academic consequences or perceived discrimination (Modir et al., 2020; Sümer et al., 2008). To mitigate these biases, future studies should incorporate objective measures alongside self-reports and utilize mixed method approaches that combine quantitative surveys and qualitative interviews to capture a more accurate and comprehensive view of students' experiences.

Furthermore, the generalizability of the findings is limited because research has focused on specific regions or countries, primarily the United States and China. International students' mental health experiences are shaped by diverse cultural factors, host country policies, and institutional support structures (Martirosyana et al., 2022). Future studies should explore mental health challenges across a broader range of countries and cultures to increase the applicability of findings globally, utilizing cross-cultural comparative methodologies to identify universal and culturally specific interventions.

Additionally, while recent studies have extensively examined the immediate impact of the COVID-19 pandemic on international students (Cao et al., 2020; Son et al., 2020), research on long-term effects, including sustained disruptions to academic and social life, is needed. Understanding the ongoing psychological impacts, particularly related to lingering uncertainties around travel restrictions, remote learning formats, and global health threats, is essential. Investigating the relationships between different learning modalities (in-person versus remote) and mental health outcomes could provide critical insights into targeted support strategies (Tasso et al., 2021; Tulaskar & Turunen, 2021).

Finally, the current literature primarily emphasizes challenges while insufficiently addressing potential protective factors. Future research should explicitly investigate resilience-building strategies and the role of social support networks in enhancing mental well-being. Identifying such protective factors could facilitate the development of interventions that address mental health problems and actively promote resilience and coping mechanisms among international students (Pharr et al., 2022). Addressing these explicit limitations through comprehensive, longitudinal, and culturally diverse research approaches will significantly improve our understanding of and support international students.

CONCLUSION

The present study confirms that depression, stress, anxiety, and sleep disturbances are prevalent among international students and significantly affect their academic performance. The findings emphasize the need for targeted interventions to address these challenges, particularly considering the ongoing effects of the COVID-19 pandemic. By implementing evidence-based mental health support strategies, universities can increase student well-being and academic success, ultimately fostering a more supportive learning environment for international students.

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