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Prevalence of Common Mental Health Concerns and Service Utilization Among International Students Studying in the U.S.

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Abstract

An estimated one million international students are enrolled in U.S. universities. However, little was known about the landscape of their mental health and help-seeking behaviors. Drawing from a large national university student sample (N = 228,421, 8.49% non-U.S. citizen) from the Healthy Minds Study, data indicated the rates of major depressive disorder, generalized anxiety disorder, eating disorder, non-suicidal self-injury, and suicidal ideation were 27.4%, 20.0%, 26.4%, 17.2%, and 8.8% respectively among international students, with high inter-country variabilities. Contrary to our expectations, there is no strong and consistent evidence suggesting international students were at higher risk for common mental health concerns compared to domestic students. However, among students who were screened positive for these mental health disorders (n = 96,567), there was a significant difference between service utilization rates for international students and domestic students (32.0% vs. 49.8%), even after controlling for gender, age, socioeconomic status, perceived need for help, mental health stigma, and using informal support. Our results highlight the urgency for addressing mental health concerns and equitable mental health care among international students.

Practical implication: Roughly half of the international students from 233 U.S. universities were screened positive for major depressive disorder, generalized anxiety disorder, eating disorder, non-suicidal self-injury, or suicidal ideation. Prevalence rates for these common mental health concerns were lower (except for a higher prevalence of eating disorders) among international students compared to domestic students, although the effect sizes of these differences were small. However, international students significantly underutilize mental health therapy and psychotropic medication services compared to domestic students.

Prevalence of common mental concerns and service utilization among international students studying in the U.S.

Within the United States, the 2018-2019 academic year marks the fourth consecutive year with more than one million international students, making up 5.5% of the total U.S. higher education population (Institute of International Education, 2020). Spreading across higher education institutions in the United States, the percentage of international students is as high as 31% in certain universities and 44% in certain liberal arts colleges (U.S. News, 2020). There has been a 75% increase in international students from 2007 to 2017, which far exceeds the 24% increase in overall student enrollment from 2006 to 2016 (Institute of International Education, 2020). International students add to the diversity of the campus learning environment and make significant economic contributions (NAFSA, 2020). For international students, studying abroad is a valuable experience that fosters personal growth, intellectual development, and career development. While seemingly a beneficiary situation for both the students and institutions, international students experience many stressors that could potentially impact their emotional wellbeing. In 2018, an initial report from the first stage of the World Health Organization (WHO) world mental health international college student project reported that, globally, 31% of full-time university students were screened positive for at least one common mental health disorder in the past year (Auerbach et al., 2018). A U.S. population study, on which the current study was also based, reported a 42.2% prevalence rate of common mental health problems among all university students (Lipson et al., 2018). Within the already vulnerable general university population, international students are likely more susceptible to mental health concerns given that they tend to face unique challenges and stressors – including the language barrier, visa and immigration policy, cultural adjustment, and discrimination – in addition to

those typically reported among their domestic counterparts (Mori, 2000; P. B. Pedersen, 1991; Prieto-Welch, 2016; Zhang & Goodson, 2011).

Mental Health Concerns among International Students

Mental health concerns among international students have been under-studied (Pendse & Inman, 2017). A content analysis of over 6,000 articles published, between 1980-2017, revealed that that only 1.37% studies focused on international students out of over 6,000 empirical articles published between 1980 to 2014 on nine journals where counseling psychologists frequently publish (Pendse & Inman, 2017). Of the limited studies available, the focus has been more on studying mental health statistics within specific international student groups with a convenience sampling. For instance, Han et al. (2013) found that among 130 Chinese international undergraduate and graduate students at Yale University, the 2-week prevalence rates for major depressive disorder (MDD) and generalized anxiety disorder (GAD) were 7.8% and 5.3% respectively. Hyun et al. (2007) reported 44% of their sample (i.e., international graduate students in a U.S. Western university) indicated having experienced emotional or stress-related problems that significantly impaired their wellbeing or academic performance. While these studies are important steps towards understanding mental health concerns among certain international student population in the United States, they are ultimately limited in generalizability. Although it has been long speculated that international students experience more psychological distress and mental health concerns than domestic students (Mori, 2000; P. B. Pedersen, 1991; Prieto-Welch, 2016; Zhang & Goodson, 2011), this difference has not been corroborated with the limited existing empirical evidence (Stallman & Shochet, 2009; Xiong, 2018). Stallman & Shochet (2009) found no differences in psychological distress between domestic and international students from three Australian university health services. Similarly, in

a recent dissertation study, Xiong (2018) reported that Asian international students endorsed overall similar levels of mental health concerns as domestic students, including depressive symptoms, internalizing, and externalizing psychopathology. However, Asian international students reported higher levels of concerns related to self-injury, suicidal ideation, and suicidal attempts. Taken together, large-scale and population-level studies are still needed to understand the landscape of the potential mental health disparities in common mental health concerns between international students and domestic students.

Mental Health Utilization Rates among International Students

Although some studies reported a significant increase in mental health treatment utilization from 19% to 34% between 2007-2017 (Lipson, Lattie, et al., 2019; Oswalt et al., 2020), the mental health utilization gap between those in need of services and those who seek out services continues to be high (Lipson et al., 2015; Prince, 2015). For example, the National College Health Assessment Survey statistics indicated that fewer than 20% of university students who reported suicidal ideation or attempted suicide received mental health services (Kisch et al., 2005). This pattern is also unfortunately present for international students. In a few studies that have investigated this issue, findings have indicated international students' mental health service utilization rate was similarly low (Eisenberg et al., 2011), or lower, compared to their domestic peers (Hyun et al., 2007; Yoon & Jepsen, 2008). For example, one study indicated that 6.9% of Asian international graduate students utilized any mental health services compared to a rate of 45.2% for domestic graduate students (Yoon & Jepsen, 2008).

We use Andersen's health service utilization model to understand the potential factors contributing to the under-utilization of mental health services among students. This model consists of three sets of factors: predisposing factors (e.g., demographics), enabling factors (e.g.,

financial resources), and need factors (e.g., perceived need) that help explain help-seeking behaviors (Andersen, 1995). Much evidence indicated older students and female students were more likely to use mental health services (Eisenberg et al., 2011; Kruisselbrink Flatt, 2013; Sontag-Padilla et al., 2016). Such gender differences have been attributed to stereotypically feminine traits in helping-seeking behaviors (Kruisselbrink Flatt, 2013). Financial stress has been studied as an important stressor contributing to students' mental health concerns (e.g., Hyun et al., 2007), which may further relate to help-seeking behaviors (Hayes et al., 2011; Lipson et al., 2018). However, there was also contradicting evidence suggesting null associations between financial stress and mental health concerns (Hubbard et al., 2018) and service utilization (e.g., Eisenberg et al., 2011; Hyun et al., 2007). Interestingly, Lipson et al. (2018) found that while financial stress was positively correlated with seeking medication treatment, it was not related to seeking psychotherapy treatment. Last but not least, consistent with Andersen's model, perceived need has been demonstrated as one of the strongest predictors of mental health service utilization among students (Eisenberg et al., 2011; Lipson et al., 2018).

Mental Health Stigma

In addition to these factors discussed in Andersen's model, another noteworthy factor that has been increasingly recognized as a key factor impeding mental health service use is stigma. Two distinct forms of mental health stigma commonly studied are perceived public stigma and personal stigma (Eisenberg et al., 2009; Lally et al., 2013; E. R. Pedersen & Paves, 2014; Schnyder et al., 2017). Perceived public stigma refers to an individual's perception of negative stereotypes and prejudices about mental illness and help-seeking behaviors held collectively by members of the general population (Corrigan, 2004; Eisenberg et al., 2009; Schnyder et al., 2017). Personal stigma refers to an individual's personal attitudes towards others' mental illness

and help-seeking behaviors (Eisenberg et al., 2009; Schnyder et al., 2017). University students were found to endorse higher levels of perceived public stigma than personal stigma (Eisenberg et al., 2009; Lally et al., 2013; E. R. Pedersen & Paves, 2014). Evidence regarding the negative association between personal stigma and help-seeking behaviors have generally been consistent (Eisenberg et al., 2009; Lally et al., 2013). However, findings regarding the impact of perceived public stigma on help-seeking behaviors were mixed. It was suggested whereas studies with a clinical population indicated students who worried about perceived public stigma were more likely to seek mental health services (Downs & Eisenberg, 2012; Marsh & Wilcoxon, 2015), findings based on a general/non-clinical population suggested a null association (Eisenberg et al., 2009; Lally et al., 2013). Public mental health stigma has also been identified as a major barrier to formal help-seeking behaviors (i.e., medication, psychotherapy) for international students, especially for those with a non-Western cultural background (Mori, 2000; Yakunina & Weigold, 2011). Incorporating perceived public stigma and personal stigma in the current study can help further elucidate barriers for help-seeking behaviors to inform interventions for international students (Lee et al., 2014; Yakunina & Weigold, 2011; Yoon & Jepsen, 2008).

The Current Study

The current study aimed to better understand common mental health concerns and service utilization among international students. Specifically, the first objective was to document and compare the prevalence rates of common mental health concerns (e.g., depression, anxiety) between international and domestic students. Based upon past studies (e.g., Stallman & Shochet, 2009; Xiong, 2018), we hypothesized the prevalence rates of common mental health concerns among international students would be similar or higher compared to domestic students. Secondly, focusing on the students who were screened positive for one or more mental health

concerns, we aim to examine the mental health service utilization gap between international and domestic students. It was hypothesized that international students would significantly underutilize mental health services compared to domestic students. Guided by Anderson's model, our third aim was to investigate contributing factors that would predict the mental health service utilization gap, including demographic factors (i.e., gender, age, and financial stress), students' perceived need for help, and mental health stigma. Consistent with past findings based upon a clinical population (Downs & Eisenberg, 2012; Marsh & Wilcoxon, 2015), we hypothesized whereas public stigma would predict more mental health service utilization, personal stigma would predict less mental health service utilization.

Method

Participants

The current study used secondary data analysis from the Healthy Minds Study (HMS), an annual online survey on university students' mental health from 2007 to date. Prior to 2014, HMS only surveyed whether students were a U.S. citizen but did not ask their specific nation of citizenship. Thus, the current study included HMS data from 2014 (n = 14,088; 15.80% international), 2015 (n = 34,299; 10.74% international), 2016 (n = 50,947; 7.97% international), 2017 (n = 67,921; 10.85% international), and 2018 (n = 61,385; 8.30% international). We used U.S. citizenship as a proxy to determine their domestic or international student status in this study. We further excluded international students with multiple nationalities (n = 219). The final sample included 228,421 (9.80% international) students enrolled in a U.S. college or university. International students represented 151 nationalities varying by the number of students from St. Vincent and the Grenadines (n = 1) to China (n = 5,458).

The final sample of 228,421 participants included both undergraduate (97.34% domestic, 87.28% international) and graduate students (2.66% domestic, 12.72% international). There were around 65.03% female, 32.86% male, and 2.10% non-binary domestic students, and 54.88% female, 44.22% male, and .90% non-binary international students. Participants were in age groups of 18 to 22 (68.63% domestic, 40.43% international), 23 to 25 (12.28% domestic, 25.12% international), 26 to 30 (9.87% domestic, 23.24% international), and above 31 years (9.22% domestic, 11.22% international). Compared to domestic students, international students were older (χ^2 (3) = 5420.34, $p < .001$, Cramer's $V = .15$) and more likely to be enrolled in a graduate program (χ^2 (1) = 1626.60, $p < .001$, Cramer's $V = .10$), consistent with the national trend (Institute of International Education, 2020).

Procedure

Two hundred and thirty-three colleges and universities elected to participate in HMS during 2014-2019, which were diverse across institutional types, geography, and selectivity (https://healthymindsnetwork.org/hms/). At each institution with 4,000 students or more, HMS recruited a random sample of 4,000 degree-seeking students from the full population; at smaller institutions, all students were recruited. Students had to be at least 18 years old to participate; there were no other exclusion criteria. The overall response rate across years was around 21% (Lipson et al., 2018). Sampling weights were calculated to adjust for non-response bias based upon gender, race/ethnicity, academic level, and grade point average, gathered from participating institutions' registrar.

Measures

Mental Health. We examined five mental health measures from HMS.

(1) Depressive symptoms over the last two weeks were measured by the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001), which is a screener for potential diagnosis of major depressive disorder (used interchangeably with depression in this manuscript). A meta-analysis recommended the range of optimal cut-off scores for diagnosing depression with the PHQ-9 range between 8 and 11 (Manea et al., 2012). In low- and middle-income contexts, a positive screen for depression was defined as a score of ≥10 (Akena et al., 2012). Thus, we used the cut-off of ≥ 10 in the current study. Reliabilities are excellent among domestic students (α = .89) and international students (α = .88).

(2) Anxiety symptoms over the last two weeks were assessed by the Generalized Anxiety Disorder scale (GAD-7; Spitzer et al., 2006), which is a screener for potential diagnosis of a generalized anxiety disorder (used interchangeably with anxiety in this manuscript). We used the standard cut-off of ≥ 10, which shows high sensitivity and specificity (Spitzer et al., 2006). Reliabilities were excellent among domestic students (α = .92) and international students (α = .91).

(3) Current eating disorder symptoms over the last four weeks were screened with the five-item SCOFF questionnaire (Morgan et al., 1999), with a score of ≥ 2 indicating a likely case of anorexia nervosa or bulimia (used interchangeably with eating disorder in this manuscript). One sample item is "Do you make yourself sick (induce vomiting) because you feel uncomfortably full?" SCOFF questionnaire has also been widely used internationally (Leung et al., 2009), albeit with more limited research in low-income countries compared to PHQ-9 and GAD-7. Cronbach's alphas were .56 among domestic students and .59 among international students, which were comparable to prior psychometric studies and considered acceptable for screening tests (Hansson et al., 2015).

(4) Non-Suicidal Self-Injury (NSSI) was measured by asking participants to identify "ways you may have hurt yourself on purpose, without intending to kill yourself" in the past year from a list of eleven means (e.g., cut myself). Responses were dichotomized to indicate whether there was any NSSI or not.

(5) Suicidal ideation was assessed by one item from the HMS that asked participants if they have seriously considered suicide in the past year. We also created a dichotomized variable to signify if one or more of these five mental health indexes were present.

Perceived need and mental health stigma. The perceived need was assessed by one item that stated, "in the past 12 months, I needed help for emotional or mental health problems such as feeling sad, blue, anxious, or nervous." Perceived public stigma and personal stigma were each measured by three parallel items by switching the subject between "*most people*" and "*I*" (e.g., most people vs. I feel receiving mental health treatment is a sign of personal failure). All items under knowledge and attitudes were rated on a 1 (=strongly disagree) to 6 (=strongly agree) Likert-type scale, with higher scores indicating more stigma or perceived need. Scores were dichotomized to indicate whether there was perceived need, perceived public stigma, and personal stigma (≥ 4) or not. The perceived public stigma and personal stigma scales were adapted from the Discrimination-Devaluation Scale (Link et al., 1989) and the adapted scales have shown good psychometric properties (Eisenberg et al., 2009). Cronbach's alphas for perceived public stigma scores were .74 among domestic students and .67 among international students. Cronbach's alphas for personal stigma scores were .71 among domestic students and .74 among international students.

Help-seeking behaviors. Formal help-seeking behaviors were examined as utilization of counseling/therapy or prescribed psychotropic medications in the last 12 months. Informal help-

seeking behaviors were assessed by asking if participants have relied on any informal sources for mental and emotional health in the last 12 months from a list of eight sources (e.g., roommate, family member, religious counselor, or other religious contacts).

Financial Stress. We opt to use the current financial stress as the proxy to their socioeconomic status, which was measured by one item "how would you characterize your current financial situation?" We collapsed all Likert-type ratings into three categories for cross-wave comparisons: "low stress" (=1), "moderate stress" (=2), and "high stress" (=3). In 2014 and 2015, this item was rated on a 3-point Likert-type scale: "Finances aren't really a problem" (=1), "it's tight but I'm doing fine" (=2), and "it's a financial struggle" (=3). In 2016, 2017, and 2018, it was measured on a 5-point Likert-type scale: "never stressful" (=1), "rarely stressful" (=1), "sometimes stressful" (=2), "often stressful" (=3), and "always stressful" (=3). Compared to domestic students (*Mean* = 2.10, *SD* = .003), international students (*Mean* = 1.92, *SD* = .008) overall endorsed less financial stress (t = -30.822, $p < .001$, d = -.22)

Detailed information, including instruction and items about all measures at each wave, sampling methods, and procedure, was publicly available on the HMS website.

Analytical Plan

For each of the mental health measures, perceived need, mental health stigma, and help-seeking behaviors, we estimated its prevalence stratified by student status. We reported proportions for domestic and international students overall and by gender. As an exploratory analysis, we examined outcomes separately for seven nationalities with a sufficient sample size. Next, we estimated the multivariate correlates of mental health concerns with student status, gender, age, and financial stress. We also estimated the multivariate correlates of formal help-seeking behaviors among students with any mental health concerns. We conducted two logistic

regressions for each help-seeking outcome: in Step 1, student status, gender, age, and financial stress were entered consistent with the logistic regression for mental health disparity. In Step 2, we further entered the perceived need for help, perceived public stigma, personal stigma, and informal support as covariates. Informal support was included as a controlling variable due to past research suggesting the impact of informal help-seeking (e.g., family, friends, religious leaders) on formal help-seeking, especially for international students (Hayes et al., 2011; Yakunina & Weigold, 2011; Yoon & Jepsen, 2008). As a sensitivity analysis, we estimated each logistic regression model with campus-level fixed effects (dummy variables for each campus). The ICCs were all lower than .05, suggesting that results were not likely driven by variations between school or over time (Raudenbush & Bryk, 2002). Results with multilevel models remain consistent in magnitude and direction. Analyses were conducted in R with *survey 4.0* (Lumley, 2020) and *WeMix 3.1.4* (Bailey et al., 2020) packages for weighted analysis.

Results

Mental health Concerns

As indicated in Table 1, the prevalence rates were 27.4% (95% CI [26.4, 28.3]) for depression (two-week), 20.0% (95% CI [19,1, 20.8]) for anxiety (two-week), 26.4% (95% CI [25.5, 27.3]) for eating disorder (one-month), 17.2% (95% CI [16.3, 18.0]) for NSSI (12-month), and 8.8% (95% CI [8.1, 9.4]) for suicidal ideation (12-month). An estimated 52.2% (95% CI [51.1, 53.2]) international students were screened positive for any of these mental health concerns, significantly lower compared to 56.1% (95% CI [55.7, 56.5]) among their domestic counterparts (χ^2 (1) = 83.9, $p < .001$), albeit small in effect size (Cramer's $V = .02$). After controlling for gender, age, and financial stress (Table 2), international students were less likely to be screened positive for depression (*OR* = .94, 95% CI [.89, .99]), anxiety (*OR* = .77, 95% CI

[.73, .82]), NSSI (*OR* = .88, 95% CI [.82, .94]), and SI (*OR* = .77, 95% CI [.70, .84]) compared to domestic students. However, international students were more likely to be screened positive for eating disorder (*OR* = 1.45, 95% CI [1.38, 1.53] and any of these mental health concerns (*OR* = 1.10, 95% CI [1.02, 1.17]) compared to domestic students. Additionally, among all students, being male and in older age groups were generally associated with lower likelihood of mental health concerns, and higher financial stress was associated with higher likelihood of mental health concerns.

Within international students, female students endorsed higher rates of depression (29.5% vs. 24.5%), anxiety (22.0% vs. 17.5%), eating disorder (31.8% vs. 20.8%), NSSI (17.6% vs. 16.1%), suicidal ideation (9.9% vs. 7.0%), and any mental health concerns (56.4% vs. 47.3%), compared to their male counterparts, *p*s < .001, Cramer's *V* = .02-.13. Given the vast heterogeneity within international student subgroups, we further provided more fine-tuned data analysis by nationality. Prior HMS publications have investigated the heterogeneity among domestic students, such as race and ethnicity (e.g., Eisenberg et al., 2009; Lipson et al., 2018). We calculated the minimal sample size needed for each country to estimate the prevalence with a 95% Confidence Interval of width 10% using the base rate of depression (as a conservative estimate), $N = 4\times0.27\times(1-0.27)\times1.96^2/0.1^2 = 303$ (Machin et al., 2018). Thus, the mental health prevalence rates were estimated among international students from China (*n* = 5,458), India (*n* = 2,432), South Korea (*n* = 903), Canada (*n* = 619), Brazil (*n* = 361), Saudi Arabia (*n* = 346), and Spain (*n* = 327) that met this cut-off sample size criterion. As indicated in Table 1, the overall prevalence rates of any mental health concerns ranged from 45.6% (Canada) to 65.8% (South Korea) with considerable cross-country differences noted in the five estimated mental health concerns (*p*s < .01, Cramer's *V* = .03 - .12). The descriptive statistics indicated Saudi Arabian

students endorsed the highest rate of anxiety (31.1%), and South Korean students endorsed the highest rates of depression (45.8%), eating disorder (37.4%), NSSI (19.8%), and suicidal ideation (12.6%).

Knowledge, attitudes, and help-seeking

As indicated in Table 3, among students meeting the screening criteria for any mental health concerns (n = 96,567), 69.2% international students perceived a need for help, which is significantly lower than that proportion (75.9%) among domestic students (χ^2 (1) = 163.1, $p < .001$, Cramer's $V = .04$). More international students endorsed perceived public stigma (43.1% vs. 38.3%, χ^2 (1) = 10.7, $p < .001$, Cramer's V =.03) and personal stigma (14.1% vs. 3.8%, χ^2 (1) =342.7, $p < .001$, Cramer's $V = .13$) towards seeking formal help compared to domestic students. An estimated 32.0% international students reported past-year treatment (25.5% therapy and 14.9% psychotropic medication use), and 66.1% reported informal help-seeking, all significantly lower (ps < .001, Cramer's V = .06 - .10) compared to those percentages among domestic students.

Within international students meeting the screening criteria for any mental health concerns (n = 8,647), female students reported higher perceived need (72.4% vs. 64.7%) and using more formal (34.5% vs. 27.8%) and informal help-seeking (71.4% vs. 59.6%), compared to their male counterparts, ps < .001, Cramer's V = .07-.12. Table 3 further presented the attitudes and help-seeking behaviors among students from China, India, South Korea, Canada, Brazil, Saudi Arabia, and Spain with considerable cross-country differences (ps < .001, Cramer's V = .09 - .18). For example, the utilization rates of mental health therapy and psychotropic medication ranged from 24.7% (China) to 48.9% (Brazil).

Lastly, as displayed in Table 4, being in older age groups, higher financial stress, perceived need for help, perceived public stigma, and using informal help were associated with higher odds ratios for seeking formal help. Being male and personal stigma were associated with lower odds ratios for seeking formal help. More important, even after controlling for these demographic variables and help-seeking attitudes, international students were still significantly less likely to use therapy (OR = .65, 95% CI [.59, .70]), psychotropic medication (OR = .36, 95% CI [.33, .40]), or any treatment (OR = .50, 95% CI [.46, .54]) compared to domestic students.

Discussion

Given the substantial size of international students in the U.S. higher education and their potential susceptibility to mental health concerns (Institute of International Education, 2020; P. B. Pedersen, 1991; Zhang & Goodson, 2011), the prevalence of mental health concerns and service utilization needs to be better understood in this population. Past research on international students have primarily been based upon convenience sampling within selected international student groups and/or limited institutions (Han et al., 2013; Hyun et al., 2007; Yoon & Jepsen, 2008). The present study contributes to the literature in providing more comprehensive empirical evidence regarding the prevalence of mental health concerns and service utilization among international students in a national sample.

Our estimates of the prevalence rates of depression, anxiety, eating disorder, NSSI, and SI raise concerns about the severity and urgency of mental health concerns among international students. For example, the 2-week prevalence rates of depression and anxiety were 27.4% and 20.0% among international students, as compared to 8.0% (Cao et al., 2020) and 6.1% (Terlizzi & Villarroel, 2020) in the general U.S. population using the same screening instruments. These rates are also higher compared to the prevalence rates (i.e., 7.8% depression and 5.3% anxiety)

found in some prior study with international students (Han et al., 2013) based on a convenience sample (i.e., 130 Chinese students at Yale University).

More importantly, the present study is the first to provide knowledge regarding the population differences between international and domestic students. Our findings indicate that prevalence rates for specific mental health concerns are lower for international versus domestic students (except for eating disorders), even after controlling for gender, age, and financial stress. Although contradictory with studies that suggested similar levels of mental health concerns between domestic and international students (Stallman & Shochet, 2009; Xiong, 2018), our results may resemble findings among immigrant population. The immigrant paradox hypothesis proclaims that, despite the significant barriers they face in adjusting to the host society, early-generation immigrants have fewer health and mental health concerns than more established immigrants and non-immigrants (Budhwani et al., 2015; John et al., 2012). This paradoxical gap has been attributed to early-generation immigrants' cultural values and practices, stronger ethnic identity, and other protective factors (Namer & Razum, 2018). Although international students are not immigrants as defined in these prior studies, it is plausible that similar protective factors may be acting to buffer international students from mental health concerns. Another possible explanation for the lower mental health concerns may be the under-reporting of symptoms resulting from higher mental health stigma. This is supported by emerging evidence suggested that individuals with high mental health stigma are likely to under-report mental illnesses (Bharadwaj et al., 2017). Given international students endorsed higher perceived public stigma and personal stigma, we conducted post-hoc analyses by further adding the perceived public stigma and personal stigma as covariates. Findings from these post-hoc analyses did not change – the prevalence rates for depression, anxiety, NSSI, and SI were still lower for international

versus domestic students. In sum, these findings suggest that mental health stigma, along with other demographic covariates, do not account for the differences in prevalence rates between international and domestic students. Future researchers may find it beneficial to examine if, similar to the immigrant paradox, international students may have unique protective factors (e.g., stronger ethnic identity).

However, while international students generally reported fewer mental health concerns than domestic students in most areas, international students interestingly reported higher prevalence rates specifically for eating disorders. Our findings on eating disorders using the 5-item SCOFF screening tool (Morgan et al., 1999) converge with the Healthy Body Study (Lipson & Sonneville, 2017) that was conducted from 2013 to 2015 and focused on disordered eating and body image dissatisfaction in general university student population. Using a more comprehensive screening assessment, the Eating Disorder Examination Questionnaire (EDE-Q; Quick & Byrd-Bredbenner, 2013), Lipson and Sonneville (2017) found that, when compared to their domestic counterparts, international female students were at a greater risk of binge eating and compensatory behaviors, and international male students were at a greater risk of compensatory behaviors. However, among students who received services at 47 university counseling centers, Kawamoto et al. (2018) did not find international students reported more eating concerns compared to domestic students, assessed by the Counseling Center Assessment of Psychological Symptoms (CCAPS) scale. In the same report, Asian international students reported more eating concerns than international students from South America (Kawamoto et al. 2018). Taken together, the current study adds to the developing and accruing evidence suggesting international students are at a high risk of eating disorders, at least defined in the current diagnostic criteria (e.g., DSM-5). However, prior studies, especially international research, also documented the

cultural differences in how eating disorders may present (e.g., Pike & Dunne, 2015; van Hoeken et al., 2016). Therefore, these results need to be interpreted with caution. Further research is critical to help elucidate the symptom representation and prevalence of eating disorders among international and culturally diverse students.

The present study also revealed the significant disparity between those in need of services and those who receive services. Our findings support past research that demonstrated a high service utilization gap present for international students, even more so than their domestic peers (Hyun et al., 2007; Yoon & Jepsen, 2008). When mental illness is left untreated, there are significant costs and dangers, none the least of which includes the potential increase in the intensity of symptoms and the increase in risk (e.g., Altamura et al., 2008). Our findings suggest that international students were less likely to seek help (formal and informal) than domestic students. Thus, there needs to be the development of tailored programs that seek to increase the utilization rates for targeted student groups, including international students (Mori, 2000; E. R. Pedersen & Paves, 2014; Prieto-Welch, 2016; Wong et al., 2014). The present study provides some potential aspects to target, such as personal stigma and perceived need for services.

While greater personal stigma was related to a decreased likelihood of seeking services, increased perceived public stigma was more predictive of a higher likelihood of service use. This supports some past research with similar findings regarding perceived public stigma (Downs & Eisenberg, 2012; Marsh & Wilcoxon, 2015). One potential reason for this could be that students who sought out mental health services may be more likely to experience and endorse, and therefore concerned about, mental health stigma (Downs & Eisenberg, 2012; Marsh & Wilcoxon, 2015). That is, after participating in treatment, students may be more sensitive to others' negative attitudes towards help seeking. Future research could consider using

longitudinal methods to better understand the directionality between service utilization and stigma. Similar to stigma, perceived need was also significantly related to service use, which is in line with past research (Bonabi et al., 2016; Eisenberg et al., 2011). However, the disparity between the prevalence of and the perceived need for mental health concerns, which indicates that not all those who screened positive were aware of their need for services, is concerning.

One possible contributing factor that was not fully explored in the present study but may be of interest to future researchers is mental health literacy. Mental health literacy is a multidimensional construct and consists of the ability to recognize disorders, knowledge of how to seek mental health information, knowledge of risk factors and causes, knowledge of self-treatments, knowledge of professional health available, and attitudes that promote recognition and appropriate help-seeking (Kutcher et al., 2016). Perceived need can be considered an aspect of mental health literacy. Given the significant relationships between perceived need and help-seeking, future researchers may explore if other mental health literacy dimensions would similarly be significantly related to help-seeking behaviors. Additionally, there were several key factors that the current study was limited in capacity to explore that may have significantly impacted service utilization. For example, international students experience unique barriers to care, including language and cultural barriers (Lee et al., 2014; Yakunina & Weigold, 2011) that domestic students may not experience to the same degree. It is thus important to recognize international students' mental health literacy in their own language and culture may not be as effective in helping them navigate the U.S. healthcare system. Future research can explore how the availability of culturally and linguistically competent therapists and services offered by a campus impacts service use and actual treatment effectiveness (Hayes et al., 2011; Mori, 2000; E. R. Pedersen & Paves, 2014; Prieto-Welch, 2016). In a more recent service utilization model,

the importance of accessibility (e.g., affordability) and availability (e.g., multicultural competence) factors have been highlighted to explain service disparity among U.S. domestic, ethnic minority populations (Turner et al., 2016). This framework can be potentially extended to understand mental health utilization among international students given similar accessibility and availability issues.

Limitations

This current study has several strengths and limitations that offer directions for future research. A significant merit of the study is the national, multisite nature of the HMS and random sampling at the student level with non-response weighting, thus increasing the current findings' generalizability. However, some limitation also lies in the weighting variables used. While the HMS used response rates and patterns to create propensity score weighting based on gender, race/ethnicity, academic level, and grade point average from the participating institutions' registrar, the response rates did not take into account students' international student status or other unobserved characteristics such as mental health status. Given that the present study's focus was to compare domestic and international students, it is possible that the weights in the present study—which were based on an overall student population—may not be fully accurate for the international student population. For example, some prior research has indicated that international students are more likely to respond to institutional surveys than domestic students (Porter & Umbach, 2006). Second, there may be potential cultural biases with the assessment tools (e.g., Parkerson et al., 2015) used in screening mental health concerns among international students that lead to over or under-identification. Thus, the differences in prevalence rates can be attributed to cross-cultural measurement error rather than actual differences. Although measures such as PHQ-9 and GAD-7 have been widely used, empirical evidence is still limited in its cross-

cultural validity across all 151 nationalities represented in the current study. Third, due to the use of cross-sectional data, directional and causal conclusions cannot be drawn. This is a particular limitation in our ability to better interpret the findings regarding the relationship between stigma and treatment utilization. Fourth, although the participating intuitional sample is large and diverse, these survey weights also do not account for the non-random sampling of the institutions that elected to participate in the HMS.

Implications and Conclusions

The present study fills a significant gap in the literature regarding knowledge of the prevalence rates of five common mental health concerns, service utilization rates, and determinants of utilization among international students. Our findings call attention to a high prevalence of these mental health concerns among international students. Researchers and practitioners may want to particularly further understand the severity and validity of eating disorder concerns among international students. Additionally, less than a third of the international students screened positive for these mental health concerns used any mental health services in the past year, which was significantly lower compared to domestic students. We highlight several key areas (e.g., mental health literacy and mental health stigma) that can be targeted in providing mental health prevention and outreach to international students. Last but not least, it is critical not to treat international students as a monolithic group in research and clinical implementations, given the significant variabilities found among international students from seven different countries in terms of prevalence rates, perceived need, mental health stigma, and help-seeking behaviors.

Unfortunately, the factors highlighted in this model were not available to explore in the Healthy Minds Study. However, the use of Andersen's model in the present study fills a critical gap in the literature by providing key information about the status of international students' mental health need and service use, including the large service gap within this population. Future researchers interested in exploring mental health service use in international students should use culturally informed models of services use (e.g., Turner et al., 2016) to frame their research. This will allow for further exploration and identification of specific cultural factors within the international student population that may be contributing to the service gap and inform the development of tailored intervention programs for this population.

Reference

Akena, D., Joska, J., Obuku, E. A., Amos, T., Musisi, S., & Stein, D. J. (2012). Comparing the accuracy of brief versus long depression screening instruments which have been validated in low and middle income countries: A systematic review. *BMC Psychiatry*, *12*(1), 187. https://doi.org/10.1186/1471-244X-12-187

Altamura, A. C., Dell'Osso, B., Vismara, S., & Mundo, E. (2008). May duration of untreated illness influence the long-term course of major depressive disorder? *European Psychiatry*, *23*(2), 92–96. https://doi.org/10.1016/j.eurpsy.2007.11.004

Andersen, R. M. (1995). Revisiting the Behavioral Model and Access to Medical Care: Does it Matter? *Journal of Health and Social Behavior*, *36*(1), 1–10. JSTOR. https://doi.org/10.2307/2137284

Auerbach, R. P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., Demyttenaere, K., Ebert, D. D., Green, J. G., Hasking, P., Murray, E., Nock, M. K., Pinder-Amaker, S., Sampson, N. A., Stein, D. J., Vilagut, G., Zaslavsky, A. M., Kessler, R. C., & WHO WMH-ICS Collaborators. (2018). WHO World Mental Health Surveys International College Student Project: Prevalence and distribution of mental disorders. *Journal of Abnormal Psychology*, *127*(7), 623–638. https://doi.org/10.1037/abn0000362

Bailey, P., Kelley, C., Nguyen, T., Huo, H., & data), C. K. (tests with T. (2020). *WeMix: Weighted Mixed-Effects Models Using Multilevel Pseudo Maximum Likelihood Estimation* (3.1.4) [Computer software]. https://CRAN.R-project.org/package=WeMix

Bharadwaj, P., Pai, M. M., & Suziedelyte, A. (2017). Mental health stigma. *Economics Letters*, *159*, 57–60. https://doi.org/10.1016/j.econlet.2017.06.028

Bonabi, H., Müller, M., Ajdacic-Gross, V., Eisele, J., Rodgers, S., Seifritz, E., Rössler, W., & Rüsch, N. (2016). Mental Health Literacy, Attitudes to Help Seeking, and Perceived Need as Predictors of Mental Health Service Use: A Longitudinal Study. *The Journal of Nervous and Mental Disease*, *204*(4), 321–324. https://doi.org/10.1097/NMD.0000000000000488

Budhwani, H., Hearld, K. R., & Chavez-Yenter, D. (2015). Depression in Racial and Ethnic Minorities: The Impact of Nativity and Discrimination. *Journal of Racial and Ethnic Health Disparities*, *2*(1), 34–42. https://doi.org/10.1007/s40615-014-0045-z

Cao, C., Hu, L., Xu, T., Liu, Q., Koyanagi, A., Yang, L., Carvalho, A. F., Cavazos-Rehg, P. A., & Smith, L. (2020). Prevalence, correlates and misperception of depression symptoms in the United States, NHANES 2015–2018. *Journal of Affective Disorders*, *269*, 51–57. https://doi.org/10.1016/j.jad.2020.03.031

Clement, S., Schauman, O., Graham, T., Maggioni, F., Evans-Lacko, S., Bezborodovs, N., Morgan, C., Rüsch, N., Brown, J. S. L., & Thornicroft, G. (2015). What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychological Medicine*, *45*(1), 11–27. https://doi.org/10.1017/S0033291714000129

Corrigan, P. W. (2004). How stigma interferes with mental health care. *American Psychologist*, *59*(7), 614–625. https://doi.org/10.1037/0003-066X.59.7.614

Downs, M. F., & Eisenberg, D. (2012). Help Seeking and Treatment Use Among Suicidal College Students. *Journal of American College Health*, *60*(2), 104–114. https://doi.org/10.1080/07448481.2011.619611

Eisenberg, D., Downs, M. F., Golberstein, E., & Zivin, K. (2009). Stigma and help seeking for mental health among college students. *Medical Care Research and Review: MCRR*, *66*(5), 522–541. https://doi.org/10.1177/1077558709335173

Eisenberg, D., Hunt, J., Speer, N., & Zivin, K. (2011). Mental Health Service Utilization Among College Students in the United States: *The Journal of Nervous and Mental Disease*, *199*(5), 301–308. https://doi.org/10.1097/NMD.0b013e3182175123

Han, X., Han, X., Luo, Q., Jacobs, S., & Jean-Baptiste, M. (2013). Report of a Mental Health Survey Among Chinese International Students at Yale University. *Journal of American College Health*, *61*(1), 1–8. https://doi.org/10.1080/07448481.2012.738267

Hansson, E., Daukantaité, D., & Johnsson, P. (2015). SCOFF in a general swedish adolescent population. *Journal of Eating Disorders*, *3*(1), 48. https://doi.org/10.1186/s40337-015-0087-6

Hayes, J. A., Youn, S. J., Castonguay, L. G., Locke, B. D., McAleavey, A. A., & Nordberg, S. (2011). Rates and Predictors of Counseling Center Use Among College Students of Color. *Journal of College Counseling*, *14*(2), 105–116. https://doi.org/10.1002/j.2161-1882.2011.tb00266.x

Hubbard, K., Reohr, P., Tolcher, L., & Downs, A. (2018). Stress, Mental Health Symptoms, and Help-Seeking in College Students. *Psi Chi Journal of Psychological Research*, *23*(4), 293–305. https://doi.org/10.24839/2325-7342.JN23.4.293

Hyun, J., Quinn, B., Madon, T., & Lustig, S. (2007). Mental health need, awareness, and use of counseling services among international graduate students. *Journal of American College Health: J of ACH*, *56*(2), 109–118. https://doi.org/10.3200/JACH.56.2.109-118

Institute of International Education. (2020). *International students U.S. study*. https://www.iie.org:443/Research-and-Insights/Open-Doors/Data/International-Students

John, D. A., de Castro, A. B., Martin, D. P., Duran, B., & Takeuchi, D. T. (2012). Does an immigrant health paradox exist among Asian Americans? Associations of nativity and occupational class with self-rated health and mental disorders. *Social Science & Medicine*, *75*(12), 2085–2098. https://doi.org/10.1016/j.socscimed.2012.01.035

Kawamoto, A., Youn, S. J., Bartholomew, T. T., Castonguay, L. G., & Locke, B. D. (2018). Inter- and intra-group differences in psychological concerns among international students. *Counselling Psychology Quarterly*, *31*(2), 186–204. https://doi.org/10.1080/09515070.2016.1274962

Kisch, J., Leino, E. V., & Silverman, M. M. (2005). Aspects of Suicidal Behavior, Depression, and Treatment in College Students: Results from the Spring 2000 National College Health Assessment Survey. *Suicide and Life-Threatening Behavior*, *35*(1), 3–13. https://doi.org/10.1521/suli.35.1.3.59263

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9. *Journal of General Internal Medicine*, *16*(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Kruisselbrink Flatt, A. (2013). A Suffering Generation: Six Factors Contributing to the Mental Health Crisis in North American Higher Education. *College Quarterly*, *16*(1). https://eric.ed.gov/?id=EJ1016492

Kutcher, S., Wei, Y., & Coniglio, C. (2016). Mental Health Literacy: Past, Present, and Future. *The Canadian Journal of Psychiatry*, *61*(3), 154–158. https://doi.org/10.1177/0706743715616609

Lally, J., Conghaile, A. ó, Quigley, S., Bainbridge, E., & McDonald, C. (2013). Stigma of mental illness and help-seeking intention in university students. *The Psychiatrist*, *37*(8), 253–260. https://doi.org/10.1192/pb.bp.112.041483

Lee, E.-J., Ditchman, N., Fong, M. W. M., Piper, L., & Feigon, M. (2014). Mental Health Service Seeking Among Korean International Students in the United States: A Path Analysis. *Journal of Community Psychology*, *42*(6), 639–655. https://doi.org/10.1002/jcop.21643

Leung, S. F., Lee, K. L., Lee, S. M., Leung, S. C., Hung, W. S., Lee, W. L., Leung, Y. Y., Li, M. W., Tse, T. K., Wong, H. K., & Wong, Y. N. (2009). Psychometric properties of the SCOFF questionnaire (Chinese version) for screening eating disorders in Hong Kong secondary school students: A cross-sectional study. *International Journal of Nursing Studies*, *46*(2), 239–247. https://doi.org/10.1016/j.ijnurstu.2008.09.004

Link, B. G., Cullen, F. T., Struening, E. L., Shrout, P. E., & Dohrenwend, B. P. (1989). A modified labeling theory approach to mental disorders: An empirical assessment. *American Sociological Review*, *54*(3), 400–423. https://doi.org/10.2307/2095613

Lipson, S. K., Gaddis, S. M., Heinze, J., Beck, K., & Eisenberg, D. (2015). Variations in Student Mental Health and Treatment Utilization Across US Colleges and Universities. *Journal of American College Health: J of ACH*, *63*(6), 388–396. https://doi.org/10.1080/07448481.2015.1040411

Lipson, S. K., Lattie, E. G., & Eisenberg, D. (2019). Increased Rates of Mental Health Service Utilization by U.S. College Students: 10-Year Population-Level Trends (2007-2017). *Psychiatric Services (Washington, D.C.)*, *70*(1), 60–63. https://doi.org/10.1176/appi.ps.201800332

Lipson, S. K., Raifman, J., Abelson, S., & Reisner, S. L. (2019). Gender Minority Mental Health in the U.S.: Results of a National Survey on College Campuses. *American Journal of Preventive Medicine*, *57*(3), 293–301. https://doi.org/10.1016/j.amepre.2019.04.025

Lipson, S. K., & Sonneville, K. (2017). Eating disorder symptoms among undergraduate and graduate students at 12 U.S. colleges and universities. *Eating Behaviors*, *24*, 81–88. https://doi.org/10.1016/j.eatbeh.2016.12.003

Lipson, Sarah Ketchen, Kern, A., Eisenberg, D., & Breland-Noble, A. M. (2018). Mental Health Disparities Among College Students of Color. *Journal of Adolescent Health*, *63*(3), 348–356. https://doi.org/10.1016/j.jadohealth.2018.04.014

Lumley, T. (2020). *survey: Analysis of Complex Survey Samples* (4.0) [Computer software]. https://CRAN.R-project.org/package=survey

Machin, D., Campbell, M. J., Tan, S. B., & Tan, S. H. (2018). *Sample sizes for clinical, laboratory and epidemiology studies*. Wiley Online Library.

Manea, L., Gilbody, S., & McMillan, D. (2012). Optimal cut-off score for diagnosing depression with the Patient Health Questionnaire (PHQ-9): A meta-analysis. *CMAJ*, *184*(3), E191–E196. https://doi.org/10.1503/cmaj.110829

Marsh, C. N., & Wilcoxon, S. A. (2015). Underutilization of Mental Health Services Among College Students: An Examination of System-Related Barriers. *Journal of College Student Psychotherapy*, *29*(3), 227–243. https://doi.org/10.1080/87568225.2015.1045783

Morgan, J. F., Reid, F., & Lacey, J. H. (1999). The SCOFF questionnaire: Assessment of a new screening tool for eating disorders. *BMJ*, *319*(7223), 1467–1468. https://doi.org/10.1136/bmj.319.7223.1467

Mori, S. C. (2000). Addressing the Mental Health Concerns of International Students. *Journal of Counseling & Development*, *78*(2), 137–144. https://doi.org/10.1002/j.1556-6676.2000.tb02571.x

NAFSA. (2020). *NAFSA International Student Economic Value Tool*. NAFSA. Retrived from https://www.nafsa.org/policy-and-advocacy/policy-resources/nafsa-international-student-economic-value-tool-v2

Namer, Y., & Razum, O. (2018, August 28). *Convergence Theory and the Salmon Effect in Migrant Health*. Oxford Research Encyclopedia of Global Public Health. https://doi.org/10.1093/acrefore/9780190632366.013.17

Oswalt, S. B., Lederer, A. M., Chestnut-Steich, K., Day, C., Halbritter, A., & Ortiz, D. (2020). Trends in college students' mental health diagnoses and utilization of services, 2009–2015. *Journal of American College Health*, *68*(1), 41–51. https://doi.org/10.1080/07448481.2018.1515748

Parkerson, H. A., Thibodeau, M. A., Brandt, C. P., Zvolensky, M. J., & Asmundson, G. J. G. (2015). Cultural-based biases of the GAD-7. *Journal of Anxiety Disorders*, *31*, 38–42. https://doi.org/10.1016/j.janxdis.2015.01.005

Pedersen, E. R., & Paves, A. P. (2014). Comparing perceived public stigma and personal stigma of mental health treatment seeking in a young adult sample. *Psychiatry Research*, *219*(1), 143–150. https://doi.org/10.1016/j.psychres.2014.05.017

Pedersen, P. B. (1991). Counseling International Students. *The Counseling Psychologist*, *19*(1), 10–58. https://doi.org/10.1177/0011000091191002

Pendse, A., & Inman, A. G. (2017). International student-focused counseling research: A 34-year content analysis. *Counselling Psychology Quarterly*, *30*(1), 20–47. https://doi.org/10.1080/09515070.2015.1128395

Pike, K. M., & Dunne, P. E. (2015). The rise of eating disorders in Asia: A review. *Journal of Eating Disorders*, *3*(1), 33. https://doi.org/10.1186/s40337-015-0070-2

Porter, S. R., & Umbach, P. D. (2006). Student Survey Response Rates across Institutions: Why Do they Vary? *Research in Higher Education*, *47*(2), 229–247. https://doi.org/10.1007/s11162-005-8887-1

Prieto-Welch, S. L. (2016). International Student Mental Health. *New Directions for Student Services*, *2016*(156), 53–63. https://doi.org/10.1002/ss.20191

Prince, J. P. (2015). University student counseling and mental health in the United States: Trends and challenges. *Mental Health and Prevention*, *3*(1–2), 5–10. https://doi.org/10.1016/j.mhp.2015.03.001

Quick, V. M., & Byrd-Bredbenner, C. (2013). Eating Disorders Examination Questionnaire (EDE-Q): Norms for US college students. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity*, *18*(1), 29–35. https://doi.org/10.1007/s40519-013-0015-1

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (Vol. 1). Sage.

Schnyder, N., Panczak, R., Groth, N., & Schultze-Lutter, F. (2017). Association between mental health-related stigma and active help-seeking: Systematic review and meta-analysis. *British Journal of Psychiatry*, *210*(4), 261–268. https://doi.org/10.1192/bjp.bp.116.189464

Sontag-Padilla, L., Woodbridge, M. W., Mendelsohn, J., D'Amico, E. J., Osilla, K. C., Jaycox, L. H., Eberhart, N. K., Burnam, A. M., & Stein, B. D. (2016). Factors Affecting Mental Health Service Utilization Among California Public College and University Students. *Psychiatric Services*, *67*(8), 890–897. https://doi.org/10.1176/appi.ps.201500307

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A Brief Measure for Assessing Generalized Anxiety Disorder: The GAD-7. *Archives of Internal Medicine*, *166*(10), 1092. https://doi.org/10.1001/archinte.166.10.1092

Stallman, H. M., & Shochet, I. (2009). Prevalence of mental health problems in Australian university health services. *Australian Psychologist*, *44*(2), 122–127. https://doi.org/10.1080/00050060902733727

Terlizzi, E. P., & Villarroel, M. A. (2020). *Symptoms of Generalized Anxiety Disorder Among Adults: United States, 2019* (p. 8). https://www.cdc.gov/nchs/data/databriefs/db378-H.pdf

Turner, E. A., Cheng, H.-L., D. Llamas, J., G.T.T. Tran, A., X. Hill, K., M. Fretts, J., & Mercado, A. (2016). Factors Impacting the Current Trends in the Use of Outpatient Psychiatric Treatment Among Diverse Ethnic Groups. *Current Psychiatry Reviews*, *12*(2), 199–220. https://doi.org/10.2174/1573400512666160216234524

U.S. News. (2020). *National Universities With the Most International Students*. https://www.usnews.com/best-colleges/rankings/national-universities/most-international

van Hoeken, D., Burns, J. K., & Hoek, H. W. (2016). Epidemiology of eating disorders in Africa. *Current Opinion in Psychiatry*, *29*(6), 372–377. https://doi.org/10.1097/YCO.0000000000000274

Wong, Y. J., Wang, K. T., & Maffini, C. S. (2014). Asian international students' mental health-related outcomes: A Person × Context cultural framework. *The Counseling Psychologist*, *42*(2), 278–305. https://doi.org/10.1177/0011000013482592

Xiong, Y. (2018). *An exploration of asian international students' mental health: Comparisons to american students and other international students in the United States* [PhD Thesis]. Ohio University.

Yakunina, E. S., & Weigold, I. K. (2011). Asian international students' intentions to seek counseling: Integrating cognitive and cultural predictors. *Asian American Journal of Psychology*, *2*(3), 219–224. https://doi.org/10.1037/a0024821

Yoon, E., & Jepsen, D. A. (2008). Expectations of and Attitudes toward Counseling: A Comparison of Asian International and U.S. Graduate Students. *International Journal for the Advancement of Counselling*, *30*(2), 116–127. https://doi.org/10.1007/s10447-008-9050-4

Zhang, J., & Goodson, P. (2011). Predictors of international students' psychosocial adjustment to life in the United States: A systematic review. *International Journal of Intercultural Relations*, *35*(2), 139–162. https://doi.org/10.1016/j.ijintrel.2010.11.011

Table 1.
Mental Health Status by Gender and Domestic/International Student Status with Selected Nationalities (%)

	Overall						Male students						Female students					
	Dep	Anx	ED	NSSI	SI	Any	Dep	Anx	ED	NSSI	SI	Any	Dep	Anx	ED	NSSI	SI	Any
All students	32.8	27.7	23.1	22.4	12.8	55.8	27.6	21.1	16.5	19.2	11.6	48.5	35.3	31.5	27.6	23.0	12.6	59.8
Domestic	33.3	28.4	22.8	22.9	13.2	56.1	27.9	21.5	16.0	19.5	12.0	48.6	35.8	32.3	27.3	23.5	12.8	60.1
International	27.4	20.0	26.4	17.2	8.8	52.2	24.5	17.5	20.8	16.1	7.0	47.3	29.5	22.0	31.8	17.6	9.9	56.4
China	24.0	15.6	30.1	15.8	8.2	51.5	23.7	15.2	25.0	14.6	6.6	48.3	23.8	16.0	34.3	16.7	9.2	54.0
India	26.8	21.0	28.7	16.5	8.7	53.0	24.6	18.1	26.5	17.8	5.9	50.5	28.9	24.0	31.1	13.6	11.5	55.8
South Korea	45.8	25.4	37.4	21.2	12.6	65.8	41.5	19.7	26.7	21.2	9.0	57.1	48.8	29.5	45.6	20.8	14.6	72.1
Canada	25.1	21.2	17.6	16.4	7.6	45.6	20.7	16.5	10.9	12.4	5.9	33.8	28.7	25.1	22.7	18.1	8.5	53.8
Brazil	28.3	28.2	18.5	16.7	7.4	51.0	27.3	24.3	10.9	12.5	6.6	44.0	29.1	32.4	25.9	21.6	7.5	58.0
Saudi Arabia	29.2	31.1	31.7	15.5	9.2	63.8	28.3	32.1	31.4	18.6	9.0	67.6	30.6	29.8	31.5	11.2	9.5	58.2
Spain	29.0	18.6	20.7	15.1	7.0	50.4	29.2	15.4	14.2	15.7	3.9	47.8	29.1	21.7	26.9	14.7	10.0	53.2

Note. Table values are percentages of the weighted sample. “Dep” (depression) is ≥ 10 on the PHQ-9. “Anx” (Anxiety) is ≥ 10 on the GAD-7. “ED” (eating disorder) is ≥ 2 on the SCOFF. “NSSI” is any past-year non-suicidal self-injury. “SI” is any past-year suicidal ideation. “Any prob” (any mental health problem) is a positive screen for depression, anxiety, eating disorder, non-suicidal self-injury, or suicidal ideation in the past year. Only nationality with more than 300 individuals were included: China (n = 5,458), India (n = 2,432), South Korea (n = 903), Canada (n = 619), Brazil (n = 361), Saudi Arabia (n = 346), and Spain (n = 327).

Table 2.

Logistic Regression Models of Mental Health Concerns among All Students (N = 228,421)

	Depression	Anxiety	ED	NSSI	SI	Any prob
Constant	.12 [.11, .13]***	.11 [.11, .12]***	.19 [.18, .20]***	.18 [.17, .19]***	.05 [.05, .06]***	.35 [.31, .39]***
International	**.94 [.89, .99]***	**.77 [.73, .82]*****	**1.45 [1.38, 1.53]*****	**.88 [.82, .94]*****	**.77 [.70, .84]*****	**1.10 [1.02, 1.17]****
Gender						
Male	.76 [.74, .79]***	.63 [.61, .65]***	.53 [.51, .56]***	.84 [.81, .87]***	.99 [.94, 1.04]	.64 [.62, .67]***
Age						
Age 23-25	.80 [.76, .84]***	.85 [.81, .89]***	.84 [.80, .88]***	.63 [.59, .66]***	.76 [.70, .82]***	.99 [.93, 1.06]
Age 26-30	.67 [.63, .71]***	.75 [.70, .80]***	.74 [.70, .79]***	.48 [.44, .51]***	.58 [.53, .63]***	.79 [.73, .86]***
Age ≥ 31	.51 [.49, .54]***	.52 [.49, .56]***	.64 [.60, .69]***	.24 [.22, .26]***	.43 [.40, .47]***	.51 [.47, .55]***
Financial stress	2.1 [2.06, 2.15]***	1.98 [1.94, 2.03]***	1.42 [1.39, 1.45]***	1.39 [1.36, 1.42]***	1.70 [1.64, 1.75]***	1.61 [1.46, 1.77]***
R^2	.07	.07	.03	.04	.02	.06

Note. Table values are odds ratios (OR) with 95% CIs in brackets. Reference groups are: U.S. citizen (for International student status), female (for gender), Age 18-22 (for age). Depression is ≥ 10 on the PHQ-9. Anxiety is ≥ 10 on the GAD-7. "ED" (eating disorder) is ≥ 2 on the SCOFF. "NSSI" is any past-year non-suicidal self-injury. "SI" is any past-year suicidal ideation. "Any prob" (any mental health problem) is a positive screen for depression, anxiety, eating disorder, non-suicidal self-injury, or suicidal ideation.

* p <.05. *** p <.001.

Table 3.
Attitudes and Help-seeking among Students with Any Mental Health Problem (*n* = 96,567) (%)

	Overall							Male students							Female students						
	Perc Need	Publ Stig	Pers Stig	Ther	Rx	Any Tx	Inf	Perc Need	Publ Stig	Pers Stig	Ther	Rx	Any Tx	Inf	Perc Need	Publ Stig	Pers Stig	Ther	Rx	Any Tx	Inf
All students	75.4	38.5	4.6	36.7	31.6	48.5	74.7	68.7	38.5	6.2	30.6	26.8	42.1	66.8	78.4	38.3	3.7	38.7	33.2	50.7	78.7
Domestic	75.9	38.1	3.8	37.7	32.9	49.8	75.4	69.1	38.0	5.3	31.7	28.1	43.6	67.6	78.8	38.0	3.0	39.4	34.4	51.8	79.2
International	69.2	43.1	14.1	25.5	14.9	32.0	66.1	64.7	44.0	15.0	21.3	13.3	27.8	59.6	72.4	42.6	13.6	28.3	15.4	34.5	71.4
China	67.2	40.1	22.2	18.8	9.7	24.7	62.5	64.1	41.5	26.0	13.8	8.0	20.1	57.5	69.5	39.2	19.8	22.5	10.9	27.9	67.2
India	70.2	45.9	10.6	24.8	9.8	28.1	67.5	66.6	48.1	14.2	19.0	6.5	21.5	62.2	73.5	43.0	5.5	31.1	12.9	34.5	73.1
South Korea	67.4	46.1	19.9	22.5	13.6	28.4	62.1	62.4	44.1	18.3	25.4	12.5	28.2	56.1	69.3	46.7	20.0	19.6	13.4	27.3	65.5
Canada	75.2	34.7	3.8	34.5	24.6	43.3	70.3	75.9	44.2	7.2	35.5	22.7	43.5	70.6	73.7	29.8	2.4	33.9	25.6	42.4	69.1
Brazil	80.0	47.6	8.2	41.8	24.1	48.9	83.0	67.3	50.7	9.7	32.0	16.4	38.8	75.0	90.3	44.4	7.4	50.2	30.2	56.9	88.9
Saudi Arabia	66.7	57.5	17.7	14.7	22.0	27.4	52.3	64.0	56.8	15.4	13.3	24.8	31.3	44.1	72.1	57.8	21.4	17.4	18.3	22.2	67.1
Spain	68.4	41.5	16.9	26.7	9.1	29.9	69.9	58.5	42.0	23.4	25.6	5.0	27.1	60.4	76.1	41.1	11.8	27.5	12.1	32.1	77.1

Note. Total values are percentages of the weighted sample among students with any mental health concerns. “Perc Need” = perceived need for help with emotional or mental health concerns. “Publ stig” = public stigma; “Pers stigma” = personal stigma towards help-seeking. “Ther” = any past-year mental health therapy. “Rx” = any past-year psychotropic medication use. “Any Tx” = any past-year mental health therapy or psychotropic medication use. “Inf” = any past-year informal help seeking with emotional or mental health concerns.

Table 4.
Logistic Regression Models of Help-Seeking among Students with Any Mental Health Concerns (n = 96,567)

	Therapy		Medication		Any Treatment	
Constant	.70 [.66, .75]***	.07 [.07, .08]***	.40 [.38, .43]***	.09 [.09, .10]***	.95 [.89, 1.01]	.16 [.14, .17]***
International	**.59 [.55, .64]***	**.65 [.59, .70]***	**.35 [.32, .39]***	**.36 [.33, .40]***	**.48 [.45, .52]***	**.50 [.46, .54]***
Gender						
Male	.70 [.67, .74]***	.83 [.79, .87]***	.74 [.71, .78]***	.83 [.79, .87]***	.71 [.68, .75]***	.83 [.79, .87]***
Age						
Age 23-25	.94 [.88, 1.00]*	.96 [.90, 1.03]	1.17 [1.09, 1.25]***	1.20 [1.11, 1.28]***	1.02 [.96, 1.09]	1.07 [.99, 1.14]
Age 26-30	1.11 [1.03, 1.20]***	1.15 [1.06, 1.26]**	1.35 [1.25, 1.45]***	1.37 [1.27, 1.49]***	1.26 [1.17, 1.35]***	1.32 [1.22, 1.43]***
Age ≥ 31	1.23 [1.14, 1.33]***	1.46 [1.34, 1.60]***	1.83 [1.69, 1.99]***	2.08 [1.91, 2.26]***	1.48 [1.37, 1.61]***	1.80 [1.65, 1.96]***
Financial stress	.96 [.94, .99]**	.90 [.87, .92]***	1.08 [1.05, 1.11]***	1.03 [1.00, 1.06]*	1.03 [1.01, 1.06]*	.97 [.94, 1.00]*
Perceived need		7.91 [7.29, 8.59]***		3.68 [3.44, 3.94]***		5.52 [5.19, 5.86]***
Public stigma		1.11 [1.06, 1.17]***		1.19 [1.14, 1.25]***		1.12 [1.07, 1.17]***
Personal stigma		.71 [.63, .79]***		.90 [.79, 1.02]		.80 [.71, .89]***
Informal help		2.09 [1.96, 2.23]***		1.60 [1.50, 1.70]***		1.86 [1.76, 1.97]***
R^2	.01	.14	.02	.08	.02	.14

Note. Table values are odds ratios (OR) with 95% CIs in brackets. Reference groups are: U.S. citizen (for International student status), female (for gender), Age 18-22 (for age). * p <.05. *** p <.001.