

Stress, Anxiety, and Depression among Latinx University Students during the COVID-19 Pandemic

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The COVID-19 pandemic has had disruptive effects on college students globally. These include economic dislocation, social isolation, and financial stress. Minority and low-income students have experienced greater adversity than their peers. During the pandemic, college students have increased levels of stress, anxiety, and depression, particularly among minority groups. We conducted a cross-sectional study using standardized instruments (PSS-4 and PHQ-4) to determine the prevalence of stress, anxiety, and depression in a university attended by a majority of Latinx students. We also conducted a meta-analysis with the inverse variance method for pooling to compare the mean PSS-4 to other norm values. We found that Latinx students had a high prevalence of moderate to severe stress and high levels of anxiety and depression that varied by age and gender. This suggests that there is a need for outreach programs that address minority students' mental health during the global public health crisis.

Keywords: COVID-19, stress, anxiety, depression, college students

Introduction

The spread of the COVID-19 pandemic has profoundly affected the lives of people worldwide, and young adults have been among those affected the most (Czeisler et al., 2020; Wallis, 2020). The global prevalence of the disease has changed human behavior on a massive scale and has included alterations in the

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work environment, schooling, public interaction, and daily routines, resulting in greater social isolation and a disruption in routine patterns of human interaction.

During the pandemic, morbidity and mortality rates have been exceptionally high, with the Johns Hopkins Coronavirus Resource Center (CRC) reporting over 126 million cases globally, with more than 30 million of those in the United States. Globally, there have been over 2.7 million deaths, of which over 548,000 have been in the United States (Johns Hopkins University, 2021). The number of pandemic-related deaths may be underestimated by as much as 50% (Centers for Disease Control & Prevention [CDC], 2020). The global population's mental health is being adversely affected, as the pandemic has subjected people to unprecedented stress, fear, and anxiety (Kendall-Tackett, 2020; Pfefferbaum & North, 2020). High rates of Covid-related mortality and morbidity have been combined with massive unemployment, financial losses, and disruptions in food security, recreation, religious practices, and schooling (Simon, Saxe, & Marmar, 2020).

The effects of the COVID-19 pandemic on the mental health of Americans have been significant. The CDC has reported that Americans have increasingly reported symptoms of anxiety, depression, and suicidal ideation during the pandemic (Czeisler et al., 2020). In addition, the frequency and volume of alcohol consumption has risen markedly (Barbosa, Cowell, & Dowd, 2020; Pollard, Tucker, & Green, 2020). During the early pandemic, 13.6% of American adults reported symptoms of serious psychological distress, over four times higher than the 3.9% rate of psychological distress in 2018 (McGinty, Presskreischer, Han, & Barry, 2020).

The frequency and quality of social interactions has declined significantly because of policies that require people to quarantine, maintain social distance, and avoid social gatherings. As a result, people are experiencing isolation and loneliness during the pandemic, which is linked to higher rates of depression, anxiety, psychological distress, and suicidal ideation (Killgore, Cloonan, Taylor, & Dailey, 2020; McGinty et al., 2020).

Bearing in mind that young adults are at higher risk of mental disorder than the general population, indications are that the pandemic is taking a disproportionate toll on the age cohort of 18–25 years (Wallis, 2020.) The National Institute of Mental Health (NIMH; 2020) reports that in the pre-pandemic context, young adults, aged 18–25 years, had the highest prevalence of mental disorders (29.4%). This was higher than rates among middle-aged adults of 26–49 years (25.0%) and adults aged 50 years and older (14.1%).

During the early part of the pandemic (June 2020), research indicated that more than 40.9% of the population of the United States reported an adverse mental condition, involving anxiety or depression (30.9%), or stress disorder (26.3%), and 13.3% reported substance use to cope with stress (Czeisler et al., 2020). In particular, the prevalence of depression symptoms in the United States was found to be three times more during the pandemic (Ettman et al., 2020). Among young adults aged 18–24 years, 74.9% reported at least one adverse mental health symptom, such as anxiety or depression, and 25.5% reported suicidal ideation,

and over half of Latinos reported an adverse symptom of mental disorder (Czeisler et al., 2020).

College Student Stress and the Pandemic

Even during the best of times, college could be a stressful experience for students. Students are exposed to the stressors of demanding courses of study, financial challenges, and the difficulties of navigating higher education (Pedrelli, Nyer, Zulauf, & Wilens, 2014). Minority and Latinx students may also face persistent financial difficulty, discrimination, institutional marginalization, lack of parental experience with college, language barriers, and discrimination (Rodriguez, Guido-DiBrito, Torres, & Talbot, 2000; UNIDOS US, 2020). The global pandemic, which has hit the United States particularly hard, has had a disruptive effect on college students. Economic dislocation and unemployment have put college students under psychological and financial stress (Brown, 2020). More students have been forced to reside with their families (Pew Research Center, 2020). The adjustment to distance learning at colleges is exacerbated by limited access to computers, Wi-Fi service, and, for some, the need to care for family members (Long & Douglas-Gabriel, 2020). Minority and low-income students, in particular, experience greater adversity than their peers in access to technology and food security (Anderson, 2020).

Universities, like all segments of society, have experienced high rates of COVID-19 infection. The New York Times (2021) research indicates that during the late summer of 2020, colleges had 6,600 active cases and 14 deaths (Cai, Ivory, Smith, Lemonides, & Higgins, 2020). By early 2021, the number of cases among college students had risen to 535,000, with at least 100 deaths. The CDC has found that the traditional college age cohort (18–24 years) has the highest rates of COVID-related anxiety (49.1%), depression (52.3%), substance use (24.7%), and suicidal ideation (25.5%) (Czeisler et al., 2020). College students are more at risk of mental disorders during the current public health crisis (Conrad, Rayala, Menon, & Vora, 2020). Huckins et al. (2020) found that at the onset of the pandemic, college students had growing levels of anxiety and depression related to media coverage of COVID-19. In a longitudinal study of college students that captured mental health data before and during the pandemic, researchers found that there was a significant increase in psychological distress among college students, which has worsened over time (Zimmermann, Bledsoe, & Papa, 2020).

Methods

This study identifies the prevalence of psychological distress in college students from a Hispanic-serving institution during the COVID-19 pandemic and explores its relationship with ethnicity, gender, education, employment status, and income. This cross-sectional exploratory study was based on a survey questionnaire sent to all university students at a large public Hispanic-serving institution. The survey

was designed to identify the prevalence and magnitude of stress, anxiety, and depression associated with the COVID-19 pandemic, during which students have abruptly shifted from in-class to virtual learning environments. The questionnaire included questions on demographic and socioeconomic data and items that measure the 1-month prevalence and severity of stress, anxiety, and depression associated with COVID-19.

The questionnaire, comprising 45 items, was administered online over 1 month. The survey was anonymous and included no individually identifiable data. To determine the 1-month prevalence of stress, anxiety, and depression, we used standardized self-reported instruments that included scales to measure the prevalence and severity of stress, anxiety, and depression associated with the COVID-19 pandemic. The psychometric scales were the abbreviated Perceived Stress Scale-4 (PSS-4) (Vallejo, Vallejo-Slocker, Fernández-Abascal, & Mañanes, 2018) and the Patient Health Questionnaire for Depression and Anxiety-4 (PHQ-4) (Kroenke, Spitzer, Williams, & Löwe, 2009; Löwe et al., 2010). The PSS is among the most widely used methods to assess psychological stress (Cohen, Kamarck, & Mermelstein, 1983) and has been used in various countries because of its capability of generating a global stress score based on general rather than specific experiences. We used the abbreviated version of PSS-4, which has sufficient internal consistency for a 4-item scale (4 = very often; 3 = fairly often; 2 = sometimes; 1 = almost never; 0 = never). Furthermore, owing to its succinctness and psychometric properties, the abbreviated version has been shown to be suitable for internet use (Vallejo et al., 2018).

We used the PHQ-4, a valid and brief 4-item Likert-type scale tool, for detecting both anxiety and depressive symptoms. Respondents were asked to rate their functional mental status in multiple domains on a Likert scale (0 = not at all; 2 = several days; 3 = more than half the days; and 4 = nearly every day). The PHQ-4 has two subscales, the PHQ-2 and the GAD-2, whose reliability, criterion, construct, and procedural validity have been established in previous studies (Kroenke et al., 2009; Löwe et al., 2010).

Participants were recruited from the general student population of a large public university in the US–Mexico border region, characterized majorly by Latinx population (83%). In early Fall of 2020, all university students (~25,000 students) were sent an invitation to participate in the study. If they opted in, they were directed to an informed consent agreement and a hyperlink to access the survey. No name or identifying information was solicited in the questionnaire. Inclusion criteria were that students were enrolled in Summer 2020 or Fall 2020 semesters and aged 18 years and older. The average time to complete the survey was 15 min.

Descriptive statistics were calculated for all collected data. Group proportions were calculated for categorical values. Quantitative analyses were conducted using SPSS® statistical package software. Finally, a meta-analysis with the inverse variance method for pooling was performed using R (The R Foundation) to compare the mean PSS-4 norm scores in the current sample with Cohen and

Williamson's (1988) original study, Karam et al. (2012), Lee, Chung, Suh, and Jung (2015), Lessage et al. (2012), Vallejo et al. (2018), and Warttig et al. (2013). The results of the random-effects model were presented to account for heterogeneity between studies. Results from the PHQ-4 and subscales were compared with norm values from the study conducted by Lowe et al. (2010). These tests are considered appropriate since the samples had unequal variances; $p < 0.05$ was considered statistically significant.

Results

Sample Population Characteristics

The survey was sent to students through the university's QuestionPro account. The message requesting participation was viewed and opened by 1,763 students; it was started by 639 and completed by 456 (71.4%). The distribution values of the characteristics of the sample population are shown in Table 1. Participants' age ranged from 18 to 58 years ($n = 456$, $M_{\text{age}} = 24.39$, $SD_{\text{age}} = 7.24$), with a right-skewed distribution, mainly because of several outlier older-age values. There were no participants aged more than 65 years. Most of the respondents were females (80.9%; $n = 369$, $M_{\text{age}} = 24.01$, $SD_{\text{age}} = 6.913$). Males were 19.1% ($n = 87$, $M_{\text{age}} = 26.03$, $SD_{\text{age}} = 8.31$). In addition, we re-categorized age into range groups to compare with normative values, identifying the majority within the age range of 18–29 years (84.2%). Females comprised the majority of participants (80.9%). Most respondents identified themselves as White (89.5%), distantly followed by American Indian/Alaskan Native (5.3%). As expected, most participants described themselves as Latino (89.9%), reflecting the geographical region's population distribution. Most students reported being single (78.5%) or married, or in a domestic partnership (18.4%). Two-thirds of the participants (66%) were full-time students at the undergraduate level (87%). Less than half (43%) declared some form of employment, mostly part-time (28%), full-time (11%), or self-employed (4%). Half of the respondents (50%) selected an income range below US\$35,000. In 2019, the average household income in Texas was \$61,874 (US Census Bureau, 2020). Lastly, as the current place of residence, 90% reported living in the United States, either in Texas (80%) or other states (10%), while the remaining 10% reported residing in Mexico.

Stress

The PPS-4 score indicates a person's self-evaluation of stressful situations in the previous month of his or her life, where a higher value (range 0–16) is indicative of the respondent's perception that their demands exceed their ability to cope. PSS-4 results revealed an overall 1-month prevalence of severe stress in 32% and moderate stress in 26% of the participants. This level of psychological stress is considered high and as reflected by the main sample score of 9.12 (95% $CI_{\text{PSS-4}} = [8.827, 9.413]$), which is much higher than those reported by Lesage, Berjot,

Table 1 Demographic, social, and economic characteristics of sampled student population (*N* = 456)

Characteristics	Category	<i>n</i>	%
Age (years)	>18–29	384	84.2
	30–44	56	12.3
	45–54	15	3.3
	54–64	1	0.2
	65 & older		
Sex	Male	87	19.1
	Female	369	80.9
Race	American Indian or Alaska Native	24	5.3
	Asian	9	2.0
	Black of African American	12	2.6
	Native Hawaiian or Other Pacific Islander	3	0.7
	White	408	89.5
Ethnicity	Hispanic	410	89.9
	Non-Hispanic	46	10.1
Marital status	Single (never married)	358	78.5
	Married or in a domestic partnership	84	18.4
	Widowed	1	0.2
	Divorced	12	2.6
	Separated	1	0.2
Student status	Full-time	301	66.0
	Part-time	155	34.0
Academic level	Undergraduate	397	87.0
	Graduate	59	13.0
Employment status	Employed		
	Full-time	52	11.4
	Part-time	126	27.6
	Self-employed	17	3.7
	Unemployed		
	Looking for work	53	11.6
Not looking for work	197	43.2	
Unable to work	11	2.4	
Income level (US\$)	Less than \$20,000	130	28.5
	\$20,000–34,999	97	21.3
	\$35,000–49,999	82	18.0
	\$50,000–74,999	69	15.1
	\$75,000–99,999	36	7.9
Over \$100,000	42	9.2	
Place of residency	United States		
	In-state	364	79.8
	Out-of-state	47	10.3
	Mexico	45	9.9

and Deschamps (2012), Vallejo et al. (2018), and Warttig et al. (2013). Scores were significantly higher statistically in females (9.4) and in the >18–29-year age group. Interestingly, and although the number of participants was small, Native Hawaiian or other Pacific Islander and American Indian or American Indian or Alaska Natives, and Native Hawaiian or other Pacific Islander had the highest scores on the PSS-4, even greater than 10. The stress scores were also significantly higher for Hispanics, undergraduates, participants employed full-time and unemployed, and those with an income of less than \$34,999.

Since the PSS-4 has no cut-off scores, individual scores need to be compared with a normative value that changes from population to population. Thus, we conducted a meta-analysis to compare with normative values from other studies (Table 2). The overall estimate of mean PSS-4 values from three existing studies was 5.65 (95% CI_{PSS-4} = [5.183, 6.114]), as shown in Table 2, and the difference in PSS-4 scores between the current sample and existing studies was statistically significant with a $p < 0.001$. Table 2 also includes the PSS-4 mean scores categorized by selected variables, showing statistically significantly higher female scores ($M = 9.4$, $SD = 3.1$) than male scores ($M = 8.0$; $SD = 3.4$; $p = 0.001$). Both males and females showed a significant increase in mean PSS-4 scores than those reported by existing studies, that is, 4.71 for females and 4.76 for males (p -values < 0.001). Regarding age, mean values were higher for the >18–29-year age group ($M = 9.4$, $SD = 3.4$; $p = 0.002$) but decreased significantly in older age groups. The mean score in the current study was higher than the mean estimate ($M = 5.50$, 95% CI = [4.842, 6.157]) of PSS-4 from previous studies done by Cohen and Williamson (1988), Karam et al. 2012, Lee et al. 2015, Lesage et al. (2012), Vallejo et al. (2018), and Warttig et al. (2013).

Although there were no statistically significant differences by race, Latinos had a higher score ($M = 9.3$, $SD = 3.1$) than non-Latinos ($M = 7.7$, $SD = 7.7$;

Table 2 Summary estimates of PSS-4 mean scores and approximate 95% confidence intervals (CI) from meta-analysis with subgroups (present vs. existing studies) of studies

Characteristics	Category	Present Study			Existing Studies		<i>p</i> -value
		M	95% CI	<i>k</i>	M	95% CI	
Overall		9.12	[8.827; 9.413]	3	5.65	[5.183; 6.114]	<0.001
Sex	Male	8.03	[7.312; 8.748]	4	4.76	[4.071; 5.442]	<0.001
	Female	9.38	[9.066; 9.695]	5	4.71	[4.038; 5.377]	<0.001
Age (years)	>18–29	9.40	[9.100; 9.700]	4	5.50	[4.842; 6.157]	<0.001
	30–44	7.88	[6.131; 9.629]	4	5.30	[4.761; 5.849]	0.006
	45–54	6.94	[4.944; 8.936]	4	5.32	[4.798; 5.842]	0.124
	55–64	–	–	4	5.14	[4.590; 5.697]	–
	65 & older	–	–	3	4.63	[3.493; 5.764]	–
Marital status	Single	9.29	[8.662; 9.918]	2	5.69	[5.638; 5.737]	<0.001
	Married	8.54	[7.771; 9.309]	2	5.15	[5.039; 5.267]	<0.001

Note: *k* = number of included studies.

$p = 0.002$). Undergraduate students had higher mean scores that were statistically significant ($M = 9.3$, $SD = 3.2$) than graduate-level students ($M = 8.1$, $SD = 3.2$; $p < 0.001$). Although there is an apparent difference in scores because of employment status, each category's mean values are not statistically significant but still relatively high. Other categories such as marital status, level of household income, and place of residence showed no statistically significant differences in mean PSS-4 scores. However, score differences between existing studies and the present study were significant for both single and married students, showing changes from 5.69 (95% CI = [5.638, 5.737]) to 9.29 (95% CI = [8.662, 9.918]) for single students and 5.15 (95% CI = [5.039, 5.267]) to 8.54 (95% CI = [7.771, 9.309]) for married students (p -values < 0.001).

Anxiety and depression

Results for the total PHQ-4 and each subscale showed high scores for anxiety and depression. The PHQ-4 is a brief 4-item Likert-scale tool for detecting psychological distress, using a scale of 0–3. Participants rate how often they perceived (1) feeling nervous, anxious, or on edge, (2) not being able to stop or control worrying, (3) feeling down, depressed, or hopeless, and (4) having little interest or pleasure in doing things. These items include two subscales to assess anxiety (PHQ-2; items 1 and 2) and depression (GAD-2; items 3 and 4). Each item in the subscale is added to estimate the score for anxiety (range 0–6) and depression (range 0–6). On each subscale, a score of 3 or more is considered positive for screening purposes. Afterward, all four items are added to produce a summation score (range 0–12) and can be classified into following four categories: 0–2 = none; 3–5 = mild; 6–8 = moderate; and 9–12 = severe (Kroenke et al., 2009).

Score of 3 and more indicates a level of anxiety and depression that should be considered positive for psychological distress during screening. According to the proposed categorization, the overall mean values for the PHQ-4 were 6.5 ($SD = 3.5$), which is considered moderate. However, we identified that close to 58% of the participants had moderate to severe levels. The overall anxiety and depression subscale scores were 3.6 ($SD = 1.9$) and 2.9 ($SD = 1.9$), respectively, favoring anxiety as the main contributor to the overall score. Furthermore, the scores in this study vary with normative values from the general German population (PHQ-2: $M = 0.94$, $SD = 1.2$; GAD-2: $M = 0.82$, $SD = 1.1$; and PHQ-4: $M = 1.76$, $SD = 2.06$). We also found statistically significant difference between genders for the total PHQ-4 score (males, $M = 5.7$, $SD = 3.5$; females, $M = 6.7$, $SD = 3.5$; $p = 0.021$) and the anxiety subscale (males, $M = 3.2$, $SD = 1.9$; females, $M = 3.8$, $SD = 1.9$; $p = 0.016$), but not for the depression subscale (males, $M = 2.5$, $SD = 1.8$; females, $M = 3.0$, $SD = 1.9$; $p = 0.07$).

We identified a trend showing decreasing scores with increase in age. There were significant differences between age groups <18–29 years and 30–44 years for the PHQ-4 and the anxiety subscale, and significant differences between all age groups on the depression subscale. There were no significant differences between the race categories for PHQ-4, anxiety, and depression subscales. However, Native

Hawaiians or other Pacific Islanders scored higher than any other race category. No significant differences were identified either between Latinos or non-Latinos. Regarding marital status, high scores were estimated for those separated, single, and divorced. However, there were no statistically significant differences between categories. The single participant reporting a marital status of "separated" had a PHQ-4 of 10.

There were no differences between those attending college full-time or part-time. Graduate students scored significantly less than undergraduate students in overall PHQ-4 ($p = 0.016$) and depression subscales ($p = 0.009$). Students that were employed part-time had higher but nonsignificant PHQ-4 scores. Those employed full-time had lower total PHQ-4 scores but only significant for depression ($p = 0.037$). There were no differences in PHQ-4 or anxiety and depression subscales between household income categories or country of residence.

Discussion

We conducted this study to determine the levels of stress, anxiety, and depression among a large sample of Latinx university students during the COVID-19 pandemic and its associated quarantines, stay-in-place requirements, and travel restrictions. Our results showed elevated stress levels in the studied population compared with normative values from previous studies, indicating a relationship to the pandemic. The score was higher regardless of gender, with slight reductions in the older age groups, but no apparent effect due to race, employment, marital status, socioeconomic level, and place of residence. Results showed an overall prevalence of 32% severe and 26% moderate psychological distress, which were higher than the reported results of Wang et al. (2020) from another population of students in the United States during the same period.

Moreover, the high psychological stress score also conditioned high scores (>3) in both PHQ-4 subscales of anxiety (53%) and depression (37%) when compared with the normative values from a study conducted in Germany. There was a significant negative tendency of anxiety and depression scores with increasing age, and higher scores for anxiety were found in women, while depression showed no difference between genders. These results indicate that the university students experienced stress-related mental health issues during the pandemic, more notable in the female and younger population (Gunnell et al., 2020).

Hispanic women were overrepresented in our sample. Thus, the predominant higher scores of stress and anxiety in women could be related to this factor. In addition, most respondents were aged between 18 and 29 years. Moreover, the Hispanic majority represented the regional population's geographical location and characteristics (83%). Interestingly, although the number of participants was small, Native Hawaiian or other Pacific Islander and American Indian or Alaska Natives had the highest scores across PSS-4 and PHQ-4, with scores greater than 10 for each. Further investigation should be conducted to determine whether the high scores are due to the pandemic situations

or related to already higher perceived psychological stress levels in this community (John-Henderson, Palmer, & Thomas, 2019; Manson, Beals, Klein, Croy, & AI-SUPERPPF Team, 2005).

Implications

College students in general, and Latinx students in particular, experience stress, anxiety, and depression as a result of the COVID-19 pandemic and its associated disruptions of public life, widespread social isolation, and economic difficulties (Conrad et al., 2020). At the beginning of the pandemic, college students had elevated levels of anxiety and depression related to ongoing news about COVID-19 (Huckins et al., 2020). As the pandemic continued over months, studies documented significant growth of psychological distress as well as depression and anxiety among college students (Zimmerman et al., 2020). We found that Hispanic students experienced particularly elevated levels of stress, anxiety, and depression.

Colleges and universities worldwide should establish comprehensive and culturally competent strategies to maintain and support the mental health of diverse and minority students during the pandemic (American Council on Education, 2020; Zhai & Du, 2020). During a global public health crisis, it is important not to concentrate solely on maintaining students' physical health through social distancing, frequent COVID testing, and vaccinations but it is also necessary to shore up the mental health of college students by developing culturally competent psychological services, adjusting academic expectations for students, expanding student advising, and extending financial support services.

University counseling centers must be mobilized to address minority students' mental health through outreach programs of and culturally adapted counseling and workshops that address stress reduction, substanceuse prevention, wellness, and self-care (Benjet, 2020).

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