A Measurement Model of Factors Associated with PTSD Symptoms

Beverly A. Spears, PhD
Assistant Professor and MSW Field Director
Brailsford College of Arts and Sciences
Prairie View A&M University
Prairie View, Texas
United States of America

Muna Bhattarai, Ph.D., RN, CRC
Assistant Professor
School of Nursing
Texas A&M University
Bryan, TX 77807-3260
United States of America

Jackson de Carvalho, PhD
Professor & MSW Program Director
Brailsford College of Arts and Sciences
Prairie View A&M University
Prairie View, Texas
United States of America

Abstract

The COVID-19 pandemic incited widespread and varied adverse biopsychosocial responses in the general population. The World Health Organization defines a pandemic as a worldwide epidemic affecting many people. The pandemic was documented in the relevant literature as a potentially traumatic event leading to high prevalence rates of post-traumatic stress disorder (PTSD). This quantitative research study included a set of research questions and hypotheses, which evolved from gaps in the literature related to the impact of Contextual factors on the PTSD Symptoms of college students during the COVID-19 pandemic. Data for this study were collected from a random sample of n=614 undergraduate students from two universities in the Fall of 2022. This research study aimed to test a hypothesized statistical model of contextual factors associated with PTSD Symptoms among college students during the COVID-19 pandemic. Hierarchical regression analysis was performed to test the research questions. Statistical indices indicated significant direct and indirect effects of contextual variables on PTSD scores. Identifying the main contextual factors associated with PTSD symptoms can inform the development of intervention strategies leading to increased utilization of mental health services.

Keys Words: *COVID-19, College Students, PTSD, Contextual Factors and Hierarchical Regression.*

1.0. Introduction

In 2019, the Coronavirus (COVID-19) respiratory disease caused by SARS-COV-19 quickly spread from person to person and became a worldwide virus (CDC, 2021). The first initial outbreak started in the Chinese city of Wuhan; the virus spread to other countries without being controlled. By January 2020, COVID-19 was declared a public health emergency and referred to as the pandemic on March 11, 2020 (CDC, 2019). The WHO (2020) defines a pandemic as an epidemic occurring worldwide, crossing international boundaries, and usually affecting many people. Quickly, the COVID-19 pandemic became considered the greatest public health threat since the 1918 Influenza Pandemic. As cases began to rise in the United States, Centers for Disease Control and Prevention (CDC) officials warned that disruptions to everyday life may be severe (Hennein & Lowe, 2020). On March 15, 2020, the United States implemented a national shutdown to prevent the spread of the COVID-19 virus (CDC, 2021). Widespread alarm characterized the early days of the pandemic, with scarce evidence to inform understanding of at-risk populations, mortality rates, and best practices for virus containment. Citizens fueled by a fear of loss of control began engaging in panic buying, leading to retail shortages of essential items such as food and toiletries (CDC, 2021; Hennein & Lowe, 2020).

The initial months of COVID-19 have seen devastating physical, mental, and economic impacts. The chronic, ongoing nature of the pandemic and widespread uncertainties have induced a wide range of psychological responses, including fear, chronic stress, anxiety, and depression. Although fear of sickness or death from COVID-19 is the most prominent source of stress, the study of Salerno et al. (2021) found that unpredictability, uncertainty, and misinformation play a central role in stress and mental health. Countries worldwide began instituting 'social distancing' protocols as well as mask-wearing and other preventative hygiene measures (Bueno-Notivol et al., 2021). Individuals have been advised not to leave their homes except for essential travel and to self-isolate in quarantine for a minimum of 14 days after instances of suspected or confirmed exposure to the virus. Such restrictions have led to a reduced workforce across all economic sectors and historically high unemployment rates (Nicola et al., 2020). Education has been disrupted at unprecedented rates as college campuses shut down, leaving 1.5 billion students worldwide to turn to remote learning platforms or homeschooling (CDC, 2020; Lee, 2020; Salerno et al., 2021).

Thus, COVID-19 led to numerous changes in the daily life of students, including social distancing, remote learning, job losses, loss of family members, and change in social life, which resulted in intensified stress and anxiety (Nicola et al., 2020). Uncertainty has colored the pandemic at every step of the way, exacerbated by continually evolving public health recommendations, political controversy, and concern regarding testing accessibility and efficacy (Liu et al., 2020). Disruptions to daily life have been severe and continue indefinitely in many parts of the globe. The new life changes have decreased academic performance, financial instability, and social isolation (Bueno-Notivol et al., 2021; Liu et al., 2020).

Subsequently, this research study aimed to test a hypothesized statistical model of contextual factors associated with PTSD Symptoms among college students during the COVID-19 pandemic. Contextual variables were defined as student characteristics, which included C**ollege student age, ethnicity and race, college students' living status, hospitalization of family members, disability of college students,** and **utilization of mental health services** during the lockdown.

The study examined the following research questions:

- RQ1. Is there a significant relationship between individual students' characteristics (age, gender, major, academic level, student status, social involvement) and the prevalence of PTSD symptoms during the COVID-19 pandemic?
- RQ2. Is there a significant relationship between students' ethnicity and the prevalence of PTSD symptoms during the COVID-19 pandemic?
- RQ3. What are the main contextual factors responsible for PTSD symptoms during the COVID-19 pandemic?

2.0 Literature Review

An extensive review of the relevant literature indicated that the toll of prior pandemics (e.g., SARS, MERS) on mental health has been well-documented (Taylor, 2019). Nevertheless, the relevant research literature is scant in explaining the influence of contextual factors on PTSD Symptoms among college students during the COVID-19 pandemic. Additionally, psychological response to COVID-19 has been highly varied (Taylor et al., 2020; Huang & Zhao, 2020; Liu, C.H. et al., 2020), partly due to individual differences in risk, exposure, and impact level. Summarizing early research is challenging, as definitions of "rates" of mental health disorders vary widely (e.g., some studies use cutoff scores suggested by the measure authors, whereas others define the incidence of a disorder as any symptoms endorsed). Examining only general population studies that use validated cutoff scores suggestive of probable diagnosis, rates of depression range from 14.6% to 48.3%, rates of anxiety range from 6.3% to 50.9%, and rates of PTSD range from 7% to 53.8% (Salerno, 2021; Xiong et al., 2020).
Notably, several factors have influenced the wide range of prevalence in the relevant research study literature (Wathelet et al., 2021). The geographic location of data collection becomes a critical consideration due to transmission risks and the severity of daily life disruption in more highly populated areas and locations with higher case rates. The study of Şahin and Kulakaç (2022) found residing in an urban area to be a risk factor for heightened anxiety and depression during the pandemic in a general population sample in Turkey. Adding to the variance in documented psychological outcomes, extant studies have varied widely in measures and cutoff scores used, methods of analysis, and whether constructs assessed were explicitly related to the COVID-19 experience (Shah et al., 2020; Wathelet et al., 2021).

As researchers struggled with conceptualizing psychological responses to this unique catalyst, several COVID-19-specific measures have been developed. These include specific measures of coronavirus-related fear and pandemic impacts on finances and resources (Ahorsu et al., 2020), as well as more broad psychological outcome measures, e.g., the Coronavirus Anxiety Scale (Lee, 2020), COVID Stress Scales (Taylor et al., 2020), and the Pandemic Stress Index (Harkness, 2020). Although valuable, this immense heterogeneity in measures and the development of

novel assessment tools precludes researchers from being able to make 'apples-to-apples comparisons of reported outcomes. Furthermore, as the nature of the pandemic is ongoing, acknowledging sociopolitical factors contemporaneous with the time of data collection is imperative (Harkness, 2020; Lee, 2020)

Posttraumatic Stress Disorder (PTSD) is a debilitating psychiatric condition that results from exposure to or witnessing a traumatic event (Ortega & Rosenheck, 2000). PTSD is a severe mental health condition that can significantly impact an individual's daily life. *Mental health* is a state of well-being in which individuals recognize they can cope with everyday stresses of life, can work productively, and can contribute to his or her community (WHO, 2021). *Health support* is the actions that support people to adopt and maintain healthy lifestyles that create supportive living conditions or environments for health (Ortega & Rosenheck, 2000; WHO, 2020).

Mental health support is considered an integral component of health promotion that focuses on the determinants of mental health services utilization and the creation of environments that enhance optimum psychological and psycho-physiological development (Vindegaard & Benros, 2020). There is an interdependent connection between mental, physical, and social functioning, but health and illness may coexist (Shah et al., 2020).PTSD is strongly associated with impairment of functioning in life domains, including occupational, academic, marital, friendships, and family functioning (Bovin et al., 2018; Torres et al., 2022).

2.0.1 Covid and PTSD

The current literature indicated that the prevalence rates of posttraumatic stress are being widely reported and PTSD heralded as the 'second tsunami' of COVID-19 (Dutheil et al., 2020), few researchers have paused to contemplate the questionable applicability of such a diagnostic label to stress reactions elicited by an ongoing PTE. This emulates broader issues in the field of traumatic stress that has gone largely unchallenged: (1) the adoption of measures of symptoms to past traumatic events (PTSD) to understanding symptoms related to current traumatic events, and (2) the application of measures designed to assess response to a true Criterion A trauma to PTEs of more variable severity (Estes, & Thompson, 2020). The rationale for the use of PTSD has largely hinged on speculation that drastic changes in the daily life of individuals during pandemics (catalyzed both by the true threat of death from illness as well as cumulative ongoing stressors) may cause levels of distress like those found in response to traumatic events (Di Crosta et al., 2020; Dutheil et al., 2020).

According to Dutheil et al. (2020) significant precedent has been drawn from previous pandemics, as the emergence of COVID-19 is the third coronavirus outbreak in recent decades, following the severe acute respiratory syndrome (SARS) epidemic in 2002–2003 and Middle East Respiratory Syndrome (MERS) in 2012. However, in considering whether pandemics like SARS should be considered a mental health disaster,' Maunder commented that the severity of such events is in the eye of the beholder (2009).
In a global pandemic that is subjectively and variably experienced, appraisals of threat and proximity to danger vary substantially (Hennein & Lowe, 2020). Thus, it is difficult to establish the true nature of a pandemic as a 'trauma' at a population 9 level. Though having been infected with COVID-19 and experiencing life-threatening symptoms leading to hospitalization has generally been accepted as a potentially traumatic event capable of leading to PTSD, psychological outcomes for non-infected members of the general population are less clear (Hennein & Lowe, 2020; Kaseda & Levine, 2020).

Certain public health measures aimed at SARS containment bear similarities to current COVID-19 guidelines: mask-wearing, hand-washing, and social distancing (Dutheil et al., 2020). Although quarantine in Toronto during SARS was voluntary and lasted a median duration of only ten days for participants in this study, 28.9% scored above the cutoff for probable PTSD diagnosis on the Impact of Event Scale (Hawryluck et al., 2004). Increased time in quarantine and acquaintance with or exposure to someone hospitalized with SARS was associated with a higher mean IES-R score. Interestingly, those who always wore their masks had higher mean IES-R scores (Estes, & Thompson, 2020). Some participants also reported infection control measures like temperature-taking as extremely distressing and inducing a physiological fear response (Reynolds et al., 2008). This study presented several interesting findings. The authors posited that the relationship between quarantine and PTSD indicated that isolation during a pandemic might be perceived as a traumatic experience in and of itself, distinct from actual exposure to the virus (Shah et al., 2020). Notably, this conclusion contradicts traditional conceptualizations of PTSD, as quarantine does not constitute a traumatic event as defined in the DSM (American Psychiatric Association [APA], 2013; Wathelet et al., 2021).

Furthermore, how flexible should we be as researchers and clinicians in loosening what constitutes trauma? It also raised questions concerning infection control strategies and traumatic stress: does the experience of consistently wearing a mask and taking one's temperature result in developing high levels of distress or can these behaviors and

associated fears be understood as arousal and hypervigilance symptom manifestations of PTSD? Reynolds et al. (2008) similarly found associations between increased compliance (mask usage, temperature monitoring, and restriction of activities) and IES-R scores during SARS (Dutheil et al., 2020). An additional explanation for this relationship may be that both increased adherence to safety measures and increased distress are the product of elevated awareness and recognition of the dangers of infection. Essentially, as one realizes threat saliency, distress levels and engagement in preventative behaviors will correspondingly rise (Reynolds et al., 2008; Salerno et al., 2021).

Concurrent with the question of what 'counts' as trauma during COVID-19 is the issue of temporality. Though the pandemic' experience' consists of numerous events and stressors, some of which have passed, many are ongoing (Salerno et al., 2021). This presents a diagnostic challenge to the construct of PTSD, which assumes an inherently posttraumatic lens. Thus, is it reasonable to assess for or diagnose posttraumatic stress in an individual whose catalytic trauma is having a loved one hospitalized with COVID-19 at the time of assessment? Is it appropriate to ascribe such psychopathology to a person who endorses PTSD symptoms accessory to extreme fear of lockdown in the future? Though PTSD has been reported far and wide as a function of pandemic psychological consequences, these inquiries remain unanswered (Di Crosta et al., 2021; Dutheil et al., 2020).

The symptoms of PTSD can include intrusive thoughts or memories, avoidance behavior, hyperarousal, and negative changes in mood and cognition (Liu et al., 2020). Additionally, PTSD symptoms have been associated with depression and suicide (American Psychiatric Association, 2013). The American Psychiatric Association (2013) noted that PTSD is frequently referred to as a delayed onset. The delay-onset of PTSD diagnosis is when the individual experiences symptoms at least six months after the occurrence of the traumatic event (Bovin et al., 2018).

The symptoms include inability to sleep, focus, detachment, emotional numbness, nightmares, and flashbacks (Di Crosta et al., 2020). Studies conducted by Liu et al. (2020), confirmed that the prevalence of COVID-19 pandemic created a delayed onset of posttraumatic and acute stress disorder among college students.
Şahin et al (2022) found that college students who had high levels of anxiety and behaviors were left with physiological responses resulting from exposure to the psychological traumatic event of the pandemic. For example, the response to social isolation led students to an acute stress disorder and created difficulties in one or more critical areas of life function (Bovin et al., 2018; Liu et al, 2020).

An extensive review of the literature found that the COVID-19 pandemic has significantly impacted mental health, particularly among United States college students. Son et al., 2020, revealed that a study conducted in the United States found that 71% of college students reported experiencing significant stress and anxiety (Taylor et al., 202). However, the study of Cao et al. (2020) reported that during the wake of the pandemic, students or young adults worldwide suffered from PTSD. A study conducted in China, reported that approximately 53% of college students worldwide experienced symptoms of PTSD during the COVID-19 epidemic (Liu et al., 2020). The same study found that 43% of college students reported moderate to severe depression, while 38% reported moderate to severe anxiety. Another study conducted in China found that 23% of college students reported PTSD symptoms related to the COVID-19 pandemic (Cao et al., 2020; Li et al., 2021).

The purpose of this study was to identify the prevalence of PTSD symptoms during the COVID-19 pandemic and the influence of social demographic characteristics among college students. Therefore, this research study hypothesized that there was a difference between college students' age, ethnicity/race, and PTSD symptoms. Also, were the PTSD symptoms influenced by their living status, hospitalization of family members disability, or non-disability? And was there a difference between students who utilized mental health services on and off campus during the pandemic?

3.0 Method

This quantitative descriptive research study included a set of research questions and hypotheses, which evolved from gaps in the literature related to the impact of Contextual variables defined as student characteristics on PTSD Symptoms among college students during the COVID-19 pandemic. Data for this study were collected from a sample of 614 undergraduate students, which contained no identifiable personal information from any participants. The sample was randomly selected from Prairie View A&M University and Texas A&M at College Station in Fall 2022. The sample size was determined by power analysis using Lenth's (2006-09) computer software employing a medium effect size of 0.3, alpha set at 0.05, and power of .80; the desired sample size for this study was calculated as 164 participants (Cohen, 1988). Prior to data collection, a research application was submitted to the Institutional Review Board (IRB) of Texas A&M University and Prairie View A&M University, and a protocol number was

provided after approval. Participants were recruited through the university listserv, study flyers, student newsletters, and the university's CANVAs platform announcement board. Data was collected via an online Qualtrics survey between October and December 2022 (Austin & Steyerberg, 2015; Cohen, 1988; Lenth's 2006-09).

The present study used hierarchical regression analysis to test the study questions and identify significant predictors of PTSD symptoms and mental health service utilization among college students. Hierarchical regression or hierarchical linear modeling assesses the effect of multiple independent variables presented sequentially to predict the membership of one or more dependent variable categories (Cliffardson, 2002). In this framework, multiple variables were added at each step, and several regression models were built by adding variables to a previous model; later models included smaller models in previous steps since the purpose was to determine whether newly added variables showed a significant improvement in R2 (the proportion of DV variance explained by the model) (Aiken& West, 1991). Thus, contextual variables were entered into the model in pre-determined iterations to see how the change in r-squared was affected to explain a statistically significant amount of variance in the dependent variable (PTSD scores) after accounting for all other variables (Aiken & West, 1991; Shrestha, 2020).

4.0. Instrumentation

Study participants completed a self-report PTSD Checklist (PCL-5), demographics information, and COVID-related and mental health service utilization questionnaires. The PCL-5 is a 20-item self-report measure that assesses the 20 *DSM-5* symptoms of PTSD, and it takes approximately 5-10 minutes to complete (Weathers et al., 2013). The data used for the analysis of this study were collected via Qualtrics, a survey aggregator that recruits participants for research studies based on specific criteria established by the researcher. As a result of completing the survey participants received $5 gift cards upon completion of the survey. The online survey included socio-demographics, COVID-19-related, service utilization information questionnaires, and posttraumatic stress disorder checklist-5 (PCL-5) (Blevins et al., 2015; Weathers et al., 2013).

In this study, the following data were collected: participants' age, gender, race/ethnicity, education level, current living status and living status during the lockdown and their disability status; levels of perceived PTSD symptomatology as measured by the PTSD Checklist for the DSM-5 (PCL-5; Weathers et al., 2013) and the Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997). COVID-related information was collected by asking questions about their experience during COVID 19 and at their present time. For collecting mental health service utilization information, students were asked for their knowledge on the availability of psychosocial services related to COVID-19 (Cheng et al., 2020; Weathers et al., 2013).

4.0.1 Posttraumatic Stress Disorder Checklist-5 (PCL-5)

The PTSD Checklist for the DSM-5 (PCL-5; Weathers et al., 2013) is a self-report measure that assesses PTSD symptomatology, utilizing the updated DSM-5 criteria for PTSD. This measure consists of questions rated on a Likert scale of 0-4 (0=Not at all, 4= Extremely). The 20 items assessing PTSD symptomatology correspond to the 20 PTSD symptoms outlined in the DSM–5 (PCL-5; Weathers et al., 2013). This measure's initial validation and internal consistency include α =.96 and a test–retest reliability score of r =.84 (Bovin et al., 2018). Despite being used mostly in veteran populations, the PCL-5 has also been validated with the reliability of α =.95 in civilian populations (Armour et al., 2015). This finding is relevant to the present study, as a largely civilian sample will be utilized (Armour et al., 2015; Bovin et al., 2018).

The validity of the PCL-5 has been demonstrated by its correlation with other self-report measures of PTSD, including the Mississippi Scale for Combat-Related PTSD (r=.85 to .93) (M-PTSD; Keane et al., 1988), as well as other structured PTSD interview forms, notably the Clinician-Administered PTSD Scale Clinician-Administered PTSD Scale for DSM–5 (CAPS-5; Weathers et al., 2018), (r=.79). A sample of participants used in the initial validation of the PCL-5 (n = 140) was used to establish a diagnostic cut-off score for PTSD (Bovin et al., 2018). This was done in tandem with the Clinician-Administered PTSD Scale for DSM–5 (CAPS-5; Weathers et al., 2018), with the PCL-5 test scores demonstrating internal consistency (α = .96) and test–retest reliability (r = .84) compared to CAPS-5 scores (Bovin et al., 2018; Weathers et al., 2018).

Additionally, this scale has been used with healthcare workers employed in China during the COVID-19 Pandemic era. The Cronbach's alpha of the total PCL-5 score among the sample of Chinese healthcare workers was revealed to be α =0.91 (Cheng et al., 2020). The internal consistency for each subscale was revealed to be α =0.74- 0.90 (Cheng et al., 2020). This finding is particularly useful for the present study, as it suggests that the PCL-5 has the desired level of validity and reliability for the sample being utilized (Cheng et al., 2020; Weathers et al., 2018).

The scale was used to help make a preliminary diagnosis of PTSD. Items were rated on a 5-point Likert scale ranging from 0-4 ("Not at all" to "Extremely"). A total severity score was generated by adding the items with a range of 0-80. According to the PCL-5 using the guideline of the National Center of PTSD, a cut-off point score of 31-33 is recommended based on current psychometric work(Bovin et al., 2016; Forkus et al., 2022; Wathelet et al., 2021). We used total scores as the PTSD cut-off point to avoid lenient or stringent inclusion criteria.
The PCL-5 exhibits strong psychometric properties in nonclinical samples of college students, with Cronbach's alphas ranging from 0.92 to 0.94 (Conybeare et al., 2012). Cronbach's alpha for the PCL-5 was 0.95 in the current study (Armour et al., 2015; Cheng et al., 2020).

5.0 Statistical Analysis

The data used for the analysis were collected via Qualtrics, a survey aggregator that recruits participants for research studies based on specific criteria established by the researcher. Once data was collected, scores from the PCL-5 survey were entered in SPSS version 28 and used to generate descriptive statistics and analyze all variables (Tabachnick & Fidell, 2007). Descriptive statistics were calculated for the participants' demographic, COVID-related, and service utilization information. Next, a chi-square test was used to compare the prevalence of PTSD among different categorical variables (Faul et al., 2009). Hierarchical regression analysis was further performed to test the study research questions and identify the influence of socio-demographic, COVID-19-related, and mental health service utilization variables on PTSD scores. The categorical variables were dummy coded in the hierarchical regression analysis (Faul et al., 2009; Tabachnick & Fidell, 2007).

Three hierarchical regression analyses were performed using IBM SPSS Software. All statistical tests' significance level was $P < 0.05$ (Mertler & Vannatta, 2002). Diagnostics showed that the residuals for the regression analysis were normally distributed, and that multicollinearity was negligible. Hierarchical regression analyses, a type of multiple linear regression analysis, were the primary analyses implemented for this study sample. According to Tabachnick and Fidell (2007), regression analyses enable the assessment of relationships between one dependent variable and multiple independent variables, and the independent variables are entered in an order determined by the researcher (Mertler & Vannatta, 2002; Tabachnick & Fidell, 2007).

The way in which the variables are entered is determined by theoretical analyses. For example, a variable with more significant theoretical importance might be entered first (Tabachnick & Fidell, 2007). According to Pallant (2016), the independent variables are then analyzed according to what contributes to the dependent variable after the preceding variables have been adjusted. Lastly, the model is analyzed regarding its capacity to determine the dependent variable (Pallant, 2016; Tabachnick & Fidell, 2007).

5.0.1 Results

The results of the present study reflect the statistical analyses done in two parts. The first part of the analysis summarizes descriptive statistics regarding individual students' characteristics (age, gender, major, academic level, student status, and social involvement) (de Carvalho& Colvin, 2014**)**. The descriptive results of demographic, COVID-19-related, and mental health service-related variables are presented in Table 1. The average age of participants was 22.7 (SD=5.6). Most of the participants were female (73.5%). About half of them were Black (45.3%). Most of them currently live with roommates (63.7%), while during the pandemic, most live with families (70.5%). The number of students with disabilities included in the study was 77 (12.5%). Moreover, 382 (62.2%) participants reported they had positive COVID-19 test; 126 (20.5%) and 175 (28.5%) participants have utilized the mental health service in and outside the university at least one time, respectively (de Carvalho & Colvin, 2014; Pallant, 2016).

Chi-square and hierarchical regression analyses were used to answer the research questions. The first question asked if there is a significant relationship between individual students' characteristics (age, gender, major, academic level, student status, social involvement) and the prevalence of PTSD symptoms during the COVID-19 pandemic. An initial Chi-square test was performed to test this question, followed by a hierarchical regression analysis with post-treatment PCL-5 score as the dependent variable and individual student characteristics as the independent variable. The analysis controlled for the independent variable of the initial PCL-5 score (Faul et al., 2009; Tabachnick & Fidell, 2007).

More specifically, using the cut-off score of 32, 351 (57.2%) college students in this study reported PSTD symptoms. Chi-square tests were conducted between demographic, COVID-19-related, mental health service variables, and PTSD symptoms (i.e., cut-off score ≥ 32) (Table 1). Individual students' characteristics (Age, disability status, COVID-19 exposure, family hospitalization due to COVID-19, loss of family member due to

COVID-19, mental health service utilization in the university, and mental health service utilization outside the university showed significant effects on PTSD symptoms (P<0.05) (Haagen, et., 2015). Results indicated there is a significant relationship between individual students' characteristics and the prevalence of PTSD symptoms during the COVID-19 pandemic (Faul et al., 2009; Haagen, et., 2015).

Table 1: Participant characteristics and effects on PTSD prevalence (N=614)

			PTSD		
Variables		**N (%)**	**Yes**	**No**	**P-value**
Age	18-24	494 (80.7%)	295	198	0.015
	25-30	63 (10.3%)	31	32	
	30+	55 (9.0%)	23	32	
Gender	Male	152 (24.8%)	79	73	0.211
	Female	451 (73.5%)	264	187	
	Other	11 (1.8%)	8	3	
Race/Ethnicity	Non-Hispanic White	111 (18.1%)	52	59	0.067
	Non-Hispanic Black	278 (45.3%)	174	104	
	Hispanic	89 (14.5%)	48	41	
	Non-Hispanic Asian	73 (11.9%)	40	33	
	Others	63 (10.3%)	37	26	
Education level	Freshman	111 (18.1%)	70	41	0.103
	Sophomore	107 (17.4%)	56	51	
	Junior	105 (17.1%)	60	45	
	Senior	140 (22.8%)	89	51	
	Graduate program	109 (17.8%)	58	51	
	Doctorate program	42 (6.8%)	18	24	
Current living status	Live alone	76 (12.4%)	46	30	0.490
	Live with a roommate	391 (63.7%)	217	174	
	Live with a family member	95 (15.5%)	60	35	
	Live with a significant other	52 (8.5%)	28	24	
Living status during COVID-19 Lockdown	Live alone	57 (9.3%)	35	22	0.094
	Live with a roommate	82 (13.4%)	44	38	
	Live with a family member	433 (70.5%)	256	177	
	Live with a significant other	33 (5.4%)	12	21	
	Other	9 (1.5%)	4	5	
Disability Status	Yes	77 (12.5%)	55	22	0.020
	No	537 (87.5%)	287	236	
COVID-19 Test	Positive	382 (62.2%)	206	176	0.037
	Negative	232 (37.8%)	145	87	
COVID-19 Hospitalization	Yes	14 (2.3%)	9	5	0.586
	No	600 (59.9%)	342	258	
Family COVID-19 Test	Positive	485 (79.0%)	278	207	0.882
	Negative	129 (21.0%)	73	56	
Family COVID-19 hospitalization	Yes	133 (21.7%)	96	37	<0.001
	No	481 (78.3%)	255	226	
Family loss due to COVID-19	Yes	124 (20.2%)	82	42	0.024
	No	490 (79.8%)	269	221	
Perception of discrimination due to COVID-19	Yes	98 (16%)	58	40	0.660
	No	516 (84%)	293	223	
Knowing the university mental health service	Yes	548 (89.3%)	307	241	0.099
	No	66 (10.7%)	44	22	
Utilization of the university mental health service	Never	488 (79.5%)	265	223	0.006
	1-2 Times	81 (13.2%)	50	31	

	3-5 Times	26 (4.2%)	23	3	
	6-10 Times	10 (1.6%)	6	4	
	More than 10 Times	9 (1.5%)	7	2	
Helpful of the university mental health service	Extremely	21 (3.4%)	14	7	0.730
	Quite a bit	32 (5.2%)	24	8	
	Moderately	35 (5.7%)	25	10	
	A little bit	32 (5.2%)	19	13	
	Not at all	6 (1.0%)	4	2	
	Missing	488 (79.5%)	-	-	
Utilization of the mental health service outside university	Yes	175 (28.5%)	116	59	0.004
	No	439 (71.5%)	235	204	
Helpful of the mental health service outside university	Extremely	53 (8.6%)	31	22	0.110
	Quite a bit	55 (9.0%)	41	14	
	Moderately	34 (5.5%)	26	8	
	A little bit	24 (3.9%)	12	12	
	Not at all	9 (1.5%)	6	3	
	Missing	439 (71.5%)	-	-	

The second research question asked if there is a significant relationship between students' ethnicity and the prevalence of PTSD symptoms during the COVID-19 pandemic. A hierarchical regression was conducted to determine whether students' White race would better explain the variance associated with PTSS symptoms compared to diverse ethnicity categorization (Cliffardson, 2002). PTSS (measured by the PCL-5) was the outcome variable. White race and diverse ethnicity were the predictor variables. White race variables were entered into the first block. Race/ethnicity was entered into the second block as dummy coded variables: Black (yes/no), Hispanic/Latinx (yes/no), Asian American (yes/no), and others (yes/no). The prediction was that the block of White race variables would account for a significant amount of variance in PTSD symptoms, and the second block of race and ethnicity categories would account for a smaller, though statistically significant, amount of additional variance in PTSD symptoms (Tabachnick & Fidell, 2007). Results indicated there is a significant relationship between students' ethnicity and the prevalence of PTSD symptoms during the COVID-19 pandemic, as the results of hierarchical linear regression analysis are presented in Table 2. (Cliffardson, 2002; Schumacker, & Lomax, 2004).

Contextual factor variables were entered in models one to three one at a time. In models 1 and 2, disability status significantly predicted PTSD symptoms (P<0.05) when controlling age, race/ethnicity, and living status during the COVID-19 lockdown and adding COVID-19 infection, family hospitalization, and loss due to COVID-19 (Cliffardson, 2002). However, after adjusting for all covariates, including demographic, COVID-19-related, and mental health service, disability status failed to predict PTSD symptoms (P=0.711). Additionally, all models revealed that the older participants (30+ years old group) have a lower risk of PTSD symptoms compared to the group aged from 18 to 24 when controlling other covariates (P<0.05) (Schumacker, &Lomax, 2004).

Non-Hispanic Blacks were at higher risk of PTSD compared to non-Hispanic Whites in all three models (P<0.05), while Hispanics were at higher risk compared to non-Hispanic -Whites only in model 1 (P<0.05). Model 3 also showed that living with a significant one reduced the risk of PTSD compared to those who lived alone (P<0.05). Moreover, in both models 2 and 3, participants who have family members hospitalized due to COVID-19 have a higher probability of PTSD symptoms occurrence (P<0.05). Besides, in model 3, participants who used the university mental health service 3-5 times were positively related to PTSD symptoms occurrence compared to the participants who never used (P<0.05), so were the participants who used the mental health service outside the university (P<0.05) (Aiken et al., 1991; Cliffardson, 2002).

Table 2: Hierarchical Regression Models of PTSD

		Model 1 Coefficients	P-value	Model 2 Coefficients	P-value	Model 3 Coefficients	P-value
Constant		31.726	0.000	31.797	0.000	24.273	0.000
Age	18-24 (reference)						
	25-30	-0.039	0.369	-0.033	0.439	-0.026	0.548
	30+	-0.101	0.025	-0.090	0.046	-0.089	0.044
Race/Ethnicity	Non-Hispanic White (reference)						
	Non-Hispanic Black	0.160	0.005	0.128	0.024	0.143	0.011
	Hispanic	0.105	0.037	0.086	0.084	0.096	0.051
	Non-Hispanic Asian	0.029	0.549	0.029	0.550	0.049	0.307
	Others	0.072	0.148	0.054	0.273	0.077	0.114
Living Status During COVID-19 Lockdown	Live alone (reference)						
	Live with a roommate	-0.043	0.468	-0.029	0.618	-0.028	0.632
	Live with a family member	-0.042	0.526	-0.037	0.567	-0.014	0.828
	Live with a significant other	-0.087	0.085	-0.093	0.064	-0.099	0.045
	Other	0.014	0.757	0.006	0.897	-0.009	0.832
Disability Status	No (reference)						
	Yes	0.091	0.024	0.080	0.046	0.016	0.711
COVID-19 Test	Negative (reference)						
	Positive			-0.050	0.218	-0.049	0.222
Family COVID-19 Hospitalization	No (reference)						
	Yes			0.097	0.031	0.090	0.042
Family Lose Due to COVID-19	No (reference)						
	Yes			0.081	0.074	0.059	0.140
Knowledge of the university mental health service	No (reference)						
	Yes					0.059	0.140
Utilization of the university mental health service	Never (reference)						
	1-2 Times					0.059	0.142
	3-5 Times					0.104	0.010
	6-10 Times					-0.013	0.747
	More than 10 Times					0.059	0.133
Utilization of the Mental health service outside university	No (reference)						
	Yes					0.162	<0.001

The third research question asked which main contextual factors are responsible for PTSD symptoms during the COVID-19 pandemic. A hierarchical regression was conducted to determine which contextual factors better explained the variance associated with the severity of PTSS symptoms (Cliffardson, 2002). Results indicated that in the first block, the predictive utility of contextual variables in explaining variance in PTSS was analyzed. The results of the first block revealed a statistically significant model, F (4.378) = 3.21, p = .013, that accounted for 3.3% of the variance in the severity of PTSD symptoms. None of the individual predictors uniquely predicted the severity of PTSS symptoms. In the second block, race and ethnicity were added to the analysis. The results of the second block were statistically significant, F (7,378) = 3.16, p = .003, and accounted for a total of 5.6% of the variance in PTSD symptom severity (Rubin & Babbie, 2010). Specifically, being Hispanic/Latinx predicted greater severity of PTSS, while disability status failed to predict PTSD symptoms (*P*=0.711). The R2 change value associated with this model suggests that adding race and ethnicity to contextual factor variables accounted for an additional 2.3% of the variance compared to contextual variables alone, F (4,371) = 3.01, p = .03 (Cliffardson, 2002; Rubin & Babbie, 2010).

6.0 Discussion

COVID-19 has dramatically impacted the mental health and well-being of a large, vulnerable population of college students nationwide. The findings of this study contribute to the growing body of literature on COVID-19 and PTSD symptoms as it impacts college students. This study identifies the prevalence of PTSD symptoms during COVID-19 using demographic characteristics of college students from two university campuses in South Texas. **This study describes mental health issues as PTSD symptoms, a** high level of anxiety, depression, psychosis, seizures, and suicidal behavior; symptoms leaving students to deal with acute stress, depression, and social isolation that significantly impact daily life functions. The study aimed to test the impact of student characteristics on the prevalence of PTSD symptoms during the COVID-19 pandemic. The data was collected online using a self-reported survey, and it was found that many students were experiencing PTSD symptoms due to COVID-19.

6.0.1 College Students 'Age: The first demographic influence factor investigated was age. Our findings showed that the prevalence of PTSD symptoms during COVID-19 was more noted among younger college students. When investigating the age of students between 18 to 24, PTSD symptoms were more prevalent with younger students compared to older students who were 25 to 30 years of age and older (Santos et al., 2022). To explain why younger participants in this study experienced more PTSD symptoms than older students can be explained due to their developmental stage of life.

Lee (2020) notes that the late adolescence and young adulthood stage is a time of considerable developmental changes, including greater autonomy, identity discovery, socializing, and internalizing morality. This stage in life is when young adults process career choices through education and explore intimate relationships (Bovin et al., 2018). These changes were disturbed by the pandemic and its pressures, which occurred while these students were going through this developmental stage (Santos et al., 2022; Weathers et al., 2013).

Socialization and developing relationships are essential factors for most young people. Lifestyle changes, such as shelter-in-place order, social distancing, and mask-wearing, may have triggered college students' anxiety and stress (Santos et al., 2022). The study of Liu et al. (2021) **noted that young** people may be more susceptible to the consequences of the pandemic on their personal and social lives. Students in this study may have felt a sense of deception because they did not receive the college experience they were expecting, the socialization, and the development of new relationships (Salerno et al., 2021). Additionally, these college students in this study may have been disproportionately hit by the economic consequences of the pandemic, with many facing job loss, decreased hours, or financial difficulties. Uncertainty and stress brought on by such volatility have been connected to developing PTSD symptoms of anxiety, depression, and suicide (Wathelet et al., 2021**).** This study's findings related to age were consistent with other research studies indicating that students ages 18-24 were at higher risk of anxiety and depression (Santos et al., 2022; Lee, 2020).

6.0.2 Ethnicity & Race: The demographic characteristics of ethnicity and race played a significant part in this research study. According to a study by the CDC (2021), minority individuals (Black/African Americans and Hispanics) are more likely to be diagnosed with COVID-19 due to systemic racism and inequities in the healthcare system. As a result, minority students have been disproportionately affected by the pandemic and are at higher risk of developing PTSD (Thielking, 2020). The significant disparities among minority students are due to several factors, including limited access to healthcare, financial hardships, and stimuli racism. The study of Bhui et al. (2020) noted that when PTSD symptoms are untreated, mental health issues exacerbate the disparities in PTSD symptoms among minority students (Bhui et al., 2020; Thielking, 2020). Moreover, when investigating ethnicity/race, in this study, the findings compared White/ Caucasian students with other students' ethnicities with PTSD symptoms; it was found that Black/African American and Hispanic students had significantly more PTSD symptoms than White/Caucasian students. This study used a cut-off score of 32 and found that 57.2% of college students reported having PTSD symptoms. However, there were more students of color such as African Americans and Hispanics who participated in this study. The reasons for the more PTSD symptoms among African American and Hispanic students may be attributed to the lack of access to mental health services, cultural beliefs, and personal fears (CDC, 2021; Thielking, 2020).

6.0.3 College Students' Living Status: During the outbreak of COVID-19, universities required students to shelter in place, lockdown, and return home to prevent the proliferation of the virus (Lee, et al., 2021). College students in this study responded to living status during COVID-19 as living alone, living with family/ parents, living with a roommate, and living with a significant other (with a male or female in a romantic relationship). However, when living status was investigated, living alone was compared with living with family members, a roommate, and a significant other. It was noted that students who lived with a significant other reported having more PTSD

symptoms than those who lived alone, with family members and a roommate. The study's findings aligned with other studies that noted that the COVID-19 pandemic strained the relationship between couples (Andrade et al., 2022; Boserup et al., 2020; Lee et al., 2021).

Many influencing factors may have contributed to the cause of symptoms of PTSD among those students who lived with a significant other/partner. Andrade et al. (2022) noted that a few reasons for more stress and anxiety among college students who lived with a significant other were a combination of life changes, i.e., staying at home, lockdown, working from home, not being on campus, social distancing, and financial challenges. Furthermore, these students experienced a sudden shift from classroom to asynchronous and synchronous or hybrid (online) learning, which was a sudden change in their regular routines and interactions between peers and professors. Thus, many students were uncertain about their future, had poor coping strategies, lacked communication skills, and had more PTSD symptoms (Andrade et al., 2022, & Lee et al, 2021). However, these symptoms have led to an alarming increase in domestic violence and abuse among couples during COVID-19 pandemic (Boserup et al., 2020). This was due to the lack of interaction with other outside individuals. The constant presence of the significant other brought conflict and dysfunctional relationships. Many of these students may have lived as a couple during the pandemic, but they experienced loneliness due to their inability to communicate effectively. Thus, social isolation and loneliness were risk factors for developing PTSD symptoms (Li et al., 2021).

6.0.4 Hospitalization of Family Members: On the other hand, for students who returned home to shelter in place with family, research studies have reported improved family relationships and communication between college students and parents who had a positive relationship (Santos et al., 2022). Many students returned home to care for their parents and loved ones. The fear of losing a loved one due to COVID-19 devastated most people. However, the COVID-19 pandemic created a new stressor, including anxiety and worries for oneself and loved ones (Şahinet al., 2022). When family COVID-19 hospitalization was examined, students reported "no" family member hospitalized compared to students who reported "yes" family had been hospitalized. It was found that college students who reported "yes" to a family member being hospitalized due to COVID-19 experienced higher PTSD symptoms than those with no family member hospitalized. The National Institute of Health (NIH) (2021) reported over 900,000 COVID-19-related hospitalizations occurred through November 2020. Many hospitalized individuals were attributed to other medical comorbidities that put people at a higher risk for severe illness from COVID-19 (Şahin et al., 2022; Vindegaard et al., 2020).

Many family members hospitalized for COVID-19 had comorbidities such as Type 2 diabetes, obesity, high blood pressure, and heart failure (Cardel et al., 2020). Family members with these comorbidities were more likely to become ill from COVID-19 (NIH, 2021). Furthermore, hospitals were not allowing individuals to visit family members because of the highly contagious virus. Black adults had the highest proportion of hospitalizations attributable to all four comorbidities at any age. NIH (2021) reported that COVID-19 deaths have disproportionately affected Black and other minority communities. Since there were so many deaths among Blacks/African Americans and Hispanic families, college students may have feared families entering the hospitals would not return home; this caused worry and increased stress and anxiety. Thus, many students in this study were Black/African Americans and Hispanics who reported members of their family who had been hospitalized and experienced symptoms of PTSD (Cardel et al., 2020; NIH, 2021).

6.0.5 Disability College Students: The survey provided a list of disabilities for students to identify, including physical, mental, and cognitive disabilities. Students provided a self-report, reporting having a disability or not having a disability. A small percentage of (12.5%) students reported having some disability. However, these disabled students reported significant experience with PSTD symptoms such as anxiety, stress, and depression. McMaughanet al. (2022) describe disabled people as having challenges with daily struggles, particularly during emergencies and disasters. Disabled individual faces many barriers, such as accessing suitable health care, faced with discrimination as it relates to employment, impoverishment, and stigma. However, during COVID-19, students with disabilities were three times more likely to have anxiety, stress, and depression compared to students without disabilities (Zhang et al., 2021). The factors contributing to this distress were financial hardships, worries about the economy, missing work, medical bills due to COVID-19, and reports experiencing personal financial loss (McMaughan et al., 2022; Zhang et al., 2021).

6.0.6 Utilization of Mental Health Services: The question of utilization of mental health services was asked of students, and when the researchers investigated the utilization of mental health services on and off campus, it was compared with never use. This study revealed that students who experienced PTSD symptoms had visited the University's mental health services at least 3 to 5 times compared to those students who never used the services. However, students indicated minimal utilization of services outside the University. Approximately 20.5% of the students reported utilizing university mental health services on and outside campus.

Even though some students indicated using the services, a large percentage 79.5 % indicated that they never used the mental health services on or off-campus (Cardel et al., 2020; Lee et al., 2020; Xiong et al., 2020). Earlier in this discussion, it was noted that African-American and Hispanic college students reported more PTSD symptoms than white/Caucasian students. This group reported not utilizing mental health services on or off campus. Why students of ethnic minority groups, such as African Americans and Hispanics, are not using mental health services can be attributed to mental health stigma beliefs (Kim et al., 2010). The study of Hoge et al. (2004) noted some common mental health stigma beliefs include: (1) mental health is dangerous, (2) one will not recover, (3) mental illness is their fault, and (4) concerns of what others might think (social stigma). It was also noted that students' stigma was due to their perceptions, the severity of the problem, and ignoring the mental illness (Ahorsu et al., 2020). The lack of trust in counseling services, not feeling comfortable sharing personal feelings, mental health issues, and the fear of being misdiagnosed and judged are reasons for students seeking mental health services (Ahorsu et al., 2020; Kim et al., 2010).

7.0 Implications and Recommendations for Mental Health Services

The COVID-19 pandemic has impacted mental health among college students, especially those aged 18 to 24. This study found that African-American and Hispanic college students experienced significant PTSD symptoms. Thus, the COVID-19 pandemic leaves the prevalence of PTSD symptoms among college students on the frontline of concerns for university administrators. However, the impact of the COVID-19 pandemic on the mental health of college students is not yet fully understood (Li et al., 2021). Nevertheless, several recommendations can be made from this research study for addressing and mitigating mental health on college campuses (Salerno et al., 2021; Wathelet et al., 2021).

It is recommended that Universities develop a marketing campaign to promote mental health awareness, services, and culturally sensitive programs (Wathelet et al., 2021). This marketing campaign needs to provide informational packages to educate and inform students of the availability of mental health services and resources. It is also imperative that all communication materials be shared with students to inform students of their rights, privacy, and confidentiality. Secondly, to assist students in overcoming the stigma associated with mental health, Ironson et al. (2018) study found that students preferred to use self-management techniques, digital technologies, and telehealth applications. Due to the COVID-19 pandemic, telehealth popularity has increased and provides access to health services to many individuals. Telehealth is defined as the use of technology in care delivery, health information, and remote health education; it is the use of electronic information, devices, and telecommunication technology to provide direct patient care, remote patient monitoring, and education at a distance (Ironson et al., 2018; Rutledge et al., 2017).

Furthermore, mental health crisis is a campus-wide problem; thus, in addressing the problems for mitigation, an interdisciplinary approach should be used. It is recommended that university health administrators partner with other departments, such as the Department/ College of Social Work, College of Nursing, and Psychology. These universities 'departments have faculty members who can contribute to the campus-wide problem. These faculty members can assist in planning and developing mental health programs to mitigate symptoms of PTSD among college students. It is highly recommended that Universities adopt telehealth services and other digital technologies to assist students who otherwise cannot access mental health support.

References

Ahorsu, D. K., Lin, C.-Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The fear of COVID-19 scale: Development and initial validation. *International Journal of Mental Health and Addiction*, 1–9. https://doi.org/10.1007/s11469-020-00270-8

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* Thousand Oaks, CA, US: Sage Publications, Inc.

Andrade C, Gillen M, Molina JA, Wilmarth MJ. The Social and Economic Impact of Covid-19 on Family Functioning and Well-Being: Where do we go from here? J Fam Econ Issues. 2022; 43(2):205-212. doi: 10.1007/s10834-022-09848-x. Epub 2022 May 27. PMID: 35669394; PMCID: PMC9136200.

American Psychiatric Association (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing.

Armour, C., Tsai, J., Durham, T. A., Charak, R., Biehn, T. L., Elhai, J. D., & Pietrzak, R. H. (2015). Dimensional structure of DSM-5 posttraumatic stress symptoms: Support for a hybrid anhedonia and externalizing behaviors model. *Journal of Psychiatric Research, 61*, 106–113. https://doi.org/10.1016/j.jpsychires.2014.10.012

Austin, P. C., & Steyerberg, E. W. (2015). The number of subjects per variable required in linear regression analyses. *Journal of clinical Epidemiology*, *68*(6), 627-636. https://doi.org/10.1016/j.jclinepi.2014.12.014

Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The posttraumatic stress disorder checklist for DSM-5 (PCL-5): Development and initial psychometric evaluation. *Journal of Traumatic Stress*, *28*(6), 489–498. https://doi.org/10.1002/jts.22059

Bhui, K., Silva, M. J., & Dinos, S. (2020). COVID-19: Exposing and addressing health disparities among ethnic minorities and migrants. Journal of the Royal Society of Medicine, 113(5), 182–187. https://doi.org/10.1177/0141076820934736

Boserup B, McKenney M, Elkbuli A. Alarming trends in US domestic violence during the COVID- 19 pandemic. Am J Emerg Med. 2020 Dec;38(12):2753-2755. doi: 10.1016/j.ajem.2020.04.077. Epub 2020 Apr 28. PMID: 32402499; PMCID: PMC7195322.

Bovin, M.J., Black, S.K., Rodriguez, P. Lunney, C.A., Kleiman, S.E., Weathers, F.W., Scnurr, P.P., Spira, J., Keane, T.M., & Marx, B.P. (2018). Development and validation of a measure of PTSD-related psychosocial functional impairment: The Inventory of Psychosocial Functioning. Psychological Services, 15(2), 216-229.

Bueno-Notivol, J., Gracia-García, P., Olaya, B., Lasheras, I., López-Antón, R., & Santabárbara, J. (2021). Prevalence of depression during the COVID-19 outbreak: A meta-analysis of community-based studies. *International Journal of Clinical and Health Psychology*, *21*(1), 1-11. https://doi.org/10.1016/j.ijchp.2020.07.007

Cardel, M. I., Manasse, S., Krukowski, R. A., Ross,K., Shakour, R., Miller, D. R., Lemas, D. J., & Hong, Y. R. (2020). COVID-19 impacts mental health outcomes and ability/desire to participate in research among current research participants. *Obesity*, *28*(12), 2272–2281. https://doi.org/10.1002/oby.23016

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. Psychiatry Research, 287, 112934.

Centers for Disease Control and Prevention. (2021). Health equity considerations and racial and ethnic minority groups. https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/race-ethnicity.html

Centers for Disease Control and Prevention (2019). 1918 Pandemic (H1N1 virus). Retrieved from https://www.cdc.gov/flu/pandemic-resources/1918-pandemic-h1n1.html.

Cheng, P., Xu, L. Z., Zheng, W. H., Ng, R., Zhang, L., Li, L. J., & Li, W. H. (2020).Psychometric property study of the posttraumatic stress disorder checklist for DSM-5 (PCL-5) in Chinese healthcare workers during the outbreak of corona virus disease 2019. *Journal of affective disorders*, *277*, 368–374. https://doi.org/10.1016/j.jad.2020.08.038

Cliffardson, C. (2002). The hierarchical structure of empathy: Dimensional organization and relations to social functioning. *Scandinavian Journal of Psychology*, *43*(1), 49-59.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.

de Carvalho, J. & Covin, A. (2014). Contextual Factors and College Retention of Single Mothers. *American International Journal of Contemporary Research*, Vol. 4 No. 6 (June 30, 2014).

Di Crosta, A., Palumbo, R., Marchetti, D., Ceccato, I., La Malva, P., Maiella, R., Cipi, M., Roma, P., Mammarella, N., Verrocchio, M. C., & Di Domenico, A. (2020). Individual differences, economic stability, and fear of contagion as risk factors for PTSD symptoms in the COVID-19 emergency. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.567367

Dutheil, F., Mondillon, L., & Navel, V. (2020). PTSD as the second tsunami of the SARS-Cov-2 pandemic. *Psychological Medicine*, 1–2. https://doi.org/10.1017/S0033291720001336

Estes, K. D., & Thompson, R. R. (2020). Preparing for the aftermath of COVID-19: Shifting risk and downstream health consequences. *Psychological Trauma: Theory, Research, Practice, and Policy*, *12*(S1), S31. https://doi.org/10.1037/tra0000853

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149-1160. https://doi.org/10.3758/BRM.41.4.1149

Haagen, J. F. G., Smid, G. E., Knipscheer, J. W., & Kleber, R. J. (2015). The efficacy of recommended treatments for veterans with PTSD: A metaregression analysis. *Clinical Psychology Review*, *40*, 184–194. https://doi.org/10.1016/j.cpr.2015.06.008

Harkness, A., Behar-Zusman, V., & Safren, S. A. (2020). Understanding the Impact of COVID-19 on Latino Sexual Minority Men in a US HIV Hot Spot. *AIDS and Behavior*, 1-7. https://doi.org/10.1007/s10461-020-02862-w

Hawryluck, L., Gold, W. L., Robinson, S., Pogorski, S., Galea, S., & Styra, R. (2004). SARS control and psychological effects of quarantine, Toronto, Canada. *Emerging Infectious Diseases*, *10*(7), 1206–1212. https://doi.org/10.3201/eid1007.030703

Hennein, R., & Lowe, S. (2020). A hybrid inductive-abductive analysis of health workers' experiences and wellbeing during the COVID-19 pandemic in the United States. *PloS one*, *15*(10), e0240646. https://doi.org/10.1371/journal.pone.0240646

Hoge, C., Castro, C., Messer, S., McGruk, D., Cotting, D., & Koffman, R. (2004). Combat dutyin Iraq and Afghanistan, mental health problems, and barriers to care. *The New England Journal of Medicine, 351*(1), 13-22.

Huang, Y., & Zhao, N. (2020). Mental health burden for the public affected by the COVID-19 outbreak in China: Who will be the high-risk group? *Psychology, Health & Medicine*, *1*(12). https://doi.org/10.1080/13548506.2020.1754438

Ironson, G., Lucette, A., Hylton, E., Pargament, K. I., & Krause, N. (2018). The relationship between religious and psych spiritual measures and an inflammation marker (CRP) in older adults experiencing life event stress. *Journal of Religion and Health*, *57*(4), 1554– 1566. https://doi.org/10.1007/ s10943-018-0600-8

Kaseda, E. T., & Levine, A. J. (2020). Post-traumatic stress disorder: A differential diagnostic consideration for COVID-19 survivors. *The Clinical Neuropsychologist*, *34*(7–8), 1498–1514. https://doi.org/10.1080/13854046.2020.1811894

Kim, P., Thomas, J., Wilk, J., Castro, C., & Hoge, C. (2010). Stigma, barriers to care, and use of mental health services among active duty and National Guard soldiers after combat. *Psychiatric Services, 61,* 582-588.

Lee, J. (2020). Mental health effects of school closures during COVID-19. *The Lancet Child & Adolescent Health*, *4*(6), 421. https://doi.org/10.1016/S2352-4642(20)30109-7

Lenth, R. V. (2006-9). *Java Applets for Power and Sample Size* [Computer software]. Retrieved November 12, 2013, from: http://www.stat.uiowa.edu/~rlenth/Power.

Liu, C. H., Zhang, E., Wong, G. T. F., Hyun, S., & Hahm, H. "Chris." (2020). Factors associated with depression, anxiety, and PTSD symptomatology during the COVID-19 pandemic: Clinical implications for U.S. young adult mental health. *Psychiatry Research*, *290*, 113172. https://doi.org/10.1016/j.psychres.2020.113172

Li, Y., Zhao, J., Ma, Z., McReynolds, L. S., Limn, J., Chen, D., ... & Fan, W. (2021). Mental health among college students in China during the COVID-19 pandemic: A protocol for systematic review and meta-analysis. Systematic Reviews, 10(1), 1-7.

McMaughan, D J., Rhoads, K. e., Davis, C., Chen, X., Han, H, Jones, R. A., Mahaffey, C.C., & Miller, B.M. (2022) . COVID-19 Related Experiences Among College Students With and Without Disabilities: Psychosocial Impacts, Supports, and virtual Learning Environments. Front. Public Health, 10 December 2021, Sec. Public Mental HealthVolume 9 – 2021 | https://doi.org/10.3389/fpubh.2021.782793

Mertler, C. A. & Vannatta, R. A. (2002). *Advanced and multivariate statistical methods: Practical application and interpretation*, 2nd ed. Los Angeles: Pyrczak Publishing.

Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International Journal of Surgery*, *78*, 185–193. https://doi.org/10.1016/j.ijsu.2020.04.018

Ortega, A. N., & Rosenheck, R. (2000). Posttraumatic stress disorder among Hispanic Vietnam veterans. *American Journal of Psychiatry*, *157*(4), 615–619. https://doi.org/10.1176/appi.ajp.157.4.615

Pallant, J. (2016). SPSS survival manual: A step by step guide to data analysis using SPSS program (6th ed.). London, UK: McGraw-Hill Education.

Reynolds, D. L., Garay, J. R., Deamond, S. L., Moran, M. K., Gold, W., & Styra, R. (2008). Understanding, compliance and psychological impact of the SARS quarantine experience. *Epidemiology and Infection*, *136*(7), 997–1007. https://doi.org/10.1017/S0950268807009156

Rubin, A. & Babbie, E. (2010*). Research methods for social* work. Belmont, CA: Wadsworth/Thomson Press.

Santos, S., Moreira, C**.,** Torres, M., Gomes, F., & Shogren, K. (2022). Uma Educação para a Autodeterminação, In S. Santos (Edt). *Contributes para a Avaliação da Diversidade em Educação*, Instituto da Educação, Universidade de Lisboa (no prelo) https://repositorio.ul.pt/handle/10451/54616

Şahin, C.,& Kulakaç, N. (2022). Exploring anxiety levelsptsd in healthcare workers during COVID-19 pandemic: Turkey sample. *Current Psychology*, *41*, 10.1007/s12144-021- 01730-7.

Schumacker, R. Lomax, R. (2004). *A Beginner's Guide to Structural Equation Modeling 2nd Ed.* Mahwah, NJ: Lawrence Erlbaum

Shah, K., Kamrai, D., Mekala, H., Mann, B., Desai, K., & Patel, R. S. (2020). Focus on Mental Health During the Coronavirus (COVID-19) Pandemic: Applying Learnings from the Past Outbreaks. *Cureus*, *12*(3), e7405. https://doi.org/10.7759/cureus.7405

Shrestha, N. (2020). Detecting multicollinearity in regression analysis. *American Journal of Applied Mathematics and Statistics*, *8*(2), 39-42. https://doi.org/10.12691/ajams-8-2-1

Salerno, J. P., Williams, N. D., Gattamorta, K. A., Jorgensen, R. S., & Gohel, L. K. (2021). COVID-19 pandemic stressors and psychological symptoms in American college students: the indirect effects of intolerance of uncertainty, depression, and anxiety. Stress and Health.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Allyn & Bacon.

Taylor, S. (2019). *The psychology of pandemics: Preparing for the next global outbreak of infectious disease*. Cambridge Scholars Publishing.

Taylor, S., Landry, C. A., Paluszek, M. M., Fergus, T. A., McKay, D., & Asmundson, G. J.(2020). COVID stress syndrome: Concept, structure, and correlates. *Depression and Anxiety, 37*(8), 706-714. https://doi.org/10.1002/da.23071

Thielking, M. (2020). CDC expects "community spread" of coronavirus, as top official warns disruptions could be 'severe.' *STAT*. https://www.statnews.com/2020/02/25/cdc-expects-community-spread-of-coronavirus-as-top-official-warns-disruptions-could-be-severe/

Torres, M., Moreira, C., Gomes, F., Santos, S. (2022). Arc's Self-Determination Scale: Adaptation and Validation to the Portuguese Adolescent and Adult Population with IDD. *Rev. bras. educ. espec.* [online]. 2022, vol.28, e0135 1980-5470. https://doi.org/10.1590/1980-54702022v28e0135.

U.S. Departmentof Health and Human Services, NationalInstitutes of Health, National Institute of MentalHealth. (2021). *Racialand Ethnic Categories and Definitions for NIH Diversity Program and for Other Reporting Purposes*. (NIH Publication No. NOT-OD-15-089). Retrieved from https://grants.nih.gov/grants/guide/notice- files/not-od-15-089.html

Vindegaard, N., & Eriksen Benros, M. (2020). COVID-19 pandemic and mental health consequences: Systematic review of the current evidence. *Brain, Behavior, and Immunity 89*, 531-542. https://doi.org/10.1016/j.bbi.2020.05.048

Xiong, J., Lipsitz, O., Nasri, F., Lui, L. M. W., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A., & McIntyre, R. S. (2020). Impact of COVID-19 pandemic on mental health in the general population: A systematic review.

Journal of Affective Disorders, 277, 55–64. https://doi.org/10.1016/j.jad.2020.08.001

Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., & Schnurr, P.P. (2013). The PTSD Checklist for *DSM-5* (PCL-5). Scale available from the National Center for PTSD at www.ptsd.va.gov.

Wathelet, M., Fovet, T., Jousset, A., Duhem, S., Habran, E., Horn, M., Debien, C., Notredame, C.-E., Baubet, T., & Vaiva, G. (2021). Prevalence of and factors associated with post-traumatic stress disorder among French university students 1 month after the COVID-19 lockdown. *Translational psychiatry*, *11*(1), 327.

Weiss, D. S., & Marmar, C. R. (1997). *The Impact of Event Scale—Revised.* In J. P. Wilson & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD* (p. 399–411). The Guilford Press.

World Health Organization (2020). WHO Director-General's opening remarks at the Mission briefing on COVID-19. Retrieved from: https://www.who.int/dg/speeches/detail/ who- director-general-s-statement-on-ihr-emergency-committee-on-novelcoronavirus-(2019)-ncov.

World Health Organization (2021). "WHO Coronavirus (COVID-19) Dashboard." *World Health Organization*, World Health Organization, covid19.who.int/.

Zhang H, Nurius P, Sefidgar Y, Morris M, Balasubramanian S, Brown J. (2021). *How Does COVID- 19 Impact Students With Disabilities/Health Concerns?* ArXiv200505438 Cs (2021). Available online at: http://arxiv.org/abs/2005.05438 (accessed August 25, 2021).