An Examination of the Impact of COVID-19 on Student Emotional Well-Being

Original Research

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Open Access

RESEARCH DIRECTS in PSYCHOLOGY and BEHAVIOR

Published: July 29, 2024

Research Directs in Psychology and Behavior: *2024, Volume 4 (Issue 1): 3*

ISSN 2831-6738

Abstract

Introduction: Emotional well-being (EWB) among university students has received deserved attention in the United States (US). The purpose of this study was to explore the impact of COVID-19 on university student emotional well-being by examining 1) self-reported differences in symptoms of psychological distress (PD) before and after COVID-19, and 2) differences in student PD and resiliency based on demographic variables. It was hypothesized that differences in PD following the onset of COVID-19 and that differences in PD and resiliency based on demographic variables would be found.

Methods: Five-hundred-and-eighty-three eligible students from a regionally accredited, southern university in the US voluntarily participated in this cross-sectional, online, retrospective study during spring 2021. Participants completed an electronic survey consisting of demographic questions and two survey instruments, the Trauma Symptom Checklist- 40 and Brief Resilience Scale. Descriptive and inferential analyses (i.e. ANOVAs) were conducted.

Results: Levels of PD were significantly greater ($p < .001$) for all students following the onset of COVID-19 ($m = 39$) in comparison to pre COVID-19 ($m = 22$). Main effects based on pre/post condition demonstrated post levels of PD were higher for sex, race, income, and education status in comparison to pre COVID-19 PD levels ($p < .001$). Main effects for between group differences were indicated for PD among all demographic variables, sex ($p < .001$), race ($p = .035$), income ($p < .001$), and education status ($p < .001$). Main effects for group differences were found for resilience, sex ($p < .001$), race ($p = .022$), income ($p < .001$), and education status ($p < .001$). Students identifying as "other sex", European American, low income and undergraduate experienced significantly greater PD and lower levels of resilience than their counterparts.

Conclusions: Student EWB was impacted by the onset of COVID-19. PD increased as a result of COVID-19. Differences in PD and resilience on the basis of demographic variables provides evidence of the need to develop tailored programs/policies in order to support the EWB of all university students.

Key Words: Psychological Distress, Resilience, Coronavirus

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Introduction

Emotional well-being (EWB) of university students is an area of increasing concern among higher education in the United States (US). EWB is the condition of positive emotional and behavioral functioning and ability to cope with life challenges, change and adversity.[1] University students across the US commonly face stressful challenges related to higher education (i.e. changes in social group, pressure to succeed, and moving away from home, etc.) that could hamper EWB.[2,3] When university students are unwell they may experience the antithesis of EWB, psychological distress. Psychological distress (PD) is a profound, unpleasant result of excessive stress that manifests as negative

mental, emotional, and physical symptoms, and often serves as a precursor to mental illnesses.[4] The coronavirus 2019 (COVID-19) global pandemic heightened risk for PD among university students as it brought on unprecedented challenges, widespread uncertainty, and unrelenting exposure to potential trauma (i.e., emotionally disturbing experiences, incidents or events that overwhelm an individual's ability to cope).[2,4–6]

The American College Health Association reported in 2023 that 45% of college students claimed to experience higher than average levels of stress associated with COVID-19.[2] Reports suggest excess stress may have been related to novel worldwide stressors (i.e. quarantines, social distancing, mask mandates, mass media sensationalism, social isolation, witnessing of suffering and/or death, etc.), academic stressors (i.e. mandates and guidelines forcing an abrupt shift to online learning),[7–9] and lack of access to essential support services designed to promote EWB (e.g., wellness center, writing center, technology center, etc.).[7,10,11] Nevertheless, few institutions of higher education in the United States have examined the impact of COVID-19 on university students EWB/PD.[2,4,5] Very little is understood about differences in EWB/PD on the basis of individual characteristics among university students. Interestingly, one study, conducted by MacDonald[12] among university students, found that resilience (i.e., the ability to recover quickly or bounce back from challenging life circumstances, experiences or PD) offsets stressors and deters PD. Though resilience does not eliminate stress or life difficulties, resilience level has been found to be more predictive of EWB/PD than type, severity and quantity of stressors endured by university students.[12–15]

While little is understood about the impact of COVID-19 on EWB/PD among university students, even less known about differences in PD and resilience on the basis of demographic variables (e.g. race, sex, socio-economic status, etc.). In fact, concerning differences in PD and resilience on the basis of demographic variables in the university settings, inconclusive results have been found. Some studies have indicated differences in symptoms of PD and resilience on the basis of sex,[16–18] race,[19–22] and socioeconomic status (i.e. income and education levels),[23,24] albeit with differing results. Other studies have shown equivocal levels of PD and resilience on the basis of demographic variables.[25] Exploring differences in PD (before and after COVID-19), and factors that may influence PD and resilience among university students is imperative to better understand the impact of COVID-19 on student EWB, as well as, to tailor the design and development of programs to promote EWB among university students.[26] Therefore, the purpose of this study was to (1) examine differences in university student PD prior to and following the onset of COVID-19, (2) explore differences in student PD prior to and following the onset of COVID-19 on the basis of student demographic variables, and (3) explore differences in student resilience on the basis of student demographic variables. It was hypothesized that university students would report a significant increase in PD following the onset of COVID-19 and that differences in PD and resilience would be impacted by various demographic factors.

Scientific Methods

Participants

All students (N= 15,210) at a southern, regionally accredited university in the United States were invited to participate in the study during spring 2021 semester via an email that included details on the purpose and the voluntary nature of the study, and a survey link generated by Qualtrics XM survey system. Students were able to access and complete the survey for a five-week period during the spring 2021 semester. An email reminder with study information, the link to the survey, and notification of the survey closing date was sent to all students approximately 2 weeks before the availability of the survey was terminated. Qualtrics sample size calculator determined that a sample size of 375 student surveys should yield a representative student sample, with a 95% confidence level and 5% margin of error. Participants were eligible to participate in the study if they were aged 18 or older and enrolled as a full-time or part-time student at the university during the time of survey dissemination.

This study used a cross-sectional, retrospective survey design with passive consent. Survey completion served as verification that students read information pertaining to the study and consented to study participation. Completion of surveys took approximately 15 to 20 minutes. Although the survey was anonymous, at the end of the survey students were given the opportunity to provide their contact information to enter into a drawing, in which 15 students were randomly selected to receive a $20 gift card for participation. Institutional Review Board (IRB) approval (protocol #1372) was granted through expedited review by the participating University.

Protocol

The electronic survey for this study was composed of 92 questions consisting of demographic questions and two survey instruments: the Trauma Symptom Checklist- 40 (TSC-40)[27–30] and the Brief Resilience Scale (BRS).[31,32] Most demographic questions had predetermined response options and included age, sex, race/ethnicity, total yearly

household income (individual and/or parental income), and student education status. Age was an open response item. Sex had 3 options (male, female or other). There were nine options used for race/ethnicity (African American – Black, European American – White; American Indian or Alaska Native; Asian Indian; Other Asian: Japanese, Chinese, Vietnamese, Filipino/a, etc.; Pacific Islander: Native Hawaiian, Samoan, Guamanian/Chamorro; Two or More Races; Unknown; and Other). Race was condensed into 3 groups to improve sample sizes for data analyses, (1) African American [AA] – Black, (2) European American [EA] –White, and (3) Other Minorities [OM]. Other minorities included all other races/ethnicities. A median split was created for university student total yearly household income (individual and/or parental) based upon census data for the surrounding communities. Two options were provided: (1) less than $50,000 and (2) $50,000 and above. Student education status options were (1) undergraduate and (2) graduate.

The TSC-40 is a popular research tool used to assess trauma-related symptoms associated with adult and other traumas in non-clinical samples. The TSC-40 is a forty-item, symptom (i.e., headaches, insomnia, weight loss, etc.) evaluation measure that is specifically utilized in research methodologies. [27–30] The severity in reported symptoms is often, but not always, associated with a clinical diagnosis of post-traumatic stress disorder (PTSD). The relationship suggests that there is a higher likelihood of prior traumatic experience if the individual scores high on the TSC-40, yet the tool was not meant for clinical diagnosis.[29] Further, the TSC-40 has been utilized as a valid measure of PD,[30] as the *symptoms* measured by the TSC-40 are commonly used to describe symptoms of PD (e.g. sleep disturbance, depression, dissociation, anxiety, etc.), which is often brought on by stressful/traumatic experiences (e.g., COVID-19). As such, the authors of this study and the panel of experts who reviewed several instruments prior to the study, deemed it appropriate to use the TSC-40 and to use the term "psychological distress" instead of the term "trauma" in conjunction with the scale.

The TSC-40 utilizes a 4-point frequency rating scale (0 = never to 3 = often) and consists of six sub-scales: anxiety, sleep disturbance, depression, dissociation, sexual abuse trauma index, and sexual problems. TSC-40 composite scores may range from 0 to 120 with higher total scores indicating greater PD present in the individual completing the TSC-40. The TSC-40 has been validated with children, undergraduate students, and adults in relation to multiple types of trauma, traumatic experiences and post-traumatic distress (including PD).[27–30] The TSC-40 subscale alphas range from .66 to .77 and the full scale averages between .89 and .91.[28] Although relatively valid and reliable, the TSC-40 measurement tool should be limited to professional research, and not used as a clinical evaluation tool.[27,29] Students completing the survey were first asked to complete the TSC-40 in relation to symptoms experienced in the previous two months (following the onset of COVID-19). Students were then asked to rate how often they experienced the same symptoms prior to the onset of COVID-19.

The Brief Resilience Scale (BRS) is a six-item scale created to assess the ability to recover quickly from PD in clinical and non-clinical adult populations.[31,32] The BRS has been tested with a wide range of participants including healthy college students.[33] The BRS is a reliable tool that represents resilience as a unitary construct.[31] The summary score provided by the BRS is predictive of health outcomes. Since resilience in adults is unlikely to vary significantly without intentional effort to change, [33] the BRS was administered only once in this study. Therefore, pre vs. post COVID-19 differences in resilience were not assessed.

The BRS is scored by calculating the mean of the six items with reverse coding of questions 2, 4, and 6. A five-point Likert-scale ranging from "1" strongly disagree to "5" strongly agree with a neutral midpoint was utilized. The following instructions were used to administer the scale, "Please indicate the extent to which you agree with each of the following statements by using the following scale". For example, (1) "I tend to bounce back quickly after hard times" and (2) "I have a hard time making it through stressful events" (reversed coded). According to the authors of the BRS,[28] scores can be interpreted as follows: (a) low = 1.0-2.99, (b) normal = 3-4.3, and (c) high = 4.31-5. For example, an overall average score of 3.7 on the BRS would be classified as "normal."[32] The BRS has shown psychometric properties with adequate internal consistency (a = 0.71-.87 and ω = .90) in a variety of populations.[31,32]

Statistical Analysis

Descriptive statistics were used to summarize demographic data. Inferential analyses, mixed model repeated measures ANOVAs were conducted (3 group x 2 condition design and 2 group x 2 condition design) to determine if differences within pre/post were evident between each demographic variable (sex, race, income, and education) with $p \leq 0.05$ considered statistically significant. Post hoc analyses were then conducted to determine where specific group differences were located. Regarding resilience, the BRS examined a single time point, post-COVID-19. As such, one-

way ANOVAs were conducted with $p \leq 0.05$ considered statistically significant. Post hoc analyses were conducted as needed. All quantitative analyses were conducted in SPSS version 24.[34]

Results

Sample

Of the 15,210 students receiving the study email communication, 3.89% (n = 592) completed the survey. Students under the age of 18, and students not enrolled in courses during the spring 2021 semester were excluded from the study. The final sample consisted of 3.83% (n= 583) of the eligible graduate and undergraduate students enrolled in courses during the spring 2021 semester. The student sample was predominantly undergraduate students (77%). Participants were primarily female (68%), with the majority of students identifying as European American (white; 81%). Over half of all participants (56%) indicated a household income of less than $50,000. Importantly, the sample was representative of the overall student population at this particular university. Demographic results are illustrated in Table 1.

Table 1. Student demographic information.

Race	N	Percentage
European American (EA)	462	81%
African American (AA)	42	7%
Other Minorities	70	12%
Sex		
Female	394	68%
Male	165	29%
Other	17	3%
Education		
Undergraduate	442	77%
Graduate	132	23%
Income		
Above $50,000	245	44%
Below $50,000	312	56%

* Percent's denote valid percent's; missing values excluded

Interactions: Psychological Distress

Statistically significant interactions were not found for PD on the basis of sex (p = .224) or race (p = .734). However, statistically significant interactions were found for household income ($F(1,474) = 10.51$, $p < .001$, $\eta_p^2 = .022$) and for education ($F(1,477) = 4.12$, $p = 0.43$, $\eta_p^2 = .009$) pre to post COVID-19.

Main Effects: Student Within (Pre/Post COVID-19) Differences for Psychological Distress

Results showed significantly more PD following the onset of COVID-19 (m = 39) in comparison to PD levels prior to the onset of COVID-19 (m = 22) for all demographic variables, $p < .001$. Mixed model repeated measures ANOVAs indicated main effects of condition (pre/post) for PD. Results demonstrated PD levels were higher for sex, race, income, and education status post COVID-19 in comparison to levels of PD pre COVID-19 ($p < .001$). Large main effect sizes were found on PD within sex, race, household income, and education status. Results are shown in Table 2.

Table 2. Main effects within (Pre/Post) student differences in psychological distress based on demographics.

Variable	*Df*	F	η_p^2	p
Sex	1	136.54	.220	<.001
Race	1	167.57	.260	<.001
Income	1	450.25	.487	<.001
Education	1	305.92	.391	<.001

Post Hoc: Within (Pre/Post COVID-19) Differences for Psychological Distress
Statistically significant differences were found within all demographic variables. In regard to sex, men, women, and those identifying as other sex (also referred to as non-binary) experienced significantly greater PD post COVID-19 in comparison to pre COVID-19. Concerning race, EA, AA and OM reported significantly more PD post COVID-19 compared to pre COVID-19. Regarding income, both low (less than $50,000 a year) and high ($50,000 a year or more) experienced a significant increase in PD following the onset of COVID-19. Similarly, both undergraduate and graduate students reported significantly more PD following the onset of COVID-19 than prior to COVID-19. For all demographic variables, p-values were statistically significant at $p < .001$.

Main Effects: Between Demographic Variable Group Differences for Psychological Distress
Results indicated main effects for group differences for PD for all demographic variables, sex ($p < .001$), race ($p = .035$), income ($p < .001$), and education status ($p < .001$). Table 3 demonstrates statistically significant main effects of group for PD on the basis of sex, race, income, and education status. A medium effect size was evident between sexes, but small effects sizes were indicated for race, income and education.

Table 3. Main effects between group differences in psychological distress based on demographics.

Variable	*Df*	F	η_p^2	p
Sex	2	26.16	.099	<.001
Race	2	3.39	.014	.035
Income	1	25.25	.051	<.001
Education	1	12.78	.026	<.001

Post Hoc: Between Group Differences for Psychological Distress
Tukey Post Hoc analysis indicated non-binary students consistently reported significantly greater PD from pre to post COVID-19 than male ($p < .001$) and female ($p < .001$) students. Females demonstrated significantly more PD pre to post COVID-19 than male students ($p < .001$). Regarding race, EA students consistently reported higher levels of PD than AA students ($p = .105$) and OM students ($p = .165$) pre to post COVID-19, but not at statistically significant levels. Further, statistically significant differences were not found between AA and other minority students, $p = .889$. Concerning income, students with income lower than $50,000 a year consistently reported greater PD pre to post COVID-19 than students reporting $50,000 or more per year, $p < .001$. Relating to education status, undergraduate students consistently reported more PD than graduate students pre to post COVID-19, $p < .001$. Table 4 provides evidence of mean scores with standard deviations for PD pre and post COVID-19 based on demographic variables.

Main Effects: Student Differences for Resilience Between Demographic Variable Groups
Results of a series of one-way ANOVAs indicated main effects for group differences for resilience for all demographic variables following the onset of COVID-19. A significant difference existed among sex ($F(2,474) = 10.78$, $p < .001$), race ($F(2, 473) = 3.85$, $p = .022$), income ($F(1, 470) = 13.51$, $p < .001$), and education status ($F(1, 473) = 20.14$, $p < .001$) on resilience.

Post Hoc: Student Differences for Resilience Between Demographic Variable Groups
Post hoc analyses revealed between group differences in the mean. Pertaining to sex, non-binary students ($m = 15.2$) were significantly less resilient than both male ($p < .001$) and female ($p = .016$) students. Female students were significantly less resilient than male students, $p = .002$. Regarding race, EA showed significantly lower resilience than AA, $p = .042$. Statistically significant differences were not found between EA and OM ($p = .251$) or between AA and OM ($p = .636$). Relating to income, results indicated students with higher income show significantly higher levels of resilience in comparison to low-income students, $p < .001$. Concerning education, graduate students showed significantly higher levels of resilience in comparison to undergraduate students, $p < .001$. Table 4 provides evidence of mean scores with standard deviations for resilience and level of resilience based on demographic variables.

Discussion
Findings from this retrospective study confirmed hypotheses and provided statistical evidence regarding the impact of COVID-19 on university student emotional well-being (EWB). Similar to previous reports,[2–5,8,24,26] psychological distress (PD) among university students increased considerably following the onset of COVID-19, regardless of demographics (i.e. sex, race, income, and education). Novel to the literature, this study found PD and resilience varied

on the basis of demographic variables among university students. Multiple factors may have contributed to the significant increase in PD among university students following the onset of COVID-19. As suggested by an earlier report,[3] university students commonly experience challenges associated with college life.[8] These stressors may have been compounded by the circumstances surrounding the COVID-19 pandemic, which may have led to increased PD, reduced resilience and ultimately adverse effects on EWB.[3,5,8]

Table 4. Means for psychological distress and resilience.

	Pre COVID PD	Post COVID PD	Mean Difference	Resilience	Resilience (Level)*
Sex					
Male	16.1 ± 13.7	31.0 ± 20.4	15	20.6 ± 4.8	3.43 (N)
Female	23.6 ± 16.3	41.2 ± 21.7	18	18.8 ± 5.2	3.13 (N)
Other	40.8 ± 18.1	61.2 ± 20.8	21	15.2 ± 4.2	2.53 (L)
Race					
Euro Amer.(EA)	23.1 ± 15.9	40.3 ± 21.6	17	18.8 ± 5.1	3.13 (N)
Afro Amer. (AA)	18.0 ± 18.5	32.8 ± 20.4	14	21.0 ± 4.5	3.50 (N)
Other Minorities	18.5 ± 17.6	35.8 ± 26.0	17	20.2 ± 5.4	3.37 (N)
Income					
Below $50K	24.6 ± 16.9	43.9 ± 22.3	19	17.9 ± 5.2	2.98 (L)
$50K or More	19.3 ± 15.3	33.4 ± 30.6	14	20.1 ± 5.0	3.35 (N)
Education					
Undergraduate	23.3 ± 16.9	41.1 ± 22.3	18	18.5 ± 5.0	3.08 (N)
Graduate	18.6 ± 14.1	32.7 ± 20.6	14	21.0 ± 5.2	3.50 (N)

Data are Means ± SD
* H = High; N = Normal; L = Low

While university students participating in this study clearly experienced more PD following the onset of COVID-19, overall, scores were considered moderate. Moderate PD scores may be attributed to a variety of factors, such as sample population, resilience level and student experiences.[16] Although the literature is inconsistent, resilience is traditionally higher among those enrolled in higher education than in the general population. Further, Macdonald's 2023 study involving college students,[12] found that resilience moderates PD among university students and that students with lower levels of resilience experienced heightened PD and adverse outcomes related to EWB compared to those with normal or high levels of resilience. Levels of resilience amongst most university students in this study were classified within a "normal" range (e.g., low, normal, high).[31] Moreover, moderate scores likely indicate that, although student PD increased, experiences associated with COVID-19 did not induce a level of "trauma" required for clinical assistance, as higher TSC-40 scores are associated with clinical presentation (i.e., diagnosis).[33]

As it pertains to PD on the basis of sex, this study supported previous findings[11,16,17] that female students consistently exhibited higher levels of PD and lower levels of resilience than males. Extending the literature, this study highlighted the need to explore other factors influencing PD and resilience of non-binary (i.e., gender non-conforming) students, as their scores were markedly higher than male and female students for all conditions. Non-binary students demonstrated significantly higher levels of PD and lower levels of resilience than male and female students, prior to and following the onset of COVID-19. Many factors may explain differences in PD and resilience related to COVID-19 on the basis of sex in this study. In general, non-binary and female students are at heightened risk/predisposition for mental health diagnoses (e.g. emotional disorders), lack self-efficacy and face social factors often resulting in higher levels of PD and lower levels of resilience compared to males.[8,16] Further, results may have been exacerbated, as non-binary and female students may have lacked access to typical coping strategies and traditional systems of support.[16,35,36] A study[37] of postgraduate students, conducted by Sipavicience,[37] established that males generally use problem-focused approaches (i.e., planning, suppression of competing activities) for coping that are typically accessible for use in most situations whereas, females and non-binary individuals often utilize emotion focused coping mechanisms (e.g. social support systems, venting, religion, self-distraction), which may have been limited by the conditions of COVID-19.

Self-efficacy (SE), confidence in one's own ability to control the environment and execute behaviors to produce a specific performance or outcome, has been shown to improve the stress response and promote resilience among non-binary and female students.[38,39] SE may have played a vital role in the findings of this study as past reports indicate that

self-efficacy among males is typically higher than females and non-binary individuals.[38,39] Research conducted by the National Institute of Mental Health (NIMH)[40] found that females tend to doubt themselves, doubt their problem-solving abilities and view their problems as unsolvable more so than males. Interestingly, when required to collaborate and communicate with peers in academic settings, females have been found to display higher levels of self-efficacy than male counterparts.[17,41,42] The mandates imposed by the onset of COVID-19, which required students to quickly pivot to online learning environments, may have limited opportunities for collaboration and communication.[3,5,7,8] Providing opportunities for mastery experiences in the absence of collaborative work may be a great way to build self-efficacy among non-binary and female students, in order to reduce PD, bolster resilience and improve overall EWB when faced with adversity.[17,39–41]

Social determinants, such as social cohesion, stability/conflict, and SES (i.e., income and education) have been found to influence PD & resilience.[16,43] The onset of COVID-19 created uncertainty and division in the country, communities and schools, thus threatening social cohesion and stability. Concurring with previous reports,[10,20,36,44] students who reported low yearly household income (i.e., less than $50,000) in this study were found to have significantly higher levels of PD and lower levels of resilience in comparison to those who reported high yearly household income (i.e., more than $50,000). Of particular interest, the majority of non-binary and female participants in this study reported low household income (<$50,000), heightened PD and reduced resilience in comparison to their male counterparts. Further, reports indicate that low-income students were more likely to work full-time, endure unsafe work conditions, lack time for self-care, and have less access to resources and support than their high income counterparts following the onset of COVID-19, thus leaving them at increased risk for common mental health disorders.[16,45]. Ijadi-Maghsoodi, Marlotte, Garcia, Aralis, & Lester[22] suggested that PD and resilience among low-income may be modifiable through the acquisition of coping skills, such as self-regulation, the ability to understand and manage behaviors, reactions to feelings, and situations (e.g., problem solving, time management, etc.). Providing access to resources that promote knowledge and skills that enable all university student to better cope with life stressors, regardless of sex or income level, may reduce PD, build resilience, and improve EWB in this population.

Given the very limited research on PD and resilience on the basis of educational status (i.e. graduate vs. undergraduate) among university students, the findings of this study offer a noteworthy contribution to the literature. This study determined that undergraduate students experienced more PD and had less resilience than graduate students. Ickes et al.[23] indicated that students of all education levels experience distress about grades and homework completion; however, the stressors endured and coping strategies employed differ for undergraduate and graduate students. Further, graduate students reported higher levels of PD related to financial pressure, lack of family support and lack of university support, while undergraduate students reported more PD related to changes in lifestyle, increased workload, new responsibilities, and interpersonal relationships. Subsequently, graduate students are also more likely to utilize healthy coping mechanisms like exercise, pets and seeking social supports to deter distress; than undergraduate students, who are more likely to use negative coping mechanisms, such as drugs, tobacco, alcohol, and other substances to cope with stress. [23,26,45] Additionally, Ickes et al.[23] found that the single most important factor mediating PD and resilience among university students was personal and institutional social support. Students who felt high levels of support and those who utilized support services typically reported higher levels of resilience regardless of any other coping mechanisms used. Providing opportunities for undergraduates to develop healthy approaches to stress management, including student support services on university campuses, is imperative to reducing PD, bolstering resilience and cultivating EWB. Kodish et al.[46] suggested that provision of support services should include (1) universal screenings (face-to-face and digital) to assess mental health status, (2) access to "free" support services (e.g., counseling, university writing centers, tutoring, etc.), and (3) access to digital mental health tools (e.g., websites, apps, etc.) as digital tools hold significant promise for bridging gaps in communication and care.

Very few studies have examined differences in PD and resilience on the basis of race within the university setting, thus, the current study adds to the existing body of literature.[19,44] Specifically, this study found a significant increase in PD among all races following the onset of COVID-19, and significant differences in resilience on the basis of race. While not statistically significant, the finding that AA students experienced less PD than their EA and OM student counterparts pre- and post-COVID-19 may be practically significant as results are not well understood. Since previous studies[19,47] have demonstrated that students of color, specifically AA students, generally exhibit higher levels of PD than their white counterparts, and considering that statistically AA and OM are at higher risk for contraction of COVID-19, and typically experience higher rates of morbidity and mortality associated with the virus,[47,48] different results would have been expected. However, a study by Harris, et al.[15] conducted prior to COVID-19 indicated that stressors, such as racism, racial discrimination and racial micro-aggressions, often experienced by AA and OM students,

throughout the early portion of life may serve to build resilience for later-life, thus reducing the lifelong risk for PD in the face of adversity. African American (AA) students in this study exhibited significantly greater resilience than European American (EA) students which may have deterred PD. Prioritizing the development of adaptive coping skills during childhood, a vital period in the formation of resilience, with reinforcement during adolescents and young adulthood may help future university students survive and potentially thrive in the face of unforeseen, negative social conditions known to impact PD and EWB.

Although this study gleamed valuable information, it is not without limitations. Due to the uniqueness of the onset of the COVID-19 virus, this study may be difficult to replicate. Other limitations include student self-report, study timing (one year after onset of COVID-19), and a predominately European American sample, although representative of the population. Self-report could introduce biases, such as recall bias and response bias, which would not allow for authentication/validation of the responses provided. Since the TSC-40 instrument is only validated for recalling symptoms in the previous 2 months, it is possible that recall bias arose from asking students to recall symptoms prior to COVID-19 (roughly 1 year after the onset of COVID-19). The lapse in time between the onset of COVID-19 and survey completion may have provided enough time for students to adjust to the conditions presented. This may have accounted for the "normal" levels of resilience found for most demographic variables and the moderate levels of PD. Further, the study used a cross-sectional design, which does not account for associated changes over time.

Conclusions

The findings from this study showcase health disparities in PD and resilience among university students on the basis of demographic variables. Although COVID-19 highlighted the importance of improving university student well-being, efforts to reduce PD and bolster resilience should continue. Low income, undergraduate, non-binary and female students are particularly vulnerable to PD and may need additional support to bolster resilience. Universities should support all students by arming them with skills (i.e., self-regulation, self-efficacy and social supports) to live emotionally healthy lives. Since the onset of COVID-19, many universities began to offer a variety of online courses and programs. Providing access to alternative resources (e.g., digital health literacy tools) and means of institutional and personal social support (e.g., peer-to-peer or student-to-faculty virtual communities) to accommodate this new version of learning may serve to promote EWB among all students. In order to create effective prevention and intervention programs geared towards the promotion of emotional well-being among university students, future studies should (1) identify the most prevalent types of PD among university students, (2) identify additional factors related PD, and (3) examine other factors related to resilience among university students.

Acknowledgements

This study was initiated through a Northern Kentucky University Institution for Health Innovation intramural seed grant.

Conflicts of Interest

No conflict of interest.

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