Evidence for elevated psychiatric distress, poor sleep, and quality of life concerns during the COVID-19 pandemic among U.S. young adults with suspected and reported psychiatric diagnoses

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ABSTRACT

We report distress levels and functional outcomes based on self-reported pre-existing mental health conditions among U.S. young adults ($N = 898$) during the COVID-19 pandemic (April 13-May 19, 2020). Depression, anxiety, and PTSD symptoms, as well as COVID-19-related concerns, sleep problems, and quality of life were compared across the following pre-existing mental health groups: 1) no diagnosis, 2) suspected diagnosis, 3) diagnosed and untreated, and 4) diagnosed and treated. Compared to those without a diagnosis, the likelihood of scoring above the clinical threshold for those with a diagnosis - whether treated or not - was more than six-fold for depression, and four-to six-fold for anxiety and PTSD. Individuals with a suspected diagnosis were 3 times more likely to score above the clinical threshold for depression and anxiety and 2 times more as likely to score above this threshold for PTSD compared to those with no diagnosis. We also present higher levels of COVID-19-related worry and grief, poorer sleep, and poorer reported health-related quality of life among those with either a suspected or reported mental health diagnosis. Findings provide evidence of vulnerability among individuals with a mental health diagnosis or suspected mental health concerns during the initial weeks of the COVID-19 pandemic.

1. Introduction

To date, over 100,000 deaths have occurred within the United States due to the COVID-19 pandemic. Numerous sources of stress exist aside from fears of contracting the virus (Holmes et al., 2020). For Americans, the experience of confinement and physical distancing is new and thus adaptation to a "new normal" has led to confusion and uncertainty (Galea et al., 2020). Feelings of isolation and loneliness, forced changes in routine, and restricted access to activities that promote emotional regulation, such as exercise and religious practices, have led to difficulties in maintaining psychological well-being. Many have experienced grief due to loss of life, loss of employment and professional opportunities, and disruption in major life milestones. Emerging empirical studies show problematic psychological health as a result of the pandemic (Lei et al., 2020; Resnick, 2020; Wang et al., 2020).

Individuals with pre-existing mental health problems are among those most vulnerable to potential deleterious psychosocial and medical consequences of the pandemic (Holmes et al., 2020; Pfefferbaum and North, 2020). Under normal circumstances, those with pre-existing mental health problems have an elevated mortality rate (Felker et al., 1996; Walker et al., 2015), more medical comorbidities (Krein et al., 2006), poorer physical health (Phelan et al., 2001), and lower overall functioning or quality of life (Evans et al., 2007). As well, those with pre-existing mental health problems have been shown to be more susceptible to stress (Bos et al., 2018).

The psychological impact of the pandemic is likely far reaching but remains poorly understood. Emerging evidence suggests that the rates of anxiety and depression rose rapidly in the beginning of the pandemic across many populations (Iasevoli et al., 2020; Jungmann and Witthöft, 2020; Qiu et al., 2020). Although the pandemic has led to prevalent experiences of anxiety, loneliness, and hopelessness across various population segments (Liu et al., 2020b, under review; Mazza et al., 2020), these negative effects are likely to disproportionately affect individuals

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with a mental health history (Chan, 2010; Chatterjee et al., 2020). Those with ongoing or persistent symptoms are likely to show a worsening of symptoms, and those in recovery may be prone to relapse. Individuals suffering from mental health conditions often report poor sleep quality, and exposure to major stress may negatively affect sleep (Huang and Zhao, 2020). Further, disruption in the access to mental health services and limited access to both social supports and activities that maintain psychological health can further exacerbate psychiatric distress, sleep, and overall functioning.

The present study examines the psychological and physical well-being among U.S. young adults during the initial months of the COVID-19 pandemic with specific attention to individuals who reported a pre-existing mental health diagnosis. Drawing on data from the CARES 2020 Project (COVID-19 Adult Resilience Experiences Study), which will follow 18-30-year-old individuals across several time points in 2020 and 2021, we compare four groups of individuals: 1) those reporting no pre-existing mental health diagnosis, 2) those who suspect a mental health diagnosis, 3) those with a mental health diagnosis but untreated, and 4) those with a mental health diagnosis and treated. Given the prevalence of depression and anxiety under normal circumstances (Chen et al., 2019; Liu et al., 2019) as well as the possibility of new or exacerbated trauma-related symptoms, we assessed symptoms of depression, anxiety, and PTSD. We measured reported levels of worry and grief specifically due to COVID-19, as well as sleep and perceived quality of life based on physical and mental health functioning.

2. Methods

2.1. Procedure

This cross-sectional study used Wave 1 data from the CARES 2020 Project (April 13 to May 19, 2020) to examine the relationships between suspected or pre-existing psychiatric diagnoses and a range of measures related to psychiatric symptoms, COVID-19 related worry and grief, sleep, and physical and mental health functioning. The data from Wave 1 were collected during the weeks between the U.S. declaration of a public health national state of emergency and the lifting of restrictions from all 50 U.S. states. A total of 908 young adults, aged 18 to 30 years, enrolled into the research study and completed a 30-minute online survey. All participants were either currently living in the U.S. or obtaining education from a U.S. institution and were recruited through social media, email listservs, and word of mouth. One out of every 10 participants received a $25 gift card. To ensure data quality, the online survey embedded various attention checks and human verification. This study was reviewed and approved by the Institutional Review Board at Boston University.

2.2. Participants

In the current analysis, a total of 898 young adults ranging from 18 to 30 years old (M = 24.5 years old) were included, given missing data from ten individuals on the variables of interest. The current sample was comprised of 14.1% men, 81.3% women, and 4.6% self-identified gender (transgender, other), and was 59.7% White, 21.2% Asian, 5.3% Black, 6.0% Hispanic/Latinx, 6.2% mixed race, and 1.5% of another race (including American Indian/Native American participants). Among our sample were 13.7% individuals that were non-U.S.-born and 61.2% that were students. The majority of respondents reported no income or an annual income of < $25,000 per year.

2.3. Measures

2.3.1. Predictors
2.3.1.1. Pre-existing mental health diagnosis. Participants were asked whether they had ever been diagnosed with the following nine clinical disorders: attention deficit hyperactivity disorder (ADHD);

generalized anxiety disorder; depression; insomnia; obsessive compulsive disorder (OCD); panic disorder; post-traumatic stress disorder (PTSD); substance abuse or addiction (alcohol or other drugs); and other mental health condition. For each disorder, participants could select *"No"; "Suspected, but not diagnosed"; "Yes, diagnosed but not treated"*; or *"Yes, diagnosed and treated."*

This item was collapsed into a single variable of pre-existing diagnosis (regardless of condition), with participants sorted according to the highest level received for any disorder.

2.3.2. Binary outcomes
2.3.2.1. Current depression symptoms. Depression symptoms experienced over the prior two weeks were assessed using the Patient Health Questionnaire (PHQ-8; Kroenke et al., 2009). Participants indicated the frequency of eight depression symptoms over the prior two weeks on a scale of 0 (*not at all*) to 3 (*nearly every day*), with total scores ranging from 0 - 24. Following established clinical cutoffs (Kroenke et al., 2009), a dichotomous version of this variable identified those with clinically significant levels of depression (scores of 10 or higher).

2.3.2.2. Current anxiety symptoms. Anxiety symptoms experienced over the prior two weeks were assessed using the Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006). Participants indicated the frequency of seven anxiety symptoms over the past two weeks on a scale of 0 (*not at all*) to 3 (*nearly every day)*, with total scores ranging from 0 - 21. Following established clinical cutoffs (Spitzer et al., 2006), a dichotomous version of this variable identified those with clinically significant levels of anxiety (scores of 10 or higher).

2.3.2.3. Current PTSD symptoms. PTSD symptoms were assessed using The PTSD Checklist—Civilian Version (PCL-C), a validated 17-item measure (Weathers et al., 1993). Participants viewed a list of 17 possible problems or complaints in response to stressful life experiences and indicated how much they had been bothered by that problem in the past month on a scale of 1 (*not at all*) to 5 (*extremely*), with total scores ranging from 17 - 85. Following established clinical cutoffs (Blanchard et al., 1996), a dichotomous version of this variable identified those with clinically significant levels of PTSD (scores of 45 or higher).

2.3.3. Continuous outcomes
2.3.3.1. COVID-19-related worry. A newly developed 6-item measure assessed COVID-19 pandemic-related worry (Liu et al., 2020a). Participants viewed a list of 6 possible items (e.g., being able to obtain groceries, obtaining a test or treatment for COVID-19, keeping in touch with loved ones under social distancing guidelines, and maintaining employment and financial stability) and indicated their level of worry on a scale of 1 (*not at all*) to 5 (*very worried*), with total scores ranging from 6 - 30. Cronbach's α for measure items was .70, indicating good reliability.

2.3.3.2. COVID-19-related grief. A newly developed 6-item measure separately assessed COVID-19-related feelings of grief and loss related to the pandemic (Liu et al., 2020a). Participants viewed a list of six grief- or loss-related statements, including items such as missing out on significant life events or loss of vital resources (e.g., housing, mentorship, food access, healthcare), and sentiments such as feeling stunned or dazed over what happened, or feeling bitter over loss in daily routines and activities. Many items were adapted from the Inventory of Complicated Grief (Prigerson et al., 1995). Participants indicated the extent to which they agreed or disagreed with each statement on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*), with summed scores ranging from 6 - 30. Cronbach's α for measure items was 0.76, indicating good reliability.

2.3.3.3. Sleep problems. Sleep quantity and quality over the past four weeks was assessed using the Medical Outcomes Study Sleep Scale (MOS-SS; Shahid et al., 2012). To assess sleep quantity, participants were asked to indicate the average number of hours they slept each night during the past 4 weeks. The Sleep Problems Index II subscale of the MOS was used to assess sleep quality. This subscale includes 9 items assessing sleep problems such as sleep disturbance, snoring, and somnolence. All items were rated on a six-point Likert-type scale, with 1 = *none of the time* to 6 = *all of the time.* To calculate a total sleep problems score, responses to the 9 sleep problem index II items were recoded on a 0 to 100 scale and calculated into a mean score, with higher scores indicating greater sleep impairment.

2.3.3.4. Physical and mental health functioning. Health-related quality of life (HRQoL) was assessed using the 12-item Short Form Health Survey (SF-12; Ware et al., 1996), which provides separate standardized summary scores for physical and mental health functioning with a mean of 50 and standard deviation of 10. Higher scores reflect better HRQoL. Although the internal consistency is difficult to obtain for the SF-12 given varying answer formats and complicated scoring, the Medical Outcomes Study (MOS) SF-36, the larger questionnaire from which the SF-12 is drawn, has high reliability (Cronbach's $\alpha \geq .80$).

2.3.4. Data analytic plan

First, chi-square tests were used to compare proportions by diagnosis status on the three binary outcomes indicating clinically significant levels of depression, anxiety, and PTSD. Given their associations with outcomes, age, race, gender, income, and student status were included as covariates. No differences were observed among US and non-US born individuals; therefore nativity was not included as a covariate. Next, logistic regression models unadjusted and adjusted for covariates were performed on the binary depression, anxiety, and PTSD outcomes, with "no diagnosis" set as the reference level. Next, a series of ANOVA models were performed to compare group means on the five continuous variables, including COVID-19-related worry and grief, sleep problems, and physical and mental health functioning. ANCOVA models were then performed on these outcomes. LSD post hoc tests were employed to determine significant differences between group means for these continuous outcomes. All analyses were performed with SPSS 25.0.

3. Results

Table 1 shows demographic characteristics of our sample. Of the sample, 32.2% indicated no pre-existing diagnosis, 23.4% reported suspecting such a diagnosis, 6.2% reported having such a diagnosis but no treatment, and 38.2% reported having received both a diagnosis and treatment. Among all participants, a large majority of respondents reported having a diagnosis of depression (31.7%), followed by anxiety (29.0%), PTSD (8.0%), ADHD (6.9%), and insomnia (6.7%), with the remainder of other rates of diagnoses being under 5%. As has been reported elsewhere on this sample (Liu et al., 2020b), over 40% of respondents reported experiencing clinical levels of depression and anxiety, with more than 30% of respondents reporting clinical levels of PTSD. As well, reported scores for COVID-19-related worry indicated that individuals were on average, "a little worried" to "somewhat worried." For COVID-19-related grief, they tended to score, on average ,between "somewhat agree/disagree" to "agree" on items referring to specific grief experiences.

Table 2 displays the unadjusted rates of probable mental health diagnoses based on reported depression, anxiety, and PTSD symptoms, stratified by individuals who reported 1) no pre-existing diagnosis, 2) suspected diagnosis, 3) diagnosed but not treated, and 4) diagnosed and treated. Chi-square tests showed significant differences in the proportion across all groups for each of the outcomes ($p < .001$). Those without a pre-existing diagnosis showed the lowest rates of a clinical level of

Table 1
Descriptive data from Wave I of CARES 2020 (N = 898), proportions unless otherwise noted

Factors	Total
Age (years)	$M = 24.47$ ($SD = 3.26$, Range = 18.02-30.87)
Gender	
Men	14.1%
Women	81.3%
Other	4.6%
Race	
Asian	21.2%
Black	5.3%
Hispanic or Latinx	6.0%
White	59.7%
Mixed	6.2%
Other race	1.5%
U.S.-Born	
Yes	86.3%
No	13.7%
Individual Income (USD/Year)	
No income	11.8%
< $25,000	45.9%
$25,000-$49,999	24.4%
$50,000-$74,999	11.6%
$75,000+	6.3%
Student	
Yes	61.2%
No	38.8%
Possible Mental Health Diagnosis	
Depression (PHQ-8 ≥ 10)	43.3%
Anxiety symptoms (GAD-7 ≥ 10)	45.4%
PTSD (PCL-C ≥ 45)	31.8%
COVID-19-related concerns	
COVID-19-related worry	$M = 15.94$ ($SD = 5.30$, Range = 6-30)
COVID-19-related grief	$M = 19.22$ ($SD = 4.68$, Range = 6-30)
Sleep	
MOS-Sleep Problems	$M = 40.15$, ($SD = 17.91.$, Range = 0-95.56)
Health Quality of Life	
SF-12 physical health	$M = 87.2$ ($SD = 11.9$, Range = 30-100)
SF-12 mental health	$M = 57.2$ ($SD = 14.2$, Range = 22-96)
Diagnosis status	
No pre-existing diagnosis	32.2%
Suspected diagnosis	23.4%
Diagnosed, not treated	6.2%
Diagnosed, treated	38.2%

depression, anxiety, and PTSD (18.3%, 20.4%, and 13.8%, respectively); those who had diagnoses but received no treatment showed the highest rates across these same outcomes (66.1%, 64.3%, 48.2%).

Comparisons of the rate of those scoring above the cutoff for depression, anxiety, and PTSD were performed across each level. Table 3 presents odds ratios and confidence intervals in both unadjusted and adjusted models, which account for the covariates of age, race, gender, income, and student status. Notably, those who reported a suspected diagnosis and those who reported a pre-existing diagnosis were significantly more likely to score above the clinical cutoff for depression, anxiety, and PTSD. When considering only the adjusted model, we found that those suspected but without a diagnosis showed odds ratios that ranged from $OR = 2.23$ ($CI = 1.43$-3.60) for PTSD to $OR = 3.32$ ($CI = 2.21$-5.00) for anxiety. Individuals who received a diagnosis but no treatment ($OR = 6.77$, $CI = 3.55$-12.95), those with a diagnosis and received treatment ($OR = 6.38$, $CI = 4.32$-9.42), and those with a suspected diagnosis ($OR = 3.16$, $CI = 2.09$-4.78) were all more likely to show clinical levels of depression compared to those with no diagnosis. Individuals who were diagnosed and treated (anxiety: $OR = 5.87$, $CI = 4.00$-8.60, PTSD; $OR = 5.31$, $CI = 3.49$-8.09), those with a diagnosis and who were not treated (anxiety: $OR = 5.44$, $CI = 2.87$-10.34; PTSD: $OR = 4.78$, $CI = 2.50$-9.13), and those with a suspected diagnosis (anxiety: $OR = 3.32$, $CI = 2.21$-5.0; PTSD: $OR = 2.23$, $CI = 1.43$-3.60) were more likely to report clinical levels of anxiety and PTSD.

Tables 4 and 5 display mean levels from ANCOVA analyses with LSD

Table 2

Unadjusted rates and means of clinical levels of mental health symptoms by pre-existing mental health diagnosis status, from Wave I of CARES 2020 (N = 898)

Total	Proportions above clinical cut off by diagnostic status				
	No diagnosis	Suspected diagnosis	Diagnosed, not treated	Diagnosed, treated	Chi-square
Depression (PHQ-8 ≥ 10)	18.3%	43.8%	66.1%	60.3%	χ^2 (3) = 125.79, $p < .001$
Anxiety symptoms (GAD-7 ≥10)	20.4%	47.2%	64.3%	62.4%	χ^2 (3) = 121.02, $p < .001$
PTSD (PCL-C ≥ 45)	13.8%	27.6%	48.2%	46.9%	χ^2 (3) = 87.80, $p < .001$

post hoc tests employed to examine differences between groups. Table 4 shows results on COVID-19-related worry and grief. After adjustment, those with no pre-existing diagnosis scored the lowest levels of COVID-19-related worry and grief (worry: M = 14.86, grief: M = 17.97), whereas those who were diagnosed but not treated scored the highest levels (worry: M = 16.53, grief: M = 21.25, respectively).

As shown in Table 5, adjusted ANCOVA models demonstrated that those with no pre-existing diagnoses showed the lowest levels of problematic sleep (M = 31.27) and those who were diagnosed and treated scored the highest on the same index (M = 46.67). With regard to health-related quality of life on physical and mental health, those with no pre-existing diagnoses showed the most optimal functioning (physical: M = 91.5; mental: M = 65.4), whereas those who received a diagnosis and no treatment (physical: M = 86.2, mental: M = 52.4) and those with a diagnosis and treatment (physical: M = 83.0; mental: M = 51.6) showed the poorest level of functioning on the same subscales.

4. Discussion

Our data show the extent to which individuals with a pre-existing mental health diagnosis, regardless of whether they received treatment, were among the groups at highest risk for a range of psychiatric distress symptoms during the initial weeks of the COVID-19 pandemic. Critically, this risk spanned a range of distress outcomes, including greater likelihood of clinically significant levels of psychiatric symptoms, heightened levels of COVID-19-related worry and grief, poorer sleep, and lower physical and mental health quality of life. More than 60% of those who indicated receiving a diagnosis scored above the clinical level for depression and anxiety during the initial weeks of COVID-19, and nearly half reported clinical levels of PTSD. The likelihood of scoring above the clinical threshold for those with a diagnosis compared to those without a diagnosis was more than six-fold for depression, and between four-to-six-fold for anxiety and PTSD, even after controlling for sociodemographic characteristics.

However, it is not only those with a pre-existing diagnosis of depression or anxiety who demonstrate a high level of concern; those with a suspected diagnosis also reported significantly higher rates and levels on these outcomes compared to those without a diagnosis. Individuals with a suspected diagnosis were over three times more likely to score above the clinical threshold for depression and anxiety and more than two times as likely to score above this threshold for PTSD compared to those with no diagnosis, even after adjusting for sociodemographic characteristics. Calls have been made to prepare for the inevitable mental health concerns, particularly for individuals with pre-existing

mental health problems (Druss, 2020; Holmes et al., 2020; Rajkumar, 2020). This high level of psychiatric distress documented during the initial weeks of COVID-19 provides evidence of vulnerability among individuals with a mental health diagnosis or suspected mental health concerns.

The high rates of mental health symptoms above the clinical threshold found among those with no pre-existing diagnosis was striking with one out of five of these young adults scoring in the clinical range for depression (18.3%) and anxiety (20.4%), and one out of eight reporting clinical levels of PTSD (13.8%). These rates are similar or even higher than rates obtained from general prevalence studies that have assessed depression (Kroenke et al., 2009; Martin et al., 2014), anxiety (Spitzer et al., 2006) and PTSD (Parto et al., 2011; Netto et al., 2016) using the same measures, but with samples not restricted to only those with no diagnosis.

The relatively high rates found in our study population may reflect the immediate distress experienced by young adults given that our study took place in the weeks immediately after the designation of COVID-19 as a pandemic. Young adults, like many other Americans, were forced to accommodate new restrictions and to adapt to new routines during this time. While we do not have pre-pandemic rates from this sample, recent reports from population-level data on the prevalence of depression and anxiety using similar validated screeners show an increase in the proportion of individuals scoring above the clinical threshold between 2019 and the beginning of 2020 (National Center for Health Statistics, 2020a, 2020b; Resnick, 2020). This underscores the likely rapid increase in the levels of mental health symptoms during the first few weeks of the pandemic.

Approximately 45% of our sample reported having a pre-existing mental health diagnosis. Taking into consideration that the measurement for these rates varies across studies and populations, and that the majority of lifetime cases occur before the age of 24, it appears that our rate is also consistent with lifetime prevalence for adults aged 18 year and older (46.4%),assessed by the National Comorbidity Survey Replication where individuals took part in a diagnostic interview (Kessler et al., 2005). Our rate is higher than the lifetime reported mental health diagnoses obtained from first year college students (35%) from the World Mental Health Surveys International College Student Project world (Auerbach et al., 2018), which seems reasonable given that we asked about pre-existing mental health within a sample that spans from 18-30 years.

Our study determined that those with a diagnosis and those suspected to have a diagnosis were more likely to experience greater worry and grief due to COVID-19-specific concerns. COVID-19-related worry largely referred to impediments in obtaining necessities or maintaining

Table 3

Unadjusted and adjusted logistic regression models predicting clinical levels of mental health symptoms by pre-existing mental health diagnosis status

Predictor	Unadjusted			Adjusted		
	Depression (PHQ ≥ 10)	Anxiety (GAD-7 ≥ 10)	PTSD (PCL-C ≥ 45)	Depression (PHQ ≥ 10)	Anxiety (GAD-7 ≥ 10)	PTSD (PCL-C ≥ 45)
No diagnosis	1	1	1	1	1	1
Suspected, no diagnosis	3.47*** (2.32-5.20)	3.48*** (2.34-5.16)	2.38*** (1.51-3.73)	3.16*** (2.09-4.78)	3.32*** (2.21-5.0)	2.23** (1.43-3.60)
Diagnosed, no treatment	8.67*** (4.63-16.3)	7.02*** (3.79-13.0)	5.80*** (3.11-10.79)	6.77*** (3.55-12.95)	5.44*** (2.87-10.34)	4.78*** (2.50-9.13)
Diagnosed, treated	6.78*** (4.69-9.79)	6.47*** (4.51-9.27)	5.51*** (3.71-8.18)	6.38*** (4.32-9.42)	5.87*** (4.00-8.60)	5.31*** (3.49-8.09)

*$p < .05$, **$p < .01$, ***$p < .001$

Adjusted for age, race, gender, income, student status

Table 4

Unadjusted and adjusted mean comparisons of COVID-19-related worry and grief by pre-existing mental health diagnosis status

	No diagnosis	Suspected, no diagnosis	Diagnosed, no treatment	Diagnosed, treated	F value, p
Unadjusted					
COVID-19-related worry	14.72[a]	16.37[b]	16.79[b]	16.56[b]	$F(3,894) = 7.74, p<.001$
COVID-19-related grief	17.73[a]	19.35[b]	21.73[c]	20.00[b]	$F(3,894) = 19.42, p<.001$
Adjusted					
COVID-19-related worry	14.86[a]	16.34[b]	16.53[b]	16.51[b]	$F(3,881) = 5.74, p<.001$
COVID-19-related grief	17.97[a]	19.39[b]	21.25[c]	19.85[b]	$F(3,881) = 13.72, p<.001$

Lettered superscripts denote significant differences from each level. For unadjusted COVID-19-related worry, the a-b comparison was significant at $p<.01$. For unadjusted COVID-19-related grief, the a-b comparison was significant at $p<.001$, and the b-c comparison was at $p<.01$. and b-c comparisons were significant at $p<.001$. For adjusted COVID-19-related worry, a-b comparison was significant at $p<.05$. For adjusted COVID-19-related grief, the a-b comparison was significant at $p<.001$ and the b-c comparison was significant at $p<.05$.

Adjusted for age, race, gender, income, student status

routines and stability due to COVID-19 (e.g., getting groceries, obtaining testing or treatment for COVID-19, maintaining financial stability). COVID-19-related grief referred to experiences including the loss of tangible and meaningful routines as feelings of stunned, dazed, or bitter. The observation that those with a diagnosis and those who suspected having a diagnosis were significantly more prone to experiencing worry and grief compared to those without a diagnosis suggests that the COVID-19 pandemic has had an impact on their distress. Further research is needed to understand if the increased rates of grief and worry in this subset were related to actual loss and resource limitations or if it represents negative cognitive bias or cognitive distortion.

We assessed sleep problems and physical and mental functioning as they reflect individual well-being - arguably one of the most critical outcomes when considering the secondary impacts of the COVID-19 pandemic. Reported sleep problems include items that assess sleep-related experiences such as disturbed sleep, quantity of sleep, and frequent nighttime awakenings. Physical and mental functioning, as measured in our study, represent the subjective appraisal of their current life situation. Individuals with a diagnosis appear to be the most vulnerable. Although it may be the case that this group is composed of individuals with the most severe forms of psychiatric problems even before the pandemic, it is also probable that the pandemic disproportionately affected their sleep and physical and mental functioning. Emerging studies have documented disrupted sleep and poorer health functioning during the COVID-19 pandemic overall (Cellini et al., 2020; Huang and Zhao, 2020).

There are a number of possible reasons why our groups differ on these assessments of sleep problems and poor health functioning. The symptoms of depression, anxiety, and PTSD disorders are often accompanied by sleep problems for many individuals, and this is particularly true for those with a pre-existing mental health concern.

Symptoms such as low mood and ruminative thinking are symptoms that may impede an individual from carrying out cognitive and physical tasks or responsibilities, that are likely exacerbated by the stresses of the pandemic. The upending of structures during the initial several weeks of the pandemic caused dramatic changes to schooling (Conrad et al., 2020b; Conrad et al., 2020a), employment, and general daily activities for most individuals in the U.S. Sleep problems and perceived poor functioning may be attributed to changes in order and routine (Connell et al., 2012), which are both critical structures for maintaining psychological well-being. Routines that maintain well-being (such as exercise or social groups) were limited, and individuals with a pre-existing mental health diagnosis that were in active treatment may have lost routines involving both self-care and professional help-seeking.

Distinct circumstances might explain why individuals do not obtain a diagnosis for a suspected mental health problem or, even with a diagnosis, seek or receive treatment (Rickwood et al., 2007). Individuals from both groups may not consider their impairments to be sufficiently severe for seeking help from a provider. Despite feelings of distress, their functioning may be relatively stable; they may also find themselves managing their distress through other supports or activities. As well, respondents may normalize their experience of psychiatric distress and other difficulties with functioning, and this has been found to be particularly true for young adults. By perceiving that their distress is normal under the circumstances, they may believe that treatment is unwarranted or that it is not urgent to seek help. Pursuing mental health treatment may be considered stigmatizing to some if it is thought that everyone is feeling similarly anxious, and this may be particularly true for many during the COVID-19 given the widespread levels of stress and anxiety across members of society.

Obstacles to mental health treatment during the pandemic may include individuals' uncertainty about whether or how to make an

Table 5

Unadjusted and adjusted mean comparisons of sleep problems and health-Related quality of life by pre-existing mental health diagnosis status

	No diagnosis	Suspected, no diagnosis	Diagnosed, no treatment	Diagnosed, treated	F value, p
Unadjusted					
MOS-Sleep Problems	31.02[a]	40.01[b]	47.27[c]	46.77[c]	$F(3,894) = 50.92, p<.001$
SF-12 physical health	91.7[a]	88.2[b]	85.4[b,c]	83.1[c]	$F(3,894) = 31.16, p<.001$
SF-12 mental health	66.1[a]	56.1[b]	50.9[c]	51.3[c]	$F(3,894) = 76.71, p<.001$
Adjusted					
MOS-Sleep Problems	31.27[a]	40.00[b]	46.62[c]	46.67[c]	$F(3,881) = 43.65, p<.001$
SF-12 physical health	91.5[a]	88.4[b]	86.2[b,c]	83.0[c]	$F(3,881) = 28.60, p<.001$
SF-12 mental health	65.4[a]	56.1[b]	52.4[c]	51.6[c]	$F(3,881) = 63.07, p<.001$

Lettered superscripts denote significant differences from each level. For unadjusted and adjusted sleep problems, the a-b comparisons were significant at $p<.001$ and the b-c comparison significant at $p<.01$. For unadjusted physical health, comparisons were significant at $p<.01$. For adjusted physical health a-b comparisons were significant at $p<.01$, and b-c comparisons significant at $p<.001$. For unadjusted mental health, the a-b comparisons significant at $p<.001$ and the b-c comparison significant at $p<.01$. For adjusted mental health a-b comparisons were significant at $p<.001$, and b-c comparisons significant at $p<.05$.

Adjusted for age, race, gender, income, student status

$N=898$, *$p<.05$, **$p<.01$, ***$p<.001$

appointment (Birch, 2020), the level of comfort using virtual care, and other new challenges in provider-patient engagement during the adoption of virtual care (Mehrotra et al., 2020) which may lead to treatment delays. This is of particular concern as delays in treating anxiety pose a risk for subsequent depression and other mental health conditions. For these reasons, the use of normalizing language regarding negative psychological reactions to the pandemic might potentially prevent individuals from seeking the mental health care that they need especially as many are endorsing clinical levels of distress that may be treatable.

The geographically transient lifestyle of many young adults should be considered as it is also often a barrier to continuous mental health treatment. Students often relocate to a college campus for part of the year, while others relocate to a new city for a summer job or professional opportunity. Allowing continuity of treatment through access to both telehealth as well as treatment by out-of-state providers may be critical to the mental health treatment of this population. The telehealth opportunities are promising and may offer newfound ways to address psychiatric distress and offer innovative treatment during and beyond the COVID-19 pandemic (Conrad et al., 2020a; Hollander and Carr, 2020; Wosik et al., 2020; Zhou et al., 2020). However, many states still have barriers to the effective expansion of telehealth, including lack of payment parity and limitations on providers who are practicing across state lines. These barriers must be addressed by federal legislation, state legislation, state licensing boards and regulatory changes in order for telehealth to serve this vulnerable population during this high-risk period.

There are major study limitations to be noted. First, there are limitations to generalizability. As mentioned, our sample includes a high number of individuals with mental health conditions. While this provides us with a sufficient sample size to compare based on diagnostic status, our sample may not be representative of U.S. young adults. Initial recruitment took place on the East Coast with outreach leading to other major cities; respondents may have been located at pandemic "hotspots," which could have accounted for the observed high levels of distress. Second, there may be variability in the circumstances among those in our diagnostic groups. For instance, the timeframe for having received a diagnosis or having received treatment may widely differ. Those who reported having had a diagnosis and treatment for their condition may refer to those who have been treated in the past and are recovered, or those who are still receiving treatment. Some individuals may have suspected a diagnosis for a long period of time whereas others may have suspected a mental health diagnosis relatively recently. We also do not have information regarding service access, help-seeking, and compliance to treatment. Finally, our study design does not allow us to make any conclusions about whether the pandemic caused greater psychological distress among individuals as a result of COVID-19 because we do not have pre-pandemic data to make this comparison. As such, we cannot make any causal statements regarding the effect of COVID-19 on the outcomes for any of our four groups.

In summary, our sample of respondents reported significant depression, anxiety, and PTSD during the first few weeks of the pandemic, and those who reported a pre-existing mental health diagnosis were more vulnerable to symptoms of grief, worry, depression, anxiety, and PTSD, as well as concerns related to COVID and poorer sleep and quality of life. Under normal circumstances, individuals with a pre-existing mental health condition encounter a range of barriers in accessing mental health treatment. The pandemic creates many new uncertainties and challenges which might further reduce professional help-seeking behavior. Specific efforts must be made to increase access to mental health treatment for this population given their elevated risk of psychiatric symptoms, and unique circumstances require specific accommodations to facilitate access to mental health treatment.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2020.113345.

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