Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Mental health symptoms among American veterans during the COVID-19 Pandemic

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ABSTRACT

We examined the symptom trajectories of posttraumatic stress disorder (PTSD), depression, and anxiety among 1,230 American veterans assessed online one month prior to the COVID-19 outbreak in the United States (February 2020) through the next year (August 2020, November 2020, February 2021). Veterans slightly increased mental health symptoms over time and those with pre-pandemic alcohol and cannabis use disorders reported greater symptoms compared to those without. Women and racial/ethnic minority veterans reported greater symptoms pre-pandemic but less steep increases over time compared to men and white veterans. Findings point to the continued need for mental health care efforts with veterans.

1. Introduction

Americans have experienced high levels of depression, anxiety, stress, and substance use during the COVID-19 pandemic (Acuff et al., 2021; Vindegaard and Benros, 2020; Wu et al., 2021), and those most vulnerable may be those with pre-existing mental health conditions (Alonzi et al., 2020). American veterans have historically experienced high rates of posttraumatic stress disorder (PTSD), anxiety, depression, alcohol use disorder (AUD), and cannabis use disorder (CUD), which often co-occur (Pedersen et al., 2020). However, current research on behavioral health outcomes for veterans during the COVID-19 pandemic is limited, with much of the research being either cross-sectional or assessing only two post-outbreak time points. Longitudinal research with multiple time points from before and throughout COVID-19 can provide information on the trajectories of veteran behavioral health.

The present study aimed to (1) examine changes in PTSD, depression, and anxiety symptoms among a large sample of American veterans before and through 12 months after the pandemic's outbreak in the U.S. and to (2) examine changes in mental health symptoms among veterans with pre-existing AUD or CUD to those without. We hypothesized that veterans' mental health symptoms would escalate over the pandemic period; moreso for those with pre-pandemic substance use disorders.

2. Methods

2.1. Participants and procedures

Individuals aged 18 to 40 who had separated from the Air Force, Army, Marine Corps, and Navy were eligible. They were recruited in February 2020 as part of a survey study designed to understand the health behavior of young adult veterans. Individuals responded to ads displayed on general and military-specific social media websites (Facebook, RallyPoint) and directed to a secure website where they consented to the study and completed a 30-minute online survey. Participants received a $20 Amazon gift card for participation.

In total, 1855 eligible participants consented and completed the survey. Building upon prior procedures using online recruitment with veterans (Pedersen et al., 2017; 2015) and to help ensure that participants were not fabricating responses to meet eligibility criteria, we ran a series of conservative internal checks on each survey to remove questionable participants (e.g., inconsistent responses between items, reviewing time stamps to check for impossible completion times,

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removing those accessing surveys multiple times). These procedures removed 625 participants, yielding a final sample of 1230 participants at baseline (see Table 1).

After COVID-19 was declared a national emergency in the U.S. and lockdown orders commenced in March 2020 (AJMC, 2020), participants were recontacted by email in August 2020, November 2020, and February 2021 (6-, 9-, and 12-months post-baseline) and asked to complete follow-up surveys. Of the baseline participants, 1025 (83.3%), 1006 (81.8%), and 1005 (81.7%), respectively, completed the follow-up surveys and passed internal validation checks. Most (75%) completed all time points. Participants received a $30 to $50 Amazon gift card for completing the follow-up surveys. All procedures were approved by the local Institutional Review Board.

2.2. Measures

2.2.1. Demographic and military characteristics

Participants self-reported birth sex (male, female), race/ethnicity, age, and 12 items for severity of combat exposure (Schell and Marshall, 2008). Almost all participants (96.1%) reported experiencing combat.

2.2.2. PTSD, depression, and anxiety

PTSD symptom severity was assessed using the 20-item Posttraumatic Stress Disorder Checklist for DSM-V (PCL-5; Bovin et al., 2016) (α=0.95 in the sample). Symptoms of depression were assessed with the Patient Health Questionnaire 8-item (PHQ-8; Kroenke et al., 2009) (α=0.85). Symptoms of anxiety were assessed with the Generalized Anxiety Disorder 7-item measure (GAD-7; Spitzer et al., 2006) (α=0.87).

2.2.3. AUD and cud

At baseline, participants filled out the 10-item Alcohol Use Disorder Identification Test (AUDIT; Saunders et al., 1993) (α=0.81), with a cutoff score of 16 indicating a probable AUD (Babor et al., 2001). The 8-item Cannabis Use Disorder Identification Test -Revised (CUDIT-R) was used to assess for symptoms of CUD (Adamson et al., 2010) (α = 0.93), with cutoff scores of 13 indicative of probable CUD.

Table 1
Demographic characteristics pre-COVID 19 (February 2020).

Variable	M(SD) or N(%)
Age	34.5 (3.67)
Sex (men)	1091 (88.7%)
Race/ethnicity	
Black	103 (8.4%)
White	1096 (89.1%)
Asian	17 (1.4%)
Native Hawaiian/Asian pacific islander	6 (0.5%)
Alaskan Native	16 (1.3%)
Other	11 (0.9%)
Combat severity	5.02 (2.35)
Mental Health Symptoms at pre-COVID	
PTSD (PCL-5 sum score)	22.77 (15.80)
Depression (PHQ-8 sum score)	7.73 (4.92)
Anxiety (GAD-7 sum score)	6.79 (4.52)
Substance Use (positive screen pre-COVID)	
Alcohol use disorder	644 (52.4%)
Cannabis use disorder	138 (11.2%)

Note: PTSD = Posttraumatic Stress Disorder. PCL-5 = PTSD Checklist for DSM-V. PHQ-8 = Patient Health Questionnaire 8 item. GAD-7 = Generalized Anxiety Disorder scale 7 item. A score of 33 or above on the PCL-5 indicates probable PTSD, with possible range of 0 to 80. A score of 10 or above on the PHQ-8 indicates probable depression, with possible range from 0 to 24. A score of 10 or above on the GAD-7 indicates probably anxiety disorder, with possible range from 0 to 24.

2.3. Analytic plan

To assess changes in mental health, we estimated separate latent growth models (Grimm et al., 2016) for PTSD, depression, and anxiety. Because all observed variables used in the growth model were count variables (e.g., counts of symptoms), a negative binomial model was the best fitting model. We first estimated an unconditional model. Next, we entered covariates of sex (female as reference group), age, race/-ethnicity (coded as white versus racial/ethnic minority), and the summed score of combat severity. All continuous covariates were centered. To examine changes in mental health among those with pre-existing probable AUD or CUD, we entered the dichotomous indicators for probable AUD or CUD, separately. Analyses were conducted using Mplus, which uses full information maximum likelihood to aid in missing data analysis for outcome variables, with latent growth modeling retaining in analyses all participants who completed baseline.

3. Results

3.1. Changes in mental health symptomology

Supplementary Table 1 presents results of our model building process for all three mental health problems. Results are presented as Incident Rate Ratios, the exponentiated value of the log-mean estimate. For PTSD, the unconditional model indicated a significant increase in past month symptoms (see also Fig. 1, top). Veterans reported, on average, a mean of 22.7 on the PCL-5 in February 2020, increasing at six months ($M = 27.6$), but decreasing at the nine-month ($M = 23.7$) and the 12-month follow-ups ($M = 23.5$). In model 2, women, racial/ethnic minorities, and veterans reporting greater combat severity reported significantly higher PTSD symptoms pre-COVID, with all three noting a less steep increase in PTSD symptoms over time. In the final models, participants with either probable AUD or CUD had higher pre-COVID PTSD symptoms, but had less steep increases in symptoms over time (Fig. 1). Results from the unconditional model for depression revealed a significant increase in depression (supplementary Table 1; supplementary Figure 1), with veterans reporting an approximate mean PHQ-8 score increase from 7.7 at baseline to 8.8 at nine-month follow-up and to 8.7 at the 12-month follow-up, with a slight dip in symptoms at six-month follow-up ($M = 7.1$). Women, racial/ethnic minorities, and veterans with more severe combat experiences reported higher depression pre-COVID, but also showed less steep increases in depression over time. In final models, veterans who screened positive for probable AUD or CUD reported significantly higher depression symptoms pre-COVID and a less steep increase over time (supplementary Figure 1).

There was a significant increase in anxiety symptoms (supplementary Table 2, supplementary Figure 2), with increases from baseline ($M = 6.8$) to nine-month ($M = 7.4$) and 12-month follow-ups ($M = 7.5$), and a dip in symptoms at six-month follow-up ($M = 5.7$). Racial/ethnic minority veterans and those with greater combat severity showed a less steep increase in anxiety. In the final model, those who screened positive for AUD or CUD had significantly higher anxiety pre-COVID, but a less steep increase over time.

4. Discussion

We examined changes in mental health among veterans assessed one month prior to- and through 12-months into the COVID-19 pandemic. Consistent with hypotheses, we observed significant increases in PTSD, depression, and anxiety symptoms over the course of the pandemic; however, these increases were slight and even decreased initially for depression and anxiety. Studies of general adults have shown more dramatic changes (Ettman et al., 2020; Vindegaard and Benros, 2020; Wu et al., 2021), yet veterans have high levels of psychological resilience (Isaacs et al., 2017; Tsai et al., 2016), which may have helped prepare them for coping with the pandemic.

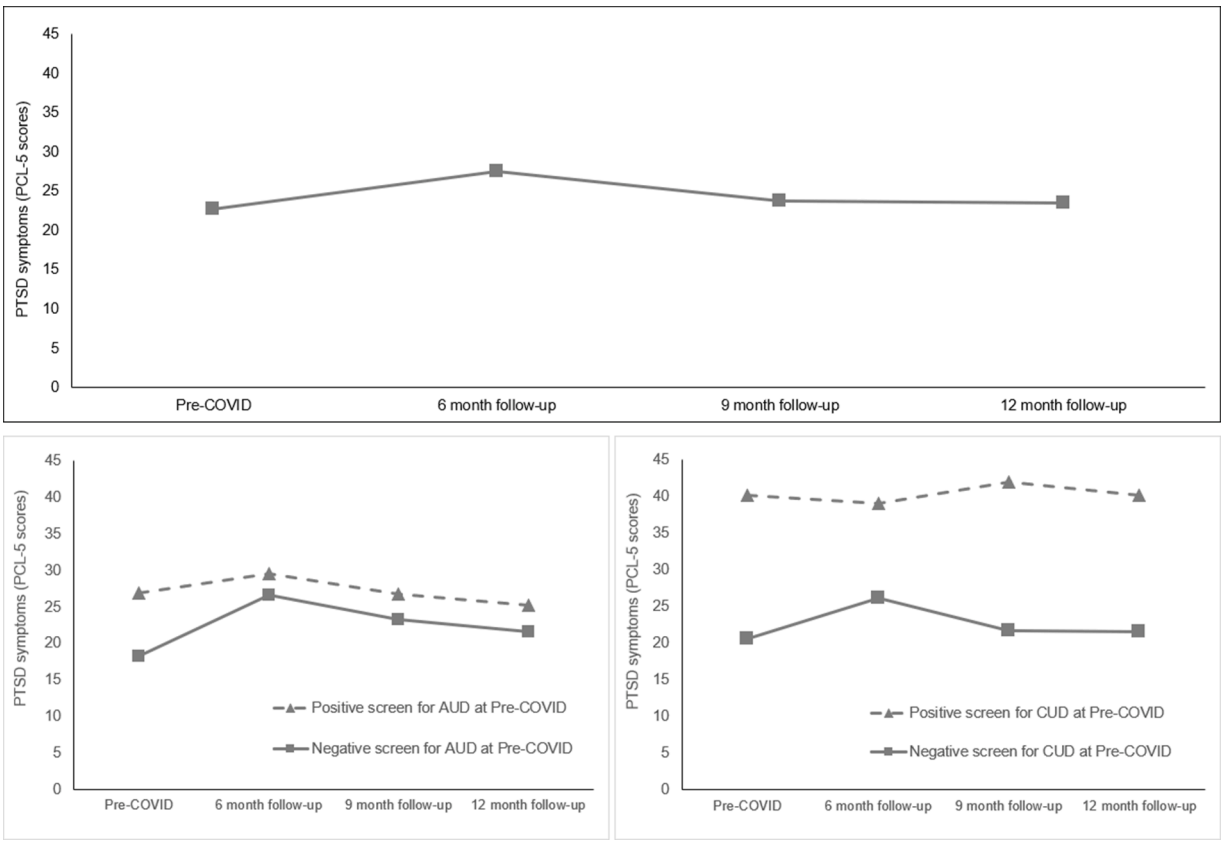

Fig. 1. Changes in PTSD symptoms before and following COVID-19 among veterans for all participants and by participants with pre-COVID Alcohol Use Disorder (AUD) and Cannabis Use Disorder (CUD) positive and negative screens.

Though mental health symptoms increased slightly for all participants, we observed less steep increases for veterans with pre-existing AUD or CUD; however, they reported greater symptoms at baseline and consistently reported higher symptoms throughout the pandemic, indicating a continued need for treatment approaches that target co-occurring substance use and mental health. Outreach efforts to bring these veterans into care settings in any form (i.e., in-person, telehealth) will continue to be necessary as the country moves into the post-COVID era or as veterans face future societal-level stressors.

Women and racial/ethnic minority veterans reported greater mental health symptoms prior to the pandemic and less steep increases in PTSD and depression symptoms during the pandemic, with less steep increases for anxiety among racial/ethnic minority veterans. Even without a large enough sample to look in greater detail at disparities among specific racial/ethnic minority groups, it is clear that more research on minority veterans is essential.

4.1. Limitations

All data were self-report and the sample was primarily composed of White male Army veterans, which make up the majority of the U.S. military (Office of Health Equity, 2021) but nevertheless limits our ability to draw meaningful conclusions about veterans who are women, racial/ethnic minorities, and from the other service branches. We also cannot infer causation as other non-hypothesized variables not included in analyses may account for the observed patterns in mental health symptoms.

4.2. Conclusions

Although mental health symptoms did not increase dramatically during the first year of the pandemic, veterans did experience increases in mental health symptoms and those with pre-pandemic AUD and CUD reported elevated levels of mental health symptoms prior to and throughout the pandemic. Outreach, prevention, and intervention efforts for veterans in the post COVID-19 era are needed to address their co-occurring substance use and mental health needs.

Author statement

Conceptualization	EP, JD
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Software	JD, JP
Validation	JD, EP
Formal analysis	JD, JP
Investigation	EP
Resources	EP
Data Curation	EP, JD
Writing - Original Draft	EP, JD
Writing - Review & Editing	EP, JD, JP, RF, DT, SS
Visualization	JD, JP, EP
Supervision	EP
Project administration	EP
Funding acquisition	EP, JD

Declarations of competing interest

None

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2021.114292.

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