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Rates and correlates of alcohol and substance use among women Veterans during the COVID-19 pandemic: The moderating role of COVID-specific anxiety.

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SUBSTANCE USE AMONG WOMEN VETERANS DURING COVID-19

Abstract

Introduction: Mental health symptoms and substance use increased during the COVID-19 pandemic and women may be disproportionately impacted. Women report substantial mental health consequences, and women veterans may experience additional risks associated with military service. However, rates and correlates of substance use and consequences among women veterans are largely unknown. This study aims to 1) report rates of substance use and consequences among women veterans; 2) identify correlates of substance use and consequences; and 3) test COVID-specific anxiety as a moderator. **Method:** Women veterans ($n = 209$) enrolled in Veteran's Health Administration (VHA) primary care completed measures of demographics, psychiatric and substance use disorder (SUD) diagnoses, current mental health symptoms, alcohol consumption, drug-related problems, and COVID-specific anxiety. Bivariate correlations evaluated demographics (age, race, employment, relationship status), psychiatric (depression/anxiety/PTSD) and SUD diagnoses, and current mental health (depression/anxiety) symptoms as correlates of substance use outcomes. For any relationships between correlates and outcomes that were statistically significant, COVID-specific anxiety was tested as a moderator using the PROCESS macro in SPSS version 27. Any statistically significant moderation effects were further investigated using the PROCESS macro to estimate conditional effects. COVID-specific anxiety was mean-centered prior to analyses. Alpha was set to .05 for all statistical tests. **Results:** 36% screened positive for hazardous ($AUDIT-C \geq 3$) alcohol consumption and 26% reported drug-related problems (18% low-level, 7% moderate-level, and 2% substantial per DAST-10 scores). Drug-related problems were positively associated with: COVID-specific anxiety, psychiatric diagnosis, SUD diagnosis, and depression symptoms. Alcohol consumption was significantly associated with SUD diagnosis. COVID-specific anxiety significantly moderated relationships between SUD diagnosis and both outcomes. **Discussion:** Results help identify women veterans with SUD diagnoses and high COVID-specific anxiety as at risk for increased substance use during COVID-19 and suggest a potential intervention target (COVID-specific anxiety).

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27 Rates and correlates of substance use among women Veterans during the COVID-19 pandemic: The
28 moderating role of COVID-specific anxiety.

29 The onset of the COVID-19 pandemic and mitigation strategies such as social distancing have
30 been associated with increased mental health symptoms and substance use. Among adults in the United
31 States, 40% endorsed at least one mental health symptom and 13.3% reported initiating or increasing
32 substance use to cope with pandemic-related stress and emotions during April-June 2020 (Czeisler et al.,
33 2020). The self-medication hypothesis, wherein substances are used to alleviate psychological distress
34 (Khantzian, 2003), may help explain patterns of mental health symptoms and substance use during the
35 COVID-19 pandemic.

36 A recent meta-analysis suggests small but significant adverse effects of lockdowns on anxiety and
37 depressive symptoms (Prati & Mancini, 2021) and, importantly, highlights substantial heterogeneity in
38 effects. Similarly, a narrative review found mixed evidence for the effect of COVID-19 on alcohol
39 consumption (Murthy & Narasimha, 2021). Heterogeneity may be explained by methodological
40 confounds inherent to the study of the effects of COVID-19 (e.g., lack of random assignment and control
41 groups) or, alternatively, may reflect variability in stress response and coping capabilities (Prati &
42 Mancini, 2021). Research examining the effects of COVID-19 on mental health and substance use has not
43 demonstrated homogenous findings, and this suggests that the effects of COVID-19 likely depend on a
44 range of factors that span the biopsychosocial spectrum. The ability to detect adverse effects experienced
45 by specific groups may be suppressed when mental health and substance use are assessed on a global
46 level. Differential effects of and responses to the COVID-19 pandemic necessitate additional research on
47 the effects of COVID-19 among specific groups.

48 Women have been disproportionately impacted by the COVID-19 pandemic. Women have
49 reported greater job loss, reduced hours at work, increased childcare responsibilities (Zamarro & Prados,
50 2021), and greater depression, anxiety (Ausín et al., 2021), and pandemic-specific trauma symptoms
51 (Currie, 2021; Liu et al., 2020) compared to men. Yet research examining gender differences in substance
52 use has resulted in mixed findings. Two studies found no gender differences in reported substance use

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53 patterns following the onset of COVID-19 (Bartoszek et al., 2020; Currie, 2021). Another study observed
54 increased alcohol use across all sociodemographic groups assessed but found that the increase in women
55 who reported drinking above recommended limits was larger than that of men (Barbosa et al., 2021).

56 Similarly, studies examining gender differences in factors associated with substance use have
57 produced mixed results. One study found greater COVID-specific PTSD symptomatology was associated
58 with increased substance use across genders (Currie, 2021). Another reported that although pandemic-
59 related psychological distress was associated with more alcohol consumption regardless of gender, greater
60 psychological distress was associated with several specific indicators of hazardous alcohol consumption
61 (greater typical and peak quantity of alcohol) among women only (Rodriguez et al., 2020). Results from
62 investigations of gender differences in substance use during COVID-19 echo those of the population at
63 large: evidence of increased substance use and related factors is reported, but not universally. Continued
64 investigation among populations historically (i.e., pre-pandemic) at risk for substance use and mental
65 health consequences may help clarify relationships and identify those in need of mental health and
66 substance use treatment.

67 Women veterans may be at risk for adverse impacts to mental health and substance use due to
68 increased vulnerability at the onset of the pandemic in several key areas. Though likely subject to similar
69 socio-environmental consequences of the pandemic as civilian women, they also face additional unique
70 risk factors associated with previous military service. Certain aspects of military culture and occupational
71 hazards (i.e., combat exposure, military sexual trauma, skewed alcohol norms) are potential risk factors
72 for substance use among women veterans (Ames & Cunradi, 2004; Cucciare et al., 2013; Goldberg et al.,
73 2019). Research has reported high rates of substance use among women veterans, including heavy
74 episodic drinking (19-23%; Hoggatt, Jamison, et al., 2015; Hoggatt et al., 2017), alcohol misuse (12-37%;
75 Hoggatt, Jamison, et al., 2015), illicit substance use (11%; Hoggatt et al., 2017), and prescription drug
76 misuse (5%; Hoggatt et al., 2017). Women veterans also experience high rates of psychiatric diagnoses
77 including depressive disorders (27.4%; Lehavot et al., 2012), anxiety disorders (19.5%; Lehavot et al.,
78 2012), post-traumatic stress disorder (13.4%; Lehavot et al., 2018), and poor current mental health status

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79 (Hoglund & Schwartz, 2014). Despite the presence of multiple mental health and substance use risk
80 factors at the onset of COVID-19, to our knowledge, no research has been conducted on the effects of
81 COVID-19 on mental health and substance use among this potentially at-risk population.

82 This study aims to extend the literature on mental health and substance use during COVID-19 to
83 an understudied population of women veterans by 1) reporting rates of substance use and related
84 problems among a sample of women veterans enrolled in Veteran's Health Administration (VHA)
85 primary care during the COVID-19 pandemic; 2) testing correlates of substance use and related problems;
86 and 3) testing COVID-specific anxiety as a moderator.

87 Due to the lack of research among women veterans and reported heterogeneity in the effects of
88 COVID-19 on mental health and substance use among broader populations, we made no *a priori*
89 hypotheses regarding specific correlates of substance use and/or the moderating effect of COVID-specific
90 anxiety. Rather, previous research informed our selection of specific factors for investigation in relation to
91 substance use among women veterans. Our review of available literature suggested that age (Czeisler et
92 al., 2020), racial identity (Czeisler et al., 2020; Murthy & Narasimha, 2021), employment status (Czeisler
93 et al., 2020; Murthy & Narasimha, 2021), relationship status (Murthy & Narasimha, 2021), psychiatric
94 (Czeisler et al., 2020) and SUD diagnoses (Murthy & Narasimha, 2021), current anxiety and depression
95 symptoms (Murthy & Narasimha, 2021; Prati & Mancini, 2021), and pandemic-specific mental health
96 symptoms (Currie, 2021; Rogers et al., 2020) were the most likely to be associated with substance use
97 among women veterans and were therefore included in this study.

98 Method

99

100 Participants

101 Women Veterans aged 18-65 who were enrolled in VHA primary care (at least one primary care
102 appointment in the past year) in a northeastern VHA region including 4 healthcare systems comprised of
103 14 medical centers and 57 community-based outpatient clinics were eligible to participate. Eligible
104 participants were identified via electronic medical record review.

105 Measures

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106 *Demographics* (age, racial identity, ethnicity, relationship status, and employment status) were
107 assessed via self-report.

108 *Alcohol consumption* was assessed with the Alcohol Use Disorder Identification Test-
109 Consumption (AUDIT-C; Bush et al., 1998). The AUDIT-C contains 3 items assessing typical drinking
110 frequency, quantity, and frequency of binge drinking (≥ 4 drinks/occasion) over the past year. Scores
111 range from 0-12; higher scores represent greater alcohol consumption. Research supports a gender-
112 specific cutoff of 3 for women as an indicator of risky alcohol consumption (Dawson et al., 2005;
113 Hagman, 2015; Reinert & Allen, 2007). Internal consistency in this sample was good ($\alpha = .78$).

114 *Drug-related problems* were assessed with the Drug Abuse Screening Test (DAST-10; Skinner,
115 1982). Ten items assess past-year drug-related problems on a binary (yes/no) scale; each affirmative
116 response is assigned one point. The sum indicates degree of functional impairment related to use of drugs
117 other than alcohol; higher scores indicate greater functional impairment. A score of 1-2 indicates low-
118 level problems, 3-5 is suggestive of moderate-level problems, 6-8 indicates substantial problems, and 8-
119 10 indicates severe problems (Skinner, 1982). Internal consistency in this sample was good ($\alpha = .78$).

120 *Psychiatric and SUD diagnoses* were assessed via self-report. Participants indicated whether they
121 had ever received a psychiatric (depression, anxiety, and/or posttraumatic stress disorder) or SUD
122 diagnosis. Presence of Alcohol Use Disorder (AUD) and Drug Use Disorder (DUD) were assessed
123 separately, but drug types were collapsed in the assessment of DUD (i.e., “illegal, street, or prescription
124 drugs”).

125 *Anxiety symptoms* were assessed with the General Anxiety Disorder 7-Item Scale (GAD-7;
126 Spitzer et al., 2006). The GAD-7 contains 7 items rated on a 4-point Likert scale; higher scores indicate
127 greater distress related to anxiety symptoms. Internal consistency in this sample was excellent ($\alpha = .94$).

128 *Depression symptoms* were measured with the Patient Health Questionnaire 8-Item Scale (PHQ-
129 8) which is identical to the PHQ-9, the standard 9-item measure of depression symptoms (Kroenke et al.,
130 2001) except for omission of the suicidal ideation item. Items assess distress and functional impairment
131 related to depression symptoms on a 4-point Likert scale; higher scores indicate greater distress and

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132 functional impairment related to depression symptoms. Internal consistency in this sample was good ($\alpha =$
133 .89).

134 *COVID-specific anxiety* was assessed with the Coronavirus Anxiety Scale (CAS; Lee, 2020). The
135 CAS contains 5 items rated on a 5-point Likert scale that represent distress related to COVID-specific
136 anxiety in the past two weeks. Higher scores indicate greater COVID-specific anxiety, and scores ≥ 9
137 signal maladaptive levels of anxiety. Internal consistency in this sample was excellent ($\alpha = .92$).

138 Procedure

139 All study procedures were approved by Western New York VA Health Care System Institutional
140 Review Board. This study is a secondary analysis of data gathered as part of a larger survey of health
141 beliefs and behaviors among women veterans in primary care. Eligible participants were mailed study
142 packets with a description of the study, self-report measures, return envelope, and study team contact
143 information. Those who did not return the packets after two weeks were contacted by study staff. If study
144 staff were unable to contact candidates, they were sent a reminder letter. Participants were compensated
145 \$35 for returned surveys. Of the 10,820 who were eligible to participate based on electronic medical
146 record review, 675 women were sent letters to achieve a sample size of $n = 211$ (31% response rate). The
147 31% overall response rate was within the range of responses from our previous work (i.e., 27-38%;
148 Buchholz et al., 2018; King et al., 2019). Data were collected Summer-Fall 2020. Responses from two
149 participants who did not identify as women were removed for a final sample size of $n = 209$.

150 Analytic strategy

151
152 Independent variables include demographics, psychiatric and SUD diagnoses, and current mental
153 health symptoms. Dependent variables include two operationalizations of substance use: alcohol
154 consumption (AUDIT-C) and drug-related problems (DAST-10). COVID-specific anxiety is the
155 moderator.

156 For aim 1, descriptive statistics were calculated to characterize the sample in terms of:
157 demographics (age, racial identity, employment status, relationship status), psychiatric (PTSD,

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158 depression, or anxiety disorder) and SUD diagnoses, current mental health symptoms (depression,
159 anxiety, COVID-specific anxiety), alcohol use (AUDIT-C), and drug-related problems (DAST-10).

160 For aim 2, bivariate associations (Pearson's r , point biserial) were computed to test associations
161 between correlates (age, racial identity, employment status, relationship status, psychiatric diagnosis,
162 SUD diagnosis), the moderator (COVID-specific anxiety), and outcomes (AUDIT-C, DAST-10)
163 compared to the null hypothesis that variables are not significantly related. Given the rapidly evolving
164 literature on mental health, substance use, and COVID-19, we opted to first conduct bivariate analyses to
165 evaluate and establish that study variables were associated on a bivariate level before conducting analyses
166 to evaluate more specific relationships among study variables. Results from aim 2 analyses directly
167 informed aim 3 analyses (detailed below). Categorical variables (racial identity: White=0, non-White=1;
168 employment status: not employed=0, employed full- or part-time=1; relationship status: not partnered=0,
169 partnered=1) were dichotomized due to low frequencies of some categories. The psychiatric diagnosis
170 variable indicates whether a participant had ever been diagnosed with any of the psychiatric conditions
171 assessed (i.e., no diagnosis=0, at least one depression, anxiety, or posttraumatic stress disorder
172 diagnosis=1). The SUD diagnosis variable indicates whether a participant had ever been diagnosed with
173 any SUD, including alcohol, illicit, and prescription substances (i.e., no diagnosis=0, at least one SUD
174 diagnosis=1).

175 For aim 3, correlates significantly associated ($p < .05$) with either outcome on a bivariate level
176 were entered into linear regression models to test for moderation effects using the PROCESS macro in
177 SPSS version 27. The PROCESS macro utilizes ordinary least squares regression to estimate coefficients
178 and, in moderation models, test for a statistically significant interaction ($p < .05$) between the independent
179 variable and the moderator, compared to the null hypothesis that the coefficient for the interaction is zero
180 (Igartua & Hayes, 2021). We probed any statistically significant interactions using the PROCESS macro,
181 which yields estimates of conditional effects of the independent variable on the dependent variable at
182 three levels of the moderator: -1 standard deviation, mean, and +1 standard deviation (Igartua & Hayes,

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183 2021). The moderator (COVID-specific anxiety) was mean-centered prior to analyses. Alpha was set to
184 .05 for all statistical tests.

185 Results

186 Participant characteristics

187 Participants were on average 49 years old ($M = 49.51$, $SD = 10.82$). Participants were primarily
188 White (69%), with 19% identifying as Black/African American, 6% identifying as
189 multicultural/multiracial, 1% identifying as American Indian/Alaska Native, and 1% identifying as Asian.
190 Participants primarily identified as non-Hispanic (85%). Most participants were married (41%), divorced
191 (20%), or single (never married, 15%). Thirty-seven percent of participants were working full time, 14%
192 were working part time, and 35% were unemployed. Most (66%) had a psychiatric diagnosis (depressive
193 disorder: 55%; PTSD: 33%; anxiety disorder: 37%). Overall prevalence of at least one SUD diagnosis in
194 this sample was 8%. Five percent reported a DUD diagnosis and 4% reported an AUD diagnosis. On
195 average, participants reported mild symptoms of depression ($M = 8.53$, $SD = 6.1$) and anxiety ($M = 8.46$,
196 $SD = 6.36$). The majority (91%) reported COVID-specific anxiety symptoms below the clinically
197 significant threshold ($M = 2.47$, $SD = 4.18$).

198 Rates of alcohol use and drug-related problems

199 A substantial minority of the sample (36%) screened positive for hazardous alcohol consumption
200 on the AUDIT-C ($M = 2.19$, $SD = 2.31$). The majority did not endorse drug-related problems (65%), 18%
201 reported low-level problems, 7% reported moderate-level problems, and 2% reported substantial
202 problems on the DAST-10 ($M = 0.65$; $SD = 1.38$).

203 Correlates of alcohol use and drug-related problems

204 Results from bivariate analyses are shown in Table 1. There were statistically significant bivariate
205 associations between higher DAST-10 scores and: higher COVID-specific anxiety ($r = .20$, $p = .01$),
206 having a psychiatric diagnosis ($r = .23$, $p = .002$), having a SUD diagnosis ($r = .41$, $p < .001$), and more
207 current depression symptoms ($r = .15$, $p = .04$). A higher AUDIT-C score was statistically significantly
208 associated with having a SUD diagnosis ($r = .14$, $p = .04$). More COVID-specific anxiety was

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209 statistically significantly associated with being unemployed ($r = -.28, p < .001$), more current depression
210 symptoms ($r = .52, p < .001$), and more current anxiety symptoms ($r = .50, p < .001$). No other
211 associations were statistically significant (all p 's $> .05$).

212 Moderation effect of COVID-specific anxiety

213 We tested COVID-specific anxiety as a moderator of the following significant correlate/outcome
214 relationships in separate models: psychiatric diagnosis/DAST-10, SUD diagnosis/DAST-10, SUD
215 diagnosis/AUDIT-C, current depression symptoms/DAST-10.

216 Results showed no significant moderation of COVID-specific anxiety on the relationship
217 between psychiatric diagnosis and DAST-10 scores ($b = .09, p = .19$). There was a significant main effect
218 of psychiatric diagnosis on DAST-10 scores ($b = .64, p = .04$). There was no significant moderating effect
219 of COVID-specific anxiety on the relationship between current depression symptoms and the DAST-10
220 ($b < .001, p = .99$) nor was there a significant main effect.

221 Results showed a statistically significant moderation effect of COVID-specific anxiety on the
222 relationship between SUD diagnosis and DAST-10 scores ($b = .28, p < .001$). Further examination of the
223 interaction revealed statistically significant differences in the magnitude of the effect at low (-1 SD; $b =$
224 $0.04, p = .02$), average ($b = 1.63, p < .001$), and high ($+1$ SD; $b = 2.78, p < .001$) levels of COVID-
225 specific anxiety. Specifically, there was a stronger positive relationship between SUD diagnosis and
226 DAST-10 scores among those with high COVID-specific anxiety compared to weaker positive
227 relationships among those with average or low COVID-specific anxiety. Results also showed a
228 statistically significant moderation effect on the relationship between SUD diagnosis and AUDIT-C
229 scores ($b = .60, p < .001$). Further examination of the interaction revealed statistically significant
230 differences in the magnitude of the effect at low (-1 SD; $b = -0.96, p = .18$), average ($b = 0.55, p = .35$),
231 and high ($+1$ SD; $b = 3.08, p < .001$) levels of COVID-specific anxiety. Specifically, there was a stronger
232 positive relationship between SUD diagnosis and AUDIT-C scores among those with high COVID-
233 specific anxiety compared to non-significant relationships between SUD diagnosis and AUDIT-C scores
234 among those with average or low COVID-specific anxiety.

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Discussion

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The aims of this study were to describe rates of substance use and related problems among a sample of women veterans during the COVID-19 pandemic, test demographic and mental health correlates of substance use and related problems, and test COVID-specific anxiety as a moderator. Results extend previous research to a novel and understudied group. Rates of hazardous alcohol use in this study are similar to pre-pandemic estimates (i.e., Hoggatt, Williams, et al., 2015), as is the prevalence of SUD (Hoggatt, Jamison, et al., 2015). As for drug-related problems (i.e., DAST-10 scores), one study among women veterans reported that 6% of the sample screened positive (i.e., at least moderate-level problems) on the DAST-10 (Nunnink et al., 2010), and a comparable study reported similar DAST-10 scores ($M = 0.47$) among women veterans (Eisen et al., 2012). Future research focused on comprehensive assessment of indicators of alcohol and drug involvement among women veterans is crucial to inform efforts to address healthcare needs of a rapidly expanding population.

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Results demonstrate some concordance with previous research during COVID-19 regarding connections between mental health (e.g., psychiatric diagnosis, current depression symptoms) and substance use (Chen et al., 2022; Currie, 2021; Roberto et al., 2020; Rogers et al., 2020; Wang et al., 2020). Statistically significant bivariate, but not moderation analyses, from this study in combination with previous research suggest that for some individuals, mental health is related to substance use regardless of whether the psychological distress/symptoms are *specific* to COVID-19. Notably, this study only assessed COVID-specific anxiety rather than the range of possible COVID-specific mental health symptoms (i.e., grief, trauma, or depression symptoms; Currie et al., 2021; Hahm et al., 2023). More research is needed to examine a range of possible COVID-specific concerns and symptoms as the nature of COVID-specific mental health symptoms and concerns likely differs between populations.

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A different pattern of results emerged from analyses of relationships among SUD diagnosis, COVID-specific anxiety, and substance use. SUD diagnosis was statistically significantly associated with both alcohol consumption and drug-related problems, and both relationships were statistically significantly moderated by COVID-specific anxiety. Statistically significant moderation effects for SUD,

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261 but not other psychiatric diagnoses or mental health symptoms, suggest that COVID-specific anxiety is a
262 particularly important stressor among those with SUD diagnoses. Individuals with SUD are more likely to
263 have comorbid physical health complications and compromised immune functioning that places them at
264 higher risk for serious COVID-19 illness and complications, and COVID-19 mitigation efforts
265 compromise access to treatment and social support for individuals with SUD (Mallet et al., 2021; Wang et
266 al., 2021). Our results may reflect these particular COVID-specific difficulties, and associated anxiety,
267 experienced by individuals with SUD.

268 Results from this study contradict previous reports regarding employment status (i.e., Czeisler et
269 al., 2020), as there was no evidence of statistically significant relationships between employment status
270 and either substance use outcome. This may reflect unique characteristics of a veteran population whose
271 patterns of employment may differ from civilian populations (Collins et al., 2014) overall, or possibly
272 even uniquely during the COVID-19 pandemic. Alternatively, non-significant findings could reflect
273 insufficient granularity in the assessment of employment status in this study versus previous findings. We
274 did not assess *type* of employment (i.e., essential versus non-essential) as the methodology for this study
275 was designed prior to the onset of COVID-19. Similarly, non-significant findings regarding many of the
276 relationships between correlates and alcohol use may also be due to insufficient granularity. The AUDIT-
277 C is a well-validated measure of alcohol consumption that is predictive of problematic alcohol use (Bush
278 et al., 1998); however we did not assess alcohol-related problems — such as failure to fulfill role
279 obligations, craving, and use of alcohol in hazardous situations — directly. Future research should include
280 increased granularity in assessment of employment status and alcohol use to best capture their
281 relationship to mental health symptoms.

282 Results from this study should be considered along with its limitations. As previously noted, the
283 assessment of employment status and alcohol consumption are limited. An additional limitation related to
284 the assessment of alcohol consumption concerns the methods used to gender-tailor this measure. In our
285 study, two methods of gender-tailoring were used: a gender-specific cutoff score of AUDIT-C ≥ 3 and a
286 tailored binge drinking item (4+ drinks/occasion). Research has not yet demonstrated a consensus on the

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287 most appropriate method of gender-tailoring of the AUDIT-C to maximize detection of hazardous use
288 without causing undue burden to providers and patients. Some have suggested the combination of both
289 gender-tailoring methods as in this study may be overly inclusive in identifying hazardous alcohol use
290 (Hoggatt et al., 2018). Additionally, as this study was not primarily designed to report rates of substance
291 use, we are unable to report rates of consumption for substances other than alcohol, only related
292 problems. Similarly, this study is limited as a secondary data analysis in its variable selection procedures;
293 future research should specify relevant variables *a priori* rather than via post hoc selection. This study is
294 cross-sectional in design and thus does not allow for assessment of causality. Given the method of
295 assessment of psychiatric and SUD diagnoses (i.e., self-report, with a “lifetime” time frame), we were not
296 able to differentiate between individuals who currently meet diagnostic criteria from those who met
297 diagnostic criteria in the past but not currently. Finally, the sample size was not sufficiently large to
298 conduct further comparisons that are likely important to understanding the nuanced impacts of COVID-
299 19. For example, collapsing racial categories into a dichotomous White/non-White variable does not
300 allow for examination of effects among those of different racially minoritized identities. Limitations
301 notwithstanding, results offer important implications for informing future research, practice, and policy
302 focused on addressing treatment needs among a rapidly expanding population of women veterans.

Implications for Practice and Policy

304 The growing body of research examining the effects of COVID-19 on mental health and
305 substance use, including results from this study, are important given the disruptions to mental health and
306 substance use treatment stemming from necessary COVID-19 mitigation strategies (Moreno et al., 2020).
307 In immediate clinical practice, our results suggest COVID-specific anxiety may be a risk factor and is
308 also a specific, modifiable psychological factor that could be targeted in interventions. Efforts to adapt
309 evidence-based interventions to address COVID-specific mental health symptoms are underway (i.e.,
310 Wahlund et al., 2021), and techniques to address COVID-specific symptoms could be incorporated into
311 substance use interventions (i.e., Cognitive Behavioral Therapy for Substance Use Disorder, DeMarce et
312 al., 2014; Mindfulness Based Relapse Prevention, Witkiewitz et al., 2005). Additionally, providers

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313 working with women veterans should be mindful to monitor their patients' substance use, particularly
314 alcohol use, due to high prevalence rates.

315 Adapting evidence-based interventions to address COVID-specific anxiety may not only help
316 ameliorate the adverse impacts to mental health of the COVID-19 pandemic specifically but may also
317 serve as a model for addressing the mental health impact of potential future stressors (i.e., natural
318 disasters, pandemics). Identifying at-risk populations, as well as possible intervention targets and
319 strategies, may help inform preventative and early intervention efforts in response to future stressors.

320 Numerous commentaries have identified individuals with SUD diagnoses as potentially at risk for
321 a range of adverse outcomes related to COVID-19 and its associated mitigation strategies (Becker &
322 Fiellin, 2020; Davis & Samuels, 2020). Findings from this study add to the growing body of empirical
323 evidence (Mallet et al., 2021; Wang et al., 2021) that may be used to inform policy governing substance
324 use treatment during, and as some have suggested, following the COVID-19 pandemic (López-Pelayo et
325 al., 2020). Early reports of policy changes to substance use treatment delivery during COVID-19 suggest
326 common adaptations (i.e., telehealth) may not universally increase access, and highlight the importance of
327 social determinants of health (i.e., housing status) to substance use treatment delivery (Harris et al., 2022).
328 Additionally, policymakers may consider unique barriers and disruptions to treatment faced by women
329 veterans with problematic substance use during the pandemic, and take steps to ensure that recent policy
330 changes to increase access to substance use treatment (i.e., telemedicine, person-centered care; López-
331 Pelayo et al., 2020) are extended to women veterans. Ongoing evaluation of changes to treatment
332 structures and delivery is key, and will help guide policymakers in determining which changes may be
333 beneficial to retain even after the immediate threat of COVID-19 has subsided to help ensure that systems
334 of substance use treatment delivery are effective and equitable in their accessibility (López-Pelayo et al.,
335 2020).

336 **Conclusions**

337 Our findings add to the literature by reporting rates and correlates of substance use during
338 COVID-19 among women veterans. Rates of alcohol use and drug-related consequences were prevalent

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339 and comparable to pre-pandemic estimates among women veterans. Psychiatric and SUD diagnoses,
340 higher COVID-specific anxiety, and more depression symptoms were related to more substance use.
341 Results add to the growing body of research demonstrating that individuals with SUD diagnoses may be
342 at increased risk during COVID-19 and extend previous research to women veterans. Results carry
343 implications for immediate clinical practice by suggesting that providers working with women veterans
344 should consider monitoring substance use due to high prevalence rates, and by identifying COVID-
345 specific anxiety as a possible intervention target among women veterans, particularly those with SUD
346 diagnoses. Results may also serve as a model to inform response to future similar stressors and to ensure
347 equitable access to mental health and substance use treatment.

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Table 1.

Bivariate associations between demographic and mental health correlates and substance use outcomes.

	Age	Race	Employment status	Relationship status	Psychiatric diagnosis	SUD diagnosis	Anxiety symptoms	Depression symptoms	COVID-specific anxiety	Alcohol consumption
1. Age	-									
2. Race	.05	-								
3. Employment status	-.25**	-.13	-							
4. Relationship status	-.19**	-.20**	.06	-						
5. Psychiatric diagnosis	-.07	.04	-.19**	.01	-					
6. SUD diagnosis	.11	.09	-.14*	-.04	.13	-				
7. Anxiety symptoms	-.19**	-.09	-.11	.11	.34***	.03	-			
8. Depression symptoms	-.03	-.09	-.20**	.01	.40***	.11	.76***	-		
9. COVID-specific anxiety	.08	.12	-.28***	.04	.22**	.10	.50***	.52***	-	
10. Alcohol consumption	-.07	-.13	.08	.09	-.002	.14*	.09	-.004	-.07	-
11. Drug-related problems	.05	.05	-.11	-.07	.23**	.41**	.11	.15*	.20**	.22**

Note. $N = 209$. Race: White=0, non-White=1. Employment status: not employed=0, employed full- or part-time=1. Relationship status: not partnered=0, partnered=1. Psychiatric diagnosis: no diagnosis=0, at least one depression, anxiety, or posttraumatic stress disorder diagnosis=1. SUD diagnosis: no diagnosis=0, at least one SUD diagnosis=1. Anxiety symptoms were assessed with the GAD-7 (Spitzer et al., 2006). Depression symptoms were assessed with the PHQ-8 (Kroenke et al., 2001). COVID-specific anxiety was assessed with the CAS (Lee, 2020). Alcohol use was assessed with the AUDIT-C (Bush et al., 1998). Drug-related problems were assessed with the DAST-10 (Skinner, 1982).

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

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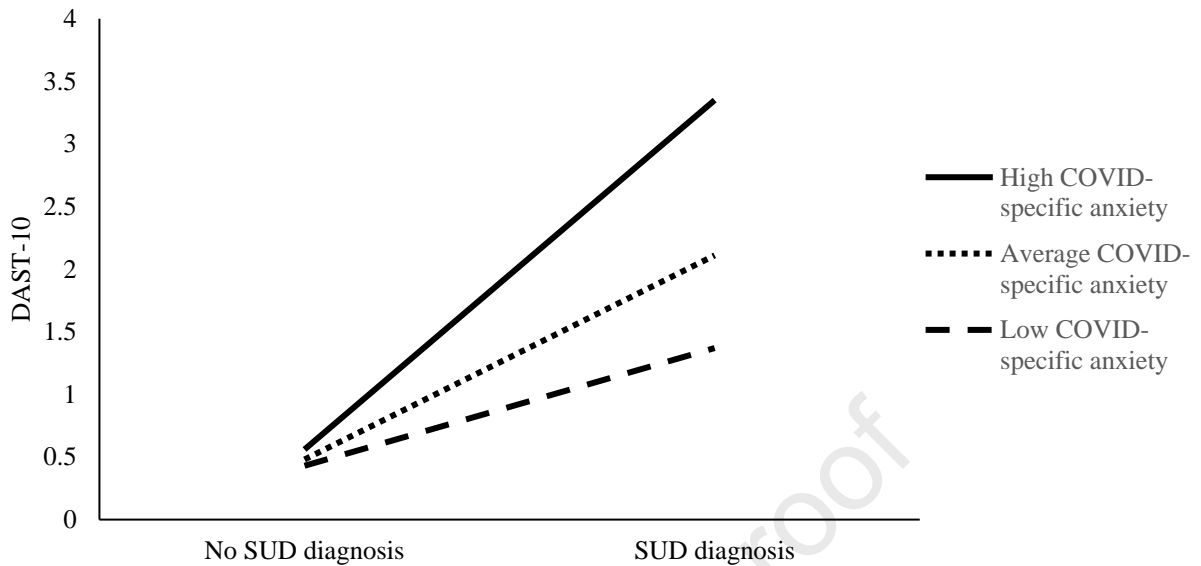
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545 *Figure 1.* Conditional effect of SUD diagnosis on drug-related problems at low (-1 SD), average, and high (+1 SD)
546 levels of COVID-specific anxiety. Drug-related problems were assessed with the DAST-10 (Skinner, 1982),
547 COVID-specific anxiety was assessed with the CAS (Lee, 2020). Figure depicts mean differences in DAST-10
548 scores between those with and without SUD diagnoses at different levels of the moderator; lines are to aid visual
549 interpretation.

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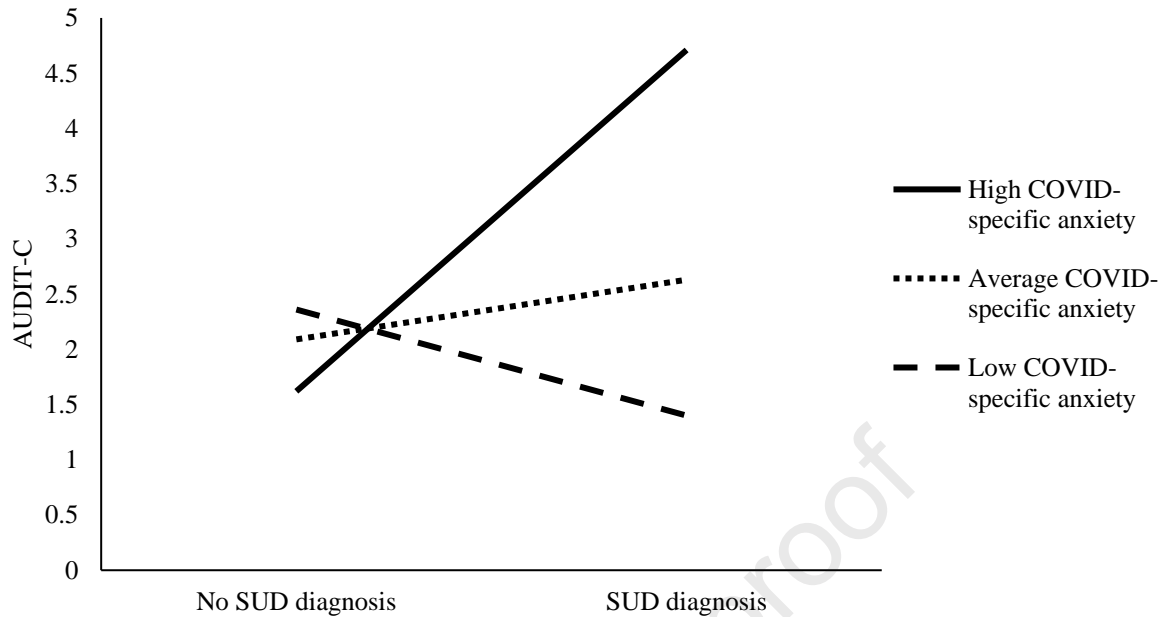
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Figure 2. Conditional effect of SUD diagnosis on alcohol use at low (-1 SD), average, and high (+1 SD) levels of COVID-specific anxiety. Alcohol use was assessed with the AUDIT-C (Bush et al., 1998), COVID-specific anxiety was assessed with the CAS (Lee, 2020). Figure depicts mean differences in AUDIT-C scores between those with and without SUD diagnoses at different levels of the moderator; lines are to aid visual interpretation.

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