Treatment Disruption and Childcare Responsibility as Risk Factors for Drug and Alcohol Use in Persons in Treatment for Substance Use Disorders During the COVID-19 Crisis

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Objectives: The novel 2019 coronavirus (COVID-19) crisis has caused considerable upheaval in the U.S. healthcare system. The current study examined patient-reported experiences in substance use disorder (SUD) treatment during the early stages of the COVID-19 crisis.

Methods: Participants in SUD treatment were recruited via online crowdsourcing from April 14, 2020 to May 26, 2020, during the early stages of the COVID-19 crisis. Participants reported disruptions in SUD treatment, stress and anxiety caused by these disruptions on a 0-100 point visual analogue scale (VAS), stress associated with childcare responsibilities on a 0–100 VAS, current stress on the Perceived Stress Scale (PSS), anxiety symptoms on the Beck Anxiety Inventory (BAI), sleep disturbances on the Insomnia Severity Index (ISI), and whether they used drugs or alcohol during the COVID-19 crisis.

Results: Participants (N = 240) endorsed that at least 1 SUD treatment was switched to telemedicine (63.7%), had some appointments cancelled (37.5%), or was discontinued due to COVID-19 (29.6%). Participants who did versus did not endorse drug/alcohol use reported difficulty obtaining medications to treat their SUD (OR = 2.47, 95% CI, 1.17–5.22, $\chi^2 = 5.98$, $P = .016$), greater scores on VAS treatment-related stress ($F_{1,197} = 5.70$, $P = .018$) and anxiety ($F_{1,197} = 4.07$, $P = .045$), greater VAS stress related to childcare ($F_{1,107} = 10.24$, $P = .002$), and greater scores on the PSS ($F_{1,235} = 19.27$, $P < .001$), BAI ($F_{1,235} = 28.59$, $P < .001$), and ISI ($F_{1,235} = 14.41$, $P < .001$).

Conclusions: Providers and public health officials should work to improve continuity and quality of care during the COVID-19 crisis, with special attention on addressing childcare difficulties and providing remote methods to improve stress, anxiety, and sleep for persons in SUD treatment.

Key Words: alcohol use disorder, COVID-19, stress, substance use disorder, treatment

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SARS-CoV-2, the virus that causes the novel 2019 coronavirus (COVID-19), has been associated with over 250,000 deaths in the U.S. by December 6, 2020,[1] and has also caused considerable upheaval in the U.S. healthcare system.[2–4] During the early stages of the COVID-19 crisis, the majority (88%) of U.S. states issued immediate stay-at-home orders[5] that resulted in the cancellation, rescheduling, or abrupt transition to telemedicine for many medical services that were deemed non-essential (e.g., outpatient mental health).[6] These stay-at-home mandates and social distancing recommendations may have been especially disruptive for persons with substance use disorders (SUDs),[7–9] as many of these individuals rely on in-person and/or group treatment and counseling as a critical component of their care. Likewise, a sudden increased childcare burden posed by abrupt closures of schools, daycares, and other local programs may have further impeded individuals with SUDs from maintaining treatment regimens, leading to excess stress and anxiety that could compromise their recovery. In addition, many persons with opioid or alcohol use disorder rely on FDA-approved medications (e.g., buprenorphine, methadone, naltrexone) as part of their recovery, which can require regular visits with providers, treatment clinics, and pharmacies. Understanding the patient-reported experiences that resulted from these sudden disruptions to health care delivery is essential to providing better care in the near-term for persons with SUDs

and improving public health planning for future epidemics and natural disasters.[10]

SUDs are, by their very nature, relapsing and remitting disorders.[11] Factors that have affected many persons during the COVID-19 crisis, namely stress and anxiety, are known to increase risk for drug/alcohol use in persons who are in SUD recovery. Increased stress reactivity and high tonic stress is common during SUD recovery[12,13] and has been associated with drug/alcohol use in several treatment outcome studies and clinical trials.[14–16] Moreover, persons with SUDs often have co-occurring mood and anxiety disorders or experience symptoms of anxiety as part of recovery, which has also been associated with drug/alcohol use.[17–19] Stress and anxiety have common psychopathology and behavioral manifestations,[20,21] including sleep disturbance, which has itself been shown to further exacerbate negative outcomes in persons with SUDs.[22–24] As such, it is especially important to assess and address acute psychiatric symptoms, psychosocial factors, and outcomes in persons receiving SUD treatment during the COVID-19 crisis.

Furthermore, there are unique aspects of the COVID-19 crisis that might contribute to excess stress, anxiety symptoms, and sleep disturbance that have not been previously delineated in the SUD population. For instance, the unexpected closure of schools and daycares, in combination with transitions to remote work-from-home models, has resulted in many persons assuming increased childcare responsibilities during the COVID-19 crisis. Although perceived stress associated with childcare is understudied in SUDs, previous research indicates that childcare responsibilities are more likely to affect women than men and may be associated with treatment attrition and persistent psychiatric symptoms.[25–27] These unique factors, such as a sudden and unexpected increase in childcare responsibilities, might further impede access to treatment, and even telecare health, and thus be associated with negative treatment outcomes during this difficult time.

When the COVID-19 crisis was declared a national emergency in the U.S. on March 13, 2020, it fundamentally changed the way many persons in SUD recovery could access treatment and may have disrupted their continuity of care. This study aimed to examine patient-reported challenges in access to different types of SUD treatment (e.g., counseling, medications for SUDs, inpatient/residential treatment), and childcare responsibilities, stress, anxiety and sleep disturbance during the early stage of the COVID-19 crisis (April 14th–May 26th). We hypothesized that persons reporting treatment disruption and/or childcare responsibilities would be more likely to report illicit drug or alcohol use relative to those who reported abstinence. Furthermore, we hypothesized that rates of self-reported stress related to childcare, and standardized assessments of perceived stress, anxiety, and sleep disturbance, would be higher among persons who reported illicit drug or alcohol use relative to those who reported abstinence.

METHODS

Participants

Participants were recruited online via Amazon Mechanical Turk (AMT) from April 14, 2020 to May 26, 2020. AMT

is an online crowdsourcing platform where individuals can register to complete surveys and other remote tasks for compensation. AMT has been used in several previous studies aimed at surveying difficult-to-reach populations in treatment for SUDs.[28,29] Participants were deemed eligible if they were 18 years or older and endorsed being in treatment for alcohol or illicit substance use in the past 3 months. The eligibility screen and primary study were hosted on Qualtrics (Provo, UT). Participants were informed that this study was voluntary, and the Johns Hopkins School of Medicine Institutional Review Board deemed that the study did not qualify as human subjects research. This cross-sectional study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines.

Participants who were eligible for the primary survey were informed that the COVID-19 crisis was declared a national emergency on March 13th, 2020, and that questions pertaining to the COVID-19 crisis were meant to reflect the time between March 13th and the day they completed the survey. Participants provided information on their age, sex, race, ethnicity, current household income, residential setting (e.g. urban, suburban, rural), primary drug of choice, and SUD symptoms and their severity on a Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) checklist.[30,31] Information on drug of choice and past 90-day treatment can be found in supplemental materials, http://links.lww.com/JAM/A241 and Tables 1 and 2.

COVID-19 Related Items

Participants indicated whether they experienced any changes in each type of treatment they utilized during the past 90-days and whether these changes were due to the COVID-19 pandemic (list of changes in supplemental materials, http://links.lww.com/JAM/A241 and Table 2). Participants who endorsed any change in treatment completed 2 separate, 0–100 point visual analogue scale (VAS) items to assess ''Stress'' and ''Anxiety'' due to changes in treatments during the COVID-19 crisis. The VAS Stress and Anxiety measures were anchored at 0 (''Not Stressed'' or ''Not Anxious'') and 100 (''Extremely Stressed'' or ''Extremely Anxious'').

Participants also responded a series of yes/no questions about COVID-19: if they used illicit drugs or alcohol during the COVID-19 crisis (defined as relapse or using illicit drugs or alcohol to get high or drunk during COVID-19), if they had symptoms of COVID-19 (e.g., fever, shortness of breath, dry cough), if they had been hospitalized for COVID-19, and if they had childcare responsibilities during the COVID-19 crisis. Participants who reported childcare responsibilities also reported the number of children they were caring for, whether or not childcare responsibilities made it more difficult to attend SUD treatment using a 4-point Likert scale anchored at 0 (''not at all'') and 3 (''extremely''), and whether childcare issues added stress to their daily life using a 0–100 point VAS anchored at 0 (''No added stress'') and 100 (''Extreme stress'').

Validated Questionnaires for Stress, Anxiety and Sleep Disturbance

Validated questionnaires were included to characterize stress, anxiety, and insomnia. To measure perception of stress, participants completed the Perceived Stress Scale (PSS),[32]

TABLE 1. Participant Characteristics

	All Participants (N = 240)	Drug/Alcohol Use (n = 97)	No Drug/Alcohol Use (n = 143)	t or χ² or U value, P
Age M (SD)	33.6 (9.3)	34.6 (9.5)	33.0 (9.2)	−1.35, .179
Sex (% male)	70.0	62.9	74.8	**3.92, .048**
Race (%)				3.75, .153
White	77.5	83.5	73.4	
Black/African American	10.0	6.2	12.6	
Other	12.5	10.3	14.0	
Hispanic (%)	16.7	24.7	11.2	**7.64, .006**
Median household income	$45−60k	$45−60k	$45−60k	6624.5, .552
Setting (%)				3.75, .153
Urban	47.5	46.4	48.3	
Suburban	41.7	38.1	44.1	
Rural	10.8	15.5	7.7	
Lifetime drug use (%)				
Alcohol	93.3	91.8	94.4	0.65, .419
Cannabis	61.3	51.5	67.8	**6.50, .011**
Opioids (heroin, prescription)	40.8	41.2	40.6	0.11, .917
Stimulants (cocaine, methamphetamine, prescription)	45.0	47.4	43.3	0.39, .534
All other	41.3	36.1	44.8	1.79, .180
Most recent primary drug of choice (%)				
Alcohol	64.2	66.0	62.9	0.23, .630
Cannabis	12.9	10.3	14.7	0.98, .321
Opioids (heroin, prescription)	11.7	9.3	13.3	0.90, .342
Stimulants (cocaine, methamphetamine, prescription)	7.9	11.3	5.6	2.62, .106
All other	3.3	3.1	3.5	0.03, .864
Severe SUD (%)	77.1	77.3	76.9	0.01, .943
History of injection drug use (%)	22.9	36.1	14.0	**15.98, <.001**
Hospitalized for COVID-19 (%)	4.2	7.2	2.1	3.79, .051
Current symptoms of COVID-19 e.g., fever (%)	5.0	10.3	1.4	**9.66, .002**

Demographics, history of drug use, and response to questions regarding the novel 2019 coronavirus (COVID-19) among the entire participant sample, participants who endorsed drug/alcohol use (consistent with their definition of relapse) during COVID-19, and participants who did not endorse drug/alcohol use during COVID-19

M, mean; SD, standard deviation; SUD, substance use disorder.

TABLE 2. SUD Treatment During COVID-19

	All Participants (N = 240)	Drug/Alcohol Use (n = 97)	No Drug/Alcohol Use (n = 143)	χ² or t value, P
Treatment type past 90 days (%)				
12-step Group	47.9	44.3	50.3	0.84, .360
Group counseling	35.4	29.2	39.2	2.17, .141
1-on-1 counseling	52.9	48.5	55.9	1.30, .254
CBT	22.9	18.6	25.9	1.75, .186
Buprenorphine	10.8	15.5	7.7	3.16, .057
Methadone	11.3	12.4	10.5	0.21, .651
Oral or extended-release naltrexone	8.8	13.4	5.6	**4.41, .036**
Sober living environment	9.6	8.2	10.5	0.34, .563
Inpatient/residential (≥28 days)	10.0	13.4	7.7	2.09, .148
Inpatient/detox (<28 days)	11.3	16.5	7.7	**4.49, .034**
Intensive outpatient	4.6	4.1	4.9	0.08, .779
Outpatient detox	13.8	15.5	12.6	0.40, .525
Physician care	30.4	33.0	28.7	0.51, .475
Number of Different treatments M (SD)	3.0 (1.8)	3.1 (1.7)	2.9 (1.5)	−0.75, .452
Any changes in treatment (%)				
Treatment discontinued due to COVID-19	29.6	33.0	27.3	0.91, .341
Treatment discontinued not due to COVID-19	12.9	16.5	10.5	1.85, .173
Some appointments cancelled due to COVID-19	37.5	35.1	39.2	0.42, .519
Appointments switched to telemedicine	63.7	60.8	65.7	0.60, .438
Treatment completed (unrelated to COVID-19)	40.4	42.3	39.2	0.23, .630
No change in treatment	26.3	32.0	22.4	2.74, .098
Started treatment due to COVID-19	1.3	3.1	0.0	**4.48, .034**

Patient-reported treatment usage leading into the novel 2019 coronavirus (COVID-19) crisis and treatment disruption caused by the COVID-19 crisis. Variables are reported for all participants, participants who endorsed drug/alcohol use, and participants who did not endorse drug/alcohol use during the COVID-19 crisis

M, mean; SD, standard deviation.

and scores were summarized into (1) low, (2) moderate, and (3) high perceived stress groups. To assess self-reported symptoms of anxiety, participants completed the Beck Anxiety Inventory (BAI),[33] and scores were summarized and represent (1) minimal, (2) mild, (3) moderate, and (4) severe (clinically significant) anxiety. Finally, participants completed the Insomnia Severity Index (ISI),[34] and scores were summarized and represent (1) no clinically significant insomnia, (2) subthreshold insomnia, (3) moderate clinical insomnia, and (4) severe clinical insomnia.

Statistical Analyses

Participant demographics, drug/alcohol use history, answers to COVID-19-specific questions, current SUD treatments, and changes in SUD treatments are presented descriptively for the entire sample, and independent sample t-tests, chi-squared analyses, and Mann-Whitney U tests were used as appropriate to examine group differences between participants who did or did not endorse drug/alcohol use during the early stages of the COVID-19 crisis. Given that participants who did or did not endorse drug/alcohol use significantly differed in sex, ethnicity, and history of cannabis use, analysis of covariance (ANCOVA) controlling for sex, ethnicity, and history of cannabis use were used to examine group differences between participants who did or did not endorse drug/alcohol use in VAS Stress and Anxiety due to changes in treatment, total scores for the PSS, BAI, and ISI, and the number of children in the household during the COVID-19 crisis, VAS Stress related to childcare, and Likert scale scores for the degree to which childcare interfered with SUD treatment. Logistic regression analyses controlling for sex, ethnicity, and history of cannabis use were used to further assess group differences in participants who did or did not endorse drug/alcohol use on binary variables, including whether participants had more difficulty obtaining medications for their SUD during the COVID-19 crisis; whether they endorsed clinically significant levels of anxiety on the BAI, high perceived stress on the PSS, or clinical insomnia on the ISI; and whether they had any childcare responsibility during the COVID-19 crisis. Sex-based differences were examined for drug/alcohol use and any childcare responsibilities using chi-squared analyses and for number of children, VAS Stress related to childcare, and Likert scale scores for the degree to which childcare interfered with SUD treatment using independent samples t-tests. Findings were considered significant if 2-tailed tests resulted in $P < .05$, and all data analyses were conducted in SPSS version 25 (IBM; Armonk, NY).

RESULTS

Demographics and Drug/Alcohol Use

A total of 7773 individuals completed the eligibility screening, with 6516 excluded because they did not qualify and 1,017 removed for data quality issues, leaving a total N = 240 (3.1% of the original sample). The final sample was 70.0% male, 77.5% white, and had a mean (SD) age of 33.6 (9.3) years (Table 1). Participants endorsed a lifetime history of alcohol (93.3%), cannabis (61.3%), and opioid (heroin/ fentanyl, prescription opioids) (40.8%) use, and their most recent drug of choice was alcohol (64.2%), cannabis (12.9%) or opioids (11.7%). Seventy-seven percent of participants qualified for severe SUD based on DSM-5 criteria and 22.9% endorsed a history of injection drug use. Overall, 40.4% endorsed having used alcohol or drugs during the COVID-19 crisis and 4.2% of participants endorsed having been hospitalized due to COVID-19.

Substance Use Treatment

The most commonly endorsed types of treatments among participants were one-on-one counseling (52.9%), 12-step groups (47.9%), and group counseling (35.4%) (Table 2). It is common for individuals in recovery from SUDs to concurrently utilize more than one type of treatment (e.g., counseling and 12-step groups), and in the current sample the mean (SD) number of different types of treatment was 3.0 (1.8). Participants endorsed that at least one of these treatments was switched to telemedicine (63.7%), had some appointments cancelled (37.5%), or was discontinued due to the COVID-19 crisis (29.6%). Only 1.3% of participants endorsed starting a new treatment during the COVID-19 crisis (Table 2).

Treatment Disruption, Mental Health, and Drug/Alcohol Use Outcomes

Participants who endorsed drug/alcohol use were marginally more likely to be receiving buprenorphine treatment, and significantly more likely to be receiving oral or extended-release naltrexone treatment or participating in an inpatient detoxification program (Table 2) compared with participants who did not endorse drug/alcohol use. In addition, participants who did versus did not endorse drug/alcohol use had higher odds of reporting difficulty obtaining medications to treat their SUD (69.8% vs 45.1%; OR = 2.47, 95% CI, 1.17–5.22, $\chi^2 = 5.98$, $P = .016$). A subgroup of participants who endorsed any change in treatment (n = 202/240; 84.2%) were also asked to rate stress and anxiety associated with changes in treatment on a 0–100 point VAS. Participants who endorsed drug/alcohol use also endorsed higher VAS scores for stress and anxiety related to changes in treatment compared with participants who did not endorse drug/alcohol use (Fig. 1).

Mental health factors that might be associated with drug/alcohol use were examined among participants who did or did not endorse drug/alcohol use during the COVID-19 crisis. Participants who endorsed drug/alcohol use also reported higher perceived stress scores on the PSS, higher anxiety symptom scores on the BAI, and higher sleep disturbance scores on the ISI relative to participants who did not endorse drug/alcohol use (Fig. 2). Participants who did versus did not endorse drug/alcohol use had higher odds of endorsing high perceived stress on the PSS (24.7% vs 7.7%, respectively; OR = 6.12, 95% CI, 2.66–14.09, $\chi^2 = 19.97$, $P < .001$), clinically-significant levels of anxiety on the BAI (29.9% vs 7.0%, respectively; OR = 4.81, 95% CI, 2.16–10.70, $\chi^2 = 16.53$, $P < .001$), and clinical insomnia on the ISI (47.4% vs 25.2%, respectively; OR = 2.23, 95% CI, 1.28–4.04, $\chi^2 = 12.7$, $P = .005$).

FIGURE 1. Group differences between persons in treatment for substance use disorders who did or did not endorse drug/alcohol use during the early stage of the novel 2019 coronavirus (COVID-19) crisis. Participants completed 2 separate 0–100 point visual analogue scale (VAS) items to assess ''Stress'' and ''Anxiety'' due to changes in treatments during the COVID-19 crisis. VAS Stress and Anxiety were anchored at 0 (''Not Stressed'' or ''Not Anxious'') and 100 (''Extremely Stressed'' or ''Extremely Anxious''). $^{*}P < .05$.

Drug/Alcohol Use and Childcare

Participants who endorsed drug/alcohol use during this period had higher odds of reporting childcare responsibilities (59.8%) compared with participants who did not endorse drug/alcohol use (37.8%; OR = 1.96, 95% CI, 1.11–3.48, $\chi^2 = 5.36, P = .001$). Participants who endorsed drug/alcohol use also reported being responsible for more children, having more stress due to childcare responsibilities, and that childcare interfered with SUD treatment to a greater degree than participants who did not endorse drug/alcohol use (Fig. 3). Women were more likely to endorse drug/alcohol use than men (50.0% vs 40.4%; $\chi^2 = 3.9, P = .048$), but were not significantly more likely to endorse childcare responsibilities (52.8% vs 44.0%; $\chi^2 = 1.5, P = .21$), be responsible for more children (mean [SD] = 1.19 [2.0] vs .91 [1.3]; $t(238) = -1.28, P = .20$), report greater mean (SD) stress due to childcare (48.0 [29.1] vs 45.0 [29.6]; $t(110) = -.51, P = .61$) or report that childcare interfered with SUD treatment on a Likert scale (1.2 [0.8] vs 1.1 [0.8]; $t(110) = 0.66, P = .512$).

DISCUSSION

SUDs are relapsing and remitting disorders,[11] and disruptions in the continuity of care can lead to drug and alcohol use among persons in recovery. Participants in this study reported notable COVID-19-related disruptions in the continuity of their SUD treatment that ranged from cancellation of appointments and treatment discontinuation to being transitioned from in-person to telemedicine visits for treatment delivery. Despite the relatively short time frame of this study, 30% of participants had already discontinued at least 1 treatment due to COVID-19, and only 1.3% had initiated a new treatment during this period. This significant and abrupt change in patient census will likely have a major impact on SUD providers, and these data also suggest that many patients may not have received adequate treatment during a period when supportive resources were vital, including access to medical treatment of SUDs. Likewise, participants in this study who used illicit drugs or alcohol reported greater stress and anxiety due to disruptions in treatment (Fig. 1), and had higher odds of endorsing difficulty obtaining medications to treat their SUD compared with participants who reported no illicit drug or alcohol use. This cascade of effects and associated decrements in quality of life during stay-at-home orders highlights important vulnerabilities in the SUD care model. Additional research to examine the feasibility and acceptance of remote care models among persons receiving various SUD treatments is necessary, because these changes have the potential to both exclude disadvantaged subgroups (e.g., those who have limited technology access) but also create a new infrastructure that may support treatment expansion in the future.

The current study also found that participants who did versus did not report drug/alcohol use during the onset of the COVID-19 crisis reported having greater stress, anxiety, and sleep disturbance (Fig. 2). However, the degree to which anxiety and stress were exacerbated by abrupt changes to daily living that resulted from the societal response to the COVID-19 crisis requires further investigation. Persons in recovery from SUDs often experience high levels of stress, anxiety, and sleep disturbance, which have been associated with negative treatment outcomes in previous studies.[11,12,15,24,35] Perhaps the
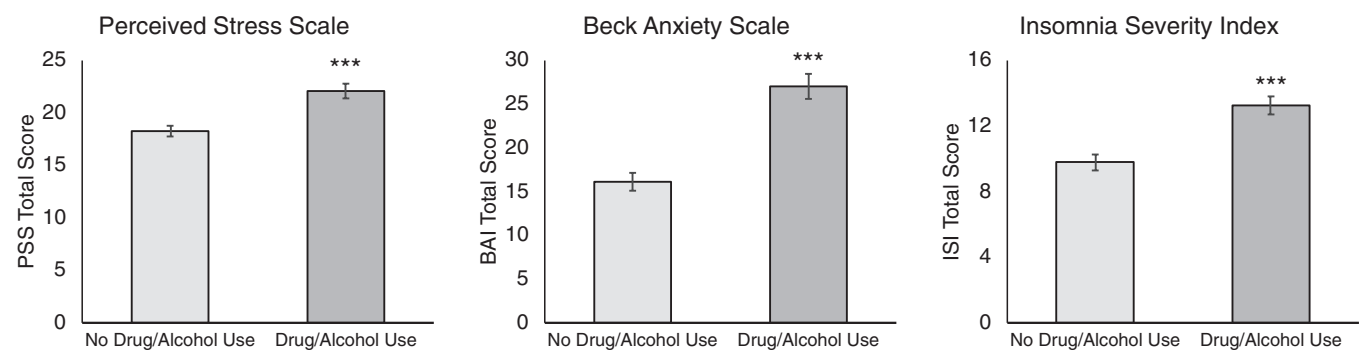

FIGURE 2. Group differences in stress, anxiety, and sleep disturbance between persons in treatment for substance use disorders who did or did not endorse drug/alcohol use during the early stage of the novel 2019 coronavirus (COVID-19) crisis. Validated questionnaires included the Perceived Stress Scale (PSS; Left), Beck Anxiety Inventory (BAI; Middle), and Insomnia Severity Index (ISI; Right). $^{***}P < .001$.
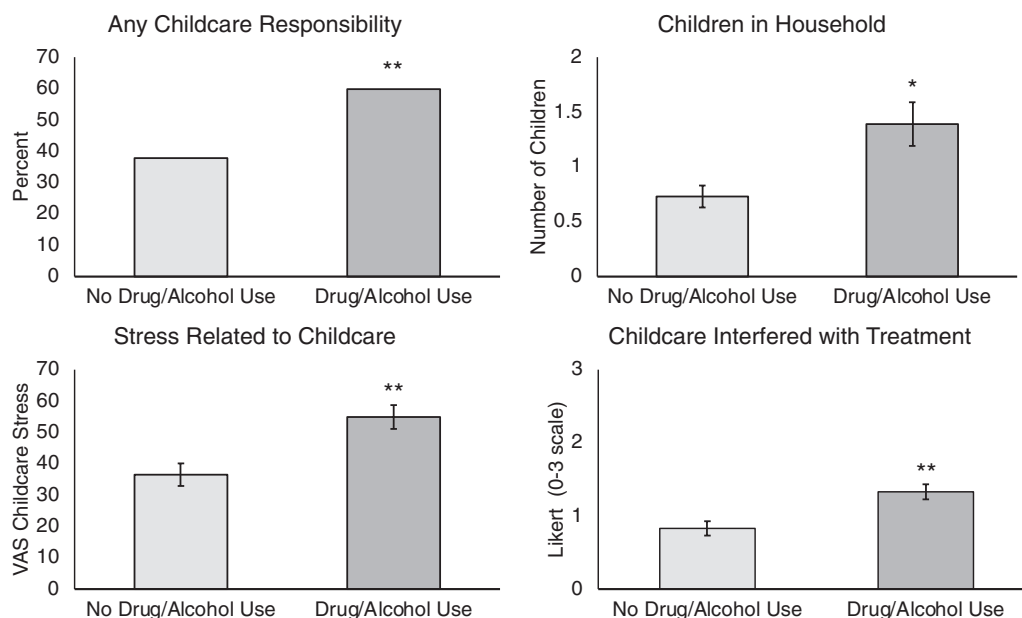
FIGURE 3. Group differences between participants who did or did not endorse drug/alcohol use regarding the percent of participants endorsing childcare responsibilities (Upper Left), number of children in the household (Upper Right), 0-100 point visual analogue scale (VAS) of stress related to childcare (Lower Left), and Likert scale of the degree to which childcare interfered with substance use disorder treatment. *P<.05; **P<.01.

most clinically-relevant finding from this study is that thresholds for high stress, clinically-significant levels of anxiety symptoms, and clinical insomnia on the PSS, BAI, and ISI, respectively, were associated with significantly higher odds of drug/alcohol use. Thus, these instruments may provide a relatively quick and clinically-relevant means for providers to assess the risk of drug/alcohol use among persons being treated for SUDs during the COVID-19 crisis. Stress, anxiety, and sleep disturbance should be assessed regularly so that providers and patients can work together to strategize practical and remote (if possible) means to improve mental health and sleep throughout the COVID-19 pandemic.[10]

It is important to note that stress, anxiety, and sleep disturbances do not exist in isolation; for example, stress and anxiety often contribute to sleep disturbances, and in turn, chronic sleep disturbance or insomnia may exacerbate perceived stress or symptoms of anxiety.[20,21,23] Although many programs aim to address these interrelated health conditions, the data presented here suggests that it may be especially important to do so in the context of the COVID-19 crisis, where multiple stressors could converge to increase the risk of drug/alcohol use. Similarly, the cross-sectional nature of this study limits the interpretation of the direction of effects among stress, anxiety, and sleep disturbance in relation to drug/alcohol use outcomes; i.e., it is not possible to determine causal relationships based on these data. Nonetheless, these data identify person-level factors that might be targets for improved SUD treatment during the COVID-19 crisis.

Of the many stressors that could affect persons with SUDs during the COVID-19 crisis, being responsible for full-time child care, and also needing to work from home and/or

find time for SUD treatment appointments could be especially challenging. Indeed, participants in this study who endorsed drug/alcohol use were more likely to report having childcare responsibilities than participants who did not endorse drug/alcohol use. Participants who endorsed drug/alcohol use were also responsible for more children, and reported more stress and disruption to their treatment due to childcare than participants who did not drug/alcohol use (Fig. 3). The majority of research on childcare and SUDs reports that these issues are more likely to affect women than men.[25–27] Although women in this study were more likely than men to endorse drug/alcohol use, they were not more likely than men to have childcare responsibilities nor did they report more stress due to childcare. These results suggest that the early stages of the COVID-19 crisis, when the majority of persons in the U.S. were under orders to shelter-in-place, might have resulted in women and men sharing childcare responsibilities (and related stress). Programs to support families during the COVID-19 crisis may be especially beneficial to women and men who have childcare responsibilities and are receiving treatment for SUDs.

Taken together, the results of this study suggest that persons with SUDs would benefit from receiving the same intensity of behavioral treatment during the COVID-19 crisis as they did before. Supplemental plans to reduce stress and anxiety, such as meditation, exercise routines, and remote delivery of cognitive behavioral therapy might be effective in supporting recovery during the COVID-19 crisis.[36–38] Providers should also inquire about sleep habits and consider behavioral and/or pharmacotherapy approaches to improve sleep in patients with SUDs.[39] Patients reporting stress, anxiety, and insomnia during the COVID-19 crisis might

be at high risk of drug/alcohol use and would likely benefit from extra clinical attention during these difficult times.

This study is limited by the need to remotely survey persons in recovery from SUDs, however, the majority of human subjects research on SUDs in the U.S. was on hiatus during the conduct of this study, and patient-reported outcomes are especially relevant during the COVID-19 crisis. The study team did not have access to medical records and thus drug/alcohol use was limited to patient-reported outcomes. Similarly, the study team was not able to confirm diagnoses or treatment regimens for this study, however, a rigorous screening and survey data quality check was used to obtain the target sample. Drug/alcohol use during the COVID-19 crisis was based on patient self-report and consistent with their personal definition of ''relapse'' or problematic use, and did not factor in how this may have differed from the characteristics of their use during pre-COVID-19 periods. Only 3% of participants who attempted the survey were included in final analyses, similar to the percent of adults 18 and older who received SUD treatment (1.5%) in the most recent National Survey on Drug Use and Health.[40]

CONCLUSION

Persons in SUD treatment might be at heightened risk for negative treatment outcomes during the COVID-19 crisis. The majority of participants in this study reported disruptions to their normal SUD treatment. Participants who endorsed drug/alcohol use reported greater perceived stress, symptoms of anxiety, and sleep disturbance relative to participants who did not endorse drug/alcohol use during the early stage of the COVID-19 crisis. Likewise, thresholds for high stress, clinically-significant levels of anxiety symptoms, and clinical insomnia on the PSS, BAI, and ISI, respectively, were associated with significantly higher odds of drug/alcohol use, and these instruments could be used during in-person or virtual visits to in aid clinical decision-making during the COVID-19 crisis. Childcare responsibilities were also identified as a risk factor for drug and/or alcohol use, especially in persons who reported increased stress due to childcare. Policy efforts to support SUD treatment providers should address the need to seamlessly switch individuals from in-person to telemedicine care, when applicable, and clinicians should be prepared to address excess stress, anxiety, and insomnia to support healthy recovery for persons with SUDs.

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