

Effects of COVID-19 on Overdose Risk Behaviors Among People Who Inject Drugs in Wisconsin

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ABSTRACT

Background: The United States is currently experiencing the worst epidemic of drug overdose in the country's history. We sought to understand whether changes in drug use behavior and access to prevention services during the COVID-19 pandemic may have contributed to increased drug overdose.

Methods: We recruited adults with a history of injection drug use to complete an online survey during March through June 2021 to assess whether overdose experiences, drug use behaviors, and access to prevention services changed due to the pandemic.

Results: Diminished social support during the pandemic was correlated with reporting disrupted access to harm reduction services ($P=0.006$) and experiencing an overdose ($P=0.005$). Disrupted access to harm reduction services also was correlated with being female ($P=0.03$) and reporting feeling pressure to share drugs or equipment ($P=0.01$), worrying about withdrawal ($P=0.03$), and changes to how and where individuals got their drugs, drug price and availability, with whom and where drugs were used, and the quantity or properties of drugs purchased (all $P<0.01$).

Discussion: The cumulative impact of COVID-19–related disruptions may have resulted in heightened risk for overdose, as these findings suggest that, in many cases, experiencing one risk factor was suggestive of experiencing several risk factors.

BACKGROUND

The United States is currently experiencing the worst epidemic of drug overdose in the country's history. Over 106 000 Americans died from drug overdose in 2021,¹ an all-time record. Overdose deaths increased annually from 1990 to 2016.² Subsequently, the

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US experienced a stabilization or decline in deaths from 2017 to 2019, a promising trend believed to reflect drug policy reform and historic investments in addiction treatment.² Unfortunately, in the first 2 years of the COVID-19 pandemic, deaths from drug overdose sharply rose again, driven by a combination of numerous concurrent forces, including disruptions in medical and behavioral health services, increased contamination of the drug supply with illicit fentanyl analogues, and myriad other potential factors, such as increased prevalence of anxiety, depression, and isolation among people who use drugs.³

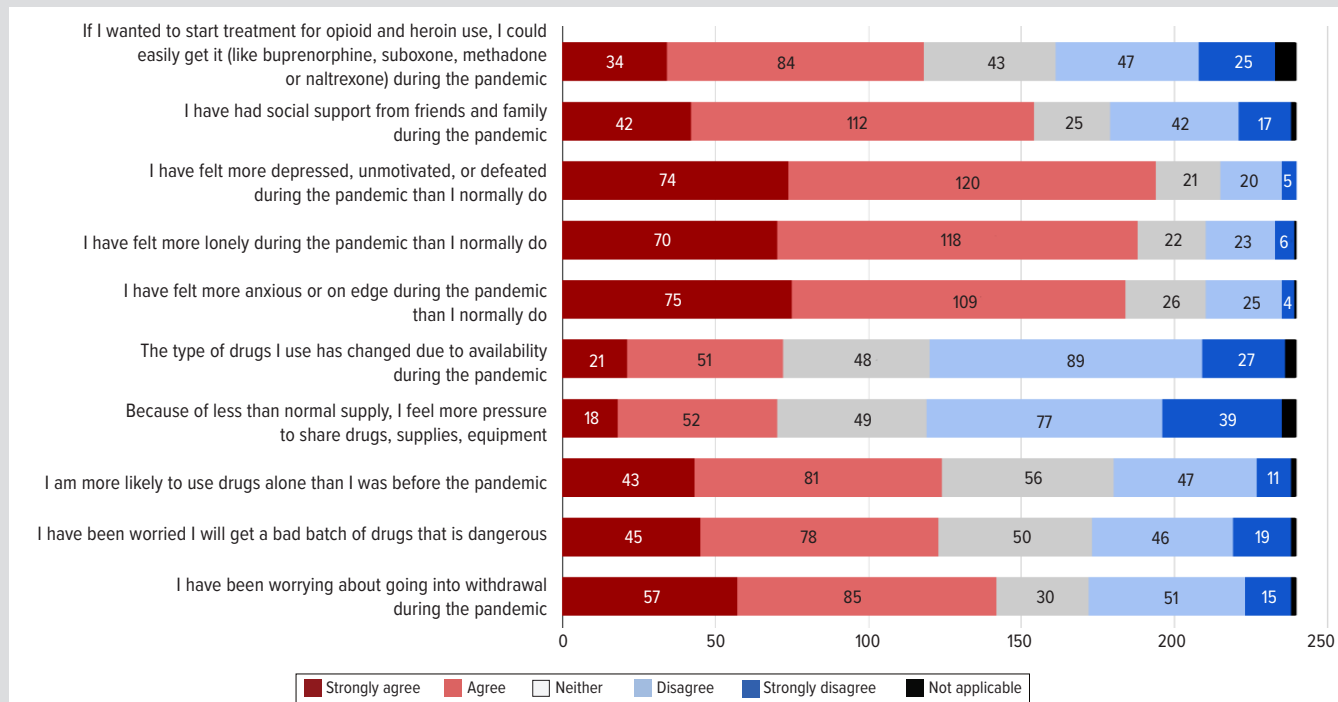
In Wisconsin, the Department of Health Services reported 1201 overdose deaths in 2019, increasing to 1531 deaths in 2020 and to 1765 deaths in 2021.⁴ In addition to drug-related deaths, evidence

suggests nonfatal overdoses also increased during the COVID-19 pandemic; for example, emergency department visits for nonfatal drug overdose increased 38% from January 2020 to January 2021 in Wisconsin—even greater than the national average increase of 31%.⁵ To explore potential mechanisms through which COVID-19 may have contributed to the overall rise in overdose morbidity and mortality, this study sought to describe changes to the experiences and behaviors of people who inject drugs during the first year of the pandemic.

METHODS

The Rural Opioid Initiative Research Consortium (ROI) is an active network of federally funded, community-based research projects aiming to reduce the risks of drug use, including overdose, HIV, and hepatitis C in rural areas.⁶ The Wisconsin-based

Figure 1. Summary of COVID-19–Related Impacts on Sample of 240 People Who Inject Drugs



ROI project, a partnership between the University of Wisconsin-Madison (UW-Madison) and Vivent Health, conducted a survey of people who inject drugs in Wisconsin communities during the pandemic.

From March 8 through May 5, 2021, Vivent Health staff recruited clients from each of their 10 Wisconsin syringe service programs (SSP). The study team at the UW-Madison provided Vivent Health staff with flyers that invited clients to complete an online survey. Vivent Health staff gave the flyer to clients when they visited the SSPs to obtain supplies. The flyer contained a quick response (QR) code to gain access to the survey from a smartphone or iPad available in the SSP office. Clients also could call the number on the flyer to reach a study staff member and take the survey over the phone. The QR code opened a Qualtrics survey link that began with a brief eligibility assessment. SSP clients were eligible to participate if they were 18 years or older and reported injecting drugs to get high at least once in the past 12 months. Eligible clients advanced to an electronic informed consent page in Qualtrics. If they affirmed consent to participate, they began the 15- to 20-minute questionnaire and were compensated for completing the survey. The UW-Madison Health Sciences Institutional Review Board approved this study protocol.

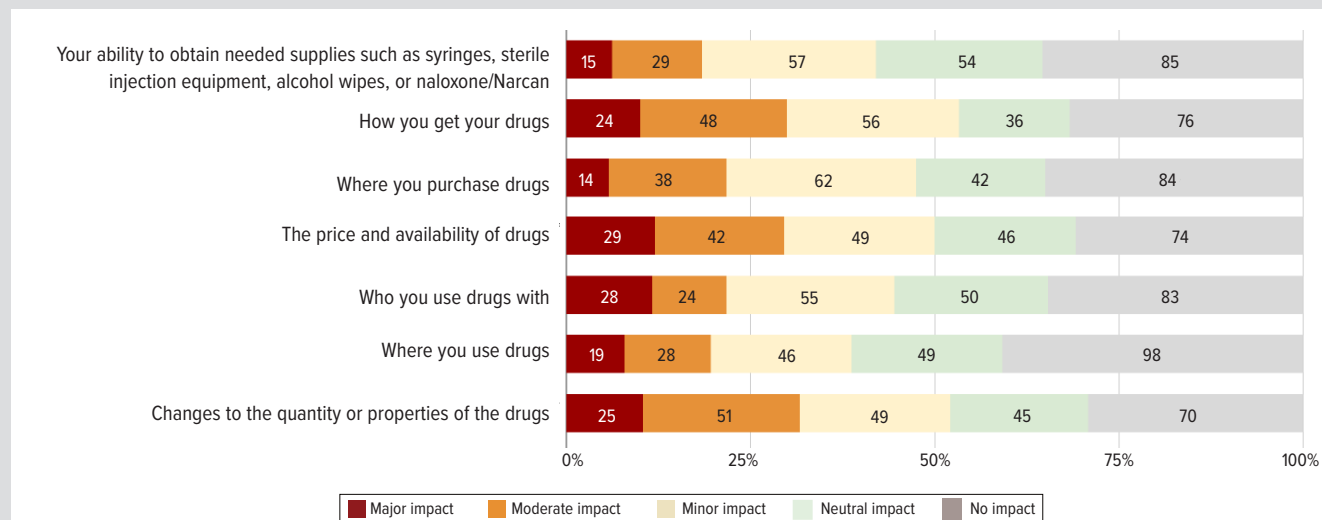
A total of 393 clients responded to the online survey. For this analysis, the study team removed respondents who were ineligible based on their responses to screening questions (n=82) and respondents who were eligible but selected “no” or did not respond

to the informed consent question (n=34). A total of 277 participants consented to participate and initiated the study survey. The study team tracked survey data to identify and remove duplicate responses completed by the same person (n=10) and incomplete surveys (n=27), leaving 240 responses valid for analysis.

The survey assessed several sociodemographic characteristics (age, race, ethnicity, gender, employment, and education) and assessed changes in substance use and mental health due to the COVID-19 pandemic. The analysis consists of 3 primary outcomes: personally experiencing at least 1 nonfatal overdose since the start of the COVID-19 pandemic (“yes” or “no”); agreement level regarding ability to access substance use treatment during the pandemic (“strongly agree,” “agree,” “neither agree nor disagree,” “disagree,” or “strongly disagree”); and reported impact of the pandemic on ability to access harm reduction supplies (“major impact,” “moderate impact,” “minor impact,” “neutral impact,” or “no impact”). The analysis explores sociodemographic characteristics, self-reported mental health (depression, anxiety, loneliness, and social support), and drug use practices (using drugs while alone, whether they believed the composition or availability of the drugs they used had changed, drug purchasing behaviors, who drugs were used with, whether they were more likely to share drugs or injection equipment) as potential correlates of the 3 primary outcomes.

Non-sociodemographic survey questions utilized likert-scale response options (“strongly agree,” “agree,” “neither agree nor disagree,” “disagree,” or “strongly disagree”) or asked participants to

Figure 2. Self-Reported Impact Rating of COVID-19 on Drug Behaviors Among 240 Wisconsin Participants



rate the degree of impact (“major impact,” “moderate impact,” “minor impact,” “neutral impact,” or “no impact”) COVID-19 had on several factors. The prevalence of each response option is reported in Figures 1 and 2. For analyses of correlates, we compared affirmative responses (“strongly agree” and “agree,” or “major impact” and “moderate impact”) to nonaffirmative responses (all else). Two variables—“I have been able to maintain access to harm reduction services/supplies” and “I have had social support from friends and family”—were coded backwards so that “strongly disagree” and “disagree” responses reflecting a negative impact of COVID-19 were compared to other responses. We used chi-square tests ($\alpha = 0.05$) to detect statistically significant associations between correlates and outcomes.

RESULTS

The mean age of participants was 35 years (SD 8.8; minimum 19; maximum 64). Approximately half of the participants identified as female (49%), and most were White (79%) and non-Hispanic (93%). Most respondents had at least a high school diploma or GED (General Education Development) certificate (85%), with about half of those also reporting some college-level education. About one quarter (26%) were employed for wages. Participants resided in 31 different Wisconsin counties in all regions of the state. Milwaukee County (30%), Brown County (18%), and Douglas County (15%) accounted for more than half of the sample. Over one-quarter (27%) reported experiencing a nonfatal overdose since the onset of the COVID-19 pandemic (ie, during the preceding 12-14 months). Approximately half (49%) of participants responded affirmatively (“strongly agree” or “agree”) that they felt they could start treatment for opioid and/or heroin use during the pandemic if they wanted to (Figure 1). Less than one fifth (18%) affirmed (“major impact” or “moderate impact”)

that COVID-19 affected their ability to obtain harm reduction supplies (such as sterile syringes, alcohol wipes, and naloxone), despite COVID-related limited-service hours of the partner SSP sites throughout 2020 (Figure 2). Overall, mental health symptoms appeared to worsen during the pandemic for most respondents: 81% responded affirmatively (“strongly agree” or “agree”) that they felt more depressed; 77% affirmed that they felt more anxious; and 78% affirmed feeling lonelier in comparison to the year prior to the pandemic. When questioned about specific issues contributing to anxiety, 51% reported they worried about a “bad batch of drugs that is dangerous,” and 59% reported worrying about going into withdrawal (Figure 1).

Reporting a lack of social support during the pandemic was correlated with reporting disrupted access to harm reduction services ($P = 0.006$) and experiencing an overdose ($P = 0.005$), (Table). Though increased feelings of depression or defeat during COVID-19 were common across the whole sample (Figure 1), those who reported these feelings also more often felt treatment was less accessible during the pandemic ($P = 0.03$, Table). Those who felt treatment was less accessible were more frequently female ($P = 0.004$) and more often reported worrying about withdrawal ($P = 0.03$) and changes in how drugs were acquired ($P = 0.02$) (Table 1). Participants who reported disrupted access to drug use supplies, such as syringes or naloxone, also were more often female ($P = 0.03$) and more frequently reported feeling pressure to share drugs or equipment ($P = 0.01$), worrying about withdrawal ($P = 0.03$), and that COVID-19 caused changes to how and where they got drugs, drug price and availability, with whom and where drugs were used, and the quantity or properties of drugs purchased (all $P < 0.01$, Table). Results indicated worrying about a bad batch of drugs during the pandemic was correlated with not experiencing overdose ($P = 0.045$, Table). However, those who personally

Table. Correlates of COVID-19–Related Disruptions in Overdose Experiences and Access to Harm Reduction Supplies and Treatment

| | Total N (%) 240 (100.0) | Disrupted Ability to Obtain Supplies (ie, syringes, naloxone) ^b | | | Did Not Feel Like They Could Easily Get Treatment (ie, buprenorphine, methadone) ^c | | | Experienced an Overdose During Pandemic ^d | | |
|---|----------------------------|---|--------------------------|------------------|---|--------------------------|----------------|---|--------------------------|----------------|
| | | Yes, n (%) 44 (100.0) | No, n (%) 196 (100.0) | P value n/a | Yes, n (%) 72 (100.0) | No, n (%) 161 (100.0) | P value n/a | Yes, n (%) 66 (100.0) | No, n (%) 166 (100.0) | P value n/a |
| COVID-19-related disruptions^d | | | | | | | | | | |
| Did not have social support ^c | 59 (24.6) | 18 (40.9) | 41 (21.1) ^f | 0.006 | 24 (33.3) | 35 (22.0) ^f | 0.07 | 25 (37.9) | 33 (20.1) ^f | 0.005 |
| Felt more depressed/defeated ^a | 194 (80.8) | 36 (81.8) | 158 (80.6) | 0.85 | 65 (90.3) | 126 (78.3) | 0.03 | 53 (80.3) | 135 (81.3) | 0.86 |
| Felt lonelier ^a | 188 (78.3) | 36 (81.8) | 152 (78.9) ^f | 0.57 | 62 (86.1) | 123 (76.4) | 0.09 | 50 (75.8) | 132 (80) ^f | 0.48 |
| Felt more anxious or on edge ^a | 184 (76.7) | 36 (81.8) | 148 (75.9) ^f | 0.39 | 56 (77.8) | 125 (77.6) | 0.98 | 54 (81.8) | 125 (75.8) ^f | 0.32 |
| Type of drugs used changed ^a | 72 (30.0) | 16 (36.4) | 56 (29.2) ^f | 0.35 | 22 (30.6) | 49 (30.8) ^f | 0.97 | 17 (25.1) ^f | 50 (30.7) ^f | 0.49 |
| Felt pressure to share drugs or equipment ^a | 71 (29.2) ^f | 20 (45.5) | 50 (26.2) ^f | 0.01 | 20 (28.6) ^f | 49 (30.8) | 0.73 | 23 (34.8) | 45 (27.8) ^f | 0.29 |
| More likely to use alone ^a | 124 (51.7) | 25 (58.1) | 99 (50.8) ^f | 0.38 | 37 (51.4) | 84 (52.5) ^f | 0.88 | 37 (56.9) ^f | 82 (49.7) ^f | 0.32 |
| Worried about a bad batch of drugs ^a | 123 (51.2) | 26 (59.1) | 97 (50.0) ^f | 0.28 | 41 (57.7) ^f | 78 (48.4) | 0.19 | 27 (40.9) | 91 (55.5) ^f | 0.045 |
| Worried about withdrawal ^a | 142 (59.2) | 32 (74.4) | 110 (56.4) ^f | 0.03 | 51 (70.8) | 89 (55.9) ^f | 0.03 | 40 (61.5) ^f | 95 (57.6) ^f | 0.58 |
| How you get drugs ^b | 72 (30.0) | 21 (47.7) | 51 (26.0) | 0.004 | 30 (41.7) | 42 (26.1) | 0.02 | 19 (28.8) | 49 (29.5) | 0.91 |
| Where you purchased drugs ^b | 52 (21.7) | 18 (40.9) | 34 (17.4) | <0.001 | 20 (27.8) | 31 (19.2) | 0.15 | 14 (21.2) | 34 (20.5) | 0.9 |
| Price/availability of drugs ^b | 71 (29.2) ^f | 25 (56.8) | 46 (23.5) | <0.001 | 27 (37.5) | 43 (26.7) | 0.1 | 28 (42.4) | 42 (25.3) | 0.01 |
| Who you use drugs with ^b | 52 (21.7) | 19 (43.2) | 33 (16.8) | <0.001 | 19 (26.4) | 31 (19.2) | 0.22 | 17 (25.8) | 32 (19.3) | 0.28 |
| Where you use drugs ^b | 47 (19.6) | 16 (36.6) ^f | 31 (15.8) | 0.002 | 17 (23.6) | 28 (17.4) | 0.27 | 15 (22.7) | 30 (18.1) | 0.42 |
| Quantity or property of drugs purchased ^b | 76 (31.7) | 29 (65.9) | 47 (23.9) ^f | <0.001 | 29 (40.3) | 45 (27.9) | 0.06 | 27 (40.9) | 46 (27.7) | 0.0508 |
| Sociodemographic characteristics^d | | | | | | | | | | |
| Non-White race | 47 (19.6) | 13 (29.5) | 34 (17.62) ^f | 0.07 | 19 (26.4) | 27 (16.9) ^f | 0.1 | 11 (16.7) | 35 (21.5) ^f | 0.41 |
| Female ^e | 118 (49.2) | 28 (65.1) ^f | 90 (46.9) ^f | 0.03 | 45 (63.4) ^f | 68 (43.0) ^f | 0.004 | 35 (55.6) ^f | 78 (47.3) ^f | 0.26 |
| Not working for wages ^f | 163 (74.0) ^f | 33 (80.5) ^f | 130 (73.0) ^f | 0.32 | 53 (77.9) ^f | 106 (73.6) ^f | 0.49 | 46 (77.9) ^f | 111 (72.1) ^f | 0.38 |
| Less than high school diploma | 32 (13.3) | 8 (18.6) ^f | 24 (12.5) ^f | 0.29 | 11 (15.5) ^f | 19 (12.1) ^f | 0.48 | 8 (12.5) ^f | 23 (13.9) | 0.79 |

^aStrongly agree or agree (yes) vs neutral, disagree, or strongly disagree (no).

^bMajor or moderate impact (yes) response vs minor impact, neutral impact, and no impact (no).

^cStrongly disagree and disagree (yes) vs strongly agree, agree, or neither (no).

^d“I don’t know,” “I prefer not to answer,” and “not applicable” responses are omitted from the “yes,” “no” summary.

^eTwo participants self-reported identifying as transgender or genderqueer, which were omitted from the bivariate analysis (treated as missing).

^f“I don’t know” and “I prefer not to answer” responses were treated as missing data in all chi square tests, percentage calculations are “yes” out of data available, not column N total.

experienced an overdose after the start of COVID-19 were more likely to report diminished social support ($P=0.005$) and that the price and availability of drugs had changed ($P=0.01$) (Table 1).

DISCUSSION

People who inject drugs are a population with extraordinary health needs and high risk of early mortality due to overdose. According to data from the Centers for Disease Control and Prevention, 58 404 overdose deaths occurred in 2021 among Americans aged 15–44 years,¹ which is more than twice the number of deaths from COVID-19 in that age group during the same year.⁷ There is a critical need to scale up evidence-based treatments and harm reduction strategies to lower the risk of overdose for people who use drugs. Understanding the factors contributing to high overdose risk in marginalized communities is important for developing strategies to implement client-centered treatment and prevention services.

The results of our study align with factors identified by Chang et al as contributors to overdose experiences: social dynamics; uncertain supply, composition, and source of drugs used; opioid-expertise, meaning their experience, tolerance, self-control, and responsibility with opioid use; and emotional pain.⁸ In this study, COVID-19 reportedly exacerbated or disrupted social dynamics, such as using alone, pressure to share drugs or equipment, and with whom individuals were using drugs, along with supply and composition of drugs. These findings—that diminished social support and changes in the price and availability of drugs were associated with experiencing an overdose—corroborate prior findings about heightened vulnerability related to interruptions to social dynamics and supply. These disruptions may have left people who use drugs vulnerable to new and unknown circumstances, subsequently reducing their “opioid expertise.” Surprisingly, those who experienced an overdose indicated less worry about a bad batch of drugs. The cross-sectional nature of the data makes this finding

difficult to interpret, but these data could indicate a diminished “opioid expertise” among participants who experienced an overdose; and/or, these could relate to previous reports about feeling apathetic about overdose risk in the context of passive suicidality, mental health challenges, or other vulnerability or life challenges that can accompany substance use disorder. Emotional pain also worsened, as evidenced by the large majority of participants reporting increased anxious, lonely, and depressed feelings during the pandemic, regardless of whether they experienced an overdose. There is a lack of consensus about the directional causality between mental disorders and substance use, but a large body of evidence suggests significant associations between mental disorders and overdose risk.⁹ While it may not be possible to discern the true cause of increased overdose risk, it is evident that the COVID-19 pandemic intensified many compounding risk factors.

This study underscores the need to enhance implementation of evidence-based interventions to reduce risk within health care, public health, and harm reduction sectors. Some novel strategies already have been developed; for example, a shift to telehealth-provided medications for opioid use disorder during the pandemic was found to be associated with reduced overdose risk.¹⁰ This study’s findings indicate that a substantial proportion of people who use drugs—who were generally more likely to be women and worried about withdrawal—may have perceived less access to treatment and, thus, benefited from flexible treatment modalities. Brick-and-mortar syringe services programs rapidly pivoted to continue providing services during COVID-19. Further, services like Next Distro¹¹ and the Never Use Alone¹² hotline provide harm reduction services available anytime, anywhere. These services may be particularly important given the finding that individuals experiencing disruptions in drug supply, acquisition, and their usual drug use practices also were experiencing disrupted access to harm reduction services/supplies.

Findings from this cross-sectional survey are subject to several methodological limitations. This study surveyed clients of local SSPs, therefore sampling individuals who are likely more aware of ways to access naloxone and harm reduction services, which limits generalizability. Additionally, self-reported changes in drug use and access to services are subject to imperfect recall and subjectivity in rating of impact and agreement. We collapsed similar responses (eg, “major impact” and “moderate impact”) to enhance the interpretability of the analysis of correlates of disruptions to access to harm reduction supplies and substance use treatment but show the full breadth of responses in descriptive analyses. Further, this study was only able to capture nonfatal overdose events and excludes those who died from overdose or COVID-19 before the study was conducted. Despite these limitations, this study adds to our understanding of the local effects of the COVID-19 pandemic on mental well-being, access to essential harm reduction and health services, and drug-related risks behaviors among people who use drugs at a time when overdose mortality continues to rise.

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