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Drug and Alcohol Dependence 221 (2021) 108584

Contents lists available at ScienceDirect

Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdep

The health and social consequences during the initial period of the COVID-19 pandemic among current and former people who inject drugs: A rapid phone survey in Baltimore, Maryland

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ARTICLE INFO

Keywords:
COVID-19
PWID
HIV
Mental health
Harm reduction

ABSTRACT

Background: There is limited data on the health and social consequences of the COVID-19 pandemic among people who inject drugs (PWID).

Methods: We conducted a rapid telephone survey from April-June 2020 among participants of the community-based AIDS Linked to the IntraVenous Experience (ALIVE) cohort study in Baltimore, Maryland. This interviewer-administered survey collected information on COVID-19 knowledge, symptoms, testing, diagnosis, and prevention behaviors, recent substance use, housing conditions, interruptions to healthcare, access to harm reduction and drug treatment, mental health, and social support.

Results: Of 443 current and former PWID who participated in the survey, 36 % were female, 85 % were Black, 33 % were living with HIV and 50 % reported any substance use in the prior six months. COVID-19 awareness was high, but knowledge of symptoms and routes of transmission were lower. PWID reporting recent substance use were less likely to always socially distance (63 % vs. 74 % among those without recent use, $p = 0.02$), and Black PWID were more likely than non-Black to socially distance (73 % vs. 48 %, $p < 0.0001$) and use when alone (68 % vs.35 %, $p < 0.01$). Only 6% reported difficulty accessing healthcare, yet only 48 % of those on opioid-agonist treatment had a four-week supply available. While 34 % reported increased depressive symptoms, participants reported high levels of social support.

Conclusions: This rapid assessment highlighted that PWID currently using drugs may be less able to practice social distancing and increased SARS-CoV-2 transmission may occur. Ongoing monitoring of substance use and mental health, as well as overdose prevention is necessary as the pandemic and public health responses continue.

1. Introduction

People who use drugs may be at greater risk of severe COVID-19 infection due to heightened comorbid conditions associated with substance use (Salter et al., 2011; Volkow, 2020; Yamanaka and Sadikot, 2013). Yet it is the indirect effects of stay-at-home orders and other restrictions to mobility in limiting access to health care and other services, such as recovery support, treatment for opioid use disorder, overdose prevention, and syringe service programs, that may result in more severe and lasting adverse health impacts among people who use drugs (Salisbury-Afshar et al., 2020). Additional strain from social distancing may result in social isolation, depression, stress, and anxiety (Abel and McQueen, 2020; Hawryluck et al., 2004; Jeong et al., 2016; Venkatesh and Edirappuli, 2020). These mental health concerns are all known triggers for substance and alcohol use and threats to recovery from substance use disorder (Chou et al., 2011; Clay and Parker, 2020; Galea, 2004; Grant et al., 2004; Krueger, 1981; McMahon, 2001; Myers et al., 2014; Pilowsky et al., 2013), particularly given the lack of

Abbreviations: PWID, people who inject drugs.

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https://doi.org/10.1016/j.drugalcdep.2021.108584
Received 25 August 2020; Received in revised form 7 January 2021; Accepted 12 January 2021
Available online 13 February 2021

in-person social support groups and care (Alexander et al., 2020; Volkow, 2020). At the same time, Black people who use drugs are not only disadvantaged due to decades of marginalization, but now also face disparities in SARS-CoV-2 burden, hospitalization, and death. These disparities are possibly linked to social and structural conditions that preclude social distancing and other strategies to prevent COVID-19 acquisition, as well as access to COVID-19 testing and care (Kullar et al., 2020; Millett et al., 2020).

Despite these potential challenges and disparities, there is limited data on disruptions to health and social conditions during the COVID-19 pandemic among specific populations. Understanding the implications of the COVID-19 pandemic response on the health and well-being of people who use drugs can provide information critical for planning for prevention and support during future waves of COVID-19 or other new emerging infectious disease pandemics. The objective of this study was to characterize knowledge of COVID-19, adherence to prevention practices and the impact of the pandemic and in particular these preventive strategies on health and access to services among a sample of people who use drugs in Baltimore, Maryland. We further investigated whether there were differences in disruption or practices by key characteristics of interest. Importantly, this survey was conducted in the weeks subsequent to the onset of statewide stay-at-home orders in Maryland issued by Governor Hogan on March 30, 2020. The statewide order was in place through May 15, 2020, however, Baltimore City elected to extend the order, with limited re-opening of retail businesses occurring on May 29, 2020, and religious facilities, personal services, libraries and day care centers on June 8, 2020. The cumulative incidence of COVID-19 in Baltimore City was 1 per 1000 population at the end of March, rising to 10 per 1000 population by early June.

2. Material and methods

2.1. Study population

The study sample was from the ALIVE (AIDS Linked to the IntraVenous Experience) cohort, a community-based cohort of people who inject drugs (PWID) in Baltimore ongoing since 1988, described in detail elsewhere (Vlahov et al., 1991). Briefly, the study enrolled n = 2398 in 1988−89, n = 434 in 1994−95, n = 295 in 1998, n = 1009 in 2005−08 and n = 830 in 2015−18. Inclusion criteria for participation included being at least 18 years of age and reporting a history of injection drug use. Participants were recruited from the community via outreach at syringe services programs, community health fairs, drug treatment programs, community health and HIV clinics, and other community events. Participation in the ALIVE cohort involves semi-annual study visits with behavioral and risk surveys administered by interviewers and via Audio-Computer Assisted Survey Instruments (ACASI), laboratory testing including HIV-RNA for those living with HIV, and other clinical assessments. In-person study visits were suspended due to the COVID-19 pandemic in mid-March 2020.

Of 1240 participants with an in-person visit since 2018, we were able to contact 532 (43 %) and of those, 443 (83 %) participated in this telephone survey between mid-April and early June. We compared those who were and were not reached by phone using data from the last in-person study visit. Those who were reached were similar to those who were not reached in terms of sex ($p = 0.19$) and depressive symptoms ($p = 0.22$), however those we reached were slightly older ($p < 0.0001$), more likely to be Black ($p < 0.001$), living with HIV ($p < 0.05$), and less likely to be homeless ($p < 0.0001$), and to have reported any recent injection drug use ($p < 0.0001$) or other substance use ($p < 0.0001$). The median time between the last in-person study visit and the clinic closure among those who participated in the phone survey was 6.5 months (interquartile range: 4.8–8.5 months). For those who participated, we offered information on COVID-19 prevention and harm reduction for those who reported recent substance use, information on access to care, food banks, and other resources available in Baltimore during the period with stay-at-home orders. This study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board and all participants provided written informed consent for in-person visits and oral consent to participate in this phone survey.

2.2. Measures

Trained ALIVE interviewers administered by phone a brief survey focused on the following domains: knowledge of COVID-19, self-reported chronic disease status (including HIV), individual and household symptoms, testing and diagnosis of COVID-19, behaviors related to COVID-19 prevention (such as handwashing, social distancing, etc.), recent substance use, housing and living conditions, interruptions in healthcare, access to harm reduction and drug treatment services, and mental health. For COVID-19-related knowledge questions, we did not provide response choices in order to allow participants to freely report what they knew. For those living with HIV, questions assessed access to HIV care and antiretroviral therapy. On average, the phone interview took 21 min to complete.

During standard in-person study visits, participants complete assessments focused on the prior six months including time-varying sociodemographic characteristics (e.g., residential location, income, employment, homelessness), substance use (opioids including heroin or non-medical prescription opioids, cocaine, marijuana) and the modes of administration of substances used (injection, snorting, smoking), depressive symptoms (Center for Epidemiologic Studies Depression Scale (Radloff, 1977)), and opioid agonist therapy (OAT; methadone and buprenorphine treatment).

2.3. Statistical analysis

Data from participants last in-person study visit was examined to determine differences in COVID-related disruptions and behaviors by recent substance use and other key characteristics such as HIV viral suppression. Descriptive statistics were used to describe the study sample demographic and other characteristics using data from each participant's last in-person study visit. We examined differences in behaviors and reported disruptions by the following characteristics: sex, age, race, active substance use, injection drug use, HIV status, number of self-reported chronic disease conditions, and current employment. Active substance use was defined as reporting use of any of the following substances in the last six months by any route of administration at the last in-person visit: heroin, cocaine, crack, speedball, non-medical prescription drugs, and marijuana. Injection drug use was defined as injection of any substance, including heroin, cocaine, speedball, prescription opioid or other substance in the last six months at the last in-person visit. Because disruptions in drug supply and harm reduction services would be relevant to those with recent substance use relative to timing of the phone survey, we examined this among those reporting recent substance use on the phone survey, rather than the last in-person study visit. Participants were classified as having depressive symptoms if they scored 23 or higher on the CES-D scale. HIV status was defined as antibodies to HIV-1 by ELISA, with Western blot confirmation, from the last in-person study visit. Plasma HIV-1 RNA levels were determined using reverse-transcriptase PCR methods (Roche Amplicor, Branchburg), with HIV viral suppression defined as a viral load measure of <40 copies/mL at the last study visit. Differences were examined using Chi-square tests for dichotomous or categorical variables, and Wilcoxon rank sum tests for continuous variables.

3. Results

3.1. Study sample

Of the 443 who completed the survey, 36 % were female, 85 % were Black, and 33 % were HIV-positive according to testing at the last study

visit (Table 1). The median age of participants was 58 years (interquartile range: 52–63). In the six months prior to their last in-person visit, 7% were homeless, 50 % reported any substance use, 25 % reported any injection drug use, and 28 % reported depressive symptoms. At the time of the phone survey, 20 % of the sample reported no chronic health conditions. In terms of chronic disease, participants reported hypertension (49 %), HIV (33 %), COPD (22 %), diabetes (16 %), cardiovascular disease (10 %), renal disease (5%) and cancer (3%). About one-quarter (23 %) of the sample reported two of the previous conditions and 22 % reported three or more of the conditions. Almost one-fifth reported current employment on the phone survey (18 %).

3.2. COVID-19 knowledge, perceptions, and prevention practices

Ninety-nine percent of participants reported having heard of COVID-19 and 97 % reported that they believed that COVID-19 was being transmitted locally. Two-thirds of participants reported knowledge of fever as a symptom of COVID-19, 50 % reported cough and 36 % reported shortness of breath, while 14 % reported all three of these symptoms. Knowledge of transmission routes included: close person-to-person contact (64 %), surfaces that an infected person touched (30 %) and sex or blood (<1%). Approximately 5% of the participants reported that they didn't know how COVID-19 was transmitted. Participants reported knowledge of the following strategies for minimizing the risk of COVID-19: wearing masks (68 %), social distancing, at least 6 feet from others (53 %), washing hands for at least 20 s multiple times a day (49 %), staying at home whenever possible (38 %), wearing gloves (36 %), cleaning and disinfecting surfaces and objects people frequently touch (18 %), avoiding touching eyes, nose or mouth with unwashed hands (10 %). Fifty-five percent of participants reported being very concerned about getting COVID-19.

Nearly all participants (97 %) reported having soap or hand sanitizer available to them, and two-thirds (67 %) reported that they would be able to isolate themselves within their household if they were to get sick. In the prior two weeks, participants reported always washing hands before eating (82 %), after contact with others (77 %), and after coughing or sneezing (75 %). In the prior two weeks, 66 % reported that they never had been in gatherings of 10 or more people, and 69 % reported always keeping six feet of distance to others when outside. Blacks were more likely than non-Blacks to report both never being in gatherings of 10 or more people (68 % vs. 54 %, $p = 0.04$) and always socially distancing (73 % vs. 48 %, $p < 0.0001$). Compared to those not working, those who reported current employment were less likely to avoid gatherings of 10 or more people (53 % vs. 68 %, $p = 0.01$). Those who reported any substance use in the prior six months were significantly less likely to report always practicing social distancing compared to those who had not used any substances (63 % vs. 74 %, $p = 0.02$) (Table 2). A similar difference was observed comparing current and former PWID (73 % vs. 57 %, respectively, $p = 0.001$) (Table 2).

3.3. COVID-19 symptoms, testing, diagnosis

Very few participants reported having had COVID-19 symptoms since the beginning of the pandemic in Baltimore (defined as March 15, 2020): fever (2%), cough (2%), new shortness of breath (3%), sore throat (1%), other symptoms (3%). Similarly low proportions reported a household member with any symptoms (fever (2%), cough (2%), new shortness of breath (2%), sore throat (0%), other (1%). 58 participants (13 %) reported having been tested for COVID-19, while only 3 (1%) reported being diagnosed; similar proportions were reported for household members (12 % tested and 1% diagnosed).

3.4. Substance use and harm reduction

Of the 443 participants, 68 % reported that they were current tobacco smokers. Overall, 26 % (n = 115) reported any substance use in the prior 6 months. Of these, 43 % reported always washing hands after buying drugs. Among the 115 who reported recent substance use on the phone survey, 19 % reported any problems buying drugs in the prior 2 weeks, 26 % reported having fentanyl strips on hand, and 58 % had a supply of naloxone available to them. PWID with suppressed HIV viral load were the most likely to report having naloxone available (88 %) compared with PWID living with HIV who were unsuppressed at their last in-person study visit (74 %) and those who were HIV-uninfected (50 %, $p = 0.02$) (Table 3). Compared to former PWID, current PWID were more likely to report having fentanyl strips (13 % vs. 38 %, respectively, $p < 0.01$) and naloxone (49 % vs. 67 %, respectively, $p = 0.06$).

Among the 115 reporting any substance use in the prior 6 months during the phone survey, 69 % (n = 79) reported use of any substance in the prior 2 weeks. Less than 1% reported having traded sex for drugs or money in the prior 2 weeks. Nineteen percent (n = 15) reported experiencing withdrawal symptoms in the prior 2 weeks, with no differences by sex, race, HIV status, or recent injection. Almost 60 % (n = 47) of those reporting use in the prior 2 weeks reported using alone, and 47 % (n = 22) of those who reported using alone reported using opioids in the prior 2 weeks. Black PWID were more likely to report using alone compared with non-Black participants (68 % vs. 35 %, $p < 0.01$, data not shown).

3.5. Healthcare access and disruptions

Only 6% of the 443 participants (n = 24) reported having any trouble accessing healthcare in the prior 4 weeks. Of those, 67 % (n = 16) reported having missed an appointment and 29 % (n = 7) reported having missed medications. Black participants (4%) were less likely than non-Black participants (15 %) to report trouble accessing healthcare (p <

Table 1
Sociodemographic characteristics and recent substance use reported at the last in-person study visit among 443 former and current people who inject drugs in Baltimore, Maryland.

Median age, in years, (range)	58 (29–78)
	N (%)
Female	
Male	284 (64)
Female	157 (36)
Race	
Black	373 (85)
Non-Black	68 (15)
HIV status	
HIV-negative	295 (67)
HIV-positive, unsuppressed [a]	21 (5)
HIV-positive, suppressed [a]	123 (28)
Homeless, last 6 months	33 (7)
Any substance use, last 6 months [b]	221 (50)
Any injection drug use, last 6 months [c]	110 (25)
Depressive symptoms (CESD> = 23)	113 (26)
Number of chronic conditions reported [d]	
None	88 (20)
1	151 (34)
2	(23)
3 or more	102 (23)

[a] HIV suppression was defined as <40 copies/mL of HIV-RNA at the last in-person study visit.

[b] Any substance use was defined as any self-reported use of heroin, crack/cocaine, non-medical prescription drugs, or marijuana via any route of administration in the last six months at the last in-person study visit.

[c] Injection drug use was defined as injection of any substance, including heroin, cocaine, speedball, prescription opioid and/or other substances in the last six months at the last in-person study visit.

[d] Chronic conditions were self-reported diabetes, hypertension, cardiovascular disease, HIV, hepatitis C or other liver disease, COPD or other lung disease, cancer or chronic kidney infection.

Table 2
Differences in adoption of prevention practices and reported disruptions in the last two weeks by demographic characteristics, HIV status, and recently reported substance and injection use among 443 former and current people who inject drugs in Baltimore, Maryland, April-June 2020.

	Never gathering of 10+ people		Always physically distancing outside		Trouble accessing healthcare		Disruptions in income or work		Increased depression	
	%	p-value	%	p-value	%	p-value	%	p-value	%	p-value
Total	66		69		6		16		34	
Sex										
Male	65	0.51	68	0.13	6	0.82	14	0.33	33	0.74
Female	68		74		5		18		35	
Race										
Black	68	0.04	73	<0.00	4	<0.00	14	<0.01	33	0.31
Non-Black	54		48	01	15	1	28		39	
Employed										
Yes	53	0.01	68	0.85	3	0.22	38	<0.000	26	0.14
No	68		70		6		11	1	35	
HIV status										
HIV-	63	0.21	66	0.19	6	0.98	18	0.19	35	0.73
HIV + unsuppressed [a]	72		75		6		13		32	
HIV + suppressed [a]	62		71		5		5		29	
Any substance use [b]										
No	67	0.40	74	0.02	4	0.13	15	0.48	29	0.01
Yes	63		63		8		17		40	
Any injection drug use [c]										
No	67	0.38	73	0.001	5	0.30	14	0.10	31	0.03
Yes	62		57		8		21		42	

[a] HIV suppression was defined as <40 copies/mL of HIV-RNA at the last in-person study visit.
[b] Any substance use was defined as any self-reported use of heroin, crack/cocaine, non-medical prescription drugs, or marijuana via any route of administration in the last six months at the last in-person study visit.
[c] Injection drug use was defined as injection of any substance, including heroin, cocaine, speedball, prescription opioid and/or other substances in the last six months at the last in-person study visit.

Table 3
Differences in disruptions to substance use and access to harm reduction tools by demographic characteristics, HIV status, and recently reported injection among 115 PWID reporting recent substance use on a phone survey in Baltimore, Maryland, April-June 2020.

	Problem buying drugs		Fentanyl strips available		Naloxone available	
	%	p-value	%	p-value	%	p-value
Sex						
Male	21	0.41	28	0.52	60	0.60
Female	15		23		55	
Race						
Black	20	0.62	29	0.32	60	0.65
Non-Black	16		19		55	
HIV status						
HIV-	16	0.31	26	0.69	50	0.02
HIV + unsuppressed[a]	22		22		74	
HIV + suppressed[a]	38		38		88	
Any injection drug use[b]						
No	25	0.10	13	<0.01	49	0.06
Yes	13		38		67	

[a] HIV suppression was defined as <40 copies/mL of HIV-RNA at the last in-person study visit.
[b] Any injection drug use was defined as injection of any substance, including heroin, cocaine, speedball, prescription opioid and/or other substances in the last six months at the last in-person study visit.

0.001) (Table 3).

Of the 211 participants who reported being on methadone, buprenorphine or naltrexone at the time of the start of the pandemic, 48 % (n = 101) reported having a 4-week supply available, 95 % (n = 200) reported having received information on how to pick up medications from their program, and 32 % (n = 68) reported the option of receiving access to a greater supply if needed.

Among the 130 (90 % of the 144 living with HIV) who reported being on antiretroviral treatment, 86 % reported having a 4-week supply on hand and 94 % reported having received information about receiving care and picking up their medications during the restricted period.

When asked about other medications, 84 % reported that they were on another medication, and of those, 84 % reported having a 4-week supply on hand, and 90 % reported having received information from their doctor or clinic about receiving care and picking up medications during the restricted period.

3.6. Housing and household conditions

Among the 443 participants, 95 % reported having current housing on the phone survey. Among the 22 without housing, 81 % (n = 18) stated that they had another safe place to stay. Overall 34 % of participants reported living with someone with a chronic health condition. Similar low proportions reported caring for children under 18 years of age (10 %) or someone over the age of 60 (10 %). Nine percent reported receiving care or help from someone else. Over 85 % reported back-up caregivers in all caregiving relationships.

3.7. Social and mental health

Among all participants during the phone survey, 18 % reported current employment and 16 % reported that they had a disruption in their income or ability to work in the previous four weeks. Those who reported current employment were more likely than those unemployed to report disruptions in income or work (Table 3; 38 % vs. 11 %, p <

0.0001). The vast majority (80 %) had enough food in their household for 4 weeks.

While 34 % reported increased depression in the prior two weeks, 95 % reported having someone to talk with if they felt lonely. Those reporting any substance use or injection drug use in the prior six months were more likely to report increasing depression compared to those who did not recently use any substances (40 % vs. 29 % substance use and 42 % vs. 31 % injection drug use, $p = 0.01$) (Table 3).

4. Discussion

This rapid assessment from the early phase of the COVID-19 pandemic in the US is among the first to report on the immediate COVID-19-related health and social consequences of the pandemic among current and former PWID. This study was based within an aging cohort of people who actively inject drugs or have a history of injection drug use with a high burden of chronic conditions. While the participants we were able to contact by phone may be more stable than those who we could not locate, they represent a vulnerable and high-risk population with respect to the potential of COVID-19 severity. Despite high reported levels of awareness and very low levels of self-reported symptoms and diagnosis of COVID-19 among this vulnerable group with a high burden of existing comorbid chronic disease, our findings suggest some potential gaps in knowledge regarding routes of transmission and symptoms of COVID-19. In comparison to national level survey data on knowledge and behavior related to COVID-19, this sample of current and former PWID had substantially lower knowledge and lower preventive behaviors than the overall population (Alsan et al., 2020). However, because our questions regarding knowledge required free response as opposed to interviewer-prompted responses, the lower knowledge observed may relate to the way in which the question was asked.

Moreover, our findings also suggested that social distancing behaviors may be lower among those reporting recent substance use, and among current PWID in particular. As the pandemic continues to unfold and jurisdictions implement reopening policies and relax restrictions on mobility, there is a need to continue to monitor symptoms and infection rates among people who currently use drugs, and particularly among PWID. Our results suggest that PWID may be among those most likely to be exposed to SARS-CoV-2 as restrictions are relaxed and social interactions outside of the home continue to increase. At the same time, although the levels of substance use reported in the phone survey reflect similar use patterns to what we captured during in-person visits, and risk behaviors such as trading sex for drugs or money were extremely low, monitoring of substance use, HIV-related risk and COVID-19 prevention behaviors among PWID and other populations of people who use drugs should continue. This is important because the data that was presented here was captured early in the COVID-19 pandemic and behaviors will likely evolve given the duration of the pandemic and consequent societal disruptions. Sustained behavioral change over long periods of time is difficult and it is likely that people will decrease their adherence to COVID-19 prevention behaviors over time (Eaton and Kalichman, 2020). PWID may face even more constraints to maintaining to COVID-19 behavioral prevention strategies. Taken together with increases in depression among this population during the pandemic, we would expect subsequent increases in substance use, and higher potential exposure to SARS-CoV-2 among people who use drugs as a result.

Interestingly, in this study, Black participants were more likely than Whites to report adhering to COVID-19 prevention strategies, potentially reflecting different patterns of substance use or age distributions by racial groups in our cohort (Cepeda et al., 2019). Those who were employed were less likely to avoid larger gatherings, but there were not differences in terms of socially distancing when compared to those who were not working. There may also have been differences in terms of essential worker status, but we did not have information on this key variable. Additional data is therefore needed to examine these differences, particularly given the evident disparities in COVID-19 burden among the Black population in the US (Kullar et al., 2020; Millett et al., 2020). That there were no reported differences in prevention behaviors by HIV status was surprising, given that those living with HIV may have received messages regarding their potential increased risk of SARS-CoV-2 infection due to having an immunocompromising condition.

A primary concern during the pandemic is related to overdose prevention. While participants infrequently reported problems accessing drugs in the prior two weeks, supplies of harm reduction tools such as fentanyl test strips and naloxone were variable. Those living with HIV who were unsuppressed at their last study visit were the most likely to report having naloxone on hand; however, this group may be the most stable due to their obvious engagement in care and adherence to ART. Reassuringly current PWID were most likely to report having a supply of both fentanyl strips and naloxone which reflects recent findings within our broader population (Buresh et al., 2020). However, one-third of those actively injecting did not have a supply of naloxone on hand. This is worrying in light of the high levels of reported opioid use while alone, and was much more often reported among Black PWID in this study. Due to physical distancing during the pandemic likely increasing how often PWID use alone, overdose occurring in social contexts of isolation are cause for concern (Bardwell et al., 2019). Coupled with the disruptions in access to drug treatment, the potential decreased use of the emergency room due to fear of COVID-19 (Wong et al., 2020) and the demonstrated increased depression among current users, this data may suggest the potential for a future increase in overdose rates. Despite increased distribution of naloxone and the implementation of other overdose prevention programs in Baltimore through early 2020 (Wen and Warren, 2018), these findings imply that additional resources will be needed to address the changing social context of use and increased need for overdose prevention among people who use drugs during the COVID-19 pandemic.

Despite the concerns regarding adherence to COVID-19 prevention and the potential increasing risk of overdose related to the changing social context of use during the pandemic, participants reported overall good recent access to medical care, housing, food and social support, as well as HIV-related care for those living with HIV. One exception to these positive trends included that half of those reporting medication for drug treatment had access to a 4-week supply of their medication and only one-third reporting access to greater supplies of medication should it be needed. This is particularly concerning given that those included in this study represented a much more stable group overall than the ALIVE cohort population, suggesting that access to services may be much more challenging for PWID overall. On the other hand, 95 % had heard from their program and while one-half did not have a larger supply of medication on hand during the stay-at-home orders, that this many had access likely reflects a substantial proportion using buprenorphine as well as the guidance issued by SAMSHA on March 16, 2020 allowing opioid treatment programs to issue 28-day Take-home doses of methadone to stable patients. The other exception to these positive trends was increases in reported depressive symptoms, particularly among those who reported recent substance use. This is concerning because the mental health consequences of the pandemic will likely worsen over time. Depression is particularly concerning among both current and former PWID as it is a risk factor for ongoing use, a threat to recovery for those who are no longer using, increases risk of HIV-related risk behaviors and overdose, and decreases engagement in care (Genberg et al., 2019; Pilowsky et al., 2011; Tobin and Latkin, 2003).

These findings must be interpreted in light of the limitations of the study design. We acknowledge that the sample we have recruited is not representative of the ALIVE cohort overall, and we are missing those who may represent the highest risk for negative health and social consequences due to the COVID-19 pandemic, including those actively using substances, injecting drugs, or experiencing homelessness. As a result, our findings likely reflect the best-case scenario for many of the

potential negative impacts of the pandemic in this population. Additional limitations include the cross-sectional nature of the data collection, providing only a brief snapshot of the current disruptions experienced by PWID during the early phase of the pandemic in this setting. There are likely already shifts in the outcomes we have reported on here. We also did not collect essential worker status among those who reported employment, which may help to explain some of the differences in behaviors observed related to social distancing and avoiding gatherings.

This rapid assessment provides a baseline to benchmark ongoing data collection among current and former PWID in regular follow-up in order to monitor trends in substance use and HIV-related risk behaviors, diagnosis and symptoms of COVID-19, knowledge, adoption and maintenance of COVID-19 prevention strategies, disruptions in care and services, mental health, and other health and social consequences related to the pandemic. These data can shed light on the impact of COVID-19 on PWID populations, in order to document and compare to other populations in terms of the negative health, economic and social consequences of the COVID-19 pandemic, and to suggest potential avenues to mitigate these harms.

4.1. Conclusions

Despite high awareness of COVID-19 and low self-reported SARS-CoV2 infection among current and former PWID during the early phase of the pandemic in the US, knowledge regarding transmission, symptoms and prevention may be lower than the general population. Further, current PWID, those reporting any substance use by any route of administration, and those who were actively employed may be less adherent to public health social distancing practices. Additional research to examine changes in experiences of SARS-CoV2 infection and testing, COVID-19 illness and knowledge and practice of prevention behaviors among this aging and vulnerable population. Although we did not find evidence of disruptions in medical and HIV care during the early phase of the COVID-19 pandemic in this survey, additional resources to ensure adequate access and supply of harm reduction services, including medication for opioid use disorder and naloxone may be necessary to safeguard against increased overdose during periods of potential social isolation.

Contributors

All authors conceived and designed the study, interpreted the findings, contributed to the revision, read and approved the submitted version. JA and TWA implemented the survey. JA analyzed the data. BLG supported data analysis, interpreted the data and wrote the first draft of the manuscript.

Funding

This work was supported by The National Institute on Drug Abuse (NIDA) (U01-DA-036297; R01-DA-12568; R01-DA-053136). This publication resulted (in part) from research supported by the Johns Hopkins University Center for AIDS Research, an NIH funded program (1P30AI094189), which is supported by the following NIH Co-Funding and Participating Institutes and Centers: NIAID, NCI, NICHD, NHLBI, NIDA, NIA, NIGMS, NIDDK, NIMHD.

Role of funding source

NIH had no further role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper.

Declaration of Competing Interest

None.

Acknowledgments

We thank the ALIVE study participants, interviewers and staff, without whom this study would not have been possible.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.drugalcdep.2021.108584.

References

Abel, T., McQueen, D., 2020. The COVID-19 pandemic calls for spatial distancing and social closeness: not for social distancing! Int. J. Public Health. https://doi.org/10.1007/s00038-020-01366-7.

Alexander, G.C., Stoller, K.B., Haffajee, R.L., Saloner, B., 2020. An epidemic in the midst of a pandemic: opioid use disorder and COVID-19. Ann. Intern. Med. https://doi.org/10.7326/M20-1141.

Alsan, M., Stantcheva, S., Yang, D., Cutler, D., 2020. Disparities in coronavirus 2019 reported incidence, knowledge, and behavior among US adults. JAMA Netw. open 3, e2012403. https://doi.org/10.1001/jamanetworkopen.2020.12403.

Bardwell, G., Kerr, T., McNeil, R., 2019. The opioid overdose epidemic and the urgent need for effective public health interventions that address men who use drugs alone. Am. J. Mens Health. https://doi.org/10.1177/1557988319859113.

Buresh, M., Gicquelais, R.E., Astemborski, J., Kirk, G.D., Mehta, S.H., Genberg, B.L., 2020. Fatal overdose prevention and experience with naloxone: a cross-sectional study from a community-based cohort of people who inject drugs in Baltimore, Maryland. PLoS One 15, e0230127. https://doi.org/10.1371/journal.pone.0230127.

Cepeda, J.A., Astemborski, J., Kirk, G.D., Celentano, D.D., Thomas, D.L., Mehta, S.H., 2019. Rising role of prescription drugs as a portal to injection drug use and associated mortality in Baltimore, Maryland. PLoS One 14, e0213357. https://doi.org/10.1371/journal.pone.0213357.

Chou, K.L., Liang, K., Sareen, J., 2011. The association between social isolation and DSM-IV mood, anxiety, and substance use disorders: wave 2 of the national epidemiologic survey on alcohol and related conditions. J. Clin. Psychiatry 72, 1468–1476. https://doi.org/10.4088/JCP.10m06019gry.

Clay, J.M., Parker, M.O., 2020. Alcohol use and misuse during the COVID-19 pandemic: a potential public health crisis? Lancet Public Heal. https://doi.org/10.1016/S2468-2667(20)30088-8.

Eaton, L.A., Kalichman, S.C., 2020. Social and behavioral health responses to COVID-19: lessons learned from four decades of an HIV pandemic. J. Behav. Med. https://doi.org/10.1007/s10865-020-00157-y.

Galea, S., 2004. The social epidemiology of substance use. Epidemiol. Rev. 26, 36–52. https://doi.org/10.1093/epirev/mxh007.

Genberg, B.L., Astemborski, J., Treisman, G., Anagnostopoulos, A., Mehta, S.H., Kirk, G. D., Abraham, A., 2019. Engagement in treatment for depression among people who inject drugs in Baltimore, Maryland. J. Subst. Abuse Treat. https://doi.org/10.1016/j.jsat.2019.09.001.

Grant, B.F., Stinson, F.S., Dawson, D.A., Chou, S.P., Dufour, M.C., Compton, W., Pickering, R.P., Kaplan, K., 2004. Prevalence and Co-occurrence of substance use disorders and independent mood and anxiety disorders. Arch. Gen. Psychiatry 61, 807. https://doi.org/10.1001/archpsyc.61.8.807.

Hawryluck, L., Gold, W.L., Robinson, S., Pogorski, S., Galea, S., Styra, R., 2004. SARS control and psychological effects of quarantine, Toronto, Canada. Emerg. Infect. Dis. 10, 1206–1212. https://doi.org/10.3201/eid1007.030703.

Jeong, H., Yim, H.W., Song, Y.J., Ki, M., Min, J.A., Cho, J., Chae, J.H., 2016. Mental health status of people isolated due to Middle East respiratory syndrome. Epidemiol. Health 38, e2016048. https://doi.org/10.4178/epih.e2016048.

Krueger, D.W., 1981. Stressful life events and the return to heroin use. J. Human Stress 7, 3–8. https://doi.org/10.1080/0097840X.1981.9936820.

Kullar, R., Marcelin, J.R., Swartz, T.H., Piggott, D.A., Macias Gil, R., Mathew, T.A., Tan, T., 2020. Racial disparity of coronavirus disease 2019 in african american communities. J. Infect. Dis. https://doi.org/10.1093/infdis/jiaa372.

McMahon, R.C., 2001. Personality, stress, and social support in cocaine relapse prediction. J. Subst. Abuse Treat. 21, 77–87. https://doi.org/10.1016/S0740-5472(01)00187-8.

Millett, G.A., Jones, A.T., Benkeser, D., Baral, S., Mercer, L., Beyrer, C., Honermann, B., Lankiewicz, E., Mena, L., Crowley, J.S., Sherwood, J., Sullivan, P.S., 2020. Assessing differential impacts of COVID-19 on black communities. Ann. Epidemiol. 47, 37–44. https://doi.org/10.1016/j.annepidem.2020.05.003.

Myers, B., McLaughlin, K.A., Wang, S., Blanco, C., Stein, D.J., 2014. Associations between childhood adversity, adult stressful life events, and past-year drug use disorders in the national epidemiological study of alcohol and related conditions (NESARC). Psychol. Addict. Behav. 28, 1117–1126. https://doi.org/10.1037/a0037459.

Pilowsky, D.J., Wu, L.-T., Burchett, B., Blazer, D.G., Ling, W., 2011. Depressive symptoms, substance use, and HIV-Related high-risk behaviors among opioid-dependent individuals: results from the clinical trials network. Subst. Use Misuse 46, 1716–1725. https://doi.org/10.3109/10826084.2011.611960.

Pilowsky, D.J., Keyes, K.M., Geier, T.J., Grant, B.F., Hasin, D.S., 2013. Stressful life events and relapse among formerly alcohol dependent adults. Soc. Work Ment. Health 11, 184–197. https://doi.org/10.1080/15332985.2012.711278.

Radloff, L.S., 1977. The CES-D scale: a self-report depression scale for research in the general population. Appl. Psychol. Meas. https://doi.org/10.1177/014662167700100306.

Salisbury-Afshar, E.M., Rich, J.D., Adashi, E.Y., 2020. Vulnerable populations: weathering the pandemic storm. Am. J. Prev. Med. https://doi.org/10.1016/j.amepre.2020.04.002.

Salter, M.L., Lau, B., Go, V.F., Mehta, S.H., Kirk, G.D., 2011. HIV infection, immune suppression, and uncontrolled viremia are associated with increased multimorbidity among aging injection drug users. Clin. Infect. Dis. 53, 1256–1264. https://doi.org/10.1093/cid/cir673.

Tobin, K.E., Latkin, C.A., 2003. The relationship between depressive symptoms and nonfatal overdose among a sample of drug users in Baltimore, Maryland. J. Urban Heal. Bull. New York Acad. Med. 80, 220–229. https://doi.org/10.1093/jurban/jtg025.

Venkatesh, A., Edirappuli, S., 2020. Social distancing in covid-19: What are the mental health implications? BMJ. https://doi.org/10.1136/bmj.m1379.

Vlahov, D., Anthony, J.C., Munoz, A., Margolick, J., 1991. The ALIVE study: a longitudinal study of HIV-1 infection in intravenous drug users: description of methods. J. Drug Issues 21, 759–776. https://doi.org/10.1177/002204269102100406.

Volkow, N.D., 2020. Collision of the COVID-19 and addiction epidemics. Ann. Intern. Med.

Wen, L.S., Warren, K.E., 2018. Combatting the opioid epidemic: baltimore's experience and lessons learned. J. Public Heal. (United Kingdom). https://doi.org/10.1093/pubmed/fdx093.

Wong, L.E., Hawkins, J.E., Langness, S., Murrell, K.L., Iris, P., Sammann, A., 2020. Where are all the patients? Addressing Covid-19 fear to encourage sick patients to seek emergency care. NEJM Catal. https://doi.org/10.1056/CAT.20.0193.

Yamanaka, T., Sadikot, R.T., 2013. Opioid effect on lungs. Respirology. https://doi.org/10.1111/j.1440-1843.2012.02307.x.