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Research Article

Characteristics and Drug Use Patterns among Harm Reduction Program Participants in NYS, Before and During COVID-19

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ABSTRACT

Background: The type of drugs being used and in combination with other drugs varies by location raising the question of which drugs are being used in New York State outside of New York City. In order to review the impact of COVID-19 and how this pandemic shifted the patterns of drugs used, this study examined drug use pre- and during COVID.

Methods: Data were collected from a parent study evaluating the effectiveness of harm reduction programs for people who use opioids. Individuals who used opioids in the prior three months participated in a survey which collected information on events occurring in the prior three months.

Results: Overdose history and overdose preventive practices were similar pre- and during-COVID except those recruited during COVID were more likely to have naloxone available. The primary opioid used was heroin (85%) followed by fentanyl (33%). Over 79% of the opioid users in the study used some type of stimulant with a higher percent of participants using methamphetamine pre-COVID. Eighty percent of the participants used at least three of the 14 non-prescription drug types asked about and 31% used at least six different substances.

Conclusion: This study did not find an effect on drug use during COVID-19. The majority of participants stated use of heroin but not fentanyl, although national data shows high prevalence of fentanyl in the drug supply. Efforts should focus on increasing awareness of fentanyl in the drug supply. Overall, more effort should be directed in identifying local patterns of drug use.

Keywords: Opioids; Overdose; COVID-19; Drug use; Polydrug use

INTRODUCTION

New York State (NYS) has been severely affected by the nation's increasing opioid crisis with over 3,200 deaths, 25,500 hospitalizations and almost 12,400 emergency department visits in 2017. NYS has experienced a 200% increase in the number of opioid overdose deaths, from 1,074 in 2010 to 3,224 deaths in 2017. The number of NYS residents admitted to treatment programs also indicates that the opioid burden across the state is high with 62,114 unique client admissions to state certified chemical dependence treatment programs for any opioid in 2018 [1].

There has been an increase in the use of illicit substances in combination with opioids [2-9]. Fatal overdoses have been increasing both due to the use of fentanyl and cocaine and other psychostimulants such as methamphetamine [4,5,8,10-12]. From May 2019 through April 2020, cocaine-related overdose deaths increased over 26% nationally and were likely associated with using in combination with fentanyl or heroin [4]. Nationally, among all drug overdose deaths, 49% involved only opioids, while 33% involved both opioids and stimulants with 69% of those involving cocaine and 33% involving methamphetamine [13]. An analysis of the 2017 National Survey of Drug Use and Health found that among people who used opioids, 43% used marijuana in the past month, 10% used cocaine and 4% used crack, 21% heavily used alcohol, 6% used hallucinogens or inhalants, and 9% used stimulants [14].

It is also known that the type of drugs being used vary by location in the United States [15,16]. Information collected in New York City (NYC) using data from the NYC Office of the Chief Medical Examiner and the NYC Department of Health and Mental

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Hygiene's Bureau of Vital Statistics describe the types of drugs involved in fatal overdoses in NYC; however, little is known about drug combinations being used in the rest of NYS [17].

There is some evidence that the novel coronavirus (COVID-19) pandemic has led to an increase in overdose events potentially due to a variety of issues including disruptions in the availability and accessibility of treatment and naloxone, changes in social support and networks, disruptions to normal drug supply chains [18-22]. Simultaneously, higher levels of isolation may lead individuals to use alone which is another risk factor for overdose death. Adding to this, individuals who have experienced non-fatal overdoses were more likely to have chronic pulmonary disease, diabetes, and coronary heart disease-all chronic conditions associated with developing severe illness due to COVID-19 [23]. Of note, NYS experienced the unprecedented impact of COVID-19 earlier than many other states with the most diagnosed cases at the beginning of April 2020, prior to any known models of ensuring that harm reduction services and drug treatment were accessible during extended periods of quarantine.

The continuously changing nature of drugs being used in various parts of the country raised the question of which drugs are currently being used in New York State outside of New York City. In addition, it was important to review the anticipated impact of COVID-19 and how this pandemic shifted the ever changing patterns in drugs used. Therefore, data from a research study evaluating the effectiveness of harm reduction programs for people who use opioids in NYS outside of New York City was analyzed for drugs used by the study population. In addition, because the study period occurred during the COVID-19 pandemic, analyses were conducted to characterize the population of people who use drugs and examine whether the pandemic affected drug use patterns among people who use opioids including the type and quantity of drug use.

MATERIALS AND METHODS

Data were collected from a parent study evaluating the effectiveness of harm reduction programs for people who use drugs in NYS outside of New York City. Human Subjects approval was obtained from the New York State Department of Health Institutional Review Board and Weill Cornell Medicine (co-researchers on the parent study).

Clients were recruited from three Syringe Service Programs (SSPs) and three drug user Health Hubs (Hubs) across New York State, excluding New York City. Staff at the sites was trained in administering the survey and recruited individuals when they were at the sites for services. Staff encouraged their clients to participate in the survey; posters advertising the study were also placed at the study sites. Recruitment began in August 2019. These surveys were in person until March 12, 2020 when COVID-19 forced the closure of the SSPs and Hubs (hereinafter referred to as "pre-COVID"). Study recruitment and surveys were suspended for the safety of both the study subjects and the research personnel. Telephone interviews were then conducted until in-person recruitment and surveys began again in June ("during COVID"). Because of the longitudinal nature of the parent study, the survey collected information on events occurring in the prior three months. With the halt in March, there was little to no overlap in responses about events that occurred in the prior three months occurring in the pre-COVID and the during COVID samples. As part of the original study, subjects were to be followed for one year with three additional regularly scheduled surveys conducted throughout the year. Baseline surveys which were administered upon recruitment concluded on November 30, 2020.

Study criteria required that participants were 21 years or older, had used an opioid within the three months prior to recruitment, and reported English proficiency as very well or well. Informed consent was obtained electronically from all participants included in the study. Of the 383 individuals screened for the study, 350 (91%) were eligible and completed the baseline survey. Of the 33 who were ineligible, 10 were younger than 21, one did not speak English well, and 22 had not used opioids in the past three months. Eighty-four percent (n=295) were recruited pre-COVID, 55 were recruited during COVID.

Data collection

Survey data were entered into Alchemer (formerly SurveyGizmo), an online HIPAA compliant survey platform. Individuals who consented participated in a baseline survey, which took participants 30 minutes, on average. Given the parent study aims, the baseline survey included questions about demographic characteristics, overdose experiences, health and health care engagement, social functioning such as employment, living situation, measures of substance use-related behaviors, and involvement in the criminal justice system. Participants were compensated with a $15.00 Walmart or Dunkin' electronic gift card for completing the baseline survey, with the potential of earning a total of $115 upon completion of each of the three follow-up surveys, each with increasing gift card amounts.

Analysis

Data analyses were conducted using SAS 9.4. Ordered logistic regression, Chi-squared test, or Fisher's Exact test were used to compare those interviewed by race/ethnicity, sex, and pre- and during COVID; missing values were not included in the percentages nor in the analyses.

RESULTS

Table 1 shows the characteristics of the study participants in the three months prior to the survey. More of the participants were between the ages of 31-40 (38%), were white (85%) and not of Hispanic origin (87%). The majority self-identified as male (61%), heterosexual (88%) and single (46%). Almost a quarter of the participants did not graduate high school. Over half were unemployed (55%), with another 20% who had not worked in the last three months due to disability status. All but 16% had run out of money for basic necessities at least once during the three months prior to the interview with 44% not having enough money almost every day for basic necessities. Almost three-quarters of the study participants used some form of public assistance in the prior three months, 15% lived on the streets and 14% lived in a rooming, boarding or supportive housing facility or a shelter (Table 1).

Client's recruited pre-COVID was compared on these characteristics to those clients recruited during COVID. Statistically significant differences in the participants included: those recruited during COVID were older; a higher percent of those during COVID collected food stamps and/or received rent assistance. Participants were less likely to stay with family during COVID.

Information about overdose history and practices to prevent overdoses are shown in Table 2. Among study participants who completed the baseline survey, two-thirds had overdosed at least

once in their lives. Of those, a third overdosed within the prior three months with a quarter of those having overdosed two or more times in the prior three months. Drugs were used primarily in a residential setting, with 54% of the participants reporting drug use in their own home, followed by use in someone else's home (20%). Another 22% reported use in a public space and/or in a car. A small percentage of participants (4%) did not have a "primary" location for use and reported use in multiple places. Half of the interviewed participants had seen a professional for the primary purpose of getting drug addiction treatment, including buprenorphine, methadone, naltrexone, detoxification, rehab or counseling. Regarding naloxone availability and use, 71% of those interviewed had naloxone and 57% made sure naloxone was available when they used, 78% usually used drugs with other people, injected slowly (31%) or used fentanyl test strips (18%), half used less of the substance, and 40% used from a trusted source. Eleven percent of the participants did not report adopting any overdose preventive measures (Table 2).

For the most part, overdose history and overdose preventive practices among participants recruited pre-COVID are similar to those recruited during COVID. The only statistically significant difference was those recruited during COVID were more likely to have naloxone available. Of interest, the percent that used drugs alone decreased from 23% among the pre-COVID participants to 15% among those interviewed during COVID, but this change is not statistically significant at the 0.05 level (Table 2).

Table 3 shows self-reported non-prescription drugs used by the study participants, by type, frequency of use, and route of administration. For those drugs used by more than 25% of the participants, information about frequency and route of use is provided; due to small numbers, this information is not shown for the other drugs. The primary opioid of choice among this population was heroin (85%), followed by fentanyl (33%), non-prescription opioid pain pills (27%), street suboxone (23%) and street methadone (11%) (data not mutually exclusive). The majority of those using heroin injected (95%), used daily (61%), and over a third (35%) used two to three times a day while a third (34%) used between four to nine times a day. Those using fentanyl also primarily injected (93%), with a much lower percent using daily (38%), and almost half (49%) using two to three times a day (Table 3).

Over 79% of the opioid users in the study used some type of stimulant (data not shown) with the majority using cocaine/crack (58%) and/or methamphetamine (43%), 20 to 37% used these stimulants daily. A statistically higher percent of participants used methamphetamine prior to COVID than during COVID.

Among the study participants, 280 (80%) used at least three of the 14 non-prescription drug types asked about in the survey, 64% used at least four different substances, and 31% used at least six different substances; whereas only 19 (5%) reported having used only one substance in the past three months. Of those who reported using heroin in the past three months, 95% used at least one other substance: marijuana (60%), cocaine (57%), methamphetamine (47%), alcohol (36%) or fentanyl (36%). Information was not collected on the combination of drugs used simultaneously other than speedballs.

Additional analyses were conducted examining type of drug used and overdose history by sex, race, ethnicity, age and homelessness (data not shown). More males used alcohol (42% *vs.* 32%, χ^2=6.23, p=0.04) and marijuana (67% *vs.* 50%, χ^2=11.29, p=0.003), while more females used street methadone (16% *vs.* 8%, χ^2=8.85, p=0.01). A higher percentage of whites compared to other races used heroin (89% *vs.* 79%, χ^2=4.31, p=0.04) and methamphetamine (50% *vs.* 32%, χ^2=6.15, p=0.01), and a higher percentage of blacks used opioid pain pills (50% *vs.* 32%, χ^2=11.31, p=0.0008) and alcohol (56% *vs.* 36%, χ^2=5.91, p=0.02). Non-Hispanics used methamphetamine more than Hispanics (48% *vs.* 18%, χ^2=13.79, p=0.0002). Those 21-30 year-olds used marijuana more frequently than the other age groups (32% *vs.* 18%, χ^2=8.66, p=0.003), 40-50 year-olds used methamphetamine more often (28% *vs.* 17%, χ^2=5.92, p=0.01), 51-60 year-olds used alcohol more frequently (20% *vs.* 10%, χ^2=7.08, p=0.008). The only demographic group that showed an increase in ever experiencing a drug overdose was those 31-40 years old (43% *vs.* 28%, χ^2=7.47, p=0.006). There was only one difference in the type of drug used by those who stated they were living on the streets in that more individuals experiencing homelessness were likely to use cocaine (55% *vs.* 72%, χ^2=4.76, p=0.03).

Table 1: Characteristics of those who completed the baseline survey, pre and during COVID-19 (N=350).

	N	%	Pre-COVID%	During COVID%	X^2/OR (P-Value)
Age					7.88 (0.05)*
21-30	91	26.0	27.1	20.0	
31-40	134	38.3	29.3	38.2	
41-50	76	21.7	22.7	16.4	
51+	49	14.0	11.9	25.5	
Race[a]					
White	281	84.6	85.3	81.5	1.44 (0.23)
Black/African American	46	13.9	13.7	14.8	0.01 (0.91)
Native American	14	4.2	3.6	7.4	1.44 (0.23)
Asian/Other	4	1.2	0.7	3.7	0.19 (0.13)[b]
Missing	18				
Hispanic					0.04 (0.85)
Yes	47	13.5	13.7	12.7	

No	300	86.5	86.3	87.3	
Missing	3				
Gender identification					6.15 (0.05)
Male	213	61.0	61.9	56.4	
Female	133	38.1	37.8	40.0	
Transgender/Other	3	0.9	0.3	3.6	
Missing	1				
Sexual orientation					3.59 (0.17)
Heterosexual	305	87.6	86.3	94.5	
Bi-sexual	5	1.4	1.4	1.8	
Homosexual/Other	38	10.9	12.3	3.6	
Missing	2				
Marital Status[a]					
Married/long-term partner	108	31.1	31.4	27.8	0.33 (0.56)
Widowed/divorced/separated	95	27.4	25.9	35.2	1.80 (0.18)
Never married/single	158	45.5	45.7	44.4	0.06 (0.81)
Other	3	0.9	0.3	1.9	Not calc.
Missing	3				
Highest education level					0.91 (0.73)[c]
Less than high school grad.	84	24.2	25.0	20.0	
High school graduate	154	44.4	44.2	45.5	
Some college[c]	98	28.2	27.1	34.5	
College graduate	11	3.2	3.8	0.0	
Missing	3				
Usual employment					7.03 (0.13)
Working full time	37	10.7	11.3	7.3	
Working part time	31	8.9	7.9	14.5	
Unemployed	192	55.3	56.5	49.1	
Disabled	68	19.6	18.2	27.3	
Homemaker/Student/Other	19	5.5	6.2	1.8	
Missing	3				
Number of days ran out of money for basic necessities					1.69 (0.05)[c]
Almost every day	153	44.3	47.1	29.6	
At least once a week	89	25.8	24.7	31.5	
At least once a month	39	11.3	10.0	18.5	
1-2 days	10	2.9	2.7	3.7	
Never	54	15.7	15.5	16.7	
Missing	5				
Public assistance[a]					
Food stamps	217	65.4	59.7	77.4	4.36 (0.04)*
Public aid check	51	15.4	14.2	17.0	0.16 (0.68)
Social security	41	12.3	10.5	18.9	2.64 (0.10)
Rent assistance	42	12.7	9.8	24.5	8.37 (0.00)*
No assistance	90	27.1	27.1	18.9	1.94 (0.16)
Other	7	2.1	1.7	3.8	0.44 (0.29)[b]
Don't know	9	2.7	3.1	0.0	Not calc.
Missing	18				

Type of housing[a]					
Own or rent home	147	42.4	40.6	51.9	0.25 (0.61)
Staying with family	51	14.7	16.4	5.6	4.36 (0.03)*
Staying with friend	66	19.0	18.4	22.2	0.37 (0.54)
Rooming, boarding or supportive housing/shelter	48	13.8	14.7	9.3	1.18 (0.28)
On the street	51	14.7	14.0	18.5	0.68 (0.4)
Other	3	0.9	1.0	0.0	Not calc.
Missing	3				

Note: *Significant at the 0.05 level. a: More than one response could be chosen. Chi-square statistics calculated on category vs all others excluding missing, b: Odds Ratio and p-value from Fishers Exact Test, c: Odds Ratio and p-value from ordered logistic regression, d: Includes junior college, technical/trade/vocational school.

Table 2: Overdose history and prevention practices among those completing the baseline survey, pre- and during COVID-19 (n=350).

	N	%	Pre-COVID (%)	During COVID (%)	X^2/OR (P-Value)
Ever overdose					2.82 (0.24)
Yes	233	68.1	66.3	77.8	
No	109	31.9	33.7	22.2	
Not sure	8	2.3			
Overdose in prior 3 months[a]					0.25 (0.88)
Yes	81	34.3	34.5	33.3	
No	154	65.3	64.9	66.7	
Not sure	1	0.4	0.5	0.0	
Missing	5				
Number of times overdose in prior 3 months[b]					1.15 (0.84)[a]
Once	59	72.5	72.3	78.6	
Twice	11	13.8	15.4	7.1	
Three or more	9	11.3	10.8	14.3	
Missing	2				
Where drugs were primarily used					1.16 (0.89)
Own home	185	53.5	53.6	52.7	
Car	14	4.0	3.8	5.5	
Someone else's home	70	20.2	21.0	16.4	
Public space	62	17.9	17.5	20.0	
Other	15	4.3	4.1	5.5	
Missing	4				
See a professional for drug addiction treatment					0.19 (0.66)
Yes	181	51.9	51.4	54.5	
No	167	47.9	48.6	45.5	
Missing	1	0.3			
Have naloxone					5.14 (0.02)*
Yes	246	70.9	68.5	83.6	
No	101	29.1	31.5	16.4	
Missing	3				
Use drugs alone or with others					1.66 (0.44)

Alone	73	21.3	22.5	14.8	
With others	104	30.3	30.1	31.5	
Both	166	48.4	47.4	53.7	
Missing	7				
Actions to prevent overdose[c]					
Use less	174	50.4	50.0	52.7	0.24 (0.63)
Go slow	107	31.0	31.7	27.3	0.33 (0.56)
Use fentanyl test strips	61	17.7	16.2	25.5	2.92 (0.09)
Not mixing with other drugs	87	25.2	23.8	32.7	2.16 (0.14)
Using from a trusted source	138	40.0	39.0	45.5	0.99 (0.32)
Make sure naloxone available	196	56.8	55.5	63.6	1.54 (0.21)
None of the above	39	11.3	12.1	7.3	0.99 (0.32)
Missing	5				

Note: *Significant at the 0.05 level. a: Denominator based upon those who responded "Yes" or "Not Sure" to ever overdose, b: Denominator based upon those who responded "Yes" or "Not Sure" to overdosed in past 3 months, c: More than one response could be chosen, d: Odds Ratio and p-value from ordered logistic regression.

Table 3: Non-prescription drugs used in the past three months among study participants including frequency and route.

	N	%	Pre-COVID (%)	During COVID (%)	X2/OR (P-Value)
Heroin	**298**	**85.1**	**84.1**	**90.9**	**1.70 (0.19)**
Frequency/week					1.01 (0.97)[b]
<1/week	51	18.7	19.8	13	
Once a week	15	5.5	5.3	6.5	
2-5 x's/week	41	15	15.9	10.9	
Daily	166	60.8	59	69.6	
Missing	25				
Frequency/day					1.60 (0.16)[b]
Once a day	32	13.3	15	2.9	
2-3 x's/day	84	34.9	30.6	60	
4-9 x's/day	81	33.6	35	25.7	
10+ x's/day	44	18.3	19.4	11.4	
Missing	57				
Route of administration [a]					
Smoked	27	9.4	10.1	6	1.68 (0.59)[c]
Sniffed/Snorted	26	9	8.4	12	0.64 (0.41)[c]
Injected	273	94.8	94.5	96	1.51 (0.22)
Missing	10				
Marijuana/Hashish	**210**	**60**	**59.7**	**61.8**	**0.03 (0.85)**
Frequency/week					1.01 (0.94)[b]
<1/week	60	30.2	29.5	33.3	
Once a week	29	14.6	15.1	12.1	
2-5 x's/week	41	20.6	21.1	18.2	
Daily	69	34.7	34.3	36.4	
Missing	11				
Frequency/day					2.60 (0.33)[b]
Once a day	67	43.5	45.2	31.6	
2-3 x's/day	59	38.3	37.8	42.1	

4-9 x's/day	17	11	10.4	15.8	
10+ x's/day	11	7.1	6.7	10.5	
Missing	56				
Route of administration[a]					
Smoked	197	99.5	99.4	100	0.41 (0.70)[b]
Swallowed	11	5.6	4.8	9.1	0.49 (0.39)[b]
Missing	12				
Cocaine/Crack	**202**	**57.7**	**57.3**	**60**	**0.06 (0.81)**
Frequency/week					0.83 (0.61)[b]
<1/week	76	39.2	39.3	38.7	
Once a week	40	20.6	20.2	22.6	
2-5 x's/week	38	19.6	20.9	12.9	
Daily	40	20.6	19.6	25.8	
Missing	8				
Frequency/day					2.70 (0.07)[b]
Once a day	49	39.8	43.1	14.3	
2-3 x's/day	50	40.7	38.5	57.1	
4-9 x's/day	13	10.6	10.1	14.3	
10+ x's/day	11	8.9	8.3	14.3	
Missing	79				
Route of administration[a]					
Smoked	135	88.2	87.9	89.7	2.54 (0.11)
Snorted	43	28.1	28.2	27.6	0.20 (0.65)
Injected	100	65.4	71.8	37.9	4.13 (0.04)*
Missing	49				
Methamphetamine	**152**	**43.4**	**47.5**	**21.8**	**13.4 (0.00)***
Frequency/week					1.10 (0.86)[b]
<1/week	30	21.4	19.5	41.7	
Once a week	18	12.9	14.1	0	
2-5 x's/week	41	29.3	28.9	33.3	
Daily	51	36.4	37.5	25	
Missing	12				
Frequency/day					0.84 (0.85)[b]
Once a day	32	30.2	29.4	50	
2-3 x's/day	27	25.5	25.5	25	
4-9 x's/day	29	27.4	28.4	0	
10+ x's/day	18	17	16.7	25	
Missing	46				
Route of administration[a]					
Smoked	54	36.5	35	54.5	0.52 (0.35)
Sniffed/snorted	24	16.2	13.9	45.5	0.22 (0.02)[c]*
Injected	123	83.1	82.5	90.9	0.84 (1.0)
Swallowed	12	8.1	7.3	18.2	0.38 (0.24)[c]
Missing	4				
Alcohol	**133**	**38**	**38.6**	**34.5**	**0.52 (0.47)**

Frequency/week					0.75 (0.55)[b]
<1/week	61	47.3	45	61.1	
Once a week	24	18.6	18.9	16.7	
2-5 x's/week	27	20.9	21.6	16.7	
Daily	17	13.2	14.4	5.6	
Missing	4				
Frequency/day					0.75 (0.73)[b]
Once a day	47	54	53.1	66.7	
2-3 x's/day	24	27.6	28.4	16.7	
4-9 x's/day	9	10.3	11.1	0	
10+ x's/day	7	8	7.4	16.7	
Missing	46				
Speedball (heroin/ fentanyl and cocaine/ crack together)	**132**	**37.7**	**40.3**	**23.6**	**6.19 (0.01)**
Frequency/week					0.77 (0.63)[b]
<1/week	39	31	30.7	33.3	
Once a week	22	17.5	16.7	25	
2-5 x's/week	36	28.6	28.1	33.3	
Daily	29	23	24.6	8.3	
Missing	6				
Frequency/day					0.31 (0.30)[b]
Once a day	42	46.7	45.3	75	
2-3 x's/day	31	34.4	34.9	25	
4-9 x's/day	13	14.4	15.1	0	
10+ x's/day	4	4.4	4.7	0	
Missing	42				
Route of administration[a]					
Smoked	14	11	11.8	0	Not calc.
Sniffed	9	7.1	6.7	7.7	0.40 (1.00)[c]
Injected	123	96.9	94.1	84.6	0.17 (0.22)[c]
Missing	5				
Fentanyl	**114**	**32.6**	**31.9**	**36.4**	**0.33 (0.57)**
Frequency/week					1.07 (0.88)[b]
<1/week	29	26.1	25.3	30	
Once a week	15	13.5	15.4	5	
2-5 x's/week	25	22.5	24.2	15	
Daily	42	37.8	35.2	50	
Missing	3				
Frequency/day					2.35 (0.20)[b]
Once a day	17	21.3	22.9	10	
2-3 x's/day	39	48.8	45.7	70	
4-9 x's/day	17	21.3	22.9	10	
10+ x's/day	7	8.8	8.6	10	
Missing	34				

Route of administration[a]					
Smoked	8	7.3	8.5	0	Not Calc.
Sniffed	7	6.4	7.4	0	Not Calc.
Injected	102	92.7	89.4	90	0.93 (1.0)[c]
Patch	7	6.4	6.4	5	1.30 (1.0)[c]
Missing	4				
Opioid pain pills (vicodin, oxycontin, percocet)	93	26.6	27.5	21.8	0.70 (0.40)
Frequency/week					0.98 (0.97)[b]
<1/week	46	50	50	50	
Once a week	22	23.9	23.8	25	
2-5 x's/week	12	13	12.5	16.7	
Daily	12	13	13.8	8.3	
Missing	1				
Frequency/day					1.03 (1.0)[c]
Once a day	33	56.9	57.7	50	
2+ x's/day	25	43.1	42.3	50	
Missing	35				
Route of administration[a]					
Smoked	5	5.6	6.3	0	Not calc.
Injected	25	27.8	30.4	9.1	4.63 (0.17)[c]
Sniffed/snorted	23	25.6	26.6	18.2	1.75 (0.72)[c]
Swallowed	57	63.3	62	72.7	0.77 (0.76)
Missing	3				
Street suboxone	**80**	**22.9**	**23.1**	**21.8**	**0.06 (0.80)**
Stimulants (amphetamines, ritalin, concerta, dexedrine, adderall, diet pills)	**48**	**13.7**	**13.9**	**12.7**	**0.09 (0.77)**
Street Methadone	**39**	**11.1**	**11.9**	**7.3**	**1.14 (0.28)**
Hallucinogens (LSD/ PCP/ psychedelics/ mushrooms)	**31**	**8.9**	**9.2**	**7.3**	**0.19 (0.80)[c]**
Tranquilizers/ barbituates/ sedatives	**31**	**8.9**	**9.2**	**7.3**	**0.19 (0.80)[c]**
Inhalants	**10**	**2.9**	**3.1**	**1.8**	**0.33 (1.0)[c]**

Note: *Significant at the 0.05 level a: More than one response could be chosen, b: Odds ratio and p-value from ordered logistic regression, c: Odds ratio and p-value from Fishers Exact test.

DISCUSSION

The population for this study was SSP or Hub patients who used opioids. SSPs and Hubs are judgment free areas designed to meet the needs of people who inject drugs. Besides providing sterile syringes which limits the spread of infectious diseases and bacterial infections, SSPs and Hubs provide ancillary services such as linkage to social services including food and housing, assistance with medical care and health insurance, and promotion of safe injection behaviors, while Hubs also offer on-site medical care and medication for opioid use disorder including buprenorphine [24,25]. These programs meet the needs of the most vulnerable individuals in that those who self-select into these programs often engage in more high risk behaviors than non-SSP users [25,26]. That two-thirds of the study participants had overdosed at some point accentuates the high-risk behaviors of this population. Approximately one-quarter of the participants inject opioids in public spaces which could mean they are injecting quickly to avoid getting caught which can increase their risk of overdose. Taking this into account, the very high percent of study participants who were experiencing economic, housing and food instability may be due to the study population being SSP and Hub users, and is probably not indicative of all people who use drugs in New York State, outside of New York City. Nevertheless, this study does provide valuable information about the drug user population and underscores the complexity of serving the needs of this population in NYS.

While other studies have shown the impact of COVID-19 on drug

use and overdoses, this study did not find these effects [20,26-29]. Although SSPs and Hubs in NYS were severely impacted by COVID-19 both financially and by closures due to staff exposures and regulations, they were deemed essential services and allowed to re-open quickly. (Clear, personal communication) Partnering SSPs and Hubs in the study were able to recruit high-risk individuals who were reaching out for services, albeit at a lower volume. As shown by Wenger et al, these programs have strong commitments to their communities and experience with dealing with crises, and were able to navigate the COVID-19 pandemic which seemed to help their clients [25]. The increase in study participants who had naloxone available during COVID may be due to the efforts of not only the SSPs and Hubs, but also to community efforts trying to address reports of increases of drug overdoses.

Previous studies have shown that drug users appear to lack knowledge of fentanyl's presence [30,31]. The majority of people in this study stated they used heroin (85%) while only 33% stated they used fentanyl among which 62% used it up to five times per week. Our study shows low use of fentanyl test strips (17%). National studies indicate increasing fentanyl in the drug supply and elevated trends in mortality due to synthetic opioids [21,33,34], and mortality due to heroin has remained relatively steady in the past few years while mortality involving synthetic opioids other than methadone has been rapidly increasing [1,5,6,17]. In order to stem this trend, it is necessary to raise awareness of fentanyl in the drug supply and promote and educate the drug user population on the use of fentanyl test strips.

As shown in other studies, polysubstance use was highly prevalent among the study participants [2-9]. In this study, 60% of the opioid users said they used marijuana, 58% stated they also used cocaine, 43% stated they used methamphetamine, 13% used alcohol daily, 9% used hallucinogens, 3% used inhalants, and 13% used stimulants. Because these sources are so different, it is hard to compare these results other than stating that those using these drug combinations in New York State, outside of New York City, is more prevalent than previously documented. These differences also highlight the need to explore local drug use patterns in order to be able to direct programs to the specific needs of the local population.

In addition to exploring local polysubstance use patterns, it is crucial to better understand the underlying drivers that contribute to polysubstance use at the individual as well as the population level. For instance, mixing different drugs among those who attempt to self-medicate a psychological disorder or experience mental health issues may require different treatment regimens than those who attempt to enhance/amplify or counteract/offset pharmacological effects of a certain substance.

CONCLUSION

Moreover, local supply of street drugs may have diverse sources and unknown potencies that local programs and community stakeholders would have to address beyond understanding use patterns and use drivers among polysubstance users. This study did not find an effect on drug use during COVID-19. The majority of participants stated use of heroin but not fentanyl, although national data shows high prevalence of fentanyl in the drug supply. Efforts should focus on increasing awareness of fentanyl in the drug supply. Overall, more effort should be directed in identifying local patterns of drug use.

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CONFLICT OF INTEREST

The authors declare that no conflict of interests exists.

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