

Substance Use and Drug Treatment Among Reproductive-Age Women With and Without HIV in the Southern United States

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Background. Women with human immunodeficiency virus (HIV; WWH) and with substance use (SU) have poorer HIV-related outcomes. We characterized SU and treatment across reproductive life stages among Study of Treatment And Reproductive Outcomes (STAR) participants.

Methods. The STAR is a prospective cohort of WWH and women without HIV (WWoH) across 6 Southern US sites. We analyzed baseline participant data (2021–2024) on self-reported past-year SU (nonmedical drug use, hazardous alcohol use, tobacco use, and nonmedical cannabis use), as well as drug and alcohol use treatment. We assessed SU and treatment by HIV and pregnancy status.

Results. Among 891 women (526 WWH and 362 WWoH), 12% (9% of WWH and 15% WWoH; $P = .02$) reported past-year drug use; 15%, hazardous alcohol use (11% and 20%, respectively; $P < .001$); 37%, tobacco use (34% and 41%; $P = .10$); and 45%, cannabis use (40% and 52%; $P = .001$). The most frequently used drug was crack/cocaine (61%). Among pregnant women, 7% reported past-year drug use, 12% hazardous alcohol use, 28% tobacco use, and 39% cannabis use. Among women with past-year drug use ($n = 102$), 16% reported experiencing accidental overdose, and 23% had used any drug treatment program in the past year. There was no statistically significant difference in drug treatment by HIV or pregnancy status.

Conclusions. Among reproductive-age WWH and WWoH in the Southern United States, SU was common, predominantly stimulant use with high rates of co-occurring cannabis and tobacco use. Implementation studies are needed to understand barriers and facilitators to integrating SU disorder care into HIV settings tailored to the needs of reproductive-age women.

Keywords. drug use; HIV; reproductive-age women; substance use disorders; women; women with HIV.

Reproductive-age women with human immunodeficiency virus (HIV; WWH) are highly vulnerable to poor health outcomes [1, 2], and young racial or ethnic minority WWH are prone to worse HIV-related clinical outcomes and higher mortality rates than men, white women, or older women, but these outcomes vary across reproductive life stages [3, 4]. Furthermore,

comorbid substance use (SU) disorders (SUDs) are also associated with worse HIV-related outcomes, including challenges with antiretroviral therapy (ART) adherence, poorer retention in care, and lower rates of viral suppression [5, 6]. In the United States, the HIV and SUD syndemic is prevalent among women, with SUDs diagnosed in 1 in 3 WWH [7, 8]

Drug overdose mortality rates in the United States increased during the coronavirus disease 2019 (COVID-19) pandemic, with a near-40% increase from February 2020 to August 2021, primarily driven by synthetic opioids (eg, fentanyl) and methamphetamines [9, 10]. These trends were also observed among pregnant and postpartum individuals from 2018 to 2021, with a 3-fold increase in drug overdose mortality among those aged 35–44 years [11, 12]. Strikingly, >15% of all pregnancy-associated deaths between 2017 and 2020 were attributed to drug overdose, characterized by increases in synthetic opioids and psychostimulants [12]. Some studies have found that SU patterns fluctuate across reproductive life stages. For example, one study observed decreases in SU during pregnancy and

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resumption during postpartum periods [13], and another noted overdose death risk to be highest during late postpartum periods [12]. For pregnant persons with SU or those parenting children, fear and mistrust of child welfare, health, and justice systems may lead to avoidance of such services due to anticipation of being stigmatized or fear of criminalization or loss of child custody, creating barriers to seeking SU care [14, 15].

Reproductive-age WWH in the United States are underrepresented in HIV research [16], and research at the intersection of HIV, SU, and pregnancy/postpartum status is limited. In a previous study of SU and treatment among women with or at risk for HIV in the Women's Interagency HIV Study (WIHS) cohort, we observed high rates of nonmedical drug use and higher-than-expected rates of drug treatment [17]. Among women in WIHS with past-year drug use, more than two-thirds reported crack/cocaine use and 40% reported opioid use, with high rates of concurrent tobacco (77%) and cannabis (52%) use [17]. However, the median age of the WIHS cohort was >50 years, so findings were not generalizable to reproductive-age women. Understanding contemporary patterns of SU and treatment across the reproductive life course, as well as by parenting status, may offer insight into opportunities to integrate SU care in women's health and/or HIV care settings. Here we leverage data from the Study of Treatment And Reproductive Outcomes (STAR) cohort—a prospective, observational cohort study of reproductive-age women with or without HIV in the Southern United States—to describe patterns of SU and treatment use across reproductive life stages.

METHODS

Study Population

The STAR is a longitudinal cohort study of cisgender women with or without HIV, aged 18–45 years, and enrolled in 6 Southern sites (Atlanta, Georgia; Birmingham, Alabama; Jackson, Mississippi; Chapel Hill, North Carolina; Miami, Florida; Washington, District of Columbia; [Supplementary Figure 1](#)) [18]. Women without HIV (WWoH) were recruited if they were HIV seronegative but at risk for HIV infection, based on reported high-risk exposures such as sexual or SU-related behaviors in the past 5 years, listed in [Supplementary Table 1](#). Additional details on recruitment are described in the study protocol [18].

STAR enrollment began in March 2021 and is ongoing. Data are collected through structured interviews with questionnaires, physical examination, biological specimens, and medical record abstraction. For this study, we included baseline data from participants from all sites enrolled between March 2021 and April 2024.

Patient Consent Statement

The STAR protocol was approved by the STAR single institutional review board at the University of Miami (sIRB no. 20190953), which provides regulatory oversight over all study sites. Informed consent was obtained from all participants in English or Spanish.

Definitions

Pregnancy Status. Pregnancy status was determined at time of enrollment as laboratory-confirmed pregnancy. *Postpartum* status was defined as reporting a pregnancy within the past year. *Nulliparous* indicated those who had never had a pregnancy resulting in a birth, and participants who were neither pregnant nor postpartum were those who were parous but had not had a pregnancy outcome in >1 year.

SU and Treatment. We referred to SU collectively as the use of tobacco, hazardous alcohol use, nonmedical cannabis use, or nonmedical use of drugs. Nonmedical drug use (“drug use”) was the primary outcome of this study and was defined as self-reported, nonmedical use of drugs other than cannabis in the past year, including crack or cocaine, methamphetamines, other stimulants (including other amphetamines, speedball), opioids (including heroin and speedball), sedatives (eg, barbiturates, benzodiazepines), and other drugs (“club drugs” [hallucinogens, inhalants, psychedelics, ketamine, phencyclidine (PCP)] or other drugs). Participants were not asked specifically about misuse of prescription opioids or synthetic opioids, such as fentanyl. Cannabis use (marijuana or hash) was categorized separately from drug use because its legal use varies by state and because prior studies of its use have not consistently demonstrated an association with worse HIV-related outcomes, in contrast to other drugs [19, 20]. Tobacco (cigarettes, e-cigarettes, and vaping), hazardous alcohol use, and cannabis use were secondary outcomes. Hazardous alcohol use was defined as an Alcohol Use Disorders Identification Test (AUDIT) score of ≥ 8 . Participants were asked about their history of accidental overdose.

Drug treatment and alcohol treatment use were assessed as any past-year treatment use among those who reported past-year drug use or hazardous alcohol use, respectively. We secondarily assessed treatment in the entire cohort, as some individuals in recovery, who have not had past-year drug use, may still use treatment. Drug treatment programs included self-reported use of inpatient or outpatient drug detoxification programs, halfway house, Narcotics Anonymous, prison/jail-based treatment programs, or medications for opioid use disorder (methadone, naltrexone, or buprenorphine-naloxone). Alcohol treatment programs included inpatient and outpatient alcohol treatment programs, halfway houses, Alcoholics Anonymous, and other treatment programs. Tobacco use treatment was not assessed in questionnaires. Other than receipt of naloxone

for accidental overdose and preexposure prophylaxis for HIV prevention, harm reduction strategies were not assessed in the questionnaires. Seeing a psychiatrist or counselor was also assessed as a form of SU care, but this was assessed separately from the drug treatment use outcome.

Other Covariates. The demographic, sociobehavioral, and clinical variables described (along with definitions) are shown in [Table 1](#).

Statistical Analysis

This was a descriptive study of cross-sectional data from STAR participants. We described baseline characteristics by HIV serostatus using count (percentage) and median (quartiles 1–3) for categorical and continuous characteristics, respectively. We assessed the association between these characteristics and HIV status, using χ^2 or Fisher exact tests for categorical variables and Wilcoxon rank sum test for continuous variables. We repeated this approach to examine participant characteristics by illicit drug use, and again by drug use treatment. We used descriptive statistics to assess the prevalence of SU by pregnancy status. We described drug treatment program and alcohol treatment program use by pregnancy status, among STAR participants reporting past-year drug use or hazardous alcohol use, respectively. We also reported patterns of drug use by frequency of use. Finally, we described drug treatment program use by use of stimulants, opioids, or both.

RESULTS

Baseline Demographic Characteristics

Our study included 891 women (526 WWH and 365 WWoH). The median age was 36 years (interquartile range, 29–41 years); 73.9% self-identified as non-Hispanic black, 21.6% were nulliparous, 11.0% pregnant, 7.0% postpartum, 60.4% parous but not pregnant or postpartum; and 56.5% reported parenting ≥ 1 child in their household. Nearly half had an annual income $\leq \$24\,000$ /year (44.4%) or were unemployed (49.9%), 36.5% were dependently or unstably housed, 33.3% reported a history of incarceration, and 36.5% reported depressive symptoms. Among WWH, 96.4% were engaged in HIV care in the past year, 98.3% taking ART, 92.0% had CD4⁺ cell counts $>200/\mu\text{L}$, and 84.1% were virologically suppressed ([Table 1](#)).

Patterns of SU

Overall and by HIV Serostatus. Among STAR participants, 11.6% reported drug use (9.4% for WWH and 14.7% for WWoH; $P = .02$); 14.9% hazardous alcohol use (11.3% and 20.2%, respectively; $P < .001$); 36.8% tobacco use (33.9% and 41.0%; $P = .10$); and 44.7% cannabis use (40.0% and 51.5%; $P = .001$) in the past year. Fewer than 1% reported past-year injection drug use.

Among 102 women with past-year drug use, the most frequently reported drug was crack/cocaine (60.8%), followed by sedatives (27.5%), methamphetamines (13.7%), and opioids 6.9% ([Figure 1](#)). Drugs in the “other drug use” category were also prevalent (29.4%); these were predominantly those considered club drugs, such as methylenedioxymethamphetamine (MDMA, or “ecstasy”), PCP, ketamine, and lysergic acid diethylamide (LSD, or “acid”). There were high rates of use of drugs along with other substances, including tobacco (76.5%), cannabis (62.8%), and hazardous alcohol use (39.2%).

The frequency of drug use by drug type is shown in [Supplementary Figure 2](#). Frequency of use was distributed relatively evenly for crack/cocaine use ($n = 62$), while most of those who used sedatives ($n = 28$) or club drugs ($n = 15$) used less than once weekly. In contrast, approximately half of those using methamphetamines, opioids, or cannabis reported using at least once daily.

SUs by Pregnancy Status. Among women reporting past-year drug use, 29 (28.4%) were nulliparous, 7 (6.9%) were pregnant, 2 (2.0%) were postpartum, and 64 (62.7%) were parous but neither pregnant nor postpartum; 34.3% reported taking care of children in their household. Among pregnant women who responded to SU questions ($n = 97$), 7.2% reported drug use, 12.4% hazardous alcohol use, 27.8% tobacco use, and 39.2% cannabis use in the past year. The remainder of SU patterns across the reproductive life stages are shown in [Figure 2A](#) among all STAR participants, and [Figure 2B](#) details substance types among those with past-year drug use. Across all categories of substances, prevalence was lowest among postpartum women and highest for those who were parous but neither pregnant nor postpartum. Cannabis use was the most prevalent substance used across all reproductive life stages, followed by tobacco use, and prevalence was especially high for women who were parous but neither pregnant nor postpartum, for whom cannabis and tobacco use each exceeded 40%.

History of Accidental Drug Overdose. Among women with past-year drug use who responded to questions about drug overdose ($n = 101$), 16 (15.8%) reported history of accidental overdose (7.9% in the past year and another 7.9% >1 year prior). These included 4 who were nulliparous, 1 who was pregnant, and 11 who were parous but neither pregnant nor postpartum at the time of enrollment. We did not have data on pregnancy status at time of drug overdose.

Use of Drug Treatment Services

Overall and by HIV Status. Among 102 women with past-year drug use, 61.8% had seen a psychiatrist or counselor in the past year, and 22.6% had used any drug treatment program in the past year, including 11.8% in Narcotics Anonymous and 9.8% in inpatient detoxification programs ([Table 2](#)).

Table 1. Demographic, Sociobehavioral, and Clinical Characteristics Among Women in the Study of Treatment And Reproductive Outcomes (STAR) at Baseline, by HIV Status (2021–2024)

| Characteristic | Participants, No. (%) ^a | | | P Value ^b |
|---|------------------------------------|------------------|------------------|----------------------|
| | Total (n = 891) | WWH (n = 526) | WWoH (n = 365) | |
| Demographics | | | | |
| Age, median (IQR), y | 35.5 (29.1–40.7) | 37.3 (31.4–41.6) | 31.7 (25.8–38.7) | <.001 ^c |
| Race | | | | |
| Non-Hispanic black | 657 (73.9) | 420 (80.0) | 237 (65.1) | <.001 ^c |
| Non-Hispanic white | 94 (10.6) | 42 (8.0) | 52 (14.3) | |
| Hispanic | 96 (10.8) | 44 (8.4) | 52 (14.3) | |
| Other | 42 (4.7) | 19 (3.6) | 23 (6.3) | |
| Missing | 2 | 1 | 1 | |
| STAR region | | | | |
| DC | 77 (8.6) | 32 (6.1) | 45 (12.3) | <.001 ^c |
| UNC | 90 (10.1) | 46 (8.7) | 44 (12.1) | |
| Atlanta | 231 (25.9) | 144 (27.4) | 87 (23.8) | |
| Miami | 226 (25.4) | 128 (24.3) | 98 (26.9) | |
| UAB | 179 (20.1) | 126 (24.0) | 53 (14.5) | |
| MS | 88 (9.9) | 50 (9.5) | 38 (10.4) | |
| Pregnancy status | | | | |
| Nulliparous | 192 (21.6) | 72 (13.7) | 120 (33.0) | <.001 ^c |
| Pregnant | 98 (11.0) | 65 (12.4) | 33 (9.1) | |
| Postpartum (up to 1 y) | 62 (7.0) | 37 (7.1) | 25 (6.9) | |
| Parous but notpregnant or postpartum (>1 y) | 536 (60.4) | 350 (66.8) | 186 (51.1) | |
| Missing | 3 | 2 | 1 | |
| Takes care of children (aged ≤18 y) in the home | | | | |
| No | 386 (43.5) | 208 (39.8) | 178 (48.9) | .007 ^c |
| Yes | 501 (56.5) | 315 (60.2) | 186 (51.1) | |
| Missing | 4 | 3 | 1 | |
| No. of children cared for in home | | | | |
| 0 | 386 (43.5) | 208 (39.8) | 178 (48.9) | .004 ^c |
| 1 | 195 (22.0) | 135 (25.8) | 60 (16.5) | |
| 2 | 150 (16.9) | 92 (17.6) | 58 (15.9) | |
| ≥3 | 156 (17.6) | 88 (16.8) | 68 (18.7) | |
| Missing | 4 | 3 | 1 | |
| Marital status | | | | |
| Married/partnered | 246 (27.6) | 162 (30.9) | 84 (23.0) | <.001 ^c |
| Divorced/widowed/separated | 140 (15.7) | 98 (18.7) | 42 (11.5) | |
| Never married/other | 504 (56.6) | 265 (50.5) | 239 (65.5) | |
| Missing | 1 | 1 | 0 | |
| Highest level of education | | | | |
| High school or less | 484 (54.4) | 319 (60.8) | 165 (45.2) | <.001 ^c |
| More than high school | 406 (45.6) | 206 (39.2) | 200 (54.8) | |
| Missing | 1 | 1 | 0 | |
| Employed (full or part time) | | | | |
| No | 444 (49.9) | 272 (51.9) | 172 (47.1) | .16 |
| Yes | 445 (50.1) | 252 (48.1) | 193 (52.9) | |
| Missing | 2 | 2 | 0 | |
| Annual household annual income | | ... | | |
| ≤\$24 000 | 373 (44.4) | 193 (38.8) | 180 (52.3) | <.001 ^c |
| >\$24 000 | 468 (55.7) | 304 (61.2) | 164 (47.7) | |
| Missing | 50 | 29 | 21 | |
| Housing status ^d | | | | |
| Stably housed | 565 (63.5) | 343 (65.3) | 222 (60.8) | .30 |
| Dependently housed | 260 (29.2) | 143 (27.2) | 117 (32.1) | |
| Unstably housed | 65 (7.3) | 39 (7.4) | 26 (7.1) | |
| Missing | 1 | 1 | 0 | |

Table 1. Continued

| Characteristic | Participants, No. (%) ^a | | | P Value ^b |
|--|------------------------------------|---------------|----------------|----------------------|
| | Total (n = 891) | WWH (n = 526) | WWoH (n = 365) | |
| Health insurance ^e | | | | |
| No | 114 (12.9) | 20 (3.8) | 94 (26.0) | <.001 ^c |
| Yes | 771 (87.1) | 503 (96.2) | 268 (74.0) | |
| Missing | 6 | 3 | 3 | |
| Ever jailed/incarcerated | | | | |
| No | 593 (66.7) | 343 (65.3) | 250 (68.7) | .30 |
| Yes | 296 (33.3) | 182 (34.7) | 114 (31.3) | |
| Missing | 2 | 1 | 1 | |
| Had sex for drugs, money, or shelter in past 5 y | | | | |
| No | 795 (90.7) | 474 (91.7) | 321 (89.2) | .21 |
| Yes | 82 (9.3) | 43 (8.3) | 39 (10.8) | |
| Missing | 14 | 9 | 5 | |
| Depressive symptoms ^f | | | | |
| No | 559 (63.5) | 324 (62.1) | 235 (65.6) | .28 |
| Yes | 321 (36.5) | 198 (37.9) | 123 (34.4) | |
| Missing | 11 | 4 | 7 | |
| Substance use | | | | |
| Hazardous alcohol use in past year ^g | | | | |
| No | 735 (85.1) | 455 (88.7) | 280 (79.8) | <.001 ^c |
| Yes | 129 (14.9) | 58 (11.3) | 71 (20.2) | |
| Missing | 27 | 13 | 14 | |
| Tobacco use (cigarettes, e-cigarettes, vaping) | | | | |
| No, never | 445 (50.4) | 276 (52.9) | 169 (46.8) | .10 |
| Yes, but not in past year | 113 (12.8) | 69 (13.2) | 44 (12.2) | |
| Yes, in past year | 325 (36.8) | 177 (33.9) | 148 (41.0) | |
| Missing | 8 | 4 | 4 | |
| Cannabis use | | | | |
| No, never | 266 (30.1) | 179 (34.3) | 87 (24.1) | .001 ^c |
| Yes, but not in past year | 222 (25.1) | 134 (25.7) | 88 (24.4) | |
| Yes, in past year | 395 (44.7) | 209 (40.0) | 186 (51.5) | |
| Missing | 8 | 4 | 4 | |
| Injection of drugs in past year | | | | |
| No | 874 (99.1) | 515 (98.9) | 359 (99.5) | .36 |
| Yes | 8 (0.9) | 6 (1.1) | 2 (0.6) | |
| Missing | 9 | 5 | 4 | |
| Nonmedical drug use (excluding cannabis only) | | | | |
| Yes, but not in past year | 781 (88.5) | 473 (90.6) | 308 (85.3) | .02 ^c |
| Yes, in past year | 102 (11.6) | 49 (9.4) | 53 (14.7) | |
| Missing | 8 | 4 | 4 | |
| Healthcare use | | | | |
| Healthcare provider seen in past year | | | | |
| No | 84 (9.5) | 20 (3.8) | 64 (17.7) | <.001 ^c |
| Yes | 801 (90.5) | 503 (96.2) | 298 (82.3) | |
| Missing | 6 | 3 | 3 | |
| Psychiatrist or counselor seen in past year | | | | |
| No | 490 (61.1) | 317 (62.9) | 173 (58.1) | .17 |
| Yes | 312 (38.9) | 187 (37.1) | 125 (41.9) | |
| Missing | 89 | 22 | 67 | |
| Clinical outcomes | | | | |
| HIV care in past year ^h | | | | |
| No | ... | 19 (3.7) | ... | ... |
| Yes | ... | 502 (96.4) | ... | ... |
| Missing | ... | 5 | ... | ... |

Table 1. Continued

| Characteristic | Participants, No. (%) ^a | | | P Value ^b |
|---|------------------------------------|---------------|----------------|----------------------|
| | Total (n = 891) | WWH (n = 526) | WWoH (n = 365) | |
| Currently taking ART ^h | | | | |
| No | ... | 9 (1.7) | ... | ... |
| Yes | ... | 517 (98.3) | ... | ... |
| Missing | ... | 0 | ... | ... |
| CD4 ⁺ cell count >200/ μ L ^h | | | | |
| No | ... | 38 (8.0) | ... | ... |
| Yes | ... | 436 (92.0) | ... | ... |
| Missing | ... | 52 | ... | ... |
| Viral suppression (HIV RNA <200 copies/mL) ^h | | | | |
| No | ... | 68 (15.9) | ... | ... |
| Yes | ... | 361 (84.1) | ... | ... |
| Missing | ... | 97 | ... | ... |

Abbreviations: ART, antiretroviral therapy; DC, District of Columbia; HIV, human immunodeficiency virus; IQR, interquartile range; MS, University of Mississippi; STAR, Study of Treatment And Reproductive Outcomes; UAB, University of Alabama at Birmingham; UNC, University of North Carolina; WWH, women with HIV; WWoH, women without HIV.

^aData represent no. (%) of STAR participants unless otherwise specified. Percentages are column percentages unless otherwise noted and may not total 100 due to rounding.

^bP values based on χ^2 or Fisher exact tests for categorical variables and Wilcoxon rank sum tests for continuous variables.

^cSignificant at $P < .05$.

^dIncluding health insurance, the AIDS Drug Assistance Program, and the Ryan White Program.

^eParticipants living in their own house or apartment were considered stably housed; those living on the street or beach or in a rooming/halfway house, shelter/welfare hotel, jail/other correctional facility, residential drug/alcohol treatment facility, car, assisted living, or other unstable setting were considered unstably housed; and those living in their parent's house or in someone else's house were considered dependently housed.

^fDefined as Center for Epidemiologic Studies–Depression (CESD) score ≥ 16 .

^gDefined as Alcohol Use Disorders Identification Test (AUDIT) score ≥ 8 .

^hAmong women with HIV only (n = 526).

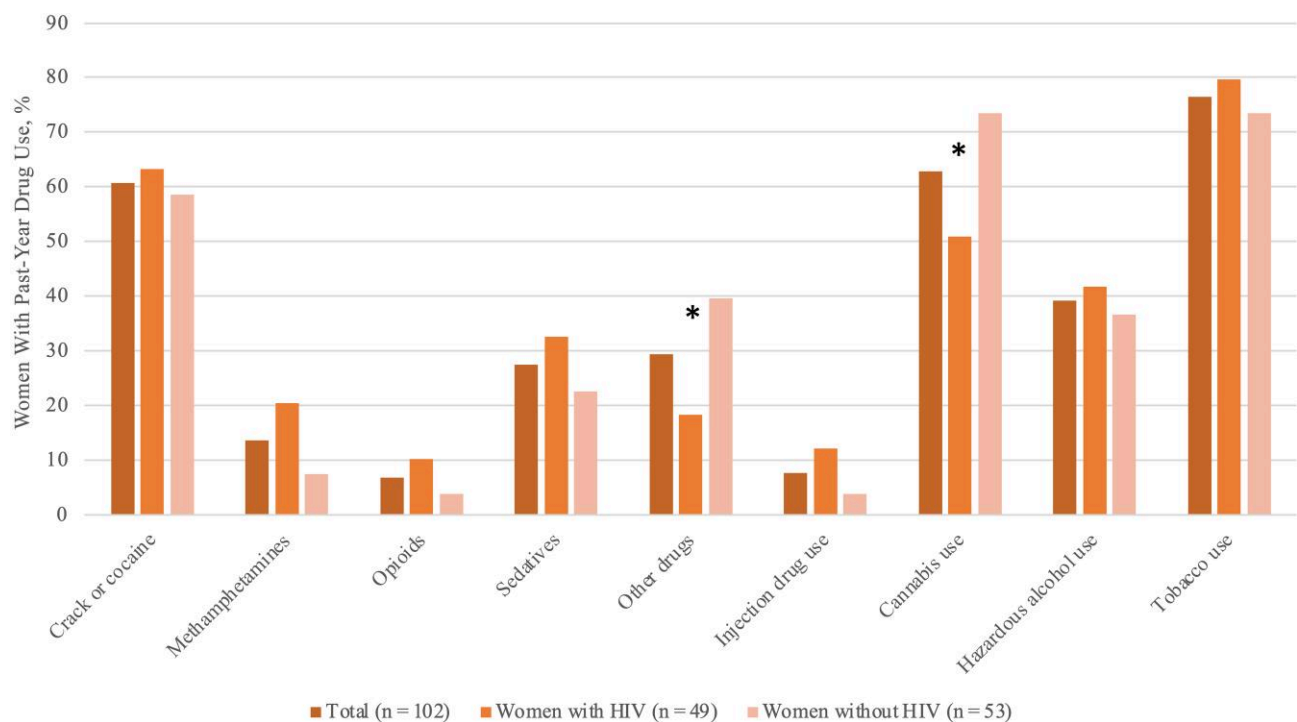


Figure 1. Types of substances used among women with past-year drug use (n = 102), by human immunodeficiency virus (HIV) serostatus. The “other drugs” category includes “club drugs” (phencyclidine [PCP], angel dust, psychedelics, hallucinogens, dimethyltryptamine, mescaline, and ketamine), as well as any other drugs reported. * $P < .05$ (statistically significant difference by HIV serostatus).

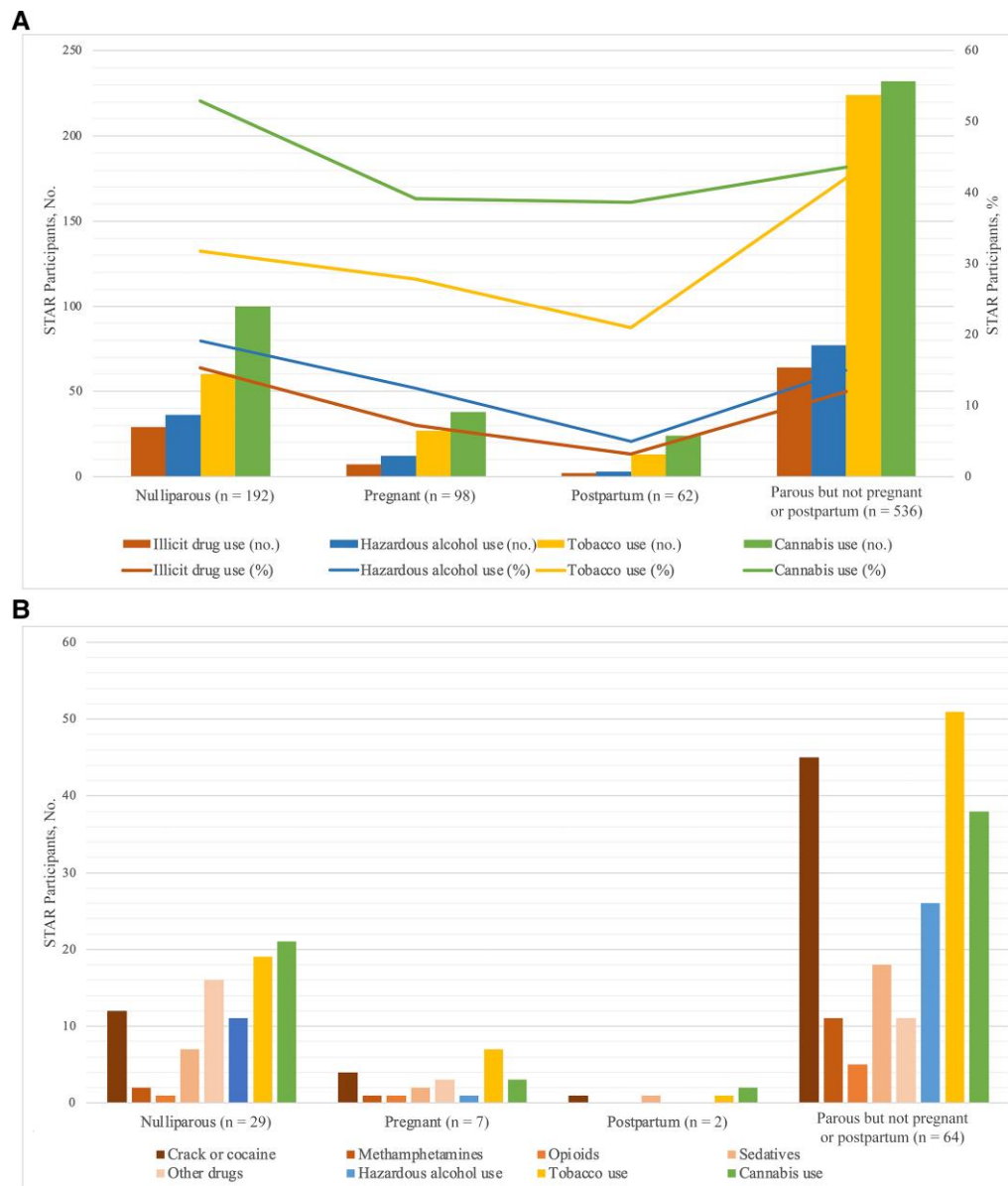


Figure 2. Patterns of types of substances across reproductive life stages among all Study of Treatment And Reproductive Outcomes (STAR) participants ($n = 887$; A) and among those with past-year drug use ($n = 102$; B). In A, the number of participants was 887 due to 4 missing substance use responses. Bars represent absolute numbers of participants using each substance, and lines show percentages. In B, bars represent absolute numbers of participants using each substance (including each type of illicit drug use), among those with past-year drug use. For B, only counts were shown rather than percentages, due to the small numbers of some of the pregnancy subgroups. The “other drugs” category includes club drugs (phencyclidine [PCP], angel dust, psychedelics, hallucinogens, dimethyltryptamine, mescaline, or ketamine), as well as any other drugs reported not already categorized.

Drug treatment was used by 11.6% of all STAR participants with drug treatment data ($n = 882$), regardless of drug use, and 1.5% of those without past-year drug use ($n = 780$). Among the 7 with opioid use, none had used methadone or naltrexone in the past year, and 1 had used buprenorphine-naloxone. However, among those who had not used opioids in the past year, another 1 used methadone, 6 used buprenorphine-naloxone, and 1 used naltrexone. There was

no difference in use of drug treatment programs by HIV serostatus (26.5% for WWH and 18.9% for WWoH; $P = .36$), nor for seeing a psychiatrist or counselor (53.2% and 71.4%, respectively; $P = .08$). Demographic, sociobehavioral, and clinical characteristics among STAR participants with past-year drug use, by use of drug treatment programs, are shown in [Table 3](#).

Table 2. Use of Drug Treatment Programs Among Study of Treatment And Reproductive Outcomes (STAR) Participants With Past-Year Drug Use, by Pregnancy Status

| | Participants, No. (%) ^a | | | | |
|--|------------------------------------|------------------|--------------------|--|-----------------|
| Treatment Type | Nulliparous (n = 29) | Pregnant (n = 7) | Postpartum (n = 2) | Parous but Not Pregnant or Postpartum (n = 64) | Total (n = 102) |
| Psychiatrist or counselor seen in past year | | | | | |
| No | 9 (36.0) | 4 (57.1) | 0 (0.0) | 21 (37.5) | 34 (38.2) |
| Yes | 16 (64.0) | 3 (42.9) | 1 (100.0) | 35 (62.5) | 55 (61.8) |
| Any drug use treatment program | | | | | |
| No, never | 23 (79.3) | 2 (28.6) | 2 (100.0) | 31 (48.4) | 58 (56.9) |
| Yes, but not in past year | 2 (6.9) | 3 (42.9) | 0 (0.0) | 16 (25.0) | 21 (20.6) |
| Yes, in past year | 4 (13.8) | 2 (28.6) | 0 (0.0) | 17 (26.6) | 23 (22.6) |
| Inpatient detoxification program | | | | | |
| No, never | 24 (82.8) | 3 (42.9) | 2 (100.0) | 38 (59.4) | 67 (65.7) |
| Yes, but not in past year | 3 (10.3) | 2 (28.6) | 0 (0.0) | 20 (31.3) | 25 (24.5) |
| Yes, in past year | 2 (6.9) | 2 (28.6) | 0 (0.0) | 6 (9.4) | 10 (9.8) |
| Outpatient detoxification program | | | | | |
| No, never | 27 (93.10) | 5 (71.4) | 2 (100.0) | 48 (75.0) | 82 (80.4) |
| Yes, but not in past year | 2 (6.9) | 1 (14.3) | 0 (0.0) | 12 (18.8) | 15 (14.7) |
| Yes, in past year | 0 (0.0) | 1 (14.3) | 0 (0.0) | 4 (6.3) | 5 (4.9) |
| Jail/prison-based treatment | | | | | |
| No, never | 29 (100.0) | 7 (100.0) | 2 (100.0) | 51 (79.7) | 89 (87.3) |
| Yes, but not in past year | 0 (0.0) | 0 (0.0) | 0 (0.0) | 12 (18.8) | 12 (11.8) |
| Yes, in past year | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (1.6) | 1 (1.0) |
| Narcotics Anonymous | | | | | |
| No, never | 27 (93.1) | 5 (71.4) | 2 (100.0) | 46 (71.9) | 80 (78.4) |
| Yes, but not in past year | 1 (3.5) | 1 (14.3) | 0 (0.0) | 8 (12.5) | 10 (9.8) |
| Yes, in past year | 1 (3.5) | 1 (14.3) | 0 (0.0) | 10 (15.6) | 12 (11.8) |
| Halfway house | | | | | |
| No, never | 29 (100.0) | 5 (71.4) | 2 (100.0) | 56 (87.5) | 92 (90.2) |
| Yes, but not in past year | 0 (0.0) | 1 (14.3) | 0 (0.0) | 6 (9.4) | 7 (6.9) |
| Yes, in past year | 0 (0.0) | 1 (14.3) | 0 (0.0) | 2 (3.1) | 3 (2.9) |
| Methadone | | | | | |
| No, never | 1 (0.0) | 0 (0.0) | N/A | 4 (80.0) | 5 (71.4) |
| Yes, but not in past year | 0 (0.0) | 1 (100.0) | ... | 1 (20.0) | 2 (28.6) |
| Yes, in past year | 0 (0.0) | 0 (0.0) | ... | 0 (0.0) | 0 (0.0) |
| Buprenorphine-naloxone in past year ^b | | | | | |
| No | 1 (100.0) | 1 (100.0) | N/A | 4 (80.0) | 6 (85.7) |
| Yes | 0 (0.0) | 0 (0.0) | ... | 1 (20.0) | 1 (14.3) |
| Naltrexone in past year ^b | | | | | |
| No | 1 (100.0) | 1 (100.0) | N/A | 5 (100.0) | 7 (100.0) |
| Yes | 0 (0.0) | 0 (0.0) | ... | 0 (0.0) | 0 (0.0) |
| Other treatment | | | | | |
| No, never | 29 (100.0) | 7 (100.0) | 2 (100.0) | 61 (95.3) | 99 (97.1) |
| Yes, but not in past year | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (1.6) | 1 (1.0) |
| Yes, in past year | 0 (0.0) | 0 (0.0) | 0 (0.0) | 2 (3.1) | 2 (2.0) |

Abbreviation: N/A, not applicable.

^aPercentages are column percentages unless otherwise noted and may not total 100 due to rounding. Absolute counts may not equal the column totals due to missing values, which are available on request.

^bOnly among those with past-year opioid use (n = 7), and only past-year treatment use could be assessed.

By Type of Substances Used (Stimulants, Opioids, or Combination). We attempted to analyze the use of drug treatment programs by use of stimulants only, opioids only, or a combination of both. However, only 1 individual in the STAR cohort reported using opioids alone, and only 6 used a combination of stimulants/opioids. Most participants (n =

62) used stimulants only. Thus, we were unable to make meaningful comparisons between the groups.

By Pregnancy and Parenting Status. Among pregnant women with past-year drug use (n = 7), 2 (28.6%) used drug treatment in the past year; neither of the 2 postpartum women with drug

Table 3. Demographic, Sociobehavioral, and Clinical Characteristics of Study of Treatment And Reproductive Outcomes (STAR) Participants With Past-Year Drug Use, by Drug Treatment Use

| Characteristic | Participants, No. (%) ^a | | | P Value ^b |
|---|------------------------------------|-----------------------------|--------------------------------|----------------------|
| | Total (n = 102) | Drug Use Treatment (n = 23) | No Drug Use Treatment (n = 79) | |
| Demographics | | | | |
| HIV serostatus | | | | |
| Seropositive | 49 (48.0) | 13 (56.5) | 36 (45.6) | .35 |
| Seronegative | 53 (52.0) | 10 (43.5) | 43 (54.4) | |
| Age, median (IQR), y | 36.8 (30.0–41.3) | 39.5 (35.1–42.7) | 35.4 (29.5–40.9) | .07 |
| Race | | | | |
| Non-Hispanic black | 59 (57.8) | 12 (52.2) | 47 (59.5) | .68 |
| Non-Hispanic white | 22 (21.6) | 7 (30.4) | 15 (19.0) | |
| Hispanic | 17 (16.7) | 3 (13.0) | 14 (17.7) | |
| Other | 4 (3.9) | 1 (4.4) | 3 (3.8) | |
| STAR site | | | | |
| DC | 9 (8.8) | 2 (8.7) | 7 (8.7) | .86 |
| UNC | 15 (14.7) | 2 (8.7) | 13 (16.5) | |
| Atlanta | 23 (22.6) | 5 (21.7) | 18 (22.8) | |
| Miami | 36 (35.3) | 9 (39.1) | 27 (34.2) | |
| UAB | 12 (11.8) | 4 (17.4) | 8 (10.1) | |
| MS | 7 (6.9) | 1 (4.4) | 6 (7.6) | |
| Pregnancy status | | | | |
| Nulliparous | 29 (28.4) | 4 (17.4) | 25 (31.7) | .46 |
| Pregnant | 7 (6.9) | 2 (8.7) | 5 (6.3) | |
| Postpartum (up to 1 y) | 2 (2.0) | 0 (.0) | 2 (2.5) | |
| Parous but not pregnant or postpartum (>1 y) | 64 (62.8) | 17 (73.9) | 47 (59.5) | |
| Takes care of children (aged ≤18 y) in the home | | | | |
| No | 67 (65.7) | 17 (73.9) | 50 (63.3) | .34 |
| Yes | 35 (34.3) | 6 (26.1) | 29 (36.7) | |
| No. of children cared for in home | | | | |
| 0 | 67 (65.7) | 17 (73.9) | 50 (63.3) | .23 |
| 1 | 12 (11.8) | 1 (4.4) | 11 (13.9) | |
| 2 | 11 (10.8) | 4 (17.4) | 7 (8.9) | |
| ≥3 | 12 (11.8) | 1 (4.4) | 11 (13.9) | |
| Marital status | | | | |
| Married/partnered | 20 (19.6) | 6 (26.1) | 14 (17.7) | .66 |
| Divorced/widowed/separated | 21 (20.6) | 4 (17.4) | 17 (21.5) | |
| Never married/other | 61 (59.8) | 13 (56.5) | 48 (60.8) | |
| Highest level of education | | | | |
| High school or less | 56 (54.9) | 12 (52.2) | 44 (55.7) | .77 |
| More than high school | 46 (45.1) | 11 (47.8) | 35 (44.3) | |
| Housing ^c | | | | |
| Stably housed | 51 (50.0) | 9 (39.1) | 42 (53.2) | .006 ^d |
| Dependently housed | 27 (26.5) | 3 (13.0) | 24 (30.4) | |
| Unstably housed | 24 (23.5) | 11 (47.8) | 13 (16.5) | |
| Employed (full or part time) | | | | |
| No | 61 (59.8) | 15 (65.2) | 46 (58.2) | .55 |
| Yes | 41 (40.2) | 8 (34.8) | 33 (41.8) | |
| Annual household annual income | | | | |
| ≤\$24 000 | 29 (29.3) | 3 (14.3) | 26 (33.3) | .11 |
| >\$24 000 | 70 (70.7) | 18 (85.7) | 52 (66.7) | |
| Missing | 3 | 2 | 1 | |
| Health insurance ^e | | | | |
| No | 21 (20.8) | 3 (13.0) | 18 (23.1) | .39 |
| Yes | 80 (79.2) | 20 (87.0) | 60 (76.9) | |
| Missing | 1 | 0 | 1 | |
| Ever jailed/incarcerated | | | | |
| No | 39 (38.2) | 4 (17.4) | 35 (44.3) | .03 ^d |

Table 3. Continued

| Characteristic | Participants, No. (%) ^a | | | P Value ^b |
|---|------------------------------------|-----------------------------|--------------------------------|----------------------|
| | Total (n = 102) | Drug Use Treatment (n = 23) | No Drug Use Treatment (n = 79) | |
| Yes | 63 (61.8) | 19 (82.6) | 44 (55.7) | .005 ^d |
| Ever had sex for drugs, money, shelter in past 5 y | | | | |
| No | 65 (63.7) | 9 (39.1) | 56 (70.9) | |
| Yes | 37 (36.3) | 14 (60.9) | 23 (29.1) | .97 |
| Depressive symptoms ^f | | | | |
| No | 41 (40.6) | 9 (40.9) | 32 (40.5) | |
| Yes | 60 (59.4) | 13 (59.1) | 47 (59.5) | |
| Missing | 1 | 1 | 0 | |
| Substance use | | | | |
| Stimulant use only | | | | .08 |
| No | 39 (38.6) | 5 (22.7) | 34 (43.0) | |
| Yes | 62 (61.4) | 17 (77.3) | 45 (57.0) | |
| Missing | 1 | 1 | 0 | >.99 |
| Opioid use only | | | | |
| No | 95 (99.0) | 20 (100.0) | 75 (98.7) | |
| Yes | 1 (1.0) | 0 (0.0) | 1 (1.3) | .13 |
| Missing | 6 | 3 | 3 | |
| Stimulant and opioid use | | | | |
| No | 96 (94.1) | 20 (87.0) | 76 (96.2) | .55 |
| Yes | 6 (5.9) | 3 (13.0) | 3 (3.8) | |
| Hazardous alcohol use ^g | | | | |
| No | 59 (60.8) | 11 (55) | 48 (62.3) | .28 |
| Yes | 38 (39.2) | 9 (45) | 29 (37.7) | |
| Missing | 5 | 3 | 2 | |
| Tobacco use (cigarettes, e-cigarettes, vaping) | | | | .008 ^d |
| No, never | 18 (17.7) | 3 (13.0) | 15 (19.0) | |
| Yes, but not in past year | 6 (5.9) | 0 (0.0) | 6 (7.6) | |
| Yes, in past year | 78 (76.5) | 20 (87.0) | 58 (73.4) | |
| Cannabis use in past year | | | | |
| No | 38 (37.3) | 14 (60.9) | 24 (30.4) | |
| Yes | 64 (62.8) | 9 (39.1) | 55 (69.6) | |
| Healthcare use | | | | |
| Healthcare provider seen in past year | | | | .71 |
| No | 11 (10.9) | 3 (13.0) | 8 (10.3) | |
| Yes | 90 (89.1) | 20 (87.0) | 70 (89.7) | |
| Missing | 1 | 0 | 1 | .23 |
| Psychiatrist or counselor seen in past year | | | | |
| No | 34 (38.2) | 5 (26.3) | 29 (41.4) | |
| Yes | 55 (61.8) | 14 (73.7) | 41 (58.6) | |
| Missing | 13 | 4 | 9 | |
| Clinical outcomes | | | | |
| HIV care in past year ^h | | | | .56 |
| No | 3 (6.1) | 0 (0.0) | 3 (8.3) | |
| Yes | 46 (93.9) | 13 (100.0) | 33 (91.7) | |
| Currently taking ART ^h | | | | >.99 |
| No | 1 (2.0) | 0 (0.0) | 1 (2.8) | |
| Yes | 48 (98.0) | 13 (100.0) | 35 (97.2) | |
| CD4 ⁺ cell count >200/μL ^h | | | | .56 |
| No | 4 (9.1) | 0 (0.0) | 4 (12.1) | |
| Yes | 40 (90.9) | 11 (100.0) | 29 (87.9) | |
| Missing | 5 | 2 | 3 | |
| Viral suppression (HIV RNA <200 copies/mL) ^h | | | | |

Table 3. Continued

| Characteristic | Participants, No. (%) ^a | | | P Value ^b |
|----------------|------------------------------------|-----------------------------|--------------------------------|----------------------|
| | Total (n = 102) | Drug Use Treatment (n = 23) | No Drug Use Treatment (n = 79) | |
| No | 11 (26.8) | 2 (20.0) | 9 (29.0) | .70 |
| Yes | 30 (73.2) | 8 (80.0) | 22 (71.0) | |
| Missing | 8 | 3 | 5 | |

Abbreviations: ART, antiretroviral therapy; DC, District of Columbia; HIV, human immunodeficiency virus; IQR, interquartile range; MS, University of Mississippi; STAR, Study of Treatment And Reproductive Outcomes; UAB, University of Alabama at Birmingham; UNC, University of North Carolina.

^aData represent no. (%) of participants unless otherwise specified. Percentages are column percentages unless otherwise noted and may not total 100 due to rounding.

^bP values based on χ^2 or Fisher exact tests for categorical variables, Wilcoxon rank sum tests for continuous variables, and *t* tests for normally distributed continuous variables.

^cIncluding health insurance, the AIDS Drug Assistance Program, and the Ryan White Program.

^dSignificant at *P* < .05.

^eParticipants living in their own house or apartment were considered stably housed; those living on the street or beach or in a rooming/halfway house, shelter/welfare hotel, jail/other correctional facility, residential drug/alcohol treatment facility, car, assisted living, or other unstable setting were considered unstably housed; and those living in their parent's house or in someone else's house were considered dependently housed.

^fDefined as Center for Epidemiologic Studies-Depression (CESD) score ≥ 16 .

^gDefined as Alcohol Use Disorders Identification Test (AUDIT) score ≥ 8 .

^hAmong women with HIV only (n = 49).

used treatment. Drug treatment was used by 26.6% of women who were parous but neither pregnant nor postpartum and 13.8% of those who were nulliparous (Table 2). There was no difference in rates of drug treatment use by pregnancy status, though the number of women in the pregnant and postpartum groups were small (n < 10 each). There were no differences in the rates of drug treatment program use by parenting status or number of children in the household.

Use of Harm Reduction Services. Among the 8 STAR participants who reported accidental overdose in the past year, half had received naloxone in the past year. In the entire STAR cohort, 19 women reported using HIV preexposure prophylaxis in the past year, of whom 1 attributed their reason for possible exposure as injection drug use.

Use of Alcohol Use Treatment Services

Overall and by HIV Status. Among 129 women with past-year hazardous alcohol use, 57.1% had seen a psychiatrist or counselor in the past year, and 7.1% had used any alcohol use treatment program in the past year. Among those who used an alcohol treatment program in the past year (n = 27), the most frequently used alcohol use treatment programs were outpatient alcohol detoxification programs (n = 6), followed by inpatient detoxification and Alcoholics Anonymous programs (n = 5 each). There was no statistically significant difference in the use of alcohol use treatment programs (overall or by type) by HIV serostatus.

By Pregnancy and Parenting Status. Among the 128 women with hazardous alcohol use and pregnancy status reported, 28.1% were nulliparous, 9.4% pregnant, 2.3% postpartum, and 60.2% parous but not pregnant or postpartum. Use of alcohol treatment programs, overall and by each type, were highest

among those who were parous but not pregnant or postpartum. Only 1 of 12 pregnant women with hazardous alcohol use reported any alcohol treatment program in the past year, and none of the 3 postpartum women reported use of alcohol treatment programs. Supplementary Table 2 shows the use of each type of alcohol treatment program, by pregnancy status.

HIV-Related Outcomes by Past-Year SU or Treatment

Among WWH (n = 526), there were no differences in any HIV-related clinical outcomes by past-year drug use. (See Supplementary Table 3 for other participant characteristics, by past-year drug use.) Among WWH with drug use (n = 49), HIV care engagement and ART use were high (>90%) regardless of drug treatment use; there were no differences in viral suppression between those who did and those who did not use drug treatment (Table 3).

DISCUSSION

In a large, prospective cohort of reproductive-age WWH and WWoH in the Southern United States, past-year drug use was common, with high rates of co-occurring tobacco and non-medical cannabis use. Among drugs, we found predominantly stimulant use with crack/cocaine. Our findings add to the literature of SU across the reproductive life stages and are aligned with the critical need to increase SU research in women [21].

The prevalence of past-year drug use in this cohort (12%) was comparable to reports of drug use in reproductive-age women from a 2014 epidemiological review [22]. Our observed prevalence of stimulant use was higher than national averages among US women, with high rates of crack/cocaine (61%) and methamphetamine use (14%) among those with past-year drug use. Considering prevalence across the entire cohort, past-year crack/cocaine use was 7.1% and methamphetamine use

was 1.6%, compared with the Substance Abuse and Mental Health Services Administration's (SAMHSA) 2023 estimates of 1.2% past-year cocaine use and 0.7% methamphetamine use among girls and women aged ≥ 12 years [23]. Notably, the largest category of stimulant use in SAMHSA's survey was prescription stimulant misuse (1.3%) [23], which STAR questionnaires do not assess. Thus, the prevalence of stimulant use in STAR may be underestimated.

The category of "other drugs" also had high prevalence at nearly 30%, driven predominantly by club drug use. Because this category of drugs encompasses several different substances, it is difficult to compare our findings with those of prior studies. Club drug use has been described as common among people living with or at risk for HIV, and it has been associated with increased sexual and HIV risk behaviors [24]. However, most of these studies have been among men who have sex with men [24–26]. Our findings may indicate a need for future studies of club drug use among reproductive-age women, especially in the context of HIV risk and prevention.

Opioid use among those with past-year drug use was low (7%) and comparable to rates reported from another cohort of reproductive-age WWH [27]. Past-year opioid use was lower than what we previously described in the WIHS cohort, where 40% of women with past-year drug use reported opioid use. These differences could reflect variation in geographic regions of study sites or the shifting trends in SU preferences, since WIHS is a longstanding cohort established in 1993, whereas STAR began enrollment in 2021. Notably, our study did not assess prescription opioid misuse, even though most opioid use in women is misuse of prescription opioids rather than heroin [23]; thus, our findings may underestimate rates of opioid misuse in US women. Finally, we observed higher prevalence of hazardous alcohol use, cannabis use, and drug use in WWoH; however, drug use was among the inclusion criteria for enrolling WWoH, which may explain the higher prevalence in this group.

As in prior published studies [13, 28, 29], we found that SU prevalence was lower during pregnancy. However, prior studies have shown a rapid return to SU in the immediate postpartum period (within <1 year), potentially due to the stressful transition to parenting roles. In contrast, we found low prevalence of SU in both pregnancy and the postpartum period, with increased SU prevalence >1 year postpartum. Interpretation of our findings is limited by the relatively small sample size of postpartum women and the cross-sectional nature of our study; we did not follow individual SU patterns over time. Distinguishing which reproductive life stages have high rates of return to SU is important to inform opportunities for interventions, especially for women who had been successful in SU cessation or reduction during pregnancy. Thus, from a research standpoint, additional longitudinal studies of SU patterns in this population are needed. From a policy standpoint, given

the alarming increase in drug overdose mortality rates among pregnant and postpartum women [9, 12], nonpunitive approaches are urgently needed to encourage pregnant and postpartum women to safely engage and persist in SU care.

Studies have reported an increase in marijuana use in women over recent years, with a range of 7%–20% [23, 27, 30, 31], possibly related to changes to legalization of marijuana in some states. In STAR, we found an even higher prevalence of cannabis use (marijuana or hash), $>40\%$ among all women and nearly 40% among pregnant women. This could reflect changes to state laws around marijuana legalization or increasing popularity among younger women, as SAMHSA reported the highest prevalence of marijuana use among 18–25-year-olds (approaching 40%), compared to those aged ≥ 26 years in the general US population [23]. Although cannabis use among people with HIV has not consistently been shown to worsen HIV-related outcomes, data suggest that maternal use of cannabis during pregnancy is associated with adverse fetal outcomes [32–35]. Together with the increasing prevalence of cannabis use, especially among younger adults [23], additional research on the effects of cannabis use on reproductive health is critical and timely.

Tobacco use was also high, at nearly 40% overall and nearly 30% among pregnant women. Unfortunately, nicotine replacement therapy and other pharmacotherapy to help quit smoking were not assessed in STAR questionnaires. Despite the teratogenic effects of nicotine [36–38] and the availability of evidence-based pharmacotherapy (eg, nicotine replacement therapy, varenicline, and bupropion) [39, 40] the US Preventive Services Task Force recommends only behavioral interventions for tobacco cessation for pregnant women, due to insufficient evidence on the risks versus benefits of pharmacotherapy for pregnant women [41]. This highlights the need for high-quality research on the safety and efficacy of pharmacotherapy for smoking cessation in pregnant women.

The prevalence of past-year drug use treatment in this cohort, $>20\%$, is higher than prior reports of $<10\%$ among reproductive-age women with SUD [31] and is relatively high considering that estimates of lifetime drug use treatment among all Americans range between 10% and 30% [42, 43]. These differences could be attributed to our study population of women, which could select for women with more engagement and access to healthcare resources. In contrast, the studies cited above were one-time surveys of the general population. In addition to drug treatment programs, $>60\%$ of those with past-year drug use saw a psychiatrist or counselor in the past year, but we could not determine whether they were seen for SUDs or other mental health needs. Interestingly, rates of drug treatment among STAR participants with drug use were half of what we found in our prior work with the WIHS cohort [17].

We initially speculated that the difference in median ages of the cohorts could influence different drug treatment

preferences. However, when we performed an informal post hoc analysis and restricted the WIHS study sites to only Southern US sites, rates of drug treatment were more comparable to STAR's. This suggests that the lower rates of drug treatment in STAR could be attributed to geographic variation rather than age. We observed low rates of use of medications for opioid use disorder among women with past-year opioid use, but the subgroup of women with opioid use was small. We found higher use of these medications among participants without past-year opioid use, which may speak to the efficacy of these medications. Importantly, the use of drug treatment did not differ by HIV status, and HIV-related clinical outcomes did not differ by drug treatment use, with high rates of HIV care engagement and ART use in both groups. This may be due to high care engagement among research participants compared with the general population.

For pregnant WWH, perinatal care is an important opportunity to optimize not only perinatal outcomes, but also HIV and SUD care engagement. During pregnancy, women have an increased number of touchpoints with the healthcare system, with typically 8–12 prenatal visits and ≥ 1 postpartum visit. This presents a unique opportunity to engage women in HIV and addiction care, in part due to increased engagement with healthcare providers and because previously uninsured women become eligible for Medicaid due to their pregnancy status. Yet, a prior study from Atlanta, Georgia revealed that despite having frequent contact with the healthcare system through prenatal visits, postpartum WWH in the Southern United States have remarkably low retention in HIV care and viral suppression [44].

Unfortunately, we lack evidence-based, effective interventions to improve these implementation gaps in the HIV/SUD care continuum for women. Novel models of care delivery to integrate HIV and SUD care have been proposed, including low-barrier care models like Seattle's MAX clinic or San Francisco's POP-UP clinic [45, 46]; however, few of these models have focused on women's health. Tailoring novel models of HIV/SUD care delivery to women's needs and preferences could address barriers to seeking and accessing SUD care. Therefore, efforts to increase SUD treatment and harm reduction uptake must focus not only on increasing access but also on exploring and understanding the perspectives of women with SUDs.

The current study has several limitations. Since the STAR recruits from Southern US cities, our findings may not be generalizable to other US regions or to rural communities. Due to stigma associated with SU, especially in pregnant and postpartum women, response or desirability bias may result in misclassification; in future work, we may explore use of techniques such as list randomization to elicit better information at the population level. This analysis uses baseline STAR data only; future longitudinal studies are needed to follow SU trends over time during reproductive transitions. Questionnaires do

not allow us to identify those with SUDs as defined by *Diagnostic and Statistical Manual of Mental Disorders* (Fifth Edition) criteria, however, we attempted to account for this by reporting SU frequency in addition to past-year use.

In conclusion, our study demonstrated high rates of SU and co-occurring SU among reproductive-age WWH and WWoH in the Southern United States with variation across reproductive life stages. Our findings from the STAR cohort reveal contemporary patterns of SU and treatment among reproductive-age women, and future implementation studies are needed to better understand the barriers and facilitators to integrating SUD care into HIV care settings tailored to the needs and preferences of reproductive-age women.

Supplementary Data

Supplementary materials are available at *Open Forum Infectious Diseases* online. Consisting of data provided by the authors to benefit the reader, the posted materials are not copyedited and are the sole responsibility of the authors, so questions or comments should be addressed to the corresponding author.

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