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Mental illness, physical and sexual abuse associated with HIV risk behaviors among adults evaluated for substance use and treatment planning in the National Addictions Vigilance Intervention and Prevention Program — United States, 2014–2019

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ABSTRACT

Background: The association between sexual and physical abuse history, mental illness, and HIV risk behaviors among persons starting treatment for substance use is not well-understood.

Methods: The study population included 216,877 US residents in the National Addictions Vigilance Intervention and Prevention Program (NAVIPPRO) from January 1, 2014–December 31, 2019. We used logistic regression models to estimate strength of pairwise association between mental illness, sexual or physical abuse histories and each of 3 HIV risk outcomes.

Results: Compared with no history of physical or sexual abuse, a history of sexual and physical abuse combined was associated with greater odds ratios for: (1) injection drug use among persons without a history of mental illness (odds ratio [OR] 2.4; 95% confidence interval [CI]: 2.3–2.6) than among persons with a history of mental illness (OR 2.0; 95% CI: 1.9–2.0); (2) prostitution conviction among persons without mental illness (OR 3.8; 95% CI: 2.8–5.1) than among persons with mental illness (OR 2.8; 95% CI: 2.4–3.4); and (3) and ≥2 sex partners within the past 30 days with a history of mental illness (OR 1.3; 95% CI: 1.2–1.4).

Conclusions: The findings imply that efforts to reduce HIV risk behaviors during and after substance use treatment can be improved by considering the patient's history of physical or sexual abuse and mental illness when providing care.

1. Introduction

As of 2019, in the United States, an estimated 1.2 million residents, 13 years and older, were living with HIV/AIDS, and an estimated 34,800 became newly infected in 2019 (Centers for Disease Control and Prevention, 2021). Adults with mental illness (e.g., psychotic, mood, or major depressive disorders) have been disproportionately affected by the HIV/AIDS epidemic (Cournos and McKinnon, 1997; Hughes et al., 2016). Estimated rates of HIV infection among persons with mental illness in the United States vary by study cohort (1.0%–22.9%) (Blank et al., 2014; Himelhoch et al., 2007; Rosenberg et al., 2001; Silberstein et al., 1994), but are greater, compared with the estimated 0.4% HIV infection among the US population aged 15–49 years (World Health Organization, 2020). Adults with mental illness are more likely to engage in HIV risk behaviors (e.g., substance use, multiple sex partners, unprotected sexual intercourse, and sex work) (Meade and Sikkema, 2005).

Persons with mental illness are also more likely to have a history of sexual or physical abuse (Chen et al., 2010; Goodman et al., 1997; Khalifeh et al., 2016). Similar to the association between mental illness diagnosis and HIV risk behaviors, persons with a history of sexual abuse are also more likely to engage in HIV risk behaviors, including substance abuse (El-Bassel et al., 2001; Liebschutz et al., 2002), having multiple sex partners (Luster and Small, 1997), having unprotected sexual intercourse (Messman-Moore et al., 2010), and working in the sex trade (El-Bassel et al., 2001).

Studies that have demonstrated associations between abuse, mental illness, and increased HIV risk-taking behavior (Meade et al., 2009; Surratt et al., 2012), did not control for the association between mental illness and sexual or physical abuse. Furthermore, previous studies regarding the association between mental illness, abuse, and HIV risk-taking behaviors did not include large samples of adults throughout the United States being evaluated for substance use treatment needs.

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We examined the pairwise associations between sexual, physical, and sexual and physical abuse combined; mental illness; and HIV risk behaviors by using a data set of observations from adults evaluated for substance use and treatment planning at sites throughout the United States. We hypothesized that adults with self-reported histories of sexual or physical abuse or mental illness would have greater odds of also reporting HIV risk behaviors, compared to participants with no histories of abuse or mental illness. We also hypothesized that, regardless of mental illness, individuals with sexual and/or physical abuse would report higher rates of HIV risk behaviors, compared with individuals with no histories of sexual and/or physical abuse.

2. Materials and methods

2.1. Data source and populations studied

Data were collected from adults evaluated for substance use disorder and treatment planning from 875 sites located in 44 US states and the District of Columbia during January 1, 2014–December 31, 2019. Adults were evaluated using the Addiction Severity Index-Multimedia Version (ASI-MV) which is part of the National Addictions Vigilance Intervention and Prevention Program (NAVIPPRO; Inflexxion, an Integrated Behavioral Health (IBH) Company (Irvine, California, USA) used the NAVIPPRO ASI-MV data collection instrument in their clinical practice. The NAVIPPRO ASI-MV, a modified version of the Addiction Severity Index (Hendricks et al., 1989), is a self-administered computerized clinical instrument used by clinicians to collect data regarding medical, employment, drug, alcohol, legal, family and social relationships, and mental illness for persons aged ≥18 years at intake in any one of the treatment centers (Butler et al., 2008). The data are de-identified and aggregated in ways that justify exemption of studies using the data from institutional review board review and approval. The ethical integrity of the study was ensured by CDC ethics officials not involved in the conduct of the study.

2.2. Analytic sample selection

The NAVIPPRO ASI-MV data set comprised 369,598 observations, with 57,551 (15.6%) being repeated observations from the same individual (Supplemental Figure 1). We included one observation from each of 312,047 unique individuals from the most recent date of ASI-MV assessment completion. We excluded from analysis adults who did not have data regarding HIV diagnosis, sexual or physical abuse, or mental illness diagnosis (n = 93,794). We further excluded 8 observations with missing age and 1368 observations with ages 0 to 17 years at the interview, leaving a sample of 216,877 observations. We excluded persons <18 years or with missing ages because of uncertain reliability of responses concerning substance use, mental health, multiple sex partners, and criminal prostitution conviction obtained from persons <18 years of age.

2.2.1. Final analytic samples for 3 outcome measures

For the criminal prostitution conviction HIV risk factor model, 1104 of available observations were excluded in the analytic sample because of missing information regarding criminal prostitution conviction, and 151,580 males or adults of unknown sex or gender identity were excluded because of model convergence failure for male and transgender female adults convicted of prostitution. The final analytic sample for modeling the prostitution conviction outcome included 64,193 females (Supplemental Figure 1). The final HIV risk model of individuals with ≥2 sex partners comprised 29,044 adults; 86.6% of adults (n = 187,833) were excluded from the analytic sample because of missing information regarding the number of sex partners during the previous 30 days. The final analytic sample for the injection drug use model included 216,877 adults with non-missing responses to questions about injection drug use.

2.3. Study outcome measures

The study outcome measures of interest were as follows: injection drug use (yes or no/not reported), criminal conviction for prostitution among females (yes or no), and number of sex partners within the 30 days before treatment evaluation (high [≥2 persons] or low [0–1 persons]).

2.4. Study independent (exposure) variables

The primary independent (exposure) variables were histories of sexual or physical abuse or diagnosis of mental illness. Using abuse history, adults were classified into non-overlapping categories named sexual abuse only, physical abuse only, sexual and physical abuse combined, or no abuse. To be considered in an abuse category, individuals must have reported abuse occurring within 30 days before treatment evaluation or anytime during the respondent's lifetime. An individual with a self-reported history of mental illness must have received at some point in their lifetime a professional diagnosis of depression or mood disorder; manic depression or bipolar illness; anxiety or nervous disorder; phobia; panic disorder; obsessive-compulsive disorder; eating disorder; posttraumatic stress disorder; multiple personality disorder; other personality disorders; psychotic or thought disorders; schizophrenia or a paranoid, delusional disorder; or dissociative disorder.

Potential effect modifiers and confounders of the association between pairs of exposure and outcome variables in the regression models included sex or gender identity (male, female, or missing/transgender), race/ethnicity, age (18–24, 25–29, 30–39, 40–49, and ≥50 years), level of education completed (less than high school to high school/GED for the prostitution conviction model or ≥4 years of college for other models), employment status (full time, parttime, unemployed, or other — student, retired, resident of a corrections facility or inpatient hospital, homemaker, or disabled) housing status for the previous 3 years (private residence, no stable residence, or other — halfway house, supervised living facility, corrections facility, or hospital), and marital status (married/cohabitating; single/never married; or single by divorce, separation or widowhood). We also adjusted the measures of association (odds-ratios) for self-reported history of other medical conditions, which included the following: frequent headaches or migraines; epilepsy or seizure disorder; asthma or breathing problems; emphysema or chronic obstructive pulmonary disease; tuberculosis; cardiovascular or heart disease; high blood pressure; diabetes; liver disease; bleeding when throwing up or using the restroom; pancreatitis; ulcers, gastritis, or other stomach problems; arthritis or joint pain; neuropathy; weakness, numbness, or pain in hands or feet; cancer; or chronic or persistent pain.

2.5. Data analyses

We conducted univariable, bivariable and multivariable regression analyses with frequency tabulations and chi-square tests to determine differences in the prevalence of HIV risk behaviors among those who had experienced abuse or had received a diagnosis of a psychological or mental disorder. These analyses were performed for each of the following HIV risk behaviors as the outcome variable within their corresponding analytic samples: injection drug use, criminal prostitution conviction among females, and having had two or more sex partners during the past 30 days before treatment evaluation. To ensure regression model convergence, we used logistic regression analyses to examine the association of independent variables as potential confounders or effect modifiers with each HIV risk behavior as the dependent variable in a separate model. Because of correlation between abuse and mental illness variables, we fit a separate logistic regression model for each category of mental illness in assessing the associations between abuse histories and HIV risk behaviors (Burnam et al., 1988). We performed log likelihood ratio tests to assess interaction between independent variables. Interaction terms with a significant value (P <0.05) were placed in the

adjusted model. We compared crude and adjusted odds ratios (aORs) to control for confounding among independent variables. We also conducted multivariable regressions with backward elimination based on log likelihood ratio tests (P <0.05) to assess the association of abuse and HIV risk factors, controlling for demographic characteristics. For variables with >10% missing observations, we included a "missing" category in the univariate and multivariate analyses to identify any statistically significant effects of missing values on odds ratios (ORs). Hosmer and Lemeshow goodness-of-fit test ensured model goodness of fit with P >0.05. Analyses were conducted by using SAS version 9.4 (SAS Institute, Inc., Cary, North Carolina, USA).

3. Results

3.1. Demographic characteristics by HIV risk cohort

Regardless of HIV risk cohort type of reported abuse, or mental illness diagnosis, the greatest percentage of adults were non-Hispanic whites, aged 30–39 years, high school educated, single and never married, HIV-negative, and living in a private residence for the previous 3 years (Table 1). The majority of adults who reported sexual abuse or sexual and physical abuse combined also had a mental illness diagnosis, regardless of HIV risk model (Supplemental Table 1). For adults who reported physical abuse only, only adults included in the criminal conviction for prostitution cohort had a majority of mental illness (50.6%; n = 942/1863). Of adults reporting mental illness in the cohorts of injection drug use, criminal conviction for prostitution, and number of sex partners within the 30 days before treatment evaluation, 68.1% (n = 65,598/96,389), 77.2% (n = 33,053/42,841), and 69.5% (n = 9488/13,659) had a combination of ≥2 disorders, respectively (Supplemental Table 2).

3.2. Logistic regression modeling by HIV risk

The majority of adults did not have an HIV risk factor of interest. Among adults without a reported mental illness, the percentage of injection drug use, criminal conviction for prostitution, and high number of sex partners was 13.9% (n = 16,694/120,488), 0.9% (n = 198/21,352), and 8.6% (n = 1330/15,454), respectively (Supplemental Tables 3–5). In contrast, for adults with mental illness, the percentage of injection drug use, conviction for prostitution, and high number of sex partners was 31.9% (n = 30,766/96,389), 2.7% (n = 1149/42,841), and 10.8% (n = 1477/12,182), respectively (Supplemental Tables 3–5). Univariate analysis was performed to evaluate the association between demographic and medical conditions and HIV risk (Supplemental Tables 3–5) before conducting multivariate analysis.

3.2.1. Injection drug use among adults by mental illness

For the injection drug use model, only univariate logistic regression was performed because multiple variables, including sex/gender identity, race/ethnicity, age, and housing interacted with the abuse variable for the mental illness and no mental illness regression models. Among the interaction variables, all adults who reported having experienced sexual and physical abuse combined had greater odds of injection drug use, regardless of mental illness, compared with no abuse (Table 2). The association of injection drug use among adults who reported having experienced either sexual or physical abuse only was variable and depended on the interaction variable of mental illness (Supplemental Table 3).

For the other noninteraction variables measured, adults with <4 years of college, non-full-time employment, not married or living as married, and living with HIV/AIDS had greater odds of injection drug use among adults with no mental illness (Supplemental Table 3). Among adults with a mental illness, persons with a self-reported medical comorbidity had greater odds of injection drug use, compared with adults without a comorbidity (Supplemental Table 3).

3.3. Multivariable regression analyses

To estimate strength of association between pairs of exposure and outcome variables, multivariable regression analyses were performed for the models regarding prostitution conviction and multiple sex partners. In these analyses, adults with a history of sexual and physical abuse combined, regardless of mental illness, had greater odds of the measured HIV risk behaviors, compared with adults with no abuse history.

3.3.1. Prostitution criminal conviction and multiple sex partners among adults without mental illness

Adults without mental illness who experienced sexual and physical abuse combined had greater odds of having a prostitution criminal conviction (adjusted odds ratio [aOR] 3.3; 95% confidence interval [CI]: 2.4–4.6) and having had multiple sex partners within the previous 30 days (aOR 1.8; 95% CI: 1.5–2.2), compared with adults with no abuse. Among adults experiencing either sexual or physical abuse, the association with HIV risk factors varied by mental illness diagnosis in the multivariate models (Supplemental Tables 4 and 5). Adults without mental illness who had experienced either physical or sexual abuse had greater odds of a conviction for prostitution, compared with adults without either abuse (aOR 2.2; 95% CI: 1.2–4.1 and aOR 3.5; 95% CI: 1.9–6.6, respectively). However, neither physical nor sexual abuse was associated with increased odds of multiple sex partners within past 30 days among adults with no mental illness (Supplemental Table 4).

In the multivariable models, other factors were associated with the HIV risk behavior among adults without mental illness. Being non-Hispanic black, aged ≥30 years, non-full time employment, single and never married, and housed in a non-private residency were associated with prostitution conviction (Supplemental Table 5). Characteristics associated with multiple sex partners within the past 30 days included being male; being non-Hispanic white, Hispanic, or other race/ethnicity; being aged ≥25 years; having <4 years of college education; being employed parttime or being unemployed; being single; not having a private residency; and having a medical comorbidity (Supplemental Table 4).

3.3.2. Prostitution criminal conviction and multiple sex partners among adults with mental illness

Adults with mental illness and those who reported having experienced sexual and physical abuse combined had greater odds of having been convicted for prostitution among adults with less than a high school diploma (aOR 2.2; 95% CI: 1.6–2.9) and with a high school diploma or GED (aOR 3.3; 95% CI: 2.6–4.2), compared with those without an abuse history. Also, among adults with mental illness, both males and females who reported having experienced sexual and physical abuse combined had greater odds of having had multiple sex partners, compared with adults without abuse (aOR 1.3; 95% CI: 1.1–1.5 and aOR 1.7; 95% CI: 1.5–1.9, respectively). For adults who reported having experienced either sexual or physical abuse only, those with less than a high school diploma and sexual abuse only had greater odds of having had a prostitution conviction (aOR 2.4; 95% CI: 1.3–4.3), compared with no abuse. Also, females who experienced physical abuse only had greater odds of having had multiple sex partners within past 30 days (aOR 1.5; 95% CI: 1.1–2.1), compared with females with no sexual abuse. Physical abuse was not associated with prostitution conviction among females or multiple sex partners among males (Supplemental Tables 4 and 5). Sexual abuse among males was also not associated with having had multiple sex partners within the past-30 days (Supplemental Table 4).

Other variables were associated with HIV risk behaviors among adults with mental illness. For the model regarding prostitution conviction, variables associated with the outcome included race/ethnicity of non-Hispanic black or other race, being aged >24 years, not being employed full-time, marital status of single and never married, not having a private residence, and a having medical comorbidity (Supplemental Table 5). Also, being non-Hispanic white, Hispanic, or other race; being aged 18–49 years; having <4 years of college education; being employed

Table 1
HIV risk behavior by demographic, sexual and physical abuse history, medical, and mental illness characteristics, among adults entering substance use treatment programs participating in the National Addictions Vigilance Intervention and Prevention Program — United States, 2014–2019.

Characteristic	HIV risk factor[a]					
	Injection drug use (n = 216,877)		Criminal conviction for prostitution (n = 64,193)		≥2 sex partners during previous 30 days (n = 29,044)	
	N	%	N	%	N	%
Self-reported mental illness[b]						
Yes	30,766	31.9	1149	2.7	1477	10.8
No	16,694	13.9	198	0.9	1330	8.6
Abuse						
Sexual and physical abuse combined	18,780	38.0	1044	3.2	836	11.6
Physical abuse only	1388	19.8	30	1.6	81	8.4
Sexual abuse only	950	25.0	40	2.1	53	9.7
No sexual or physical abuse	26,342	16.8	233	0.8	1837	9.0
Sex/gender identity						
Male	21,534	18.9	—	—	1842	10.5
Female	18,080	28.0	1347	2.1	953	8.3
Other/missing	7846	20.5	—	—	12	22.2
Race/ethnicity						
White, non-Hispanic	38,981	28.0	773	1.8	1701	8.6
Black, non-Hispanic	2053	5.8	361	4.9	510	14.1
Hispanic	3499	13.1	99	1.4	348	10.7
Other[c]	2926	18.4	114	2.1	248	10.7
Missing	1	17	0	0	0	0
Age, years						
18–24	7008	16.8	103	0.9	724	13.4
25–29	11,213	25.9	212	1.5	622	10.7
30–39	17,899	26.5	453	2.1	893	9.0
40–49	7077	19.6	369	3.6	374	7.7
≥50	4263	15.0	210	3.0	194	6.4
Highest education level						
Less than high school	12,053	24.3	495	3.3	684	10.2
High school/GED[d]	21,783	24.2	846	1.7	1219	9.7
<4 years of college	11,546	20.7	—	—	711	9.7
≥4 years of college	2021	9.8	—	—	186	7.9
Missing/unknown	57	17.5	6	6.1	7	19.4
Employment status						
Full-time	15,767	15.1	234	1.0	1324	8.9
Parttime	10,294	24.7	251	1.8	616	10.5
Other[e]	10,871	25.4	424	2.6	480	9.5
Unemployed	10,469	37.4	429	4.2	384	12.1
Missing	59	16.5	9	9.0	3	11.1
Marital status						
Married/living as married	9041	19.6	233	1.6	247	3.2
Single (divorced/separated/widowed)	12,121	25.3	372	2.2	634	10.6
Single (never married)	26,248	21.4	742	2.3	1926	12.6
Unknown/missing	50	24.6	0	0	0	0
Housing during previous 3 years						
Private residence	38,680	19.8	993	1.7	2462	9.1
No stable residence	4791	45.7	237	5.6	207	19.5
Other[f]	3924	36.4	114	5.7	134	15.7
Missing/unknown	65	22.8	3	4.1	4	16.7
Self-reported HIV/AIDS infection						
Yes	447	30.3	81	24.7	24	17.8
No	47,013	21.8	1266	2.0	2783	9.6
Self-reported medical comorbidity[g]						
Yes	28,137	28.9	990	2.8	1241	9.8
No	18,180	16.0	307	1.1	1483	9.5
Missing	1143	20.4	50	3.2	83	11.5

[a] Compliment categories of no/missing injection drug use, no criminal prostitution conviction, and ≤1 sexual partners not shown.
[b] Medically diagnosed mental illnesses were self-reported and included depression or mood disorder; manic depression or bipolar illness; anxiety or nervous disorder; phobia; panic disorder; obsessive-compulsive disorder; eating disorder; posttraumatic stress disorder; multiple personality disorder or other personality disorders; psychotic or thought disorders; and schizophrenia or a paranoid, delusional disorder, or dissociative disorder.
[c] Other race includes being non-Hispanic American Indian/Alaskan Native, Asian/Pacific Islander, Hawaiian, or any race not listed.
[d] Criminal prostitution conviction model combines all forms of education at high school/GED level and higher because of small cells size when stratified by abuse.
[e] Other employment includes being a resident of a prison/jail or inpatient hospital, or being a student, homemaker, retired, or disabled.
[f] Other housing includes residence in a prison/jail, inpatient hospital, or half-way house.
[g] Medical comorbidity, not including HIV, includes the following: frequent headaches or migraines; epilepsy or seizure disorder; asthma or breathing problems; emphysema or chronic obstructive pulmonary disease; tuberculosis; cardiovascular or heart disease; high blood pressure; diabetes; liver disease; bleeding when throwing up or using the restroom; pancreatitis; ulcers, gastritis, or other stomach problems; arthritis or joint pain; neuropathy; weakness, numbness, or pain in hands or feet; cancer; or chronic or persistent pain.

Table 2
Adjusted odds ratios (95% confidence intervals) indicating strength of association between injection drug use and sexual and physical abuse, stratified by demographic, medical, and mental illness characteristics, among adults entering substance use treatment programs participating in the National Addictions Vigilance Intervention and Prevention Program — United States, 2014–2019.

Characteristic	Adjusted odds ratio (95% confidence interval)	
	No mental illness[a]	Mental illness[a]
Sexual and physical abuse (Ref., no abuse)		
Sexual and physical abuse combined	2.4 (2.3–2.6)	2.0 (1.9–2.0)
Sexual and physical abuse combined (Ref., no abuse) stratified by variables		
Sex/gender identity		
Male	2.4 (2.2–2.6)	1.8 (1.7–1.9)
Female	2.7 (2.5–2.9)	2.3 (2.2–2.5)
Missing/transgender	2.6 (2.3–3.0)	1.9 (1.7–2.0)
Race/ethnicity		
White, non-Hispanic	2.2 (2.1–2.3)	1.9 (1.8–2.0)
Black, non-Hispanic	1.4 (1.04–1.9)	1.5 (1.3–1.7)
Hispanic	3.0 (2.5–3.6)	2.1 (1.9–2.3)
Other[b]	3.6 (3.0–4.3)	2.1 (1.9–2.4)
Age, years		
18–24	3.4 (3.0–3.9)	2.5 (2.3–2.7)
25–29	2.6 (2.3–2.9)	1.8 (1.6–1.9)
30–39	2.0 (1.8–2.2)	1.8 (1.7–1.9)
40–49	2.2 (1.9–2.5)	1.9 (1.8–2.1)
≥50	2.4 (2.0–2.8)	2.0 (1.9–2.2)
Highest level of education		
Less than high school	…	1.9 (1.8–2.0)
High school/GED	…	1.8 (1.7–1.9)
Less than 4 years of college	…	2.0 (1.9–2.1)
≥4 years of college	…	2.7 (2.4–3.0)
Employment status		
Full-time	…	1.9 (1.8–2.0)
Partime	…	1.8 (1.7–1.9)
Other[c]	…	2.0 (1.9–2.2)
Unemployed	…	1.7 (1.6–1.8)
Marital status		
Married/living as married	…	2.5 (2.3–2.6)
Single (divorced/separated/widowed)	…	2.0 (1.9–2.1)
Single (never married)	…	1.8 (1.8–1.9)
Housing during previous 3 years		
Private residence	2.4 (2.3–2.6)	1.9 (1.9–2.0)
No stable residence	1.6 (1.3–1.9)	1.5 (1.3–1.6)
Other[d]	2.0 (1.6–2.5)	2.1 (1.9–2.3)
Self-reported medical comorbidity[e]		
Yes	2.0 (1.8–2.1)	. . .
No	2.5 (2.3–2.7)	. . .

indicates variable not stratified by sexual and physical abuse combined.

[a] Medically diagnosed mental illnesses were self-reported and included depression or mood disorder; manic depression or bipolar illness; anxiety or nervous disorder; phobia; panic disorder; obsessive compulsive disorder; eating disorder posttraumatic stress disorder; multiple personality disorder; personality disorders; psychotic or thought disorders; and schizophrenia or a paranoid, delusional disorder, or dissociative disorder.

[b] Other race includes being non-Hispanic American Indian/Alaskan Native, Asian/Pacific Islander, Hawaiian, or any race not listed.

[c] Other employment includes being in residence in a prison/jail or inpatient hospital, student, homemaker, retired, or disabled.

[d] Other housing includes residence in a prison/jail, inpatient hospital, or half-way house.

[e] Medical comorbidity, not including HIV, includes the following: frequent headaches or migraines; epilepsy or seizure disorder; asthma or breathing problems; emphysema or chronic obstructive pulmonary disease; tuberculosis; cardiovascular or heart disease; high blood pressure; diabetes; liver disease; bleeding when throwing up or using the restroom; pancreatitis; ulcers, gastritis, or other stomach problems; arthritis or joint pain; neuropathy; weakness, numbness, or pain in hands or feet; cancer; or chronic or persistent pain.

parttime or being unemployed; and not having a private residence or a medical comorbidity was associated with having had multiple sex partners during the past 30 days (Supplemental Table 4).

4. Discussion

Our study determined that, a history of mental illness (compared with no history of mental illness) increased the strength of association (adjusted odds ratio) between a combined history of sexual and physical abuse and a history of injection drug use from 2.0 to 2.4 times as high as that for a history of no abuse among adults evaluated for substance use disorder and treatment planning during 2014–2019. In contrast, having a history of sexual or physical abuse alone was not consistently associated with increased odds ratio for injection drug use. We also determined that, regardless of mental illness, indicators of lower SES (e.g., an education level less than a high school/GED diploma, being single, lacking a private residency, and non–full-time employment) were associated with greater odds ratio of having had a criminal prostitution conviction and having had multiple sex partners.

Similar to our results, a previous study among adolescents who had experienced physical and sexual abuse reported that the co-occurrence of both forms of abuse are associated with the HIV risk behaviors of intravenous drug use, sexually transmitted diseases, positive HIV results, and anal sex without a condom (Bensley et al., 2000). However, our study differed from prior studies that measured sexual abuse and HIV risk behaviors (Bensley et al., 2000; El-Bassel et al., 2001;

Liebschutz et al., 2002; Luster and Small, 1997; Messman-Moore et al., 2010), because we identified inconsistent associations of sexual abuse with HIV risk behavior. This might be the result of the different types of HIV risk variables we measured, cohorts, period of collection, or the type of sexual abuse the study participants experienced. For example, we were unable to differentiate the timing other than the past 30 days and extent of sexual abuse, because early and chronic sexual abuse experienced in childhood is associated with increased HIV risk behavior (Bensley et al., 2000).

Another key finding of our study was that the odds of HIV risk behavior among adults with substance use were similar, regardless of mental illness diagnosis. Even so, our data revealed a stronger association between physical/sexual abuse and injection drug use among adults with a history of mental illness, compared with those without that history. However, if the adults, particularly those with sexual abuse histories, had undiagnosed mental illness is unclear. An increased risk for mental illness has been associated with a history of sexual and physical abuse (Chen et al., 2010). Discerning if clients entering substance use treatment facilities have mental illness or are at risk for mental illness might influence the types of care needed, including HIV prevention care. For example, although HIV preventive care decreases HIV risk behavior among persons with substance use and mental illness (Carey et al., 2004), the efficacy is reduced among this population (Berkman et al., 2005).

Although the aim of our study was to explore the association between abuse and HIV risk factors by mental illness, we also identified other SES factors that were associated with HIV risk behaviors among adults assessed for substance use and treatment planning. In the adjusted models for HIV risk factor outcomes of criminal prostitution conviction and multiple sex partners, we determined that adults with lower levels of education, less than full-time employment, and non-private housing to be more likely to have HIV risk behaviors. These results were anticipated because social disadvantage is associated with increased likelihood of prostitution and having multiple sex partners (Raiford et al., 2014). Our data also reveal that females aged ≥30 years were more likely to have a history of prostitution conviction, compared with those aged <30 years. The age distribution of females with prostitution convictions in our 2014–2019 sample was different from that in the 1990–2010 sample of people arrested for prostitution described by Snyder et al. (Snyder, 2012). However, this might be because our sample was from a large data set and was different from the sample analyzed by Snyder et al. Or, it might be that the older females in our study were more likely to be arrested and convicted of prostitution in 2014–2019 because of longer duration of sex work. We also determined that, compared with non-Hispanic blacks, non-Hispanic whites had greater odds of having had multiple sex partners in our adjusted model. A previous adjusted model revealed no difference between whites and blacks regarding number of sex partners (Hallfors et al., 2007). However, our study differed slightly because it included a greater number of adults, wider age ranges, more SES-dependent variables, and adults assessed for substance use. Furthermore, our study asked adults to report number of sex partners during the previous 30 days, while the Hallfors study used a recall period of 365 days (1 year).

Our study had at least 8 limitations. First, responses to the screening questions might have been biased in favor of socially desirable responses selectively recalled because of sensitive questions regarding sex, mental health, physical, sexual and substance use. Second, we could not differentiate the type of sexual and physical abuse, whether the abuse occurred during childhood and/or adulthood, nor the frequency of abuse. Third, we were unable to separate adults by mental illness diagnosis because the majority of adults with mental illness had multiple diagnoses. Fourth, mental illness diagnosis has been associated with either increased or decreased HIV risk behavior (Meade and Sikkema, 2005). Fifth, we were unable to determine if adults with a mental illness had been experiencing symptoms while participating in an HIV risk behavior or if their symptoms and signs were in remission from treatment. Sixth, although the study had a large sample size, we did not have a sample representative of the U.S. population of people assessed for substance use treatment needs during 2014–2019. Seventh, the number of adults included in the analysis are not representative of adults within the ASI-MV dataset because of the high number of excluded adults for some of our models. Therefore, we cannot clearly define the population not studied to which the results can be generalized. Lastly, the samples differed in consistency by outcome measures.

Despite these limitations, however, our results can assist clinicians and health care workers, particularly those providing HIV-related services to the ~300,000 people assessed for substance use and treatment needs within the NAVIPPRO ASI-MV network during 2014–2019. Our study examined associations between abuse history and HIV risk behaviors by mental illness. A history of physical and sexual abuse might indicate high risk for acquiring or transmitting HIV infection to others, regardless of mental illness history. Clinicians who are prescribing and implementing treatment plans for clients who inject drugs, similar to those in this study, might consider prescribing harm reduction services such as syringe service programs, and housing services if needed to reduce physical and mental health problems described in our findings. Furthermore, clinicians might consider the impact of SES status, such as lack of employment and single relationship status on their clients' mental health and provide positive coping mechanisms in place of substance use.

Future studies with targeted data are needed to understand the interactions of social status, past experiences with physical or sexual abuse, mental illness, sexual and drug use behaviors in mediating the need for treatment for mental health, substance use, and infectious diseases such as HIV/AIDS. Furthermore, posttreatment longitudinal studies regarding persons with physical and mental (psychological) diagnoses and abuse histories are needed to understand the efficacy of different combinations of treatments on the basis of mental illness, substance use, and physical or sexual abuse history.

Declaration of Competing Interest

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Note

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.dadr.2021.100009.

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