



# Correlates of Transactional Sex and Violent Victimization among Men Who Inject Drugs in Los Angeles and San Francisco, California

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**Abstract** Men who inject drugs (MWID) and engage in transactional sex (i.e., receive money or drugs in exchange for sex) are vulnerable to HIV and violence. However, MWID who engage in transactional sex have been less studied than women. We examine factors associated with transactional sex among MWID in Los Angeles and San Francisco and whether transactional sex is associated with violent victimization. MWID were recruited using targeted sampling methods in 2011–2013 and completed surveys that covered demographics, drug use, HIV risk, violence, transactional sex, and other items. Multivariable logistic regression was used to (1) determine factors independently associated with transactional sex and (2) determine if transactional sex was independently associated with violence victimization in the last 6 months among MWID. An interaction term between income source and sexual identity was included in the transactional sex model. Of the 572 male PWID in the sample, 47 (8%) reported transactional sex in the past 6 months. Self-reported HIV infection was 7% for MWID who did not report transactional sex, 17% for MWID who reported transactional sex, and

24% for MWID who reported transactional sex and reported gay or bisexual identity. In multivariable analysis, transactional sex was positively associated with gay or bisexual identity (GB without illegal income adjusted odds ratio [AOR] = 5.16; 95% confidence interval [CI] = 1.86–14.27; GB with illegal income AOR = 13.55, CI = 4.57–40.13), coerced sex in the last 12 months (AOR = 11.66, CI = 1.94–70.12), and violent victimization in the last 12 months (AOR = 2.31, CI = 1.13–4.75). Transactional sex was negatively associated with heroin injection (last 30 days) (AOR = 0.37; 95% CI = 0.18–0.78). Transactional sex was independently associated with violent victimization in the last 12 months (AOR = 2.04; 95% CI = 1.00–4.14) while controlling for confounders. MWID who engaged in transactional sex are at elevated risk for HIV and multiple forms of violent victimization. Interventions focused on this at-risk subpopulation are urgently needed and should include access to substance use disorder treatment, victimization services, and harm reduction services across the HIV care continuum.

**Keywords** Persons who inject drugs · Transactional sex · Violence

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## Introduction

Men who inject drugs (MWID) are at heightened risk for HIV infection via injection and sexual practices [1, 2]. One sexual behavior that could place MWID at increased risk for HIV is transactional sex, defined as

exchanging sex for money or drugs [3–6]. Research examining transactional sex has mostly focused on women, including women who inject drug, and has largely neglected to examine MWID. Research focusing on transactional sex among men has often focused on men who have sex with men (MSM), with little or no focus on MWID engaged in transactional sex [7–9]. Therefore, we do not have a clear understanding about transactional sex experiences among MWID [10]. Studying MWID is important for identifying and understanding the specific associations and circumstances that MWID experience, which could differ from the broader MSM population.

One study examining transactional sex among MWID in New York City found gay and bisexual identity, cocaine use, methamphetamine use, and syringe sharing to be associated with transactional sex [11]. Another study among MWID in Vancouver found transactional sex to be associated with HIV-positive status, daily crack smoking, injecting cocaine, syringe sharing, and inconsistent condom use with casual sex partners [12]. These studies suggest that there may be an interplay between drug use behaviors, sexual behaviors, and sexual identity which should be explored further.

Further, research has demonstrated that MWID who have sex with men (MSM-MWID) are more likely to engage in behaviors that place them at risk for HIV and are more likely to be HIV positive, compared to non-MSM MWID [13, 14]. For example, two studies found that MSM-MWID had higher HIV prevalence than MWID who did not have sex with men [15, 16]. This could be because the concurrence of drug use and sex creates a “synergistic effect” in which HIV transmission risk is markedly increased [17]. Stimulants such as cocaine [18] or methamphetamines may create a greater synergy between sex and drugs for MWID [19]. It is also possible that sexual identity, sexual behaviors, and drug use could impact rates of transactional sex. For example, two studies in New York City found MWID who identified as gay or bisexual were more likely to engage in transactional sex [10, 11]. These studies suggest there is a need to better understand the intersections of drug use, sexual behaviors, and sexual identity.

Syndemic theory posits that biological diseases cluster across groups of people, usually among disadvantaged groups, in a synergistic way [20]. Important to syndemic theory is that biological diseases interact with social environments, which can amplify risk for disease [20, 21]. Research has demonstrated that substance

abuse, violence, and HIV/AIDS (i.e., SAVA) are a syndemic [22–25]. Research focusing on MSM has shown an association between interpersonal violence (IPV) and alcohol and/or drug use, including injection drug use [26–28]. Further, there is an association between condomless anal sex (including with partners of unknown or discordant status) [29–33] and having multiple anal sex partners [30] with the SAVA syndemic. Other syndemic factors that have been identified, mainly among MSM, are child sexual abuse [29], depression [32], and sexual compulsivity [24].

Informed by syndemics theory, this study focused on associations between violence, sexual identity, and transactional sex among MWID. In a previous study, authors found that coerced sex among persons who inject drugs (PWID) was associated with transactional sex as well as gay and bisexual identity [34]. Similarly, a study in Vancouver found that 70% of MWID experienced physical violence at least once within a 5-year period [35]. Another study in Vancouver reported that 19% of MWID experienced sexual violence within their lifetime. Pointing towards a syndemic, research has shown that MWID who experience sexual violence are more likely to engage in transactional sex and other sexual and injection risk behaviors [36, 37]. Therefore, this study aimed to identify associations with transactional sex among MWID with a special focus on sexual identity and experiences with violence in order to test a possible syndemic.

## Methods

### Sampling and Recruitment

Targeted sampling and community outreach methods were used to recruit a cross-sectional sample of PWID in Los Angeles and San Francisco, California, between April 2011 and April 2013 [38–41]. Eligible participants were 18 years of age or older and self-reported injection drug use in the last 30 days, which was verified by visual inspection for signs of recent venipuncture or track marks [42]. Following an informed consent process prior to enrollment, trained interviewers administered a computer-assisted personal interview (Questionnaire Development System, NOVA Research, Bethesda, MD). Participants were compensated \$20 for completing the survey. This analysis includes data from 572 MWID, of which 298 participants were recruited in Los

Angeles and 274 in San Francisco. All study procedures were approved by the Institutional Review Boards at RTI International and the University of Southern California.

### Study Measures

*Transactional Sex* Transactional sex was measured through the following question: “In the last 6 months did you have any sex partners who paid you in cash or drugs for sex?”

*Experiences with Violence* To assess recent experience of unwanted or coercive sex, participants were asked: “In the past 12 months, has somebody used physical force or threats to make you have vaginal, anal, or oral sex with them?” This item was coded as a dichotomous variable. Participants who answered affirmatively were then asked to identify their relationship to the perpetrator. Response options included various relationships such as steady partner, friend, family member, and stranger. Violent victimization was considered anyone that had experienced at least one incident of physical violence in the last 12 months. Types of physical violence measured were being shot; being shot at (not hit); threatened with a knife, gun, club, or weapon; punched, kicked, slapped, or physically hurt; been attacked by a stranger on the streets.

*Drug Use* Injection drug use measures included age of first injection, injection frequency, frequency of injecting with others, years of injecting, types of drugs injected, injecting others or being injected by someone else, and injection sharing. We also included whether MWID had been in drug treatment within the last 6 months. Injection frequency was the sum of self-reported injection episodes with the following drugs: cocaine, crack cocaine, methamphetamine, heroin, speedball (admixture of cocaine and heroin), goofball (admixture of heroin and methamphetamine), prescription opiates, stimulants, sedatives, tranquilizers, methadone, and buprenorphine in the last 30 days. We converted injection frequency in last 30 days into a categorical variable with the following classifications: less than daily use (< 30 injections), once or twice a day (30 to 89 injections), and three or more times a day ( $\geq 90$ ). Any injection of the drugs listed above was also considered. Chronic drug use was measured as using methamphetamines, heroin, and/or cocaine at least twelve times in

the last 30 days, an approach that we and other researchers have classified as regular or chronic drug use [43] [44].

*Criminal Justice* We measured experiences with the criminal justice system such as currently being on probation, currently being on parole, any arrest in the last 6 months, encounters with security guards in the last 6 months, and encounters with police in the last 6 months.

*Health* Participants were asked to report whether they had received a mental health diagnosis, a positive HCV test, and a positive HIV test.

*Demographic Characteristics* We collected participant information on demographic, socioeconomic, and health characteristics. Socio-demographic variables included in our analysis were age (< 30, 30, or older), gender, race/ethnicity (white, Latino, Black, Asian/Pacific Islander, Native American, and mixed race), sexual partner types (steady, casual, paid), and sexual identity (heterosexual, bisexual, gay). Socio-economic characteristics include monthly income (< \$1401 vs. \$1401 or more—the US federal poverty threshold for a 2-person household in 2016), homeless (yes or no), and education (high school graduate or equivalent). We also collected data on source of income by asking how participants received income in the last 6 months. We collected data on childhood sexual abuse by asking the following: “When you were under the age of 16, did you have sex with someone at least 5 years older than you?” Those answering “yes” were classified as having childhood sexual abuse.

### Analysis

Descriptive statistics were examined for all variables of interest. Bivariable analyses were conducted using chi-square test for categorical variables and *t*-test for continuous variables. Variables significant at the  $p < 0.05$  in bivariable analysis were tested in the multivariable models. We first developed a multivariable logistic model with transactional sex as the outcome variable. Since coerced sex and violent victimization were associated with transactional sex and given the logistic regression method, we were unable to determine directionality. Therefore, we developed an additional multivariable model with violent victimization as the

outcome to provide additional insight into associations with violent victimization. Given the small number of MWID who reported coerced sex, we were unable to develop a multivariable model using coerced sex as the outcome. We tested for collinearity among bivariable variables using Pearson correlation. Correlated variables were removed from the final analysis based on strength of association with the dependent variable (i.e., the variable with the strongest association was retained). Multiple logistic regression models with transactional sex in the last 6 months as the dependent variable were constructed. Variables found to be significant at the  $p < 0.05$  level were considered to be independently associated with transactional sex in the last 6 months and were retained in the final model, non-significant variables were dropped. The same methods were used for the violent victimization model. We explored syndemics in two ways. The first was by creating a count variable for syndemic conditions [29, 45], including HIV, mental health, violent victimization, and chronic drug use. The second way we explored syndemics was by testing a series of interaction terms to identify the multiplicative nature of syndemics (something a count variable cannot do) [46, 47]. Specifically, interactions with gay or bisexual identity and illegal income and gay or bisexual identity and family income were significant and retained. We looked at these variables to examine the potential magnified disadvantages due to sexuality and income and how this might create constrained circumstances that encourage transactional sex. The count syndemic variable did not yield significant results so we only report the interaction results in our models.

## Results

Most MWID reported heterosexual identity (87%) and reported having a high school diploma or higher education level (66%) (Table 1). In terms of race/ethnicity, 34% of MWID were White, 26% Latinx, 31% Black, 2% Native American, 7% mixed race or other, and less than 1% ( $n = 3$ ) were Asian or Pacific Islander. Over half of MWID reported current homelessness (62%) and living in poverty with a monthly income less than \$1400 (78%). MWID ages ranged from 10% aged 18–29 years, 11% aged 30–39 years, 27% aged 40–49, to 53% aged 50 and older. Violent experiences in the last 12 months were reported by 42% of the sample. Figure 1 displays the types of violence

experienced by perpetrator. We report the number of participants who encountered each experience.

Overall, 8% of MWID reported transactional sex in the last 6 months, 42% reported violent victimization in the last 12 months, and 2% reported coerced sex in the last 12 months. MWID who engaged in transactional sex reported an average of 4 male sexual partners (median = 0) and 7 female sexual partners (median = 2) in the past 6 months. Self-reported HIV infection was 7% for MWID with no transactional sex (Table 2), 17% for MWID who engage in transactional sex, and 24% for MWID who identified as gay or bisexual and engage in transactional sex (data not shown). A wide range of demographic, health, criminal justice, violence, and drug use measures were different by transactional sex involvement.

In multivariable analysis (Table 3), we report the results of an interaction term between sexual identity and illegal source of income. MWID who identified as gay or bisexual (GB) had higher odds of transactional sex (GB without illegal income adjusted odds ratio [AOR] = 5.16; 95% confidence interval [CI] = 1.86–14.27; GB with illegal income AOR = 13.55, CI = 4.57–40.13), as did MWID who experienced coerced sex (AOR = 11.66, CI = 1.94–70.12) and MWID who experienced violent victimization (AOR = 2.31, CI = 1.13–4.75). We also found that MWID who injected heroin in the last 30 days had lower odds of transactional sex (AOR = 0.37; 95% CI = 0.18–0.78) as compared to MWID who did not inject heroin.

In multivariable analysis examining violent victimization (Table 4), we found that transactional sex in the last 6 months (AOR = 2.04; 95% CI = 1.00–4.14), contact with police in the last 6 months (AOR = 2.34; 95% CI = 1.60–3.41), having an illegal source of income in the last 6 months (AOR = 1.67; 95% CI = 1.14–2.45), relying on a spouse or partner for income in the last 6 months (AOR = 2.70; 95% CI = 1.20–6.07), being homeless (AOR = 1.62; 95% CI = 1.10–2.40), ever having a mental health diagnoses (AOR = 1.74; 95% CI = 1.20–2.54), and chronic methamphetamine use (AOR = 2.02; 95% CI = 1.30–3.18) were positively associated with violent victimization. Residing in Los Angeles, compared to San Francisco, was negatively associated with violent victimization (AOR = 0.53; 95% CI = 0.36–0.77).

**Table 1** Selected demographic and behavioral characteristics (*n* = 572)

Characteristics	<i>N</i> (%)
<b>Demographics</b>	
Study site	
Los Angeles	298 (52%)
San Francisco	274 (48%)
Sexual orientation	
Gay or bisexual	77 (14%)
Heterosexual	495 (87%)
Race/ethnicity	
White	190 (34%)
Latino	149 (26%)
Black	176 (31%)
Native American	12 (2%)
Asian/Pacific Islander	3 (<1%)
Mixed race/other	38 (7%)
Education	
Less than high school diploma	196 (34%)
High school diploma or more	376 (66%)
Age	
18–29	55 (10%)
30–39	60 (11%)
40–49	153 (27%)
50 and older	304 (53%)
Income, last 30 days	
Less than \$1400	448 (78%)
\$1400 or more	124 (22%)
Income sources, last 6 months	
Job	81 (14%)
Unemployment benefit	18 (3%)
VA benefits	11 (2%)
Welfare benefits	184 (32%)
SSI or SSDI benefit	205 (36%)
Spouse or partner you live with	36 (6%)
Other family or friends	81 (14%)
Recycling	149 (26%)
Panhandling	144 (25%)
Illegal or possibly illegal income	209 (37%)
Homeless (current)	353 (62%)
<b>Sexual behaviors</b>	
Any sex partner in the last 6 months	
Any steady sex partner (last 6 months)	273 (48%)
Consistent condom use—100%	41 (15%)
Sex partner is a person who injects drugs	134 (23%)
Any casual sex partner (last 6 months)	193 (34%)
Consistent condom use – 100%	(41%)

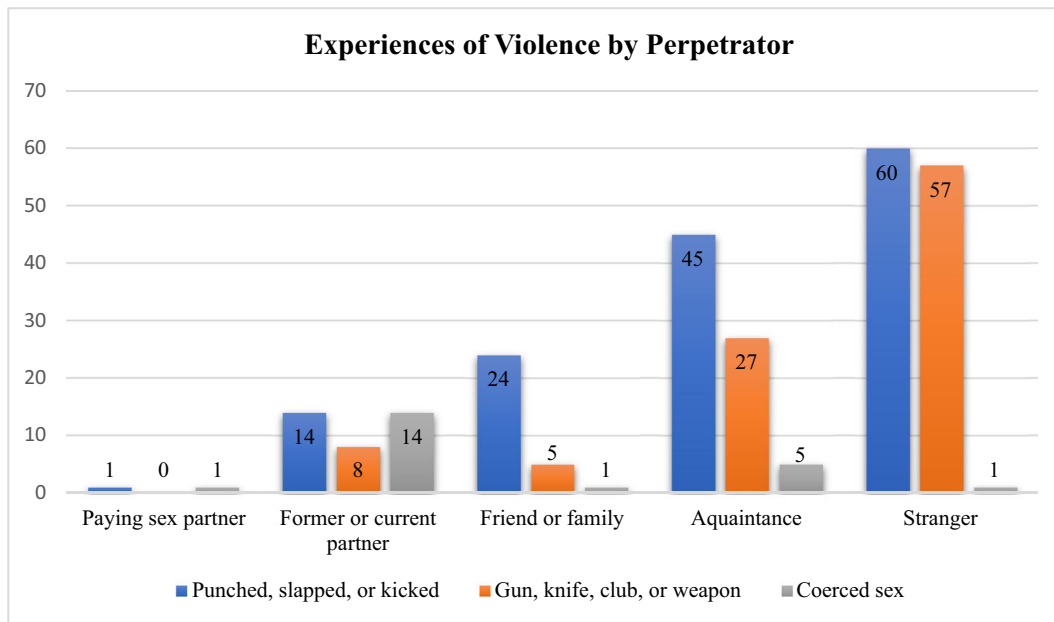
**Table 1** (continued)

Characteristics	<i>N</i> (%)
Sex partner is a person who injects drugs	118 (21%)
Any paying sex partners (last 6 months)	47 (8%)
Consistent condom use – 100%	21 (45%)
Sex partner is a person who injects drugs	37 (7%)
<b>Violence</b>	
Childhood sexual assault	59 (10%)
Coerced sex	9 (2%)
Violent victimization (last 12 months)	239 (42%)
Witnessed violence (last 12 months)	134 (24%)
<b>Criminal justice</b>	
Currently on probation	128 (23%)
Currently on parole	59 (10%)
Any arrest (last 6 months)	160 (28%)
<b>Drug and alcohol</b>	
Drug treatment (last 30 days)	207 (36%)
Age at first injection	
17 years or less	224 (40%)
18–29 years	267 (47%)
30 or older	81 (14%)
Injection frequency (last 30 days)	
Less than 30	283 (50%)
30–89	153 (27%)
90 or more	136 (24%)
Injected speedball (last 30 days)	89 (16%)
Injected goofball (last 30 days)	70 (12%)
Injected crack cocaine (last 30 days)	51 (9%)
Injected powder cocaine (last 30 days)	57 (10%)
Injected methamphetamine (last 30 days)	222 (39%)
Injected heroin (last 30 days)	441 (77%)
Injected prescription opioid (last 30 days)	71 (12%)
Overdosed (last 6 months)	41 (7%)
Witnessed an overdose (last 6 months)	131 (23%)
<b>Health</b>	
Mental health diagnosis (ever)	243 (43%)
Received HIV-positive test result (ever)	45 (8%)
Received HCV-positive test result (ever)	182 (68%)

## Discussion

Of the 47 MWID who reported transactional sex, 53% identified as gay or bisexual. Self-reported HIV infection was highest among the MWID who reported both transactional sex and gay/bisexual sexual identity. In multivariable analysis, we found that sexual identity





**Fig. 1** Experiences of violence by perpetrator

was highly associated with transactional sex, indicating that MWID who identified as gay or bisexual had greater odds of engaging in transactional sex, compared to heterosexual MWID. This finding is important, as it supports the idea that sexual identity (not just behavior) can impact health [48, 49]. This may be because life circumstances and experiences associated with sexual identity can impact social and economic environments. For example, previous research has highlighted the particular vulnerability of gay and bisexual persons in relation to health [50], and specifically in relation to increased HIV risk [51]. One reason health disparities exist among sexual minority populations may be due to stress, often caused by stigma, that comes with having a minority identity [52]. MWID who identify as gay or bisexual may occupy two stigmatized identities (person using drugs and a sexual minority), which could compound stigmatizing experiences resulting in increased health disparities, including potential increased odds of transactional sex. For this reason, MWID may be at increased risk for negative health outcomes. Research has demonstrated that drug use stigma is prevalent and often more severe than other types of stigma, such as mental health [53] or obesity [54]. Furthermore, experiencing drug use stigma is associated with negative health outcomes [55] and negative healthcare experiences [56, 57]. MWID who are gay or bisexual could potentially be experiencing concurrent sexual minority

stigma and drug use stigma, creating a particularly vulnerable environment which could increase rates of transactional sex. Among MWID who identified as gay or bisexual, those who reported illegal source of income had the highest odds (over 13 times increased odds) of transactional sex. This finding points to the intersections between sexual identity and employment/income opportunities. It may be that gay or bisexually identified men face employment discrimination [58] making it difficult to obtain income legally. Sexual identity discrimination coupled with discrimination associated with criminal justice involvement (28% of the sample had been arrested at least once in the last 6 months) [59] may create additional barriers for legal income among MWID. It is important that MWID have viable employment options that allow for a fair wage and healthy working conditions so they do not have to engage in illegal activities (if they do not wish to) or rely on others for income, which place them at risk for violence [60]. If MWID had viable employment options, we may see less transactional sex and fewer experiences with violence.

We also found that both sexual and physical violence (sexual coercion and violent victimization) were significantly and positively associated with transactional sex. MWID who engage in transactional sex might be experiencing elevated rates of violence due to larger systems and structural conditions that create circumstances of oppression. Above, we discussed the role of

**Table 2** Bivariable factors associated with transactional sex among men who inject drugs ( $n = 572$ )

Characteristic	Transactional sex ( $n = 47$ )	No transactional sex ( $n = 525$ )	$p$
<b>Socio-demographics</b>			
Sexual identity			0.000
Gay or bisexual	25 (53%)	52 (10%)	
Heterosexual	22 (47%)	473 (90%)	
Race/ethnicity			0.030
White	20 (43%)	170 (33%)	
Latino	7 (15%)	142 (27%)	
Black	11 (23%)	165 (32%)	
Native American	1 (2%)	11 (2%)	
Asian/Pacific Islander	1 (2%)	2 (<1%)	
Mixed race	7 (15%)	31 (6%)	
Age			0.021
<30	9 (19%)	46 (9%)	
30 and older	38 (81%)	479 (91%)	
Mental health diagnosis (last 6 months)			0.001
Yes	31 (66%)	212 (41%)	
No	16 (34%)	310 (59%)	
Criminal justice			0.033
Contact with police (6 months)			
Yes	32 (68%)	272 (52%)	
No	15 (32%)	252 (48%)	
Violence			0.000
Coerced sex (12 months)			
Yes	7 (15%)	2 (<1%)	
No	40 (85%)	521 (>99%)	
Violent victimization (12 months)			0.000
Yes	32 (68%)	207 (40%)	
No	15 (32%)	313 (60%)	
Parental drug and alcohol			0.004
Parent had alcohol problem			
Yes	35 (75%)	275 (52%)	
No	12 (26%)	250 (48%)	
Parent had an illegal drug problem			0.001
Yes	21 (45%)	116 (22%)	
No	26 (55%)	409 (78%)	
Injection drug use behavior			0.006
Years of injection			

**Table 2** (continued)

Characteristic	Transactional sex ( $n = 47$ )	No transactional sex ( $n = 525$ )	$p$
<10 years	14 (30%)	67 (13%)	
10–19 years	5 (11%)	81 (15%)	
20 years or more	28 (60%)	377 (72%)	
Frequency of injecting with others			0.029
Never	105 (20%)	6 (13%)	
Less than 25% of the time	156 (30%)	18 (38%)	
25%–74% of the time	104 (20%)	3 (6%)	
75%–99% of the time	78 (15%)	13 (28%)	
Always	81 (16%)	7 (15%)	
Peer to peer injection (30 days)			0.017
Neither	19 (40%)	319 (61%)	
Injection provider	11 (23%)	97 (19%)	
Both	9 (19%)	42 (8%)	
Injection recipient	8 (17%)	67 (13%)	
HIV			0.019
Positive HIV test (ever)			
Yes	8 (17%)	37 (7%)	
No	38 (83%)	462 (93%)	

drug use and sexual minority stigma in increasing health disparities and employment options, which likely applies here as well. In addition, stigma may be more severe for some MWID who engage in transactional sex. For instance, research has shown that bisexual MSM may experience greater stigma because they do not want to disclose their MSM behavior [61, 62]. Experiencing stigma (or anticipating stigma) may contribute to social isolation among MWID, which might heighten experiences with violence. Further, MWID who sell sex may be isolated from larger gay communities, and as a result they may not have access to social supports offered within those communities [63]. In addition, policies (often constructed in stigmatizing ways towards PWID [64]) can impact individual circumstances. For example, the criminalization of drug use [62] could contribute to the choice to engage in transactional sex because transactional sex can generate income. Additionally, the criminalization of drug use along with the criminalization of sex work [65] could

**Table 3** Multivariable analysis of factors associated with transactional sex ( $n = 567$ )

	OR	CI	aOR	CI
Sexual identity/income				
Heterosexual/no illegal income	Ref		Ref	
Heterosexual/illegal income	2.16	0.91–5.10	1.84	0.76–4.48
Gay or bisexual/no illegal income	7.80***	3.05–19.91	5.16**	1.86–14.27
Gay or bisexual/illegal income	35.08***	13.25–92.89	13.55***	4.57–40.13
Coerced sex (last 12 months)	45.58***	9.17–226.71	11.66**	1.94–70.12
Violent victimization (last 12 months)	3.23***	1.70–6.11	2.31*	1.13–4.75
Heroin injection (last 30 days)	0.20***	0.11–0.37	0.37**	0.18–0.78

Log likelihood:  $-242$ . Cox & Snell R-squared: 0.134. Nagelkerke R-squared: 0.307. \* indicates  $p < 0.05$ , \*\* indicates  $p < 0.01$ , \*\*\* indicates  $p < 0.001$

be contributing to situations that foster violence when engaging in transactional sex.

In relation to drug use, we found MWID who reported heroin use in the last 30 days had decreased odds of transactional sex. Past research has shown a positive association with sexual risk behaviors and stimulants such as cocaine [66] and amphetamines [67], but not heroin. Given the biological effects of heroin, this finding is not surprising.

Engaging in transactional sex under constrained conditions may place MWID at risk for experiencing violence [36]. In order to gain a better understanding of correlates with violence, and how violence might be associated with transactional sex, we developed an additional model with violence as the outcome. In this model, we found that transactional sex was positively associated with violent victimization. We also found

that experiences with police, having an illegal source of income, and relying on a spouse or partner for income were positively associated with violence. It is possible that engaging in illegal activities heightens risk for violence [68]. In regard to relying on a spouse or partner for income, this may suggest MWID who rely on partners for income are experiencing intimate partner violence (IPV). Importantly, high rates of violence have been found among MSM populations [69] and IPV and depression have been associated [70]. In addition, we found that homelessness was associated with violence. Homelessness likely creates structures that allow for greater violence as people do not have the ability to take shelter in their home.

Finally, we found that ever being diagnosed with a mental health condition and chronic methamphetamine use was associated with violent victimization. Research

**Table 4** Multivariable analysis of factors associated with violent victimization ( $n = 564$ )

	OR	CI	aOR	CI
Transactional sex (6 months)	3.56***	1.86–6.82	2.04*	1.00–4.14
Contact with police (6 months)	2.99***	2.11–4.25	2.34***	1.60–3.41
Illegal source of income (6 months)	2.39***	1.69–3.40	1.67**	1.14–2.45
Spouse/partner source of income (6 months)	3.34**	1.61–6.93	2.70*	1.20–6.07
Homeless (last 12 months)	1.75**	1.24–2.50	1.62*	1.10–2.40
Mental health diagnosis (ever)	2.08***	1.48–2.93	1.74**	1.20–2.54
Chronic methamphetamine use	2.89***	1.93–4.33	2.03**	1.30–3.18
Study site				
Los Angeles	0.47***	0.33–0.66	0.53***	0.36–0.77
San Francisco	Ref.		Ref.	

Log likelihood:  $-658$ . Cox & Snell R-squared: 0.179. Nagelkerke R-squared: 0.240. \* indicates  $p < 0.05$ , \*\* indicates  $p < 0.01$ , \*\*\* indicates  $p < 0.001$



among women sex workers has found that methamphetamine use was associated with mental health and experiences with violence and suggests that there is a bi-directional relationship between the three [71]. Importantly, methamphetamine use has been associated with increased odds of transactional sex [9], HIV risk, and incidence [72–75]. The findings from this study suggest that methamphetamine using MWID, especially those who engage in transactional sex, may be a key population to target HIV prevention efforts at, including pre-exposure prophylaxis (PrEP) [76–78] and increased access to syringe service programs [79, 80]. MWID, specifically men who inject amphetamines, may also benefit from increased efforts towards engagement throughout the HIV care continuum, particularly focusing on treatment as prevention, since HIV-positive stimulant using men who have sex with men have greater odds of a detectable viral load. [81]

Although there is no medication-assisted therapy for methamphetamine use, behavioral interventions have been effective. For example, contingency management, a behavioral therapy that immediately provides an incentive (usually monetary) for not using amphetamines, has been effective in reducing amphetamine use and increasing health promoting behaviors among MSM [82, 83]. Furthermore, integrating positive affect strategies into community-based contingency management interventions may result in lower viral loads among MSM, suggesting the importance of positive messaging to help affirm oneself [84]. Finally, we suggest that interventions consider harm reduction approaches, since integrating harm reduction perspectives into cognitive behavioral interventions can reduce stimulant use and sexual risk behaviors [85].

The results of this study should be considered in light of potential limitations. Given our cross-sectional study design, causality cannot be inferred. Study data are derived from participant self-reports and are subject to recall and social desirability biases. However, the reliability and validity of items used in this study have been established in prior studies [86]. Data were collected in 2011 to 2013, and MWID transactional sex behaviors may have changed since then. However, given the increase of injection drug use nationally, along with increases in injecting-related infectious diseases [87–89], it is possible that MWID are experiencing additional risk than what was reported in 2011–2013. We were unable to describe transactional sex experiences in terms of the number of transactional sex partners (we only know the

number of sex partners). We were also unable to describe the context that transactional sex occurred in nor were we able to identify if MWID sought clients on the street or online. Our survey did not collect data on sexual compulsivity and we therefore could not test sexual compulsivity in the models. The variable for coerced sex had small numbers, and as a result, we have wide confidence intervals for this variable, which could reduce the precision of the estimate effects. Given the small cell count for transactional sex, we were unable to test interactions with transactional sex in the violent victimization model (Table 4). Future research should address the contextual factors of sex work, as to fully understand experiences and risk.

## Conclusion

The above findings demonstrate the intersections and complexities of transactional sex, violence, poverty, and drug use. We suggest that future research explore how multiple inequalities experienced by MWID may impact health, particularly research focused on how structural inequalities, such as drug policies, poverty, and racism, impact sexual risk behaviors [90].

Future research should also aim to understand the processes of transactional sex (e.g., when, how, and why MWID engage in transactional sex) and how social environments and processes of inequalities impact risk behaviors. Given the results of this study, MWID, especially men who inject amphetamines, may be an important group to target for HIV prevention services, such as pre-exposure prophylaxis (PrEP). Understanding which sub-groups of MWID are most at risk is critical for public health initiatives so that messaging and programs can be tailored to specific communities. Interventions targeting sub-populations of MWID should consider a multi-level approach that targets individual, community, and structural elements [91]. For example, biomedical interventions such as PrEP could be paired with structural interventions aimed at improving the overall quality of life for MWID (e.g., increasing employment opportunities and housing availability) and/or at mitigating stigma.

Transactional sex among MWID was strongly associated with gay and bisexual identity, illegal source of income, coerced sex, violent victimization, and heroin injection (negative association with heroin). Our data suggests that structural factors such as stigma, policies

criminalizing drug use and transactional sex impact MWID's choices to engage in transactional sex and their risk for experiencing violence. Multi-level interventions focused on MWID, which might combine individual, community, and structural elements, are urgently needed. Policies that harm MWID, such as the criminalization of drug use and sex work, should be restructured. In addition, providing easy access to substance use disorder treatment, victimization services, and harm reduction services for MWID would be helpful. Partnering with community organizations, such as syringe service programs (SSPs), may yield the best results as they are likely established non-stigmatizing spaces within communities [16].

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