



Sexual Risk and Criminal Justice Involvement Among Women Who Use Drugs

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Abstract

Criminal justice system involvement among US women is associated with increased risk for HIV/sexually transmitted infections, yet effects of different forms of criminal justice involvement on intimate relationships are not well understood. This study examined associations between arrest, probation, and jail incarceration on the number of sexual partners, sexual concurrency, and consistent condom use for drug-using women ($n = 631$) in Oakland, California. We used logistic and negative binomial regression and adjusted for demographics, sex exchange and drug use. Probation was associated with higher rates of sexual partnership and concurrency (IRR 1.87, 95% CI [1.11, 3.15]; OR 3.64, 95% CI [1.08, 12.20]). Incarceration lasting over 12 weeks was associated with higher rates of sexual partnership (IRR 2.23, 95% CI [1.41, 3.51]). Women incarcerated once in the past year had higher odds of concurrency (OR 2.15, 95% CI [1.01, 4.57]). Our results reinforce the need for risk-reduction interventions and criminal justice diversion for women who use drugs.

Keywords Incarceration · Sexual health · Sexual behavior · Drug use

Resumen

Involucramiento de mujeres estadounidenses en el sistema de justicia penal está asociado con riesgo aumentado de VIH/ITS, aunque los efectos de las formas diferentes de involucramiento en la justicia penal en las relaciones íntimas no se comprenden bien. Este estudio examinó las asociaciones entre el arresto, la libertad condicional y el encarcelamiento de la cárcel y el número de parejas sexuales, la concurrencia sexual, y el uso consistente de condones para mujeres que consumen drogas ($n = 631$) en Oakland, California. Utilizamos regresión logística y binomial negativa y se ajustamos para la demografía, el intercambio sexual y el uso de drogas. La libertad condicional se asoció con tasas más altas de parejas sexuales y concurrencia (IRR 1.87, IC del 95% [1.11, 3.15]; OR 3.64, IC del 95% [1.08, 12.20]). El encarcelamiento más de 12 semanas se asoció con tasas más altas de parejas sexuales (IRR 2.23, 95% CI [1.41, 3.51]). Las mujeres que habían sido encarceladas una vez en el último año tenían mayores probabilidades de concurrencia (OR 2.15, IC del 95% [1.01, 4.57]). Nuestros resultados refuerzan la necesidad de intervenciones enfocadas en la reducción de riesgo y el desvío del sistema de justicia penal para las mujeres que consumen drogas.

Introduction

Mounting evidence demonstrates that involvement in the criminal justice system is either an independent risk factor for sexual risk behaviors and sexually transmitted infections (STIs), or is a marker for other, potentially unmeasured characteristics that shape risk. Women who have been arrested or incarcerated are more likely to report high risk partnerships, multiple partnerships, condomless sex, and transactional sex than women who have never been incarcerated [1–6]. Consistent with this, incarcerated women have high rates of chlamydia (7–22%) and gonorrhea

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(3–9%), more than double those of the general population [7–13]. The risk of HIV and other STIs extends across partnerships and sexual networks, and communities with high rates of criminal justice involvement have elevated HIV/STI risk, even among those who are not themselves involved in the criminal justice system [14–16].

The mechanisms underlying these associations are not well understood, particularly among criminal-justice involved women. Research on incarcerated men's relationships suggests incarceration may lead to relationship disruption and thus the acquisition of new sexual partners and may also result in the concentration of risk into sexual networks where a large proportion of both men and women have been incarcerated [15, 17, 18]. Indeed, approximately half of men's primary relationships end during a period of incarceration, and recently incarcerated men report that they wish to increase their number of partners once they are released from prison or jail, to account for the time they were incarcerated [17, 19]. In addition, incarcerated men report that once they are released from prison they are seen as healthier, more desirable, and with more potential as romantic partners, perhaps in part due to high rates of male incarceration which reduce the overall number and quality of potential partners [15, 18]. There has been comparatively little work on the effects of women's incarceration on their intimate relationships. Substance abuse, emotional needs, perceptions of risk and self-worth, partner pressure and violence, and economic self-sufficiency have all been identified as factors that affect HIV risk both before and after incarceration [20]. In addition, the exchange of sex for money or drugs places many formerly incarcerated women at heightened risk for sexual violence and condomless sexual encounters [21].

This study aimed to examine the temporal associations between arrest, probation and jail incarceration on the number of sexual partners, rates of sexual concurrency, and consistent condom use in a sample of women who use drugs in Oakland, California, and to determine whether engagement in sex exchange or use of particular drugs could account for these relationships. Previous work has demonstrated that experiencing an arrest in the past 6 months is associated with increased sexual risk, but no previous studies have examined whether there is a dose–response relationship [6]. Few prior studies have collected sufficiently granular data on incarceration to measure an effect of timing and duration, with the notable exception of Khan and colleagues who reported that incarceration episodes lasting 1 day to 1 month may increase risky partnerships (defined as having multiple partners or engaging in sex exchange) more than episodes lasting greater than 1 month [1, 6].

This work was motivated by hypotheses outlined below regarding the effects of women's criminal justice involvement on sexual risk behavior.

- (1) Increasing frequency of arrests and episodes of incarceration for women will be associated with increasing numbers of sexual partners and increasing odds of having concurrent relationships, defined as sexual partnerships that overlap in time, due to temporary relationship disruption.
- (2) Increasing duration of probation and incarceration for women will be associated with an increase in the number of sexual partners due to permanent relationship disruption. Previous analyses that used a composite outcome of numbers of partners and engagement in sex exchange might have missed this effect on non-transactional relationships.
- (3) Increasing duration of probation and incarceration will be associated with a decrease in the rates of concurrency because the longer time away will be more likely to end a relationship permanently.
- (4) Any criminal justice involvement will be associated with less consistent condom use.

Methods

Study Design

The Oakland Women's Health Study consisted of a cross-sectional survey which aimed to measure unmet healthcare needs and the range and accumulation of criminal justice involvement in a population of women who use illicit drugs. The study is described in detail elsewhere [22]. Targeted sampling methods were used to recruit 631 adult women in Alameda County, California, who had used crack/cocaine, methamphetamine, or heroin within the 30 days prior to recruitment. The survey included questions about sexual risk behaviors and a detailed inventory of involvement in the criminal justice system. The interviewers and other study staff were trained to refer respondents to local services and provide resources for support in addition to the study incentive.

Measures

Sexual Risk

Respondents were asked about the total number of male and female sexual partners they had in the past 6 months. These were added together for the total number of sexual partners in the past 6 months. Concurrency was assessed by asking "did any of [these sex partners] overlap? In other words you had sex with partner A, then partner B, and then partner A again." Sexual exchange was measured with two questions by asking respondents whether, in the past 6 months, any male sex partners had given them money in exchange for sex

or had given them drugs in exchange for sex. Respondents were asked whether, in the last 6 months, they used condoms with male partners. The responses “never” and “sometimes” were coded as inconsistent condom use, and “always” was considered consistent use.

Criminal Justice Involvement

Respondents were asked whether they had ever been arrested, how old they were at the time of first arrest, and how many times they had been arrested. They were also asked whether they had been arrested in the past year.

Jail incarceration experiences were measured by asking whether the individual had ever spent time, even 1 day, in city or county jail. This was followed up asking the number of lifetime jail incarcerations, the total time spent in jail as an adult, and how old they were the first time they were sent to jail as an adult. Respondents were then asked how many times they had been to jail in the past year and the total amount of time in the past year they had spent in jail. This same series of questions was repeated for prison incarceration.

Respondents were also asked whether they had ever been on probation and then whether they had been on probation in the past year. This was followed by asking the number of months and weeks spent on probation in the past year. The same questions were repeated for parole. Fewer than ten women reported being in prison or on parole in the past year, so no analyses were performed using these variables.

Partner incarceration was measured by asking respondents whether a steady partner had ever been in jail and whether they had been in jail in the past year. These same questions were repeated for prison incarceration. A steady partner was defined for respondents as either a husband, wife, girlfriend, boyfriend, fiancé or fiancée. Fewer than ten women reported partners with prison incarcerations in the past year, and so only the jail variables were used in the analyses.

Demographics

Age was asked directly of the respondents and was confirmed using the respondent’s date of birth. Respondents were asked about whether they had a high school diploma or general equivalency diploma (GED). Respondents were asked for their race (White, Black, Asian, Pacific Islander, or Native American, and could indicate multiple categories) and ethnicity (Latina or not Latina). Asian/Pacific Islander and Native American respondents made up a very small portion of the sample, and so only dichotomous variables for Black race and White race were used for analysis, and other racial categories were considered non-Black and non-White.

Drug Use

Respondents were asked to indicate whether, in the past 6 months, they had used marijuana, crack or rock cocaine, powder cocaine by itself, heroin by itself, speedball (heroin plus cocaine or crack), other opiates (Oxycontin, codeine, Percocet, etc.), benzodiazepines (Valium, Klonopin, Xanax, etc.), methamphetamine (crystal), or methadone without a prescription. Binary variables were created for each drug and were added to the models separately.

Statistical Approach

Descriptive statistics for the study sample were generated to provide a foreground of respondents’ experiences with the criminal justice system and their demographics, sexual behavior, and drug use. Bivariate logistic (concurrency) and negative binomial (number of sexual partners) regression models were created to calculate unadjusted odds ratios and incident rate ratios with the independent variables of demographics, criminal justice involvement, sex exchange and drug use. Bivariate logistic regression models were also used to identify relationships between criminal justice involvement and both sex exchange and drug use, in order to explore potential confounding relationships. Then, multivariable models were constructed (again using logistic and negative binomial regression) containing those variables which were significant at the 0.05 level in the bivariate analyses.

Results

The study sample consisted of 631 women in Oakland, California who had used drugs in the past 30 days. The most commonly reported drugs used in the past 6 months were crack (81%), marijuana (64%), heroin (40%), cocaine (35%), other opioids (32%), and methamphetamine (26%), as shown in Table 1. The average age was 46 years, and respondents ranged from 18 to 68 years old. The women in our sample predominantly identified as Black (86%), with much smaller proportions identifying as Latina (6%), White (5%), Native American (2%), or Asian/Pacific Islander (1%).

Approximately half (47%) endorsed having a steady partner (Table 2). The mean number of male partners in the past 6 months was 12. Although the majority reported having only 1 partner in the past 6 months, there were 22 women (2%) who reported more than 100 partners in the past 6 months (range 0–500). Over half of respondents (55%) reported exchanging sex for money or drugs with men in the past 6 months. Approximately 21% ($n = 107$) had a positive gonorrhea, chlamydia, or trichomonas test at the time of their last test. The prevalence of HIV in the sample was 2.7% ($n = 17$), compared with an overall prevalence for women

Table 1 Description of the study sample

Variables	Percent (n)
Age	
18–24	3.2 (20)
25–34	13.9 (88)
35–44	21.9 (138)
45–54	37.1 (234)
55–64	21.1 (133)
65 and over	2.9 (18)
Race	
Black	86.1 (543)
White	5.1 (32)
Native American	2.4 (15)
Asian	0.3 (2)
Pacific Islander	0.3 (2)
Latina ethnicity	6.0 (38)
Educational attainment	
Less than high school/GED	36.8 (232)
High school/GED or more	63.2 (399)
Drug use in the past 6 months	
Marijuana	63.9 (402)
Crack	80.8 (508)
Cocaine	35.5 (223)
Heroin	40.2 (253)
Speedball	13.4 (84)
Other opiates	32.3 (203)
Benzodiazepines	21.9 (138)
Methamphetamines	26.4 (166)
Methadone	10.4 (65)
Total ^a	100 (631)

^aCategories may not sum to the total if there were missing data or participants were allowed to select more than one option (race/ethnicity and drug use)

in Alameda County of 0.1% [23]. Approximately one third of women reported never using condoms and another third reported only sometimes using condoms.

The majority of respondents had been arrested (86%) or on probation (71%), and most had also spent some amount of time in jail (83%). Nearly one quarter (22%) had spent time in prison. Details of respondents' criminal justice involvement are shown in Table 3.

In the initial bivariate analyses of the number of sexual partners, age greater than 45 years was a significant predictor of having fewer sexual partners in the past year (incident rate ratio, IRR = 0.49, 95% CI [0.36, 0.66]). The age variable was initially divided into ten-year categories, however there were not statistically significant differences between the younger age groups, and so this was collapsed into age less than 45 years and age greater than 45 years. Latina women reported fewer sexual partners than non-Latina identified

Table 2 Sexual partnership characteristics of study sample

Variables	Percentage (n)
Currently have a steady partner	47.1 (297)
Number of male partners in the past 6 months	
0	19.7 (124)
1	33.4 (211)
2–3	18.2 (115)
4–10	11.4 (72)
> 10	17.3 (109)
Number of female partners in the past 6 months	
0	89.4 (564)
1	5.7 (36)
2–3	3.3 (21)
4–10	0.3 (2)
> 10	1.3 (8)
Concurrent male sexual partners	39.8 (250)
Sex exchange in the past 6 months (male partners)	55.3 (260)
Condom use in the past 6 months (male partners)	
Never	31.4 (148)
Sometimes	34.4 (162)
Always	34.2 (161)
Steady partner was in jail in the past year	29.1 (66)
Total ^a	100 (631)

^aCategories may not sum to the total if there was missing data

women (IRR = 0.44, 95% CI [0.21, 0.77]), but there was not a significant effect of Black or White racial identity on the number of sexual partners. Women with a high school education, GED, or more education had fewer sexual partners than women who had not completed high school/GED (IRR 0.65, 95% CI [0.48, 0.89]). Engaging in sexual exchange was associated with an extremely high IRR for sexual partnership (IRR = 22.2, 95% CI [17.30, 28.47]). Of the drug use variables, crack use, methamphetamine use, and methadone use in the past 6 months were associated with higher rates of sexual partnership (IRRs 2.49, 3.17, and 2.12, respectively, and 95% CIs [1.72, 3.60], [2.25, 4.46], and [1.24, 3.61]). Benzodiazepine use was associated with having fewer partners (IRR 0.57, 95% CI [0.39, 0.85]). Heroin use was not significantly associated with the number of sexual partners. The unadjusted IRRs for all of the arrest-, probation-, and jail-related variables were significant, and predicted higher numbers of sexual partners (shown in Table 4, Column 1).

In the bivariate analyses of the odds of concurrent partnerships, odds were decreased for women over the age of 45 (OR 0.40, 95% CI [0.29, 0.56]), and for women who had at least a high school education or GED (OR 0.57, 95% CI [0.41, 0.79]). There was no significant effect of the racial or ethnic identity variables on the odds of concurrent partnerships. As with the number of sexual partners, engaging in sex exchange was a significant predictor

Table 3 Frequency of criminal justice involvement as an adult in the study sample, and extent of involvement for women who had experienced each type

Variables	Percent (n)
Ever arrested	86.4 (539)
Ever on probation	69.9 (436)
Ever been in jail	83.2 (519)
Ever been in prison	21.5 (116)
Arrested in the past year	26.3 (140)
Jail in the past year	23.1 (146)
Variables	Mean (range)
Number of arrests—past year ^a	1.5 (1–7)
Age at first arrest ^a	24.5 (18–57)
Total time on probation—past year (months) ^a	8.3 (0.25–12)
Number of jail episodes—past year ^a	1.9 (1–25)
Total time spent in jail—past year (weeks) ^a	8.5 (1–52)
Number of prison episodes—lifetime ^a	4.1 (1–40)
Total time spent in prison—lifetime (years) ^a	4.7 (0.1–28)

^aCalculated for only those respondents who had experienced the outcome

Table 4 Unadjusted and adjusted incident rate ratios (IRRs) for the number of sexual partners [adjusted for age, race and ethnicity, educational attainment, sex exchange for money or drugs, crack use in the past 6 months, benzodiazepine use in the past 6 months, meth use in the past 6 months, and methadone use (not from a program) in the past 6 months] and odds ratios (ORs) for concurrent partnership (adjusted for age, educational attainment, sex exchange for money or drugs, coke use in the past 6 months, and meth use in the past 6 months)

Variables	Sexual partners		Sexual partners		Concurrency		Concurrency	
	Unadjusted		Adjusted		Unadjusted		Adjusted	
	IRR	CI (95%)	AIRR	CI (95%)	OR	CI (95%)	AOR	CI (95%)
Arrested in the past year (reference = No)	2.54***	(1.77, 3.65)	1.24	(0.91, 1.68)	2.47***	(1.67, 3.67)	1.73	(0.90, 3.32)
Number of arrests in the past year	1.36*	(1.01, 1.85)	1.00	(0.80, 1.26)	1.21	(0.91, 1.60)	1.26	(0.83, 1.93)
Age at first arrest	0.92***	(0.90, 0.94)	0.99	(0.97, 1.01)	0.95***	(0.92, 0.97)	1.02	(0.98, 1.07)
Probation in the past year (reference = no)	2.59***	(1.60, 4.21)	1.55*	(1.04, 2.31)	2.18**	(1.30, 3.67)	2.01	(0.83, 4.83)
Total time on probation in the past year—months (reference = 0)								
1–11	1.83	(0.94, 3.58)	1.24	(0.74, 2.09)	1.92	(0.94, 3.97)	1.48	(0.45, 4.92)
12	3.38***	(1.77, 3.48)	1.87*	(1.11, 3.15)	2.84**	(1.38, 5.87)	3.64*	(1.08, 12.20)
Jail in the past year (reference = No)	2.48***	(1.75, 3.52)	1.20	(0.89, 1.61)	2.18***	(1.50, 3.19)	1.60	(0.86, 3.00)
Total time in jail in the past year—weeks (reference = 0–1)								
2–3	1.75	(0.44, 6.90)	1.06	(0.39, 2.92)	2.22	(0.49, 10.05)	1.17	(0.11, 12.39)
4–12	1.20	(0.63, 2.28)	0.79	(0.46, 1.33)	1.58	(0.80, 3.13)	1.46	(0.45, 4.73)
Over 12	4.53***	(2.41, 8.56)	2.23***	(1.41, 3.51)	2.95**	(1.46, 5.96)	1.05	(0.36, 3.03)
Number of times admitted to jail in the past year (reference = none)								
Once	2.64***	(1.73, 4.03)	1.16	(0.82, 1.64)	2.44***	(1.54, 3.87)	2.15*	(1.01, 4.57)
More than once	2.22**	(1.32, 3.75)	1.27	(0.84, 1.92)	1.82*	(1.03, 3.20)	0.97	(0.39, 2.41)
Steady partner in jail in the past year (reference = no)	3.72***	(2.25, 6.16)	1.48	(0.97, 2.25)	2.53**	(1.41, 4.54)	2.07	(0.75, 5.72)

Boldface indicates significance (* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$)

of having concurrent partnerships (OR 26.33, 95% CI [16.08, 43.12]). Cocaine use and methamphetamine use in the past 6 months were also associated with higher odds

of concurrent partnerships (ORs 2.80 and 2.91, respectively, with 95% CIs [1.38, 5.70] and [1.98, 4.26]). All of the arrest-, probation-, and jail-related variables were

significantly associated with increased rates of concurrent partnerships in the unadjusted analyses (shown in Table 4, Column 3).

Engaging in sex exchange was associated with increased odds of consistent condom use (OR 2.55, 95% CI [1.70, 3.83]). No other variables, and in particular none of the criminal justice involvement variables, were associated with condom use, and so a multivariable model was not constructed.

Bivariate analyses of the relationships between criminal justice involvement and specific types of drug use demonstrated that women who used methamphetamines had greater odds of arrest in the past year (OR 3.28, 95% CI [2.18, 4.94]), of more frequent arrest (OR 1.75, 95% CI [1.24, 2.47]), of being on probation in the past year (OR 2.17 95% CI [1.29, 3.68]), and of having spent the entire past year on probation (OR 2.97 95% CI [1.48, 5.95]). Methamphetamine use was also associated with increased odds of jail incarceration in the past year (OR 2.88 95% CI [1.94, 4.28]), having one jail incarceration (OR 3.17 95% CI [1.97, 5.07], reference = none), having two or more jail incarcerations (OR 2.47, 95% CI [1.38, 4.42], reference = none), spending 4–12 weeks in jail (OR 5.52 95% CI [2.71, 11.2], reference = 0–1 weeks), and having a partner in jail in the past year (OR 3.07 95% CI [1.67, 5.66]). Crack use was associated with decreased odds of having a partner in jail in the past year (OR 0.50, 95% CI [0.27, 0.94]). Other specific substances (benzodiazepines, methadone, and other forms of cocaine) were not significantly associated with criminal justice involvement in this sample.

The bivariate relationships between sex exchange and criminal justice involvement were statistically significant for arrest in the past year (OR 1.86, 95% CI [1.18, 2.94]), jail incarceration in the past year (OR 1.87, 95% CI [1.21, 2.91]), having one jail incarceration (OR 1.69, 95% CI [1.00, 2.85], reference = none), having two or more jail incarcerations (OR 2.26, 95% CI [1.12, 4.57], reference = none), and spending over 12 weeks in jail in the past year (OR 3.03, 95% CI [1.27, 7.19], reference = 0–1 weeks). The relationships between sex exchange and frequency of arrest in the past year, probation in the past year, amount of time on probation in the past year, and having a partner in jail in the past year were not statistically significant.

Once age, race and ethnicity, educational attainment, sex exchange for money or drugs, crack, benzodiazepine, methamphetamine, and methadone use in the past 6 months were included as covariates in the models of rates of sexual partnership over the past 6 months, many of the associations with the criminal justice involvement variables were diminished and were no longer statistically significant (shown in Table 4, Column 2). The variables that remained statistically significantly associated with an increased number of sexual partners were experiencing probation in the past year,

spending the entire past year on probation, and spending more than 12 weeks in jail in the past year (Table 4, Column 2).

The ORs for concurrent partnerships were adjusted for age, educational attainment, sex exchange for money or drugs, and cocaine and methamphetamine use in the past 6 months. With this adjustment, many of the odds ratios were reduced and no longer reached statistical significance. The associations with increased odds of concurrent partnerships that remained statistically significant were those with spending the entire past year on probation and experiencing one jail incarceration in the past year (Table 4, Column 4).

Discussion

The relationship between high risk sexual behavior and involvement in the criminal justice system is a complex one. It is clear that many factors which lead to arrest, probation, and jail incarceration, such as using drugs and exchanging sex for money or drugs, also lead to high risk sexual behaviors. In these analyses, we were able to look at the effect of criminal justice involvement in the past year controlling for these other risk behaviors. We found that even after accounting for sex exchange and drug use, women who had been on probation, and in particular those who had been on probation for the full year, reported a higher number of sexual partners compared with women who were not on probation. In addition, women incarcerated for more than 12 weeks in the past year, but not those who had been incarcerated for shorter durations, reported a higher number of sexual partners in the past 6 months compared with women who were not incarcerated. This supports our hypothesis that a longer cumulative duration of probation and incarceration would lead to an increase in the number of sexual partnerships, perhaps because of relationship disruption.

We also found that women who had been on probation during the entire year, and those who had been incarcerated once in the past year, but not more than once, had higher rates of concurrent partnerships even after controlling for sex exchange and drug use; this may be suggestive of temporary, rather than permanent disruptions in relationships in the setting of a single, short episode of incarceration or supervision in the community. We did not find evidence to support our hypothesis that longer duration of probation or incarceration would decrease rates of concurrency.

We also found that in our sample, methamphetamine use in particular is strongly associated both with two measures of sexual risk (the number of partners and rates of concurrency) and with criminal justice involvement, making it an important confounder in our analyses. Indeed, the inclusion of the drug use variables in our multivariable models reduced the magnitude of our effect sizes and in many cases

reduced statistical significance as well. This is consistent with prior work that demonstrates that women who use methamphetamine have high rates of sexual risk behavior [24]. It is notable that even with the inclusion of drug use variables, there was a significant effect of both probation and jail time. This suggests that even once the effects of drug use are accounted for, the temporary and permanent disruptions of criminal justice surveillance and supervision may result in additional increases in the number of partners and rates of concurrent partnerships.

With regard to sex exchange, our results suggest that it may act as a partial mediator between criminal justice involvement and our measures of sexual risk [25]. Sex exchange meets the criteria set forth by Baron and Kenny, in that it is significantly associated with both criminal justice involvement and our measures of sexual risk, and when it is included in the multivariable models, the effect sizes and statistical significance of the relationships between criminal justice involvement, number of sexual partners, and rates of concurrency are reduced. It may be that women increase their engagement in sex work during probation or after incarceration to account for economic hardships that come with criminal justice involvement. There are, however, multiple potential confounding relationships between sex exchange and criminal justice involvement and, without longitudinal data, our ability to draw firm conclusions about mediation relationships is limited [26].

Our findings diverge somewhat from previous work on the effects of criminal justice involvement on an individual's number of sexual partners. It has previously been reported that incarceration episodes lasting from 1 day to 1 month, more so than episodes lasting longer than 1 month, increased the odds of reporting multiple partners or engagement in sex exchange among African American women in North Carolina with a low prevalence of substance use [1]. By contrast, we found that longer duration of incarceration was associated with a higher number of sexual partners. There are several potential explanations for this; first, it may be that because our study separated out jail incarcerations, which are on average quite short, while previous work combined both jail and prison incarcerations, that we are seeing the same phenomenon but with different categorical cut points. Second, it is important to note that this earlier study used sex exchange as an outcome, rather than as a covariate, and so the underlying conceptual model is slightly different. Thirdly, these samples represent quite disparate groups of women. Taken together, the two studies suggest that individuals who are incarcerated for very brief periods are more likely to be engaged in sex work, and as a result have more sexual partners, but that separate from sex exchange, episodes of incarceration that last more than 12 weeks are most likely to disrupt other relationships and result in the acquisition of new sexual partners.

Arrest, as measured in our study, may simply be serving as a marker for other risk behaviors. The associations between arrest and high risk sexual behavior were almost entirely accounted for by engagement in sex exchange and drug use. This is consistent with prior work, which has shown that arrest in the past 6 months is associated with high risk sexual behavior, when sex exchange was included in that measure of high risk behavior [6]. For women who exchange sex or use drugs or both, the presence of police and the possibility of arrest may be daily realities, and the frequency with which an individual is arrested likely reflects her exposure to the criminal justice system due to these behaviors.

There has previously been little description of how probation, a degree of involvement in the criminal justice system between the most superficial (policing and arrest) and the most intense (incarceration in jail or prison), affects sexual risk behavior. In our sample, probation had more effects on the number of partners and concurrency than arrest; any probation was associated with an increase in the number of partners, and a longer duration of probation was associated both with an increased number of partners and increased rates of concurrency. This suggests that this intermediate level of criminal justice supervision and surveillance may also result in relationship disruptions, similar to the effects of incarceration, but because the individual remains in the community, fewer of these relationship disruptions are permanent and both the number of partners and rates of concurrency are increased. This is particularly noteworthy because probation supervision is by far the most common form of criminal justice involvement among women.

The study is not without limitations. The exclusive recruitment of women who use drugs, although resulting in a data set that represents a group that is often excluded from research, means that generalizations of these results to all women involved in the criminal justice system may need to be tempered. The high rates of substance use among criminal justice-involved women, however, mean that analyses of these data represent the majority of women arrested, on probation, and in jail, and certainly many of those at highest risk for HIV and other STIs. Our study sample that skews toward middle age is likely to miss some of the higher risk behaviors and patterns of high risk partnerships that are more common in younger women. The cross-sectional nature of the study also significantly limits the ability to make causal statements about the relationships we observed and to draw conclusions about mediation and other confounding relationships. We did limit our exposures to the last year, and outcomes of sexual partnership to the last 6 months in order to try to capture a temporal effect, but it remains a possibility that the sexual risk behaviors pre-dated the criminal justice episodes. Finally, because women were asked the cumulative amount of time they were incarcerated or on probation, rather than the duration of their longest episode of incarceration or

probation, the distinction between frequency and duration in our data set is somewhat blurred; for example, among the women who had been on incarcerated for 12 or more weeks in the past year, some may have experienced on 3 month incarceration while others were incarcerated for 2 weeks on six different occasions.

It is notable that in this sample of women who use drugs in Oakland, California, involvement in the criminal justice system was a normative experience. The vast majority had been arrested and had spent time in jail, which is consistent with previous work with women who use drugs [27, 28]. Indeed, a large number of women in this study experienced an intersection of circumstances that place them at exceptionally high risk for HIV and other STIs, including sex exchange, drug use, and criminal justice involvement. Based on our results suggesting that there is an independent association between probation, jail incarceration and high risk sexual behavior, we conclude that in the interest of harm reduction we must work toward not only implementing risk-reducing interventions (such as medication-assisted treatment and pharmacologic pre-exposure prophylaxis for HIV) for women involved in the criminal justice system, but also toward reducing the burden of criminal justice involvement experienced by women who use drugs.

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