Published in final edited form as:

Am J Drug Alcohol Abuse. 2009 ; 35(5): 368–374. doi:10.1080/00952990903108256.

Substance Use and High Risk Sexual Behaviors among Women in Psychosocial Outpatient and Methadone Maintenance Treatment Programs

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Abstract

Objectives—The purpose of the present study was to assess the association between substance use/diagnosis and sexual risk behaviors among women enrolled in both psychosocial outpatient (PS) and methadone maintenance (MM) treatment and involved in a HIV prevention intervention study within the National Institute for Drug Abuse Clinical Trials Network.

Methods—515 sexually active women reported on unprotected sexual occasions (USO), anal sex, sex trading, sex with drug occasions, and multiple male sex partners at the baseline assessment.

Results—Within the PS sample, cocaine use diagnosis was associated with more than twice the risk of having multiple partners, trading sex for drugs, having anal sex, or having sex with drugs; alcohol or opioid use diagnosis was associated with fewer risk behaviors. Within the MM sample, cocaine use, alcohol use and opiate use diagnoses were each associated with one to two risk behaviors. Associations between sexual risk and substance using days were less frequent in both samples.

Conclusions—These findings highlight the need for integration of HIV sexual prevention interventions that address the relationship between sexual risk behavior and substance use diagnoses into substance abuse treatment programs.

Keywords

Substance use; Sexual Risk; HIV/AIDS; Women; Outpatient Treatment

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Declaration of Interest

Dr. Nunes has served on the advisory panel and speakers' bureau of Alkermes/Cephalon, Inc. (resigned October 2007). The authors report no other conflicts of interest. The authors alone are responsible for the content and writing of the paper.

INTRODUCTION

Among women, 80% of new HIV infections are acquired through heterosexual transmission (1). Among drugs of abuse, cocaine is especially associated with high risk sexual behavior, including greater numbers of sexual partners, frequency of unprotected sex, and higher rates of sex exchange (2-6).

Studies examining sexual risk behaviors are largely in out-of-treatment samples (2-3,6-7) or in methadone maintained individuals (8-11). To our knowledge, one single-site study of a mixed treatment sample (4) reported a relationship between cocaine use and sexually transmitted infection, sex exchange, and number of sexual partners. The present study seeks to add to the literature on the relationship between drug use – specifically cocaine, alcohol or heroin – and high-risk sexual behavior in a multi-site sample of women in both psychosocial outpatient and methadone maintenance treatment. We predicted that cocaine use would especially be associated with high risk sexual behavior, especially within the psychosocial outpatient treatment sample.

METHODS

Participants

Study participants were 515 women enrolled in the National Institute for Drug Abuse (NIDA) Clinical Trials Network (CTN) Safer Sex for Women study. The Safer Sex for Women study was a multi-site randomized trial comparing a 5-session gender-specific safer sex skills building intervention for women (SSB) (12) to a single session HIV/STD education (HE) group representing HIV prevention treatment-as-usual. Assessments were completed at baseline, 3- and 6-month follow up. The sample, methods, and results of this study are reported elsewhere (13). The current paper reports baseline data only.

The Safer Sex for Women study included 7 methadone maintenance (MM) and 5 psychosocial (PS) outpatient treatment programs with recruitment occurring from May 2004-April 2006. Study eligibility was assessed at a brief screening interview and included collection of demographic information. Eligible patients were ≥ 18 years old, able to understand/speak English; and reported at least one unprotected vaginal or anal sexual occasion with a male partner within the 6 months prior to study entry.

Data Collection Procedures

After screening and study consent, participants were asked to complete a 2 to 3 hour baseline interview assessing sexual risk behavior, safer sex attitudes and skills, substance use and problems, and psychosocial information. Participants received \$25 for their effort.

Measures

Sexual risk behavior was collected using the Sexual Experiences and Risk Behavior Assessment Schedule (SERBAS) (14). The SERBAS assesses the number of unprotected vaginal and anal intercourse occasions (i.e., without condom use) by partner gender and type (i.e., main versus non-main partners) in the past 3 months. The SERBAS has robust evidence of reliability and validity in women at high risk for HIV (15). The SERBAS was administered using an audio computer-assisted self-interview (ACASI) format (16), a method shown to increase self-report of sexual risk behavior (17). Outcome variables included: count of unprotected vaginal or anal sex occasions; and dichotomous variables indicating whether a woman had engaged in anal sex, sex exchange for money or drugs, sex under the influence of drugs or alcohol, and sex with multiple male sex partners. Monogamy status was determined

from the SERBAS, based on the woman's self-report of whether she considers any male partner to be her "main" partner, and whether or not she reports any other (male or female) partners.

Substance use variables included both frequency of use and presence/absence of abuse/dependence diagnoses. Respondents were asked about daily use in the past 30 days for cocaine, alcohol use to intoxication, and opioids and answers were categorized as none, 1-12 days and ≥ 13 days, measured using the Addiction Severity Index-Lite (ASI), a revised version of the ASI 5th Edition (18). The category of ≥ 13 days corresponds to the definition of "regular use" on the ASI (i.e., ≥ 3 days per week). Past 6 month abuse/dependence disorders for cocaine, alcohol, and opioids were identified using the Composite International Diagnostic Interview for DSM-IV (CIDI) (19). Age and race/ethnicity were collected using a standard CTN assessment. Education was assessed by the ASI.

Data Analysis

Initial analyses assessed frequency of each predictor and outcome variable by treatment setting (i.e., PS or MM). Main analyses were conducted for each treatment setting separately.

To assess the effect of substance use predictors and covariates on unprotected sexual occasions, a negative binomial model with random effects was used to calculate odds ratios. While both Poisson and negative binomial models can be used to model count data, the negative binomial model relaxes the restriction that the variance equals the mean. Covariates included substance use and diagnosis, age, race/ethnicity, education level, and monogamy status. To assess the effect of drug use on the four dichotomous outcomes – anal sex, sex trading, sex with drug occasions, and multiple male sex partners – logistic regression models were applied. PROC GLIMMIX in SAS was used to conduct the analysis (20).

RESULTS

Demographic Characteristics

Table 1 provides demographic, sexual risk behavior, and substance use data for the two treatment setting samples. The overall sample was evenly split between methadone maintenance (MM; n=255) and psychosocial outpatient (PS; n=260) programs. The majority of the sample was white (57.9%), with a substantial proportion of African Americans (24.3%). There were fewer Latinas (8.9%). About half the women were less than 40 years old. There were no significant sociodemographic differences between MM and PS settings.

Substance Use Characteristics

Although there was a higher percentage of cocaine abuse or dependence diagnoses in the PS (58.3%) versus MM (25.0%) samples ($\chi^2(1)=55.49$, $p < .001$), there was a higher percentage of any cocaine use days (in the past 30 days) in the MM (38.6%) versus PS (19.5%) samples ($\chi^2(2)=22.28$, $p < .001$). The majority in both treatment settings reported no cocaine use in the prior 30 days (61.4% in MM and 81.5% in PS). Alcohol abuse or dependence diagnoses were higher in PS (36.1%) versus MM (3.8%) ($\chi^2(1)=53.61$, $p < .001$) but the majority of both samples (more than 80%) reported no alcohol use. Opioid abuse or dependence diagnoses (28.6% in MM, 20.4% in PS) ($\chi^2(1)=4.61$, $p = .03$) and percentage with any opioid use (in the past 30 days) were both higher among the MM sample (44.1% in MM, 14.5% in PS) ($\chi^2(2)=49.99$, $p < .001$).

Sexual Risk Characteristics

Both the PS and MM samples were equally sexually active with means of 22 sexual occasions (in past 3 months) each. The overwhelming majority of each (MM = 79.5%; PS = 80.9%) had engaged in unprotected vaginal or anal sex with similar mean numbers of unprotected sexual

occasions (MM = 18.0, PS = 20.6). A higher percentage of the PS (46.1%) than MM (24.5%) sample had multiple sex partners ($\chi^2(1)=25.3$, $p < .001$). The majority of each sample (MM = 56.1%, PS = 60.6%) reported having sex with drugs or alcohol. A higher percentage in PS (34.6%) than MM (21.2%) reported exchanging sex for money or drugs ($\chi^2(1)=10.68$, $p < .01$). About one fourth of participants in each treatment setting reported any anal sex.

Association between Substance Use and Sexual Risk – Psychosocial Sample

Within the PS sample (see Table 2), diagnosis of cocaine abuse or dependence was significantly associated with greater sexual risk behavior in multiple categories. There was more than twice the risk of having multiple sex partners, trading sex, and anal sex, as well as almost three times the risk of having sex while under the influence of drugs. There was no significant association with unprotected sex occasions. With an alcohol diagnosis, participants were twice as likely to have multiple sexual partners and to have sex with drugs or alcohol. Use of alcohol for 1-12 days of the past 30 was significantly associated with higher risk of having sex with drugs or alcohol (18 times the risk), and of having anal sex (3 times the risk). With an opioid diagnosis, participants were twice as likely to have multiple sexual partners.

Association between Substance Use and Sexual Risk – Methadone Maintenance Sample

Analysis of the MM sample (see Table 3) showed that a cocaine diagnosis was associated with more than twice the risk of having multiple male sex partners. A high frequency of cocaine use (≥ 13 days in past 30) was associated with 10 times the risk of having sex with drugs or alcohol. An alcohol diagnosis was significantly associated with 2.69 times the number of unprotected sexual occasions, and with 11 times the risk of having anal sex. Having any alcohol use days in past 30 was associated with 4 times the risk of having sex with drugs or alcohol. Opioid abuse or dependence diagnosis was associated with twice the risk of having multiple male partners and 3 times the risk of having sex with drugs or alcohol. A high frequency of opiate use (≥ 13 days in past 30) was significantly associated with 2.25 times the number of unprotected sex occasions.

DISCUSSION

This study examined the relationship between drug use and HIV high risk sex behaviors among women in methadone maintenance (MM) and psychosocial outpatient (PS) treatment settings. In both samples, the overwhelming majority was engaged in high risk sexual behavior, at mean frequencies of about 20 unprotected occasions in the past 3 months. Because women in PS have been less studied, and because cocaine has been shown to play a role in HIV sexual risk behavior, there was a particular interest in the relationship between cocaine and sexual risk. Especially in the PS sample, cocaine use was significantly associated with an increase in high risk sex behavior, including risk of having multiple male partners, sex trade, sex with drugs or alcohol, and anal sex. Interestingly, the association was with a cocaine diagnosis, either abuse or dependence, and not with frequency of cocaine use. Thus, the association was increased by problem use, rather than any use. The substantial percentage of diagnoses of cocaine dependence within the past six months (58.3%) compared to a much smaller number reporting actual use within the past 30 days (19.5%) was notable. Since this was a treatment-seeking sample, this could explain the difference and may be a reflection of the participants' motivation to change behavior.

In the PS sample, neither opiate use diagnosis was found to have the broad relationship with multiple sex risk variables seen for cocaine use diagnosis. A single significant association was found between opiate use diagnosis, as opposed to days of opiate use, and having multiple male partners. Indeed, while chronic opiate use is associated with diminished libido and sexual function, cocaine is associated with hypersexuality. A similar distinction was made in an earlier

study of patients in residential treatment (6) which highlighted the impulsivity effects of cocaine. Alcohol diagnosis was present in a third of the PS sample and associated with having multiple male partners and having sex with drugs or alcohol. Number of alcohol use days was positively associated with having sex with drugs or alcohol and of having anal sex. These findings, for both problem alcohol use and any alcohol use, suggest a somewhat broader influence of alcohol on sexual risk behavior than opiates, and closer to that of cocaine. Previous research has shown that trait impulsivity has been described as a common pathway to both sexual risk behavior and cocaine or alcohol abuse, while not to opiate abuse (6). The findings of alcohol influence presents a special caution to alcohol-using substance users, for whom alcohol is not their primary substance of abuse and who may underestimate the risks of drinking.

Evidence of cocaine use in MM treatment was consistent with previous studies (8-11). However, our findings of association (i.e. between cocaine diagnosis and having multiple sex partners and between cocaine use days and sex with drug or alcohol) are more limited than findings in the prior methadone maintenance literature (9). This may be due to differences in sexual risk behavior outcomes (e.g. use of count of unprotected sexual occasions, dichotomous ratings of other sexual risk behaviors), or in their operational definitions (e.g. use of past 30 day timeframe). This may also be due to differences in drug and alcohol use measures. This study included clinical evaluation for abuse and dependence diagnoses, revealing associations not captured by frequency of use questions.

This study had the important advantage of including a large, multi-site sample of participants from community psychosocial outpatient treatment programs, as well as methadone maintenance programs. In doing so, it included the (arguably) higher risk sample of primary cocaine users – who are most likely to present to psychosocial outpatient treatment programs. At the same time, it differed from the majority of prior studies of cocaine users in characterizing a sample of cocaine users in treatment, and, perhaps, at greater readiness for HIV prevention intervention. However, this study was limited by its use of self-report assessment of substance use and sexual risk. Participants may have under-reported substance use if there were concerns about jeopardizing their treatment status, even with assurances of confidentiality.

This study demonstrated that women in psychosocial treatment and methadone maintenance treatment programs frequently engage in HIV sexual risk behavior. Among those in psychosocial treatment, cocaine, as well as alcohol use disorders, are prevalent, and have an association with increased HIV high risk sex behavior. HIV sexual risk prevention interventions are needed in psychosocial treatment and methadone maintenance programs that target the relationship between substance abuse and sexual risk behavior. Such intervention should target alcohol, as well as cocaine and opiate, use and problem use. Such intervention should address the impulsivity that drives both sexual risk behavior, especially among individuals engaging in cocaine and alcohol use and problem use.

Acknowledgments

The authors wish to thank the research staff and participants at each of the 12 participating treatment programs. This study was supported by the National Institute on Drug Abuse (NIDA) Clinical Trials Network grant U10 DA13035 (Edward Nunes, PI). The trial is registered with ClinicalTrials.gov, a Service of the US National Institutes of Health, Number NCT00084188, <http://www.clinicaltrials.gov/>

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Table 1
Demographic Characteristics, Sexual Risk Behavior, and Substance Use and Diagnosis (past 6 months) for Women in Psychosocial Outpatient and Methadone Maintenance Treatment Programs

		Methadone (n=255)	Psychosocial (n=260)	p-value
		Mean (SD) or %		
Age (years)	≤40	44.71%	63.46%	
Race/Ethnicity	White	59.22%	56.54%	
	African American	18.43%	30.00%	
	Hispanic/Latina	14.51%	3.46%	
	Mixed or Other	7.84%	10.00%	
Monogamy Status	Yes	65.88%	41.54%	
Education (years)	<12	30.71%	25.77%	
	12	36.22%	38.85%	
	>12	33.07%	35.38%	
Unprotected Vaginal/Anal Sex	>0	79.45%	80.86%	
Occasions (past 90 days)	Mean (SD)	18.02 (31.14)	20.56 (30.42)	
Anal Sex (past 90 days)	Yes	22.13%	25.10%	
Sex Trade (past 90 days)	Yes	21.22%	34.55%	**
Sex with Drugs (past 90 days)	Yes	56.13%	60.55%	
Number of Partners (past 90 days)	≥2	24.51%	46.09%	***
	Mean (SD)	1.71 (4.66)	3.18 (7.72)	
Cocaine Abuse or Dependence		25.00%	58.30%	***
Cocaine Use (past 30 days)	0	61.42%	81.46%	***
	1-12	28.35%	15.63%	
	≥13	10.24%	3.91%	
	Mean (SD)	3.30 (7.19)	1.30 (3.86)	***
Alcohol Abuse or Dependence		3.78%	36.05%	
Alcohol Use (past 30 days)	0	87.80%	81.25%	
	1-12	10.63%	14.84%	
	≥13	1.57%	3.91%	
	Mean (SD)	0.74 (3.23)	1.25 (3.80)	
Opioid Abuse or Dependence		28.57%	20.38%	*
Opiate Use (past 30 days)	0	55.91%	85.55%	***
	1-12	29.92%	10.94%	
	≥13	14.17%	3.52%	
	Mean (SD)	4.42 (8.87)	1.04 (3.87)	

*
p < .05

**
p < .01

p < .001

Table 2
High Risk Sexual Behavior among Psychosocial Outpatient Treatment Sample (Total: n=260, Sexually Active: n=214) Controlling for Age, Race/Ethnicity, Education, and Monogamy Status

	Unprotected Sex Occasions (Sexually Active)		Number of Partners (Total)		Sex Trade (Total)		Sex with Drugs (Total)		Anal Sex (Total)	
	AOR	(95% CI)	AOR	(95% CI)	AOR	(95% CI)	AOR	(95% CI)	AOR	(95% CI)
Cocaine Abuse or Dependence	1.21	(0.82-1.78)	2.08*	(1.09-3.97)	2.48*	(1.11-5.58)	2.82**	(1.46-5.45)	2.34*	(1.10-4.99)
Cocaine Use (30 days) ^a										
0 (n=206, reference)										
1-12 (n=40)	1.01	(0.61-1.69)	1.18	(0.49-2.83)	1.10	(0.39-3.13)	1.92 ^b	(0.72-5.16)	0.51	(0.18-1.42)
≥13 (n=10)	1.31	(0.51-3.40)	1.24	(0.22-6.89)	5.10	(0.50-52.05)			0.80	(0.13-4.95)
Alcohol Abuse or Dependence ^a	1.24	(0.85-1.82)	2.08*	(1.07-4.05)	0.98	(0.46-2.08)	2.00*	(1.02-3.92)	1.04	(0.52-2.05)
Alcohol Use in Past 30 days										
0 (n=208, reference)										
1-12 (n=38)	1.07	(0.65-1.75)	0.98	(0.42-2.34)	2.55	(0.85-7.66)	18.61***	(3.85-89.98)	3.55**	(1.39-9.08)
≥13 (n=10)	1.09	(0.43-2.77)	0.92	(0.18-4.69)	0.78	(0.09-7.24)	1.67	(0.29-9.58)	5.37	(0.82-35.03)
Opioid Abuse or Dependence	0.92	(0.59-1.45)	2.35*	(1.03-5.35)	0.99	(0.41-2.42)	0.98	(0.46-2.09)	0.89	(0.41-1.96)
Opioid Use (30 days) ^a										
0 (n=219, reference)										
1-12 (n=28)	0.93	(0.53-1.63)	0.90	(0.35-2.32)	0.75	(0.23-2.39)	1.39	(0.50-3.86)	0.90	(0.31-2.59)
≥13 (n=9)	1.39	(0.55-3.49)	1.54	(0.24-10.00)	0.77	(0.10-6.10)	0.21	(0.03-1.77)	2.04	(0.42-9.84)

^a 4 cases did not report the use of drugs in last 30 days.

^b The number of days using cocaine was recoded into a dichotomous variable (0, ≥1) instead of a trichotomous variable (0, 1-12, ≥13) because cases using cocaine >12 days during the past 30 days all had sex with drugs. Compared to 54.46% for non-cocaine users, 80% of cases using cocaine 1-12 days had sex with drugs. The association between cocaine use and sex with drugs was significant ($\chi^2(2) = 15.95, p = 0.0003$).

*
p < 0.05
**
p < .01

p < .001

Table 3
High Risk Sexual Behaviors among Methadone Treatment Sample (Total: n=255, Sexually Active: n=215) Controlling for Age, Race/Ethnicity, Education, and Monogamy Status

	Unprotected Sex Occasions (Sexually Active)		Number of Partners (Total)		Sex Trade (Total)		Sex with Drugs (Total)		Anal Sex (Total)	
	AOR	(95% CI)	AOR	(95% CI)	AOR	(95% CI)	AOR	(95% CI)	AOR	(95% CI)
Cocaine Abuse or Dependence	1.25	(0.76-2.06)	2.65*	(1.06-6.66)	2.12	(0.67-6.73)	1.35	(0.49-3.75)	2.43	(0.92-6.40)
Cocaine Use (30 days) ^d										
0 (n=156, reference)										
1-12 (n=72)	1.05	(0.67-1.65)	1.66	(0.68-4.02)	2.58	(0.94-7.07)	1.96	(0.85-4.50)	0.78	(0.32-1.90)
≥13 (n=26)	1.02	(0.52-1.99)	1.48	(0.41-5.35)	0.96	(0.18-5.14)	10.44*	(1.76-61.83)	1.02	(0.28-3.69)
Alcohol Abuse or Dependence	2.69*	(1.05-6.89)	1.01	(0.13-7.84)	0.17	(0.01-3.12)	3.67	(0.37-36.02)	11.22*	(1.62-77.57)
Alcohol Use (30 days) ^d										
0 (n=223, reference)										
1-12 (n=27)	0.56	(0.31-1.01)	1.29	(0.43-3.90)	1.36	(0.32-5.78)	4.18 ^b *	(1.21-14.46)	0.80	(0.24-2.68)
≥13 (n=4)	0.68	(0.16-2.84)	14.79	(0.68-323.54)	9.43	(0.18-503.86)			0.20	(0.01-3.90)
Opioid Abuse or Dependence	0.81	(0.53-1.25)	2.31*	(1.02-5.21)	2.15	(0.84-5.55)	3.36**	(1.42-7.91)	1.00	(0.44-2.27)
Opioid Use (30 days) ^d										
0 (n=142, reference)										
1-12 (n=76)	1.13	(0.75-1.69)	1.11	(0.50-2.46)	0.53	(0.19-1.42)	1.65	(0.76-3.58)	0.88	(0.40-1.96)
≥13 (n=36)	2.25**	(1.31-3.85)	0.50	(0.16-1.63)	1.15	(0.29-4.51)	1.67	(0.58-4.78)	1.51	(0.56-4.09)

^a 1 case did not report the use of drugs in last 30 days.

^b The number of days using alcohol was recorded as a dichotomous variable (0, ≥1) instead of a trichotomous (0, 1-12, ≥13) because cases with alcohol use >12 days during the past month all had sex with drugs. Compared to 52.25% for non-alcohol users, 81.48% of cases drinking alcohol 1-12 days had sex with drugs. The association between alcohol use and sex with drugs was significant ($\chi^2(2) = 11.53, p = 0.003$).

*
p < .05

**
p < .01