

Examining Racial/Ethnic Disparities in Sexually Transmitted Diseases Among Recent Heroin-Using and Cocaine-Using Women

Courtenay E. Cavanaugh, Ph.D.,* Leah J. Floyd, Ph.D., Typhanye V. Penniman, Ph.D., M.P.H.,
Alicia Hulbert, M.D., Charlotte Gaydos, Dr.P.H., and William W. Latimer, Ph.D., M.P.H.

Abstract

Background: This study examined racial differences in the prevalence of sexual risk behaviors and their associations with sexually transmitted diseases (STDs) among recent heroin-using and cocaine-using women.

Methods: Participants were 214 women (59% black, 41% white) who were recruited during 2002–2010 using targeted sampling to participate in a study in Baltimore, Maryland, and reported using heroin, cocaine, or crack during the previous 6 months. Participants completed self-report questionnaires about their drug use, sexual risk behaviors, and lifetime history of one of six STDs, including gonorrhea, syphilis, chlamydia, genital herpes, genital warts, or trichomoniasis.

Results: More black women (50%) than white women (28%) reported a lifetime STD. Although there were no racial differences in the lifetime prevalence of sexual risk behaviors assessed, there were racial differences in the sexual behaviors associated with ever having a lifetime STD. Simple logistic regressions revealed that ever having a casual sex partner or anal sex were correlates of having a lifetime STD among black women but not among white women. Multiple logistic regression analyses revealed that ever having a casual sex partner was significantly associated with having a lifetime STD among black women, and ever trading sex for money was significantly associated with having a lifetime STD among white women.

Conclusions: Findings are consistent with national studies and elucidate racial disparities in STDs and associated sexual behaviors among recent heroin-using and cocaine-using women. Findings underscore the need to tailor STD prevention interventions differently for black and white recent heroin-using and cocaine-using women.

Introduction

SEXUALLY TRANSMITTED DISEASES (STDs) adversely affect the health of a significant number of women in the United States.¹ There are approximately 18.9 million new cases of STDs each year,² with biological, behavioral, and contextual factors contributing to women being disproportionately affected.^{3,4} STDs contribute to enormous healthcare costs⁵ and health problems among women, including cervical cancer, pelvic inflammatory disease (PID), and pregnancy complications.⁶ STDs can also cause ulcers or inflammation that make it easier to facilitate transmission of HIV.⁷

Racial STD disparities exist, with substantially more black than white women being affected.^{1,8–10} Although there is some evidence that black women may engage in some sexual risk behaviors at higher rates than white women (e.g., early sexual debut and sex trade),^{11–13} national studies not specific

to women suggest that racial STD disparities are not accounted for by differences in sexual risk behaviors of blacks and whites.^{14–16} In fact, results from a national study suggest that blacks remain at greater risk for contracting STDs even when they engage in fairly normative behavior.¹⁵ This¹⁵ and other national studies^{14,16} suggest that racial STD disparities may be accounted for by factors beyond the individual level, such as sexual risk behaviors for adolescents and adult populations. However, these studies used combined samples of men and women and only controlled for gender.^{14–16} Therefore, racial differences in sexual behaviors and their associations with STDs among women remain unclear. Because women are biologically susceptible to contracting STDs,³ engage in different sexual risk behaviors than men, and are disproportionately affected by STDs,^{17,18} studies elucidating individual level factors, such as sexual risk behavior, influencing STD disparities among women are warranted.

Johns Hopkins University, Baltimore, Maryland.

*Current affiliation: Rutgers University, Camden, New Jersey.

Furthermore, as sexual risk behaviors and STDs are more common among drug-using women (injection and noninjection) than women in national studies or drug-using men, studies examining racial disparities in this high-risk population are particularly salient. Over a third of female injection drug users reported having received money or drugs for sex in the previous 3 months,¹⁹ which is substantially higher than the 2% of women reporting to have traded sex for money or drugs during the last year in a national study.¹³ In addition, an earlier age of sexual debut has been reported among injection drug-using women (mean = 15)²⁰ compared with women in a national study (mean = 19).²¹ Other studies have found female injection drug users were more likely to have traded sex than were male injection drug users.^{17,19} In contrast, male injection drug users have been found to report more casual sex,¹⁷ and they tended to be ($p = 0.52$) more likely to have paid someone for sex¹⁹ compared to female injection drug users. Gender differences also have been found in sexual risk behaviors among noninjection drug users of heroin, cocaine, or crack (e.g., more men than women reporting a casual partner).¹⁸ Drug-using women also have significantly higher rates of STDs than other high-risk populations, such as drug-using men.^{22,23}

Despite high rates of sexual risk behavior and STDs among drug-using women, we are aware of only one study that examined racial differences in sexual risk behaviors and STDs among substance-using women who were incarcerated.²⁴ In a study of predominantly white (73%) incarcerated women from correctional facilities in Connecticut, Delaware, and Kentucky who reported having used "substances" in the 6 weeks before being incarcerated, Oser et al.²⁴ found that more black women self-reported having a lifetime STD than white women. They also found racial differences in sexual risk behaviors, with black women reporting more unprotected sex trade than white women. Alternatively, more white women reported more unprotected sex with injection drug users than did black women. We are unaware of any studies examining racial differences in the sexual risk behaviors associated with STDs among recent drug-using women. Furthermore, given that recent heroin and cocaine-using women are at particular risk for contracting STDs, including HIV, as a result of injection and sexual risk behaviors, research testing whether the same racial patterns of sexual risk behaviors and their associations with STDs in this population is particularly salient, as it may serve to inform prevention interventions for this high-risk population of women. Therefore, the purpose of this study was to examine racial differences in the (1) prevalence of sexual risk behaviors and (2) associations of sexual risk behaviors with STDs among recent heroin-using or cocaine-using women.

Materials and Methods

Participants and procedures

This study used data from the NEURO-HIV Epidemiologic Study,¹⁷ a longitudinal study of neuropsychological, social, and behavioral risk factors for HIV and hepatitis A, B, and C among injection and noninjection drug users. That study was fully approved by the Institutional Review Board of the Johns Hopkins University Bloomberg School of Public Health. Participants were recruited between February 14, 2002, and February 2010 using targeted sampling procedures (e.g.,

street outreach, advertisements in local newspapers, outreach at local needle exchange sites, and referrals from local service agencies, clinics, and enrolled participants) in Baltimore, Maryland. Participants attended a face-to-face, standardized baseline assessment where they provided written informed consent and completed questionnaires about their histories of sexual and drug use behaviors and STDs. Participants were remunerated \$45 for their time. The present study used a subset of the participants in the parent study who identified as (1) women, (2) black or white, and (3) using heroin, cocaine, or crack in the past 6 months. Two hundred thirty women met the three criteria. Sixteen women were missing data on one of the variables of interest, with the most missing data found for the following four variables: ever anal sex (9 missing), ever traded sex for drugs (5 missing), ever traded sex for money (4 missing), and condom use last sex (4 missing). The 16 women with missing data were compared to the 214 without missing data with respect to age, education, race, and lifetime history of STD. No differences between participants with and without missing data were found. Therefore, missing data were believed to be missing at random, and participants with missing data were removed from the sample for this study. This resulted in a final study sample size of 214.

Measures

Drug use, sexual behavior, and STDs. The HIV Risk Behavior Interview, which was adapted from measures used in a landmark HIV risk behavior study,²⁵ was used to obtain information about participants' lifetime and recent drug use, sexual behaviors, and STDs. Dichotomous variables were created to identify participants with negative (coded as 0) and positive (coded as 1) histories on all variables of interest, including sexual debut before the age of 15 or lifetime history of having traded sex for drugs; traded sex for money, shelter, or anything other than drugs; a casual sex partner (i.e., someone they knew for <3 months); anal sex with a casual, steady (i.e., someone they had a sexual relationship with for ≥ 3 months), or sex trade partner for drugs or money. Dichotomous variables were also created to represent whether participants had (coded as 0) or had not (coded as 1) used a condom during their first or last sexual intercourse. Participants were also asked if they had ever been told by a health professional that they had an STD, including gonorrhea, syphilis, chlamydia, genital herpes, genital warts, or trichomoniasis. A dichotomous variable was created to identify any participants with (coded as 1) or without (coded as 0) a history of one of these six STDs.

HIV serostatus. In order to better describe the sample, we report on participants' HIV-seropositive status, given that this information was collected in the parent study. Participants provided blood samples that were used to test for participants' HIV serostatus. HIV testing was performed using the standard ELISA screening and confirmatory western blots. Serology results were completed for 190 of the 214 women in this study.

Demographics. Participant demographic information, including age, race, educational history, history of homelessness in the last 6 months, and history of incarceration (i.e., juvenile detention, jail, corrections, or prison), was also ob-

tained. Dichotomous variables were created to distinguish participants with (coded as 0) or without (coded as 1) a high school education, as well as participants with a positive history of homelessness in the past 6 months or incarceration (coded as 1, otherwise 0). A dichotomous variable was created to identify any participants who identified as black (coded as 1) or white (coded as 0).

Data analysis

All data analyses were performed using PASW statistics 17 (SPSS, Chicago, IL).²⁶ Descriptive statistics were used to obtain information about participant demographics and histories of sexual behaviors and STDs. Chi-square and *t* tests were used to examine whether there were differences between white and black drug-using women in terms of their demographics, drug use, sexual risk behaviors, and STDs. Simple logistic regressions were used to test independent demographic and sexual risk behavior correlates of having a lifetime STD. Multiple logistic regressions were then performed to test univariable sexual behavior correlates of STDs at *p* < 0.10 simultaneously along with participants' age. The logistic regression analyses were tested separately for Black and white women to better elucidate correlates of STDs unique to black vs. white women.

Results

Participant descriptives

Participants were between 17 and 50 years of age, and they had all been sexually active at some point during their lifetime. The majority identified as black (59.3%), with 95.3% of

those who identified as black identifying as African American. Sample descriptive statistics for the full and stratified samples of black and white women are reported in Table 1. As shown, the mean age of women in the full sample was 33.35 (standard deviation [SD] 6.93), and black women were significantly older (mean = 36.02, SD 5.44) than white women (mean = 29.45, SD 7.05). The majority of participants had a high school education or equivalent (51.4%). One fifth had been homeless during the previous 6 months (20.6%), and the majority of women (72.4%) had been incarcerated (i.e., juvenile detention, jail, corrections, or prison) during their lifetime. There were no differences between black and white women in terms of their educational attainment, recent homelessness, or lifetime history of incarceration. The majority of women had not used a condom during their first (69.6%) or last (65.0%) sexual encounter. No significant differences were found between black and white women on any of the sexual behaviors listed in Table 1. With respect to STDs, significantly more black women (49.6%) than white women (27.6%) had one of the six STDs assessed. The number and percent of black and white women having reported lifetime histories of specific STDs are reported; however, no comparisons were made between black and white women in terms of the specific six STDs because of small cell sizes.

Not included in Table 1 but of interest is that 18 women (9.5%) were HIV positive; 15 (13.2%) black women were HIV-positive, and 3 (3.9%) white women were HIV-positive. There was 94% consistency between participants' HIV status according to their self-report and their serostatus test results. Also, there were no differences between women who were HIV-seropositive and those who were seronegative in terms of their prevalence of having traded sex for drugs or money,

TABLE 1. DEMOGRAPHIC, SEXUAL RISK BEHAVIOR, AND INFECTIOUS DISEASES AMONG HEROIN, COCAINE, AND CRACK-USING WOMEN IN BALTIMORE, MARYLAND, 2002–2010 (N = 214)

	Total n (%)	Black n (%)	White n (%)
Total	214 (100)	127 (100)	87 (100)
Demographics			
Age, mean (SD)	33.35 (6.93)	36.02 (5.44)	29.45 (7.05)**
Less than high school education	104 (48.6)	58 (45.7)	46 (52.9)
Homelessness past 6 months	44 (20.6)	23 (18.1)	21 (24.1)
Incarceration	155 (72.4)	96 (75.6)	59 (67.8)
Sexual behavior			
Early sexual debut (before 15)	86 (40.2)	49 (38.6)	37 (42.5)
Ever traded sex for drugs	54 (25.2)	37 (29.1)	17 (19.5)
Ever traded sex for money, shelter, other	73 (34.1)	41 (32.3)	32 (36.8)
Ever had casual sex partner	117 (54.7)	70 (55.1)	47 (54.0)
Ever had anal sex	43 (20.1)	21 (16.5)	22 (25.3)
Condom not used during first sex	149 (69.6)	93 (73.2)	56 (64.4)
Condom not used during last sex	139 (65.0)	84 (66.1)	55 (63.2)
Infectious diseases			
Ever had one of six STDs	87 (40.7)	63 (49.6)	24 (27.6)**
Gonorrhea ^a	46 (21.5)	38 (29.9)	8 (9.2)
Syphilis ^a	13 (6.1)	9 (7.1)	4 (4.6)
Chlamydia ^a	43 (20.1)	29 (22.8)	14 (16.1)
Genital herpes ^a	13 (6.1)	9 (7.1)	4 (4.6)
Genital warts ^a	8 (3.7)	5 (3.9)	3 (3.4)
Trichomoniasis ^a	11 (5.1)	8 (6.3)	3 (3.4)

***p* < 0.01.

^aNo comparisons made between black and white women because of small cell sizes. SD, standard deviation; STD, sexually transmitted disease.

a casual sex partner, anal sex, or used a condom their first or last sex.

The most common drugs reported among women in the past 6 months were heroin (84.1%), crack (59.8%), cocaine (52.3%), and cannabis (43.0%). Nearly two thirds of the sample (72.9%) had used heroin in the past 30 days. Because STDs were assessed during the lifetime, this study was unable to take into account drug use patterns that could be related to women's risky sexual behavior (e.g., crack use). Nevertheless, analyses were run to provide descriptive information about women's past 6-month drug use in order to provide pertinent contextual information. Chi-square analyses revealed significant racial differences in the prevalence of past 6-month heroin, cocaine, or crack between black and white women. More white women used heroin (90.8%) or cocaine (65.5%) during the past 6 months compared to black women (79.5%, $p < 0.05$, and 43.4%, $p < 0.01$, respectively). In contrast, more black women used crack (66.1%) during the past 6 months compared to white women (50.6%, $p < 0.05$).

Unadjusted logistic regressions

Demographic and sexual behaviors were tested as independent correlates of ever having a lifetime STD. The results of these regressions are presented as the unadjusted odds ratios (OR) with 95% confidence intervals (CI) in Table 2. As shown, independent correlates of having a lifetime STD for black women were education, recent homelessness, lifetime history of sex trade for money, ever having a casual sex partner, and ever having anal sex. Black women who did not have a high school education or equivalent were less likely (OR 0.48, 95% CI 0.23-0.97, $p < 0.05$) to report having a lifetime STD compared to black women who had a high school education or equivalent. In addition, black women who were recently homeless (OR 2.77, 95% CI 1.05-7.30, $p < 0.05$), had traded sex for money (OR 2.68, 95% CI 1.23-5.81, $p < 0.05$), ever had a casual sex partner (OR 3.39, 95% CI 1.63-7.05, $p < 0.01$) or ever had anal sex (OR 5.54, 95% CI 1.75-17.59) were more likely to report having a lifetime STD compared to

TABLE 2. UNIVARIATE CORRELATES OF SEXUALLY TRANSMITTED DISEASES AMONG BLACK AND WHITE HEROIN, COCAINE, AND CRACK USING WOMEN IN BALTIMORE, MARYLAND, 2002-2010 (N = 214)

Variable	STDs among 127 black women			STDs among 87 white women		
	n (%) of 63 with STD	OR	95%CI	n (%) of 24 with STD	OR	95%CI
Demographics						
Age		0.98	0.92-1.04		1.01	0.94-1.08
Education						
High school education or GED	40 (63.5)	1.00	–	9 (37.5)	1.00	–
Less than high school education	23 (36.5)	0.48*	0.23-0.97	15 (62.5)	1.72	0.66-4.51
Homeless in past 6 months						
No	47 (74.6)	1.00	–	19 (79.2)	1.00	–
Yes	16 (25.4)	2.77*	1.05-7.30	5 (20.8)	0.77	0.25-2.41
Lifetime history of incarceration						
No	15 (23.8)	1.00	–	4 (16.7)	1.00	–
Yes	48 (76.2)	1.07	0.47-2.40	20 (83.3)	3.08***	0.94-10.92
Sexual behaviors						
Sexual debut before 15 years of age						
No	37 (58.7)	1.00	–	10 (41.7)	1.00	–
Yes	26 (41.3)	1.25	0.61-2.56	14 (58.3)	2.44***	0.93-6.36
Lifetime history of sex trade for drugs						
No	40 (63.5)	1.00	–	16 (66.7)	1.00	–
Yes	23 (36.5)	2.05***	0.94-4.50	8 (33.3)	3.00***	1.00-9.05
Lifetime history of sex trade for money, shelter, other						
No	36 (57.1)	1.00	–	9 (37.5)	1.00	–
Yes	27 (42.9)	2.68*	1.23-5.81	15 (62.5)	4.51**	1.67-12.21
Lifetime history of casual sex partner						
No	19 (30.2)	1.00	–	8 (33.3)	1.00	–
Yes	44 (69.8)	3.39**	1.63-7.05	16 (66.7)	2.07	0.77-5.51
Lifetime history of anal sex						
No	46 (73.0)	1.00	–	16 (66.7)	1.00	–
Yes	17 (27.0)	5.54**	1.75-17.59	8 (33.3)	1.75	0.62-4.93
Condom used first sex						
Yes	16 (25.4)	1.00	–	6 (25.0)	1.00	–
No	47 (74.6)	1.15	0.52-2.52	18 (75.0)	1.97	0.69-5.66
Condom used last sex						
Yes	23 (36.5)	1.00	–	10 (41.7)	1.00	–
No	40 (63.5)	0.79	0.38-1.65	14 (58.3)	0.75	0.29-1.97

** $p < 0.01$; * $p < 0.05$; *** $p < 0.10$.

CI, confidence interval; OR, odds ratio.

black women who were not recently homeless and who had not engaged in those sexual risk behaviors. Although not statistically significant at $p < 0.05$, there was a trend ($p < 0.10$) for black women who traded sex for drugs to also have increased risk for an STD compared to black women who had not traded sex for drugs.

The only independent correlate of having a lifetime STD for white women was ever trading sex for money. White women who had a lifetime history of having traded sex for money (OR 4.51, 95% CI 1.67, 12.21, $p < 0.01$) were more likely to have a lifetime STD compared to white women who had no lifetime history of having traded sex for money. There was also a trend ($p < 0.10$) for white women who had a history of incarceration, early sexual debut, or trading sex for drugs to be at elevated risk for STDs.

Adjusted logistic regression

Correlates associated with reported lifetime history of STDs in the univariable analyses ($p < 0.10$) were subsequently tested simultaneously along with age as correlates of lifetime STDs. The results of these multiple regressions are presented as the adjusted odds ratios (OR) with 95% CIs in Table 3. As shown, black women who had ever had a casual sex partner (OR 2.84, 95% CI 1.26-6.38, $p < 0.05$) were more likely to have a lifetime STD compared to black women who never had a casual sex partner, after controlling for age, education, recent homelessness, sex trade (for money or

drugs), and anal sex. This model accounted for 19.4%–25.9% of the variance in lifetime self-reported STDs. In contrast, white women who traded sex for money were more likely (OR 3.62, 95% CI 1.16-11.35, $p < 0.05$) to have reported a lifetime history of a STD compared to white women who had never traded sex for money, after controlling for age, incarceration, early sexual debut, and sex trade for drugs. This model accounted for 14.6%–21.1% of the variance in lifetime self-reported STDs.

Given the findings and available data, we examined the sexual characteristics of black and white women in terms of the age they first and last traded sex for drugs, traded sex for money, had a casual sex partner, or had sex with a steady partner. This information is presented in Table 4, along with information about the number and percent of women who reported substance use before each type of sexual partnership and those who reported 100% condom use for each type of sexual partnership. On Table 4, similar superscripts indicate significant differences between black and white women who engaged in this type of sexual partnership on this partnership characteristic. As shown, there was a significant difference between black and white women who traded sex for money in terms of the age in which they had last traded sex for money; black women were on average older the last time they traded sex for money (mean = 32.63) than white women (mean 29.03). White women who had casual sex partners had their first casual sex partner at an earlier age (mean = 16.98) than black women who had a casual sex partner (mean = 19.84). In

TABLE 3. MULTIVARIABLE LOGISTIC REGRESSION MODEL OF CORRELATES OF SEXUALLY TRANSMITTED DISEASES AMONG BLACK AND WHITE HEROIN, COCAINE, AND CRACK USING WOMEN IN BALTIMORE, MARYLAND, 2002–2010 (N = 214)

Variable	STDs among 127 black women		STDs among 87 white women	
	OR	95%CI	OR	95%CI
Age	0.99	0.92-1.07	1.01	0.94-1.10
Education			a	
High school education or GED	1.00	–		
Less than high school education	0.46***	0.21-1.03		
Homeless in past 6 months			a	
No	1.00	–		
Yes	2.13	0.70-6.45		
Lifetime history of incarceration				
No			1.00	–
Yes			2.31	0.60-8.99
Sexual debut before 15 years of age	a			
No			1.00	–
Yes			2.22	0.72-6.86
Lifetime history of sex trade for drugs				
No	1.00	–	1.00	–
Yes	0.88	0.29-2.68	1.13	0.29-4.35
Lifetime history of sex trade for money, shelter, other				
No	1.00	–	1.00	–
Yes	2.48	0.83-7.40	3.62*	1.16-11.35
Lifetime history of casual sex partner			a	
No	1.00	–		
Yes	2.84*	1.26-6.38		
Lifetime history of anal sex			a	
No	1.00	–		
Yes	3.24***	0.95-11.04		

* $p < 0.05$; *** $p < 0.10$.

^aVariable not included in multivariate model because it was not a significant univariate correlate.

TABLE 4. CHARACTERISTICS OF LIFETIME SEXUAL PARTNERSHIPS AMONG BLACK AND WHITE RECENT HEROIN, COCAINE, OR CRACK USING WOMEN IN BALTIMORE, MARYLAND

	Black women				White women			
	Sex trade for drugs	Sex trade for money	Casual	Steady	Sex trade for drugs	Sex trade for money	Casual	Steady
Total <i>n</i> who ever had this type of sex partner	37	41	70	126	17	32	47	87
Mean age (SD) first had this type of sex partner	25.95 (6.66)	24.93 (6.76)	19.84 ^{c*} (6.66)	16.37 (2.73)	23.76 (8.20)	22.28 (7.79)	16.98 ^{c*} (5.34)	15.84 (2.55)
Mean age (SD) last had this type of sex partner	32.08 (7.37)	32.63 ^{a*} (6.27)	28.41 (8.19)	35.29 ^e (5.42)	28.65 (8.44)	29.03 ^{a*} (7.23)	25.85 (8.26)	29.17 ^e (7.01)
Mode number of this type of partner	1	1	1	3	1	100	1	3
<i>n</i> (%) reported alcohol before/during this type of sex	19 (52.8)	20 (51.3)	39 (55.7)	73 (58.4)	6 (35.3)	10 (31.3)	24 (51.1)	45 (51.7)
<i>n</i> (%) reported noninjection drugs before/during this type of sex	24 ^{g***} (66.7)	25 (64.1)	34 (48.6)	80 (64.0)	6 ^{g***} (35.3)	14 (43.8)	25 (53.2)	48 (55.2)
<i>n</i> (%) reported injection drugs before/during this type of sex	11 ^{h***} (31.4)	14 ^{b*} (35.0)	11 ^{d*} (15.7)	36 ^{f**} (28.6)	11 ^{h***} (64.7)	22 ^{b*} (68.8)	17 ^{d*} (37.0)	55 ^{f**} (65.5)
<i>n</i> (%) used condoms 100% when having sex with this type of partner	13 (36.1)	14 (35.9)	24 (34.8)	3 (2.4)	8 (47.1)	18 (56.3)	11 (23.4)	7 (8.0)

** $p < 0.01$; * $p < 0.05$; *** $p < 0.10$.

Some variables had missing data for 1–2 participants.

Similar superscripts represent significant differences between black and white women for this sex characteristic.

No comparisons were made between blacks and whites with respect to mode number of specific sexual partnerships in each category given the range.

addition, white women who ever had a steady sex partner were also found to be younger at the age they last had a steady sex partner (mean = 29.17) than black women (mean = 35.29) who ever had a steady sex partner. There was a large range in the number of each type of sexual partner (e.g., sex trade for drugs, sex trade for money, casual, and steady), so the mode number of specific partners is reported, and no comparisons between black and white women are made. As shown in Table 4, however, the mode number of partners with whom women had traded sex for money was noticeably higher (mode = 100) for white women compared to black women (mode = 1).

There were also significant differences between black and white women with respect to drug use before certain sexual partnerships. White women were more likely than black women to have used injection drugs before trading sex for money (68.8%), having sex with a casual partner (37.0%), or having sex with a steady sex partner (65.5%). Black women used injection drugs before trading sex for money (35.0%), having sex with a casual partner (15.7%), or having sex with a steady partner (28.6%). There was also a trend ($p < 0.10$) for white women to be more likely to have reported using injection drugs before trading sex for drugs (64.7%) than Black women (31.4%). In contrast, there was a trend ($p < 0.10$) for black women who traded sex for drugs to be more likely to have used noninjection drugs before sex trade for drugs (66.7%) than white women who had traded sex for drugs (35.3%).

Discussion

STDs adversely affect the health of many women, particularly women of color. Although national studies suggest racial

disparities are not accounted for by individual level factors, such as sexual risk behaviors,^{14–16} these studies used combined samples of men and women and do not report on racial disparities in sexual risk behaviors and their associations with STDs specifically among women. Furthermore, because drug-using women are at higher risk for engaging in sexual risk behaviors than women in national studies or even drug-using men, research focusing on this population is particularly salient. Results from the 214 recent heroin, crack, or cocaine-using women studied reveal no racial differences in the prevalence of sexual risk behaviors examined. However, there were significant racial differences in the sexual risk behaviors associated with STDs. After controlling for other sexual risk behaviors and participants' age, the only significant sexual risk behavior correlate of having a lifetime STD for black women was ever having a casual sex partner, whereas the only significant sexual risk behavior correlate of having a lifetime STD for white women was ever trading sex for money. These findings extend previous studies pertaining to correlates of STDs among drug-using women^{19,26} by further elucidating patterns that may be unique to black and white women who have recently used heroin or cocaine.

What is particularly striking about the pattern of findings concerns the threshold of risk behavior associated with STD status across the two racial groups studied, which may provide important insights into relationships between differential STD risk levels characterizing social networks of black and white female drug users. Namely, the findings suggest that a relatively high prevalence risk behavior, such as casual sex, may place black female drug users but not white female drug users at elevated STD risk. Conversely, the findings also suggest that a comparatively low prevalence but high risk behavior, such as sex trade, places white female drug users

but not black female drug users at elevated STD risk. Each of these findings is both simultaneously sensible and curiously noteworthy. One possible explanation may have to do with variations in STD prevalence across the social networks of the black and white women in this study. To the extent that white drug users tend to access casual sex partners in social networks that are generally not characterized by high levels of STDs, casual sex, though risky, still might not be a potent predictor of STD status. However, when white female drug users engage in sex trade, they expose themselves to a social network with much higher levels of STDs, thus helping to explain the significance of sex trade status among this subgroup of women. The findings may also suggest that the prevalence of STDs is higher among social networks in which black women find sex partners, and to this end, casual sex operates as a potent predictor of STD status. Further, if already high rates of STD among casual sex networks of black drug-using women explain the STD risk associated with casual sex in this group, it may also help explain why the additional risk engendered by sex trade status does not achieve significance. This pattern of findings is consistent with extant studies suggesting differing rates of STDs among social networks across racial/ethnic lines, with considerable pertinence to the focus of targeted prevention efforts.

STDs were common in this sample of recent heroin-using or cocaine-using women, with 40.7% of women reporting that a health professional had told them they had an STD, including gonorrhea, syphilis, chlamydia, genital herpes, genital warts, or trichomoniasis. More black women (49.6%) than white women (27.6%) reported a lifetime history of one of these six STDs. The higher rates of STDs found among our sample of black women are consistent with the broader literature suggesting racial disparities in the prevalence of STDs.^{8–10,14,15}

Sex trade for money was more common and showed a larger association with STDs in terms of the size of the ORs and significance levels than sex trade for drugs. These findings suggest that there may be differential patterns of associations between types of sex trade and STD risk that warrant further investigation. To date, these two types of sex trade are typically combined in studies,^{27,28} but future studies looking into potential unique relationships with these variables and health outcomes may elucidate specific patterns that may inform infectious disease prevention interventions. Future studies are also needed to repeat these analyses while controlling for other potential covariates, including women's histories of violence, which have also been associated with women's risk for contracting STDs.²⁹

These findings suggest that although targeted STD/HIV interventions may assist with reducing STD/HIV risk among white recent heroin-using and cocaine-using women, these individual level interventions are necessary but not sufficient to address the racial STD disparities that exist among black recent heroin-using and cocaine-using women. In fact, multiple studies suggest that high rates of STDs among black women are attributed to networks and other structural level factors, such as the high rates of incarceration among black men, that impact black women. Therefore, to truly reduce the rates of STDs among high-risk black women, such as those who use heroin or cocaine, reducing safe sex alone, including promoting women's methods (e.g., female condom, microbicides), may not be enough to substantially reduce STD rates in this high-risk population. Other structural interventions

for reducing STDs among black recent heroin-using or cocaine-using women, including those that address poverty, discrimination, racism,^{30–32} and the impact of incarceration,³³ are also needed, in addition to individual level interventions, to reduce risk for STDs in this population of women.

Important study limitations should be noted. This study relied on participant self-reports of STDs, which may be less accurate than serological data.³⁴ However, self-reports of STDs have been found to be valid in comparison to other assessment methods, including medical record reviews and state health department reports.³⁵ The span of some CIs also suggests some instability in the models. Also, this study is cross-sectional so conclusions about the temporal relationship of variables examined cannot be drawn. Although partner, peer, social, cultural, and structural level variables also play a role in the transmission of STDs,^{31,32,36} such data were not available for this study. Future research should examine these factors in order to better understand how these mechanisms may influence racial STD disparities in this population of women. Nevertheless, individual level information, such as that reported here, is essential for informing individual behavioral interventions.

Conclusions

This is the first study, to our knowledge, to examine racial differences in sexual risk behaviors and their associations with STDs among recent heroin-using or cocaine-using women. Findings from this study on drug-using women are consistent with studies of women nationally,^{14,15} suggesting that black women are disproportionately affected by STDs and at risk even with less risky behavior than white women. These findings in combination with other related factors, including sexual networks, concurrency and assortative mixing, access to healthcare, and the ethnic racial homogeneity and sociodemographics of a community,^{16,37–42} may help inform efforts to address racial disparities and reduce risk in this vulnerable population of women.

Acknowledgments

This study was supported by grants R01DA014498, T32DA007292, and R03DA024981 from the National Institute on Drug Abuse.

Disclosure Statement

The authors have no conflicts of interest to report.

References

1. Centers for Disease Control and Prevention. Sexually transmitted diseases in the United States, 2008: National surveillance data for chlamydia, gonorrhea, and syphilis. 2009. Available at www.cdc.gov/std/stats08/2008survFactSheet.PDF.
2. Weinstock H, Berman S, Cates W Jr. Sexually transmitted diseases among American youth: Incidence and prevalence estimates, 2000. *Perspect Sex Reprod Health* 2004;36:6–10.
3. McCree DH, Rompalo AM. Biological and behavioral risk factors associated with STDs/HIV in women: Implications for behavioral interventions. In: Aral SO, Douglas JM, eds. *Behavioral interventions for prevention and control of sexually transmitted diseases*. New York: Springer, 2007:310–324.

4. Logan TK, Cole J, Leukefeld C. Women, sex, and HIV: Social and contextual factors, meta-analysis of published interventions, and implications for practice and research. *Psychol Bull* 2002;128:851-885.
5. Chesson HW, Blandford JM, Gift TL, et al. The estimated direct medical cost of sexually transmitted diseases among American youth, 2000. *Perspect Sex Reprod Health* 2004;36:11-19.
6. U.S. Dept of Health and Human Services. Sexually transmitted diseases: Overview, 2005. Available at www.womenshealth.gov/faq/sexually-transmitted-infections.cfm#6 Accessed March 17, 2010.
7. Fleming DT, Wasserheit JN. From epidemiological synergy to public health policy and practice: The contribution of other sexually transmitted diseases to sexual transmission of HIV infection. *Sex Transm Infect* 1999;75:3-17.
8. Datta SD, Sternberg M, Johnson RE, et al. Gonorrhea and chlamydia in the United States among persons 14 to 39 years of age, 1999 to 2002. *Ann Intern Med* 2007;147:89-96.
9. Miller WC, Swygard H, Hobbs MM, et al. The prevalence of trichomoniasis in young adults in the United States. *Sex Transm Dis* 2005;32:593-598.
10. Miller WC, Ford CA, Morris M, et al. Prevalence of chlamydial and gonococcal infections among young adults in the United States. *JAMA* 2004;291:2229-2236.
11. Miller HG, Cain VS, Rogers SM, et al. Correlates of sexually transmitted bacterial infections among U.S. women in 1995. *Fam Plann Perspect* 1999;31:4-9.
12. Lewis DK, Watters JK. Sexual risk behavior among heterosexual intravenous drug users: Ethnic and gender variations. *AIDS* 1991;5:77-83.
13. Anderson JE, Mosher WD, Chandra A. Measuring HIV risk in the U.S. population aged 15-44: Results from Cycle 6 of the National Survey of Family Growth. Hyattsville, MD: CDC National Center for Health Statistics, 2006.
14. Ellen JM, Aral S, Madger LS. Do differences in sexual behaviors account for the racial/ethnic differences in adolescents' self-reported history of a sexually transmitted disease? *Sex Transm Dis* 1998;25:125-129.
15. Hallfors DD, Iritani BJ, Miller WC, et al. Sexual and drug behavior patterns and HIV and STD racial disparities: The need for new directions. *Am J Public Health* 2007;97:125-132.
16. Laumann EO, Youm Y. Racial/ethnic group differences in the prevalence of sexually transmitted diseases in the United States: A network explanation. *Sex Transm Dis* 1999;26:250-261.
17. Mitchell MM, Latimer WW. Gender differences in high risk sexual behaviors and injection practices associated with perceived HIV risk among injection drug users. *AIDS Educ Prev* 2009;21:384-394.
18. Absalon J, Fuller CM, Ompad DC, et al. Gender differences in sexual behaviors, sexual partnerships, and HIV among drug users in New York City. *AIDS Behav* 2006;10:707-715.
19. Plitt SS, Garfein RS, Gaydos CA, et al. Prevalence and correlates of *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Trichomonas vaginalis* infections, and bacterial vaginosis among a cohort of young injection drug users in Baltimore, Maryland. *Sex Transm Dis* 2005;32:446-453.
20. Neaigus A, Gyarmathy VA, Miller M, et al. Injecting and sexual risk correlates of HBV and HCV seroprevalence among new drug injectors. *Drug Alcohol Depend* 2007;89:234-243.
21. Sandfort TGM, Orr M, Hirsch JS, et al. Long-term health correlates of timing of sexual debut: Results from a national U.S. study. *Am J Public Health* 2008;98:155-161.
22. Hwang LY, Ross MW, Zack C, et al. Prevalence of sexually transmitted infections and associated risk factors among populations of drug abusers. *Clin Infect Dis* 2000;31:920-926.
23. Latka M, Ahern J, Garfein RS, et al. Prevalence, incidence, and correlates of chlamydia and gonorrhea among young adult injection drug users. *J Subst Abuse* 2001;13:73-88.
24. Oser CB, Havens JR, Mooney JL, et al. Racial differences in HIV/AIDS discussion strategies and sexual risk behaviors among drug-abusing female criminal offenders. *J Psychoactive Drugs* 2008;40:483-492.
25. Vlahov D, Anthony JC, Celentano D, et al. Trends of HIV-1 risk reduction among initiates into intravenous drug use, 1982-1987. *Am J Drug Alcohol Abuse* 1991;17:39-48.
26. Plitt SS, Sherman SG, Strathdee SA, et al. Herpes simplex virus 2 and syphilis among young drug users in Baltimore, Maryland. *Sex Transm Infect* 2005;81:248-253.
27. Golder S, Logan TK. Correlates and predictors of women's sex trading over time among a sample of out-of-treatment drugs abusers. *AIDS Behav* 2007;11:628-640.
28. Edwards JM, Halpern CT, Wechsberg WM. Correlates of exchanging sex for drugs or money among women who use crack cocaine. *AIDS Educ Prev* 2006;18:420-429.
29. Wilson HW, Widom CS. Sexually transmitted diseases among adults who had been abused and neglected as children: A 30-year prospective study. *Am J Public Health* 2009;99 (Suppl 1):S197-203.
30. Adimora AA, Schoenbach VJ. Contextual factors and the black-white disparity in heterosexual HIV transmission. *Epidemiology* 2002;13:707-712.
31. Adimora AA, Schoenbach VJ. Social context, sexual networks, and racial disparities in rates of sexually transmitted infections. *J Infect Dis* 2005;191 (Suppl 1):S115-122.
32. Aral SO, Adimora AA, Fenton KA. Understanding and responding to disparities in HIV and other sexually transmitted infections in African Americans. *Lancet* 2008;372:337-340.
33. Khan MR, Wohl DA, Weir SS, et al. Incarceration and risky sexual partnerships in a southern U.S. city. *J Urban Health* 2008;85:100-113.
34. Kleyn J, Schwabke J, Holmes KK. The validity of injecting drug users' self-reports about sexually transmitted diseases: A comparison of survey and serological data. *Addiction* 1993;88:673-680.
35. Niccolai LM, Kershaw TS, Lewis JB, et al. Data collection for sexually transmitted disease diagnoses: A comparison of self-report, medical record reviews, and state health department reports. *Ann Epidemiol* 2005;15:236-242.
36. Hogben M, Leichliter JS. Social determinants and sexually transmitted disease disparities. *Sex Transm Dis* 2008;35: S13-18.
37. Kraut-Becher J, Eisenberg M, Voytek C, et al. Examining racial disparities in HIV: Lessons from sexually transmitted infections research. *JAIDS* 2008;47:S20-S27.
38. Kaplan MS, Crespo CJ, Huguet N, et al. Ethnic/racial homogeneity and sexually transmitted disease: A study of 77 Chicago community areas. *Sex Transm Dis* 2009;36: 108-111.
39. Du P, McNutt L-A, O'Campo P, et al. Changes in community socioeconomic status and racial distribution associated

- with gonorrhea rates: An analysis at the community level. *Sex Transm Dis* 2009;36:430–438.
40. Adimora AA, Schoenbach VJ, Doherty IA. HIV and African Americans in the southern United States: Sexual networks and social context. *Sex Transm Dis* 2006;33:S39–45.
 41. Parrish DD, Kent CK. Access to care issues for African American communities: Implications for STD disparities. *Sex Transm Dis* 2008;35:S19–22.
 42. Morris M, Kurth AE, Hamilton DT, et al. Concurrent partnerships and HIV prevalence disparities by race: Linking

science and public health practice. *Am J Public Health* 2009; 99:1023–1031.

Address correspondence to:
Courtenay E. Cavanaugh, Ph.D.
Rutgers University
Department of Psychology
311 North Fifth Street, #307
Camden, NJ 08102

E-mail: cocavana@camden.rutgers.edu

