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An Effective HIV Risk Reduction Protocol for Drug-Using Women Sex Workers

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Abstract

HIV prevention is an especially salient issue for women, given the ongoing feminization of the epidemic. Female sex workers are especially vulnerable to HIV infection, particularly those who are drug-using and engage in street-based sex exchange. This paper examines risk behaviors and HIV serostatus of 806 drug-using women sex workers in Miami, Florida, and assesses the relative impact of two HIV and hepatitis prevention interventions on changes in risk behavior. Drug-using sex workers were recruited using targeted sampling strategies and were randomly assigned to one of two intervention conditions – the NIDA Standard, or an innovative Sex-Worker Focused (SWF) intervention. Interview data were collected pre-intervention and 3 and 6 months post-intervention, and blood samples were collected for HIV and hepatitis B and C testing. Overall, 21% of the sample tested HIV positive. Outcome analyses indicate that both groups benefited from participation in the intervention trial. However, the SWF intervention was found to be more efficacious with reductions in unprotected oral sex, and sexual violence. These data support the importance of HIV testing and intervention programs for drug-using women sex workers.

Keywords

Sex workers; HIV interventions; peer counselors; drug use; sexual risk behaviors and violence

Among large urban centers in the U.S., Miami remains a high-incidence community for HIV/AIDS. Miami ranks first in the nation for new cases of HIV with an estimated rate of 48.5 per 100,000 population (CDC 2008), and the impact of HIV/AIDS has been felt most acutely in Miami's African American community (Florida Department of Health 2006). In fact, the Centers for Disease Control and Prevention has declared HIV/AIDS among Miami's African American women – who represent 76% of all female AIDS cases in the county (MDCHD 2007) – to be at state-of-emergency levels (CDC 2001).

The geographically clustered communities characterized by the highest concentrations of HIV/AIDS in Miami also display high rates of substance abuse (Young 2006) and extremely elevated poverty rates. These neighborhoods also contain numerous illegal drug markets, further exacerbating and sustaining the environment of risk that surrounds residents of these communities (Inciardi 1995). The entrenched HIV epidemic in Miami is linked to high rates of drug abuse in these areas. For almost four decades, Miami has been both a port of entry and corridor community for the trafficking of illegal drugs, and it has been a well-known epicenter for the abuse of cocaine, crack, heroin, and other drugs (Inciardi & Pottier 1998).

Miami's HIV epidemic is also intertwined with South Florida's active commercial sex industry. Sex work has long been evident in Miami, but economic issues, including poverty and unemployment, continue to drive vulnerable women into the sex trade. Women's precarious economic position and limited access to legitimate income-generating activities often spurs their engagement in "survival sex" to support their subsistence and drug needs. Beginning with the *crack*-cocaine era in the early 1980s (Inciardi 1995) and enduring into the new century (Inciardi & Surratt 2001), exchanges of sex for drugs and sex for money have become commonplace along the boulevards and back streets adjacent to downtown and inner-city Miami.

Drug-using street sex workers are most visible in Miami, and although most express a preference for commercial solicitation along local prostitution "strolls" (i.e., locations where sex workers openly walk the streets soliciting customers), many resort to sex-for-drugs exchanges when they have an immediate need for drugs, when money is scarce, and when paying "dates" (customers) are few in number (Inciardi & Surratt 2001). Because drug-using street sex workers engage in extensive high-risk sexual behaviors with numerous partners (Surratt & Inciardi 2004), their vulnerability to HIV is pronounced. Concomitant with this position, street sex workers are exposed to elevated levels of violence, including rape and assault (Kurtz et al. 2004). Moreover, many are heavy users of cocaine, crack, heroin, and other drugs (Inciardi & Surratt 2001), which places them at high risk for loss of social services and support structures, including family connections and stable housing. Due to these factors, HIV prevention initiatives for highly vulnerable women sex workers are critically important.

A growing body of literature suggests that HIV intervention models must be adapted and tailored for particular social contexts in order to be effective with unique groups (Dévieux et al. 2004). Increasingly, HIV interventions documented to be efficacious for women are those that address the social context of women's lives, and work with women to improve their personal power and control in sexual relationships (Serk, Theall & Elifson 2003). A significant body of research has begun to demonstrate that HIV interventions specially designed for drug-using women can effectively reduce sexual risk behaviors (Wechsberg et al. 2004). Among HIV-negative African American women, for example, Serk and colleagues (2003) found an overall reduction post-intervention in both crack use and sexual risk behaviors, including having sex while high and having sex for drugs or money. Similarly, Wechsberg and colleagues (Wechsberg et al. 2004) documented significant decreases in unprotected sex among crack-using women after exposure to a tailored women's intervention.

Taken together, these studies demonstrate that HIV prevention measures can be effective with drug-using women, in spite of the myriad economic, environmental and lifestyle factors that increase their vulnerability to HIV infection. Nevertheless, the existing intervention literature is heavily focused on women drug users, and reports on the effectiveness of HIV prevention interventions specifically designed for women sex workers are not well-represented in the scientific literature. This gap is particularly apparent for commercial sex workers in the U.S., as the overwhelming majority of studies targeting female sex workers take place in international settings (Aklilu et al. 2001; Wechsberg et al. 2006). This paper aims to address this gap by examining the effects of participation in a tailored HIV risk reduction intervention on risky drug use and sexual behavior change among street-based women sex workers in Miami, Florida.

METHODS

Interventions

The primary purpose of the study was to test the relative effectiveness of two alternative HIV and hepatitis B and C prevention protocols – the National Institute on Drug Abuse (NIDA)

“Standard Intervention” and a Sex Worker-Focused (SWF) Intervention (developed specifically to reduce the risky drug use and sexual behaviors of street-based women sex workers). The Standard Intervention, initially developed by NIDA researchers and grantees in the early 1990s (Coyle 1993), was subsequently revised and updated to include additional information on the risks associated with crack and other non-injection cocaine use, increased emphasis on sexual risks for HIV, benefits of the female condom, as well as information on hepatitis B and C (Wechsberg et al. 1998; NIDA 2000). This brief intervention is delivered in two sessions, each approximately 60 minutes in length, and provides pretest counseling on HIV disease, hepatitis B and C, transmission routes, risky drug use, unsafe sexual practices, male and female condom use, disinfection of injection equipment, and the benefits of drug treatment.

The SWF Intervention is unique in that it was developed by the authors of this paper through a collaborative process that elicited significant input on the content of the intervention from the target population of sex workers themselves. Prior to the initiation of the study, a series of focus groups was conducted with 53 active and former sex workers in order to understand the issues most relevant to HIV prevention among this population, including drug use and sexual activity. One important example of the intervention content derived from these focus groups was the role of violent victimization in exacerbating women’s risk for HIV. An issue raised often in these groups was the regularity with which sex workers encountered physical and sexual violence – in fact, it was considered a “hazard of doing business on the street.” As a result, the intervention protocol was designed to include strategies for assessing a potential “bad date” and ways of averting potentially dangerous situations. As such, the SWF Intervention integrates violence prevention into the HIV/hepatitis intervention protocol for women on the street.

Similar to NIDA’s Standard Intervention, the SWF Intervention was also designed as a brief protocol consisting of two one-hour sessions. It provides parallel coverage of many of the topics covered in the NIDA Standard Intervention, yet it discusses these in language suggested by the target population as more relevant and meaningful to women sex workers. In addition, as indicated above, the intervention addresses issues of special relevance to sex workers, including sex workers’ common misconceptions about HIV risk behaviors, violent encounters common to street sex workers and techniques for avoiding violent situations, risks associated with unprotected oral sex, and common barriers to safe sex experienced by street sex workers.

The SWF Intervention was designed for peer delivery, and was structured around five basic elements: *Engagement*: designed to establish rapport between the interventionist and participant and to engage sex workers in the intervention process by highlighting their special risks. The intent is to have the participant realize that the interventionist is someone who is in recovery and understands the risks faced by women sex workers; *Education*: provides basic factual information about HIV/AIDS and hepatitis B and C, about behaviors that put women sex workers at risk, including information about drugs, sex, relationships, sexually transmitted infections, and common misconceptions about risks; *Action*: focuses on what sex workers can do to: a) reduce sexual risks, including risks associated with oral sex; b) reduce drug use; and c) reduce exposure to violent situations; *Testing*: provides information on the benefits of HIV and hepatitis B and C testing and the meaning of test results, and discusses access to testing in a supportive environment; and, *Referral*: raises women’s awareness of drug treatment, violence prevention, and other health and social services available in the community, offers assistance in accessing these resources, and builds networks with community service providers.

Testing for HIV and hepatitis B and C was provided on a voluntary basis in both interventions, and all clients received relevant risk reduction literature and service referrals, as well as a hygiene kit containing a variety of risk reduction materials. Participants received their HIV

and hepatitis test results two weeks post-baseline, and primary follow-up assessments were conducted at 3 and 6 months after the baseline contact.

Sampling and Recruitment

The target population for this intervention trial was drug-using women sex workers who solicited clients for sex exchange on the primary and secondary prostitution strolls in Miami-Dade County, Florida. Eligible participants were women ages 18 to 50 who had: a) traded sex for money or drugs at least 3 times in the past 30 days; and, b) used heroin and/or cocaine 3 or more times a week in the past 30 days.

Participants were located for recruitment using targeted sampling strategies (Watters & Biernacki 1989), which are especially useful for studying hard-to-reach populations. Targeted sampling is a systematic method by which specified populations within geographical districts are identified, and detailed plans are designed to recruit adequate numbers of cases within each of the target areas. In addition, through focus groups with current and former sex workers, the downtown Miami “strolls” most heavily traveled in the sex industry were specifically described and identified for recruitment. A unique aspect of the project’s recruitment strategy was the use of active sex workers as study outreach workers/client recruiters. The decision to employ sex workers as field recruiters was based on focus group discussions with Miami sex workers, which indicated that traditional outreach activities were ineffective in contacting members of this marginalized population. This study employed a cadre of some fifteen active sex workers as key recruiters over the course of the study.

Data Collection

Peer recruiters referred potential participants to the project intervention center where they were screened for eligibility, consented, urine tested and interviewed by experienced female staff members. The interview process took approximately ninety minutes to complete. Immediately following the baseline interview participants were randomly assigned to one of the two intervention conditions described above. Both interventions were delivered by peer counselors – former drug-using sex workers now in recovery. All study procedures were reviewed and approved by the University of Delaware’s Institutional Review Board.

Measures

Study interviews were conducted using a standardized data collection instrument based primarily on the **NIDA Risk Behavior Assessment** (RBA) (NIDA 1993), and the **Revised Risk Behavior Assessment** modified for women (Wechsberg 1998). The core measures of drug use were retained from the original RBA, which has been extensively tested for validity and reliability (Needle et al. 1995). The lifetime and 30-day measures of drug use assessed ten specific substances, including alcohol, marijuana, powder cocaine, crack-cocaine, and heroin. The primary drug-related outcomes on the present study included a composite measure of substance use days in the past month (including alcohol, marijuana, crack, cocaine, and heroin), as well as past month episodes of alcohol and/or drug use immediately prior to or during sexual contact.

The Revised RBA was utilized as the primary assessment tool for examining current sexual risk behaviors. This questionnaire contained sexual activity questions tailored specifically for women, and included lifetime as well as 30-day measures of sexual risk behaviors. Questions were asked separately for vaginal, oral, and anal contact and generated counts of these specific sexual behaviors in the month prior to interview, as well as the number of episodes where condoms were utilized. These items were computed to yield 30-day counts of unprotected vaginal and oral sex acts, which represent the primary sexual behavior outcomes of the study. This instrument also captured information on victimization. For the present study, violent

victimization outcomes were measured with three specific items assessing physical, sexual, and emotional abuse adapted from the validated General Victimization Index (Titus et al. 2003). These items yielded yes/no responses for each abuse category in the 90 days prior to interview.

Analyses

Descriptive statistics were compiled on baseline demographic characteristics, drug use, sexual risk behaviors and victimization experiences of the participants. Using t-tests for continuous variables and chi-square tests for categorical variables, we examined baseline differences in key study outcomes (drug use, sexual risk behaviors, violent victimization) by intervention condition in order to assess the equivalence of the study intervention groups. Prior to initiating outcome analyses, we explored the potential for differential attrition by examining the baseline characteristics of 3 and 6 month follow-up completers and their lost to follow-up counterparts using t-test and chi-square comparisons for statistical testing.

The initial step in the outcome analysis was to examine within-group differences on the primary study outcomes at the 3 and 6 month follow-up assessments. We examined differences in the means and, where appropriate, differences in the proportions, of key outcomes separately for participants in the SWF and NIDA Standard conditions. Statistical testing utilized paired t-test and McNemar comparisons to assess the significance of behavioral change between the baseline and 3 month contact, as well as between the baseline and 6 month contact.

For the primary outcome analyses we grouped participants into bivariate categories: those who reported a decrease in a particular risk behavior from baseline to follow-up; and, those who maintained equal or increased level of risk on this same behavior from baseline to follow-up. Change scores were calculated for each outcome variable by comparing baseline values with 3 and 6 month follow-up values. Participants with a change score greater than 0 on a particular outcome had decreased the risky behavior, and were assigned a value of 1 in the logistic regression model. Bivariate logistic regression analyses were then conducted to directly compare the intervention outcomes on risk behaviors for HIV, specifically occasions of drug use, occasions of sexual contact while high, occasions of unprotected vaginal and oral contact, as well as the proportion experiencing sexual and physical victimization. The differential effect of intervention assignment on each of these key study outcomes was estimated by computing separate logistic regression models at the 3 and 6 month follow-up contacts. All analyses were conducted using the SPSS v.15.0.1 for Windows (SPSS 2006).

RESULTS

806 participants were randomized over the course of the study, 396 to the NIDA Standard Intervention and 410 to the SWF Intervention. Overall, the participants had a mean age of 36.8 years and nearly two-thirds were African-American. More than half of the sample (53.2%) had less than a high school education, and some 42% of the sample reported homelessness at the time of the baseline interview. Just under 21% of the participants tested positive for HIV, and 48.9% and 25.6% tested positive for hepatitis B and C, respectively. The sample reported elevated levels of drug and sexual risk behaviors for HIV at entry into the study. Participants reported a mean of 26.0 days of active substance use (including crack, alcohol, heroin, marijuana, and powder cocaine) in the month prior to interview. Sexual contacts while high were numerous as well with a mean of 29.6 times in the month prior to interview. Although condom use was fairly prevalent in this sample of sex workers, substantial numbers of unprotected vaginal and oral sex acts were reported at baseline. Violent victimization was also widespread, with 23% and 17% reporting recent physical and sexual victimization, respectively. Table 1 displays the baseline demographic characteristics and risk behaviors of the study sample by intervention group. No significant differences in sample characteristics

were observed between study conditions at baseline, with the exception of a marginally higher prevalence of sexual victimization among SWF Intervention participants.equivalent.

Of the 396 participants allocated to the NIDA Standard condition, 274 (69%) completed a 3-month follow-up assessment and 252 (64%) completed a 6-month follow-up assessment. Of the 410 participants assigned to the SWF condition, 272 (66%) completed a 3-month follow-up interview and 254 (62%) completed a 6-month follow-up. Although these single follow-up rates are modest, the outcome analyses were conducted with participants who completed either of the two follow-up assessments, and the global follow-up rate reached 74.1% among the SWF Intervention group, and 73.2% among the Standard Intervention group. As these data suggest, retention rates did not differ between the two study intervention conditions. Nevertheless, given that attrition rates were substantial, we explored the potential for differential attrition by examining the baseline characteristics of those retained in the study versus those lost to follow-up. In this regard, we compared the baseline characteristics of women who completed the 3 and 6 month follow-up assessments and their lost to follow-up counterparts using t-test and chi-square comparisons. These analyses indicated that follow-up completers were: slightly older on average than non-completers; more likely to be African American than non-completers; and, less likely to have attained a high school education than non-completers. Importantly, however, no significant differences were noted on baseline HIV risk behavior variables between participants retained in the study and those lost to follow-up.

Initial behavior change analyses consisted of examining differences in the group means and proportions of key study outcomes for the two intervention conditions at the 3- and 6-month contact points. Analyses were performed separately at the 3-month (baseline to 3 month) and 6-month assessments (baseline to 6 month), using an intent-to-treat approach. Table 2 presents the findings of the within-group analyses on the primary study outcomes.

In terms of substance-related outcomes, both groups reported significant decreases in the number of days using alcohol and drugs between baseline and 3- and 6-month follow-up. Mean occasions of sex work while drunk or high also declined significantly for both intervention groups at the 6-month follow-up contact. Examining high-risk sexual practices, both interventions again achieved positive outcomes. Group means for unprotected vaginal and unprotected oral sexual contact decreased significantly at both follow-up time points for both intervention protocols. Lastly, change in the proportion of the sample experiencing violent victimization was examined over time. Both physical and sexual victimization were reduced significantly at 3- and 6-months among participants in both intervention protocols.

The differential effect of intervention assignment on each of these key study outcomes was estimated by computing separate bivariate logistic regression models at 3- and 6-month follow-up. Table 3 presents the results of these analyses. In terms of substance use outcomes, defined as decreases in the number of substance using days and decreases in the number of sexual contacts while high, there were no statistically significant differences between the SWF Intervention group and the NIDA Standard group at either of the two follow-up assessments.

When examining risky sexual behavior outcomes, the SWF Intervention proved to be marginally better than the NIDA Standard in reducing unprotected oral sex at 3-months ($OR = 1.37$, 95% CI = .98, 1.94, $p=.07$), and significantly more effective than the NIDA Standard in reducing unprotected oral sex at the 6-month contact ($OR = 1.6$, 95% CI = 1.12, 2.30, $p=.01$). There was no apparent added benefit of the SWF Intervention in reducing occasions of unprotected vaginal sex, as participants in NIDA Standard fared equally well at both follow-ups.

Violent victimization outcomes were also examined for intervention group effect. The SWF Intervention was significantly more effective in reducing sexual violence at the 6-month

contact, with participants in this condition nearly two times more likely than NIDA Standard participants to report a decrease in sexual abuse/victimization ($OR = 1.89$, 95% $CI = 1.11, 3.23$, $p=.02$). Although both groups reported lower physical abuse/victimization after exposure to their respective intervention protocols, no differential impact was apparent for the SWF Intervention and the NIDA Standard conditions at either the 3- or the 6-month contact.

DISCUSSION

This study documented that participation in a tailored HIV risk reduction intervention was effective in reducing drug use and sexual risk behaviors, and violent victimization among this group of highly vulnerable women. Although not significant, data from the 3-month contact indicated that the SWF Intervention reduced unprotected oral sex to a marginally greater degree than did the Standard Intervention. By the 6-month contact, however, the intervention effects reached statistical significance. Women in the SWF Intervention were 1.6 times more likely than women in the NIDA Standard to decrease unprotected oral sex and were 1.9 times more likely to report decreased sexual victimization. Although the precise reason for this pattern of effects is unclear, the significant 6-month outcomes may indicate that the targeted message of the SWF Intervention had a longer-term impact than the traditional message of the NIDA Standard. Because the SWF Intervention message was tailored in its content, language and style, it was likely perceived to be more salient by the target population. As such, changes in the participants' behavioral repertoires may have been appropriated to a greater degree over time, and possibly were less subject to degrading effects over time. Regardless, these data are critical from a public health perspective given that sex work facilitates the transmission of HIV, and that violence against women is a major risk factor for HIV (Klein 2004).

In spite of the positive impact demonstrated by the SWF Intervention, significant differences from the NIDA Standard were achieved on only a small number of key outcomes and only at the 6-month contact. Although we hypothesized that the SWF protocol would produce more robust differences in a number of domains, it is not unexpected that the NIDA Standard produced behavioral change. Prior research has demonstrated that the NIDA protocol is a powerful intervention for drug-using populations (Inciardi, Surratt & Telles 2000), and has shown efficacy in reducing risk behaviors among individuals at risk for HIV (Wechsberg et al. 2004).

The lack of robust intervention effects between the SWF and Standard conditions suggests that other aspects of intervention participation may be important for achieving risk reduction. In the present study, such key components were the use of peer interventionists, and the supportive environment of the intervention center. Because both interventions were delivered by peers – former drug-using sex workers now in recovery – and both took place within the same safe and non-judgmental setting, these attributes may have outweighed specific intervention content factors. Indicators from anonymous client opinion surveys provide support for this idea. In their spontaneous comments, clients offered a genuine sense of personal connection to the staff that impacted their ability to learn and engage with the intervention material: “I was able to share shameful behavior with someone who understands;” “the kindness and openness I was able to have with the staff;” “how comfortable I felt learning.” These findings suggest that the use of peers facilitates open communication, increases clients' comfort level, and facilitates engagement with and personal application of intervention material.

Limitations

Although the data presented here are drawn from a large sample, those who participated may not have been representative of all street-based sex workers in Miami. Recruitment was targeted to certain neighborhoods and geographical districts where drug-using sex workers were most visible, and therefore a random sample of sex workers was not achieved. As such -- and together

with perhaps unique aspects of Miami's street prostitution economy and structure -- the findings reported here may not be generalizable to other sex worker populations.

Tapping into a population of highly marginalized sex workers created unique challenges with follow-up tracking, and as a result study attrition was considerable. Elevated levels of unstable housing and transience, combined with heavy drug use, serious health problems, and limited social connections, impeded our efforts to maintain contact with a significant proportion of the sample. Although this is a serious limitation of the study, our analyses found that neither intervention group nor baseline HIV risk behaviors differed among those retained in the study and those lost to follow-up. Thus, there is no direct evidence to suggest that attrition biased our analyses of key drug use, sexual behavior, and victimization outcomes. As such, in spite of the difficulties associated with conducting longitudinal research with this hard-to-reach population, our efforts at targeting and intervening with the most marginalized women sex workers had a significant positive impact on women at very high risk of infection with HIV.

A final limitation was related to the use of self-report measures of HIV risk behavior. Although reliance on self-report behavioral measures is somewhat controversial, studies have documented that when questioned about drug use and sexual activities in a non-threatening environment, drug users and sex workers provide reliable information (Needle et al. 1995). We would suggest that these findings, combined with assurances of confidentiality and the use of specially trained female peers as staff in the present study, served to mitigate the potential deficiencies in reliance on self-report data.

Despite these limitations, the data in this study document the importance of prevention initiatives among sex workers as well as the significance of science-based interventions for women in the sex industry. The HIV seropositivity rate of 21% in the current study suggests that the HIV epidemic continues to be a significant problem among sex workers, and has yet to be addressed to the degree warranted. Nevertheless, this study represented an important step by demonstrating that targeted HIV and hepatitis prevention programs can have a positive impact on behavior change among marginalized women, particularly when these initiatives involve significant collaboration with members of at-risk communities.

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Table 1
Baseline Characteristics by Intervention Group Assignment

Characteristics	Total (n=806)	NIDA Std. (n=396)	SWF (n=410)	p-value
Sociodemographics				
Age, mean (SD)	36.8 (8.2)	37.1 (8.2)	36.5 (8.2)	0.3
Race/Ethnicity, n (%)				
African American	513 (63.6)	258 (65.2)	255 (62.2)	0.41
Latina	122 (15.1)	61 (15.4)	61 (14.9)	
White	150 (18.6)	65 (16.4)	85 (20.7)	
Other	21 (2.6)	12 (3.0)	9 (2.2)	
Education, n (%)				
Less than high school	429 (53.2)	206 (52.0)	223 (54.4)	0.80
High school	238 (29.5)	120 (30.3)	118 (28.8)	
More than high school	139 (17.2)	70 (17.7)	69 (16.8)	
Homeless, n (%)	331 (42.0)	167 (42.9)	164 (41.0)	0.58
HIV Seropositive, n (%)	156 (20.8)	76 (20.3)	80 (21.3)	0.34
HBV Seropositive*, n (%)	361 (48.9)	182 (48.9)	179 (48.9)	0.99
HCV Seropositive*, n (%)	189 (25.6)	89 (23.9)	100 (27.3)	0.29
Risk Behaviors				
Days of substance use in past 30 days, mean (SD)	26.0 (7.6)	25.8 (7.7)	26.2 (7.5)	0.53
Times unprotected vaginal sex in past 30 days, mean (SD)	9.9 (27.9)	10.5 (30.6)	9.3 (28.9)	0.56
Times unprotected oral sex in past 30 days, mean (SD)	10.9 (35.4)	11.4 (37.9)	10.5 (32.9)	0.73
Times sex work while high in past 30 days, mean (SD)	29.6 (70.5)	30.6 (73.9)	28.6 (67.1)	0.68
Physical victimization in past 90 days, n (%)	187 (23.2)	83 (21.0)	104 (25.4)	0.13
Sexual victimization in past 90 days, n (%)	139 (17.3)	58 (14.6)	81 (19.8)	0.05

Note: p values were calculated using t tests for continuous variables, and chi-square tests for categorical variables.

* : n=738 for hepatitis testing.

Table 2

Group Means at Baseline, 3-Month, and 6-Month Follow-Up

Variable	Baseline	3-Mo. Follow-Up	6-Mo. Follow-Up
No. at each time point			
Sex Worker Focused	410	272	254
NIDA Standard	396	274	252
No. of days using alcohol or drugs during the past 30 days, mean (SE)			
Sex Worker Focused	26.1 (0.46)	20.6 (0.69) ***	18.0 (0.77) ***
NIDA Standard	25.8 (0.37)	20.8 (0.71) ***	18.5 (0.77) ***
No. of times sex work while high during the past 30 days, mean (SE)			
Sex Worker Focused	28.6 (3.31)	24.3 (6.61)	8.1 (1.09) ***
NIDA Standard	30.6 (3.71)	18.9 (4.5)	9.2 (1.24) ***
No. of unprotected oral sex acts during the past 30 days, mean (SE)			
Sex Worker Focused	10.5 (1.6)	3.8 (0.61) ***	3.5 (0.89) **
NIDA Standard	11.4 (1.9)	3.1 (0.60) ***	3.1 (0.47) ***
No. of unprotected vaginal sex acts during the past 30 days, mean (SE)			
Sex Worker Focused	9.3 (1.6)	6.0 (0.80) *	4.8 (0.60) **
NIDA Standard	10.5 (1.5)	5.5 (0.86) **	4.2 (0.56) **
Reporting <i>sexual</i> victimization during the past 90 days, %			
Sex Worker Focused	20%	11% ***	7% ***
NIDA Standard	15%	7% **	7% ***
Reporting <i>physical</i> victimization during the past 90 days, %			
Sex Worker Focused	25%	13% ***	13% ***
NIDA Standard	21%	13% ***	13% ***

*
p ≤ .05;**
p ≤ .01;***
p ≤ .001.

Note: p values were calculated using paired t tests for continuous variables, and McNemar tests for categorical variables.

Table 3

Logistic Regression Models of Intervention Effects on HIV Risk Behaviors at Follow-Up

Variable	3-Mo. Follow-Up		6-Mo. Follow-Up	
	%	OR (95% CI)	%	OR (95% CI)
Decreased alcohol or drug use				
Sex Worker Focused	43	1.17 (.84, 1.66)	53	1.14 (.80, 1.61)
NIDA Standard	39	<i>reference</i>	50	<i>reference</i>
Decreased sex work while high				
Sex Worker Focused	54	.944 (.67, 1.32)	67	1.14 (.79, 1.65)
NIDA Standard	56	<i>reference</i>	64	<i>reference</i>
Decreased unprotected oral sex acts				
Sex Worker Focused	44	1.37 (.98, 1.94)	45	1.60 (1.12, 2.30)**
NIDA Standard	37	<i>reference</i>	33	<i>reference</i>
Decreased unprotected vaginal sex acts				
Sex Worker Focused	39	.807 (.57, 1.14)	40	.852 (.60, 1.21)
NIDA Standard	44	<i>reference</i>	44	<i>reference</i>
Decreased sexual victimization				
Sex Worker Focused	14	1.22 (.74, 2.01)	17	1.89 (1.11, 3.23)*
NIDA Standard	12	<i>reference</i>	10	<i>reference</i>
Decreased physical victimization				
Sex Worker Focused	19	1.28 (.82, 1.99)	17	1.05 (.66, 1.67)
NIDA Standard	16	<i>reference</i>	17	<i>reference</i>

*
p ≤ .05;**
p ≤ .01.