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The Effect of Serostatus on HIV Risk Behaviour Change among Women Sex Workers in Miami, Florida

James A. Inciardi
University of Delaware

Hilary L. Surratt
Nova Southeastern University, surratt@nova.edu

Steven P. Kurtz
Nova Southeastern University, steven.kurtz@nova.edu

Jason C. Weaver
University of Delaware

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The effect of serostatus on HIV risk behaviour change among women sex workers in Miami, Florida

J. A. INCIARDI, H. L. SURRATT, S. P. KURTZ, & J. C. WEAVER

Center for Drug and Alcohol Studies, University of Delaware, USA

Abstract
HIV prevention and risk reduction are especially salient and timely issues for women, particularly among those who are drug-involved or who exchange sex for drugs or money. Studies suggest that HIV-prevention measures can be effective with highly vulnerable women, and have the potential to produce significant reductions in risk behaviours among both HIV-negative and HIV-positive women. Within this context, this paper examines risk behaviours and HIV serostatus among 407 drug-involved women sex workers in Miami, Florida, and investigates the effects of participation in HIV testing, counselling, and a risk-reduction intervention on subsequent behavioural change among this population. Overall, at follow-up, the HIV-positive women were 2.4 times more likely than the HIV-negative women to have entered residential treatment for drug abuse, 2.2 times more likely to have decreased the number of their sex partners, 1.9 times more likely to have decreased the frequency of unprotected sex, 1.9 times more likely to have reduced their levels of alcohol use, and 2.3 times more likely to have decreased their crack use. These data support the importance of HIV testing and risk-reduction programmes for drug-involved women sex workers.

The most recent report on the global AIDS epidemic indicated that some 40 million people around the world are now living with HIV, with almost 5 million people acquiring the virus during 2003 – the greatest number of new infections in any one year since the beginning of the epidemic. Significant proportions of these new infections occurred through heterosexual contact, leading to increasing numbers of women being affected worldwide (UNAIDS, 2004). As such, HIV prevention and risk reduction are especially salient and timely issues for women, particularly among those who are drug-involved or who exchange sex for drugs or money. Crack, in particular, has been demonstrated to be a primary risk factor for the sexual transmission of HIV (Edlin et al., 1994; Fullilove et al., 1990; Wechsberg et al., 1998), in that it is associated with inconsistent condom use (Inciardi et al., 1993; Wilson et al., 1999), an increased number of sex partners (Weissman & Brown, 1995), and having sex while high (Longshore & Anglin, 1995).

In general, risk-reduction interventions among crack-involved women have proven successful. Among HIV-negative African American women, for example, Sterk et al. (2003) found an overall reduction post-intervention in both crack use and sexual risk behaviours, including having sex while high and having sex for drugs or money. Similarly, Wechsberg et al. (2004) documented significant decreases in unprotected sex among crack-using women after exposure to a specialized women's intervention. Interestingly, an

Correspondence: James A. Inciardi, University of Delaware, 2100 Ponce de Leon Blvd., Suite 1180, Coral Gables, FL, USA.

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intervention study by Deren et al. (1998) demonstrated greater reductions in sexual risk behaviours at follow-up among male and female seropositive drug users compared to seronegatives, regardless of which intervention the participants received.

Taken together, these studies suggest that HIV prevention measures can be effective with highly vulnerable women, and have the potential to produce significant reductions in risk behaviours among both HIV-negative and HIV-positive women. Unfortunately, however, the existing literature regarding the effects of serostatus on behavioural change among women is scarce. Early research on behaviour change after notification of a positive HIV test often had mixed results (Higgins et al., 1991; Wolitski et al., 1997), and typically focused on men who have sex with men (MSM). McCusker et al. (1988), for example, found that seropositive MSM reduced their sexual risk behaviours moreso than seronegative MSM after receiving test results, but that risk behaviours were still more prevalent among the HIV-positive individuals. Similarly, Darrow et al. (1998) found that, among HIV-positive MSM, those aware of their status engaged in *more* sexual risk behaviours than those who were unaware (45.9% vs. 15.4%). Nevertheless, a more recent study of women, many of whom were drug-involved, found lower levels of risk behaviours among seropositive women compared to their seronegative counterparts (Wilson et al., 1999): less crack use, less sexual activity and more condom use during vaginal sex.

In this regard, meta-analytic studies conducted by Weinhardt et al. (1999) and Wolitzki et al. (1997) have concluded that seropositive individuals are more likely than seronegatives to reduce sexual risk behaviours after exposure to HIV counselling and testing. In a study by Kalichman et al. (2001), HIV-positive participants in a risk reduction intervention showed a greater rate of unsafe sex refusal than the standard group six months post-intervention. Additionally, Cleary et al. (1995) found that HIV-positive individuals in structured counselling, as well as those referred to community services, reported large decreases in unsafe sex at the time of the follow-up assessment.

It has been suggested that for some individuals diagnosed with HIV, sexual activity simply becomes less important (Cranson & Caron, 1998) or there is a loss of interest in sex (Catalan et al., 1996; Siegel & Schrimshaw, 2003). HIV-related sexual dysfunction has been studied and documented in several male populations (Brown et al., 1993; Catalan et al., 1992; Catalan & Meadows, 2000), however, studies with women are far fewer in number. In two such studies, a significant number of women reported sexual abstinence after diagnosis with HIV (Pergami et al., 1993) and at significantly higher rates than HIV-positive men (Siegel & Schrimshaw, 2003). Adam and Sears (1994), however, found that the loss of interest in sexual activity or sexual abstinence associated with an HIV-positive diagnosis was often temporary, with most individuals eventually re-engaging in sexual activity. Given this, it is essential that current initiatives be expanded to focus on risk reduction among HIV-positive individuals, as many engage in unprotected sex at some time after diagnosis (Catalan et al., 1992; Cleary et al., 1995; Cranson & Caron, 1998; Kalichman, 1999; Kwiatkowski & Booth, 1998; Pergami et al., 1993; Wilson et al., 1999; Wulfert & Safren, 1999).

Despite this range of studies, missing from the literature are reports on the effectiveness of HIV prevention interventions among highly vulnerable drug-involved women sex workers. Studies documenting the linkages between HIV infection, drug use, and prostitution are numerous and have offered clear evidence that drug-involved, street-based sex workers often engage in high-risk behaviours, including inconsistent condom use with multiple partners (Baseman et al., 1999; Deren et al., 1996; Goudreau, 1987; Hansen et al., 2002; Kwiatkowski & Booth, 2000; McKeganey, 1994; Porter & Bonilla, 2000;

Wojcicki & Malala, 2001). As such, the prevalence of HIV in this population is typically elevated, making testing and intervention among sex workers an important public health priority. Within this context, this paper examines risk behaviours and HIV serostatus among drug-involved street-based women sex workers in Miami, Florida, and investigates the effects of participation in HIV testing and counselling and a risk reduction intervention on subsequent behavioural change among this population. The data are drawn from baseline and three month follow-up interviews, as well as focus groups conducted as a part of an ongoing research project testing the effectiveness of two brief HIV-HBV-HCV risk reduction interventions, described in detail elsewhere (Surratt et al., 2004).

Methods

Sampling and recruitment

The target population for this study was drug-involved women sex workers who solicit paying clients on the streets and in other locales, as well as engage in sex-for-drug exchanges (typically crack) in automobiles, empty lots and back yards, crack houses, motels, and behind fences, along the sidewalks of darkened streets, and in the many back alleys that are characteristic of the downtown Miami geography. The primary purpose of the study was to test the relative effectiveness of two alternative HIV and hepatitis prevention protocols – the National Institute on Drug Abuse (NIDA) 'Standard Intervention' and a new Sex Worker-Focused Intervention (developed specifically to reduce the risky drug use and sexual behaviours of street-based women sex workers). The Standard Intervention, developed by NIDA researchers and grantees (Wechsberg et al., 1997), includes individual pretest counselling covering such topics as HIV disease, transmission routes, risky drug-using behaviours, unsafe sexual practices, rehearsal of condom use, disinfection of injection equipment, and rehearsal of needle/syringe cleaning. The Sex Worker-Focused Intervention is unique in that it was developed by the authors of this paper with input from active sex workers. In addition to the topics covered in the NIDA Standard Intervention, it addresses issues of special relevance to the target population, including the violent encounters and barriers to safe sex experienced by street sex workers (Surratt et al., 2004).

From March 2001 through April 2004, 407 sex workers had been recruited into the intervention programme, completed baseline and 3-month follow-up interviews, and had agreed to be tested for HIV as a part of their participation; data from those 407 respondents are included in this report. Clients were located and recruited through traditional targeted sampling strategies (Watters & Biernacki, 1989). To be eligible for the study, sex workers had to be between the ages of 18 and 49, have traded sex for money or drugs at least 3 times in the past 30 days, and have used heroin and/or cocaine 3 or more times a week in the past 30 days.

Because street sex workers are a hard-to-reach population, active sex workers were trained to conduct the outreach and recruitment. Using standard multiple-starting-point snowball sampling techniques and 'chain referral' strategies (Inciardi, 1986) in specific neighbourhoods where rates of drug use and sex work are known to be high, client recruiters made contact with potential participants on the streets both day and night. These active sex workers have access to and credibility with a variety of local drug user and sex worker networks. Although the plan does not ensure a totally unbiased sample, the use of multiple starting points and numerous client recruiters eliminates the problem of drawing all respondents from only one social network.

Any client who expressed an interest in recruiting and who kept an appointment for a one-on-one orientation session with the project site director was eligible to become a recruiter. Although the financial incentive ($20 per qualifying recruit) was an important motivator, many clients also saw the recruitment of others into the project as a way to help other women. Some were also attracted by the opportunity to be productive and to engage in paid employment that did not include sex work. Most recruiters only referred one or two acquaintances. Those who voiced a greater long-term interest and who demonstrated success in making outreach contacts in multiple neighbourhoods were given more advanced individual and small group training, including targeted sampling, finding very hard to reach populations, role playing, and trouble shooting.

The most difficult aspects of retaining productive recruiters included: (1) as drug-involved women sex workers, even the most dedicated recruiters had some difficulties in meeting the scheduling demands of the project; (2) the project did not generate enough consistent income for women who were interested in and capable of holding a full-time job; and (3) transience and homelessness made scheduling and rescheduling appointments with both recruiters and recruits difficult. Nevertheless, more than 95% of all project clients were referred by client recruiters. About 15 women became highly trained recruiters during the course of the project, successfully referring more than 10 (and a few more than 30) clients each.

Data collection

Sex workers meeting eligibility requirements were directed to a project field office where interviews were conducted using a battery of standardized data collection instruments, were randomly assigned to one of the two intervention arms, and were paid monetary stipends for participating in all research activities (interviews, testing and intervention). Instrumentation included the National Institute on Drug Abuse (NIDA) Risk Behavior Assessment (Needle et al., 1995), the Childhood Trauma Questionnaire (short form) (Bernstein et al., 1994), and the Georgia State University Prostitution Inventory (Elifson, 1990). Testing for HIV and hepatitis B and C was conducted on a voluntary basis, and the participants received relevant risk reduction literature and service referrals, as well as a hygiene kit containing condoms and other risk reduction materials.

All interviews were administered at the field office by trained English-Spanish bilingual interviewers who were able to assess respondents' ability to complete the interview at the scheduled time (respondents who were high on alcohol or drugs upon arriving for a scheduled interview were asked to reschedule) as well as to clarify the meanings of questions that were not clearly understood. Follow-ups to assess behaviour change were conducted at 3 months after baseline using similar instrumentation. Participation in all phases of the research was voluntary, and the methods described above as well as the protocols for the protection of participants against research risks were reviewed and approved by the University of Delaware's Institutional Review Board.

In addition to the quantitative baseline and follow-up interviews, between April and June 2004, three focus groups with a total of 12 HIV-positive study participants, ages 21–48, were conducted in order to assist the authors in understanding the context of the quantitative findings. Women were screened to determine if they had first tested positive for HIV more than six months but less than five years ago. It was hoped that these criteria would include women who could clearly recall their reactions to the subsequent diagnosis, while excluding those who had not had time to absorb the emotional shock. Ten participants were African American, one was white-Anglo, and one was Latina. Although

no women invited to participate in focus groups declined, approximately 20 women who met the focus group eligibility criteria could not be contacted in a timely manner to request their participation.

Following Morgan (1997), the focus groups were kept to a small size because the questions targeted sensitive emotional and personal issues and because it was anticipated that respondents would be quite deeply involved in the questions of interest. Similarly, the number of groups was considered sufficient when the group discussions reached consensus, or converged, i.e., when additional data collection was not expected to generate new knowledge or themes (Morgan, 1997).

After informed consent, the sessions lasted approximately one hour, and all of the focus groups were audio-taped and later transcribed. The discussions were guided by a relatively unstructured interview schedule that included open-ended questions about the women's initial and subsequent emotional reactions to their diagnosis, concomitant drug use and sexual behaviour changes, HIV disclosure strategies, and the impact of the intervention program on their risk behaviours. Participants identified themselves on the tape using a pseudonym, and they were compensated $25 for their participation.

Analyses and interpretation

Data from the standardized interviews and laboratory reports were linked by an identification number, merged into a database, and analysed with the assistance of a standard statistical package (SPSS version 11.5.1). Pearson chi-square, t-tests, and bivariate logistic regression tests of statistical significance and associated levels of probability (p) were used to assess differences between groups of women categorized by serostatus. In the presentation of results that follows, this categorization is based upon the results of HIV tests administered as a part of the risk reduction intervention project described above. Therefore, the 'HIV-positive' category includes women who newly tested positive for infection on tests administered as a part of this study ($N = 43$) as well as those who reported at baseline having been told they were infected sometime in the past ($N = 46$). Importantly, we found no differences on any demographic, drug use, or sexual risk behaviour measure between these two subgroups of women at baseline (data not shown), and these two groups were combined for analysis.

Except where noted in the tables, information regarding continuous variables such as age and numbers of sex partners were collected and reported at the ratio level of analysis. Nominal variables, including race/ethnicity and education, were derived from simple 'yes/no' or categorical responses on the interview questionnaires. Sexual behaviours were measured by having the respondent indicate whether, and with how many partners, she had engaged in certain activities during the preceding 30 days. Focus group sessions were transcribed using pseudonyms to identify individual speakers. The transcribed texts were segmented and coded while retaining their links to the original speakers and contexts (Leap, 1996; Miles & Huberman, 1994). Although the interview schedule targeted specific aspects of receiving a diagnosis of HIV infection, including subsequent emotional and behavioural changes, social support and medical care, coding categories used in the analyses were not predetermined. As this was an exploratory study, the themes emerged from the data following a grounded theory approach (Glaser & Strauss, 1967).

Results

As illustrated in Table I, the women had a mean age of 38 years; the overwhelming majority (79.5%) was age 30 or older (data not shown). In terms of race/ethnicity, 67.3% were African American, 16.7% were white-Anglo, 13.3% were Latina, and 2.7% were members of other ethnic groups. Almost all were born in the US (93.2% – data not shown); the majority (56.2%) had less than a high school education; 79.3% earned less than $2,000 per month; 41.3% considered themselves to be homeless; and 21.9% tested positive for HIV. As shown in the table, there were no statistically significant demographic differences between women who tested positive for HIV and those who did not.

Drug use frequencies are shown in Table II. All of the women in the study reported extensive histories of lifetime drug abuse – alcohol (97.3%), marijuana (93.9%), crack (80.8%), other forms of cocaine (83.0%), and heroin (35.9%), although only 26.3% had histories of injection drug use. The primary drugs currently (last 30 days) reported were alcohol, crack, and marijuana, followed by powder cocaine and heroin. No differences in lifetime or current drug use behaviours were noted between HIV-positive and -negative clients.

Sex and sex work behaviours for the study sample are shown on Table III. Very few women were newcomers to the sex industry; the mean length of their careers in sex work was 15 years, and almost two-thirds (61.2%), had been sex workers for 11 or more years. The mean number of lifetime sex partners was 1066, and 30.5% of the women reported having had more than 500 lifetime partners. For the 30-day period prior to the baseline contact, 38.3% of the women reported having had 15 or more sex partners, and over three-quarters (77.6%) reported having had 5 or more sex partners. The data in Table III also indicate that a high proportion of the women sex workers were at considerable risk of HIV

Table I. Selected characteristics of 407 women sex workers in Miami, Florida, by serostatus.

Characteristics	Total (N = 407)	(%)	HIV − (N = 318)	(%)	HIV + (N = 89)	(%)	p
Mean age	38		37		38		ns†
Race/Ethnicity:							ns†
African American	274	(67.3)	208	(65.4)	66	(74.2)	
White-Anglo	68	(16.7)	56	(17.6)	12	(13.5)	
Latina	54	(13.3)	45	(14.2)	9	(10.1)	
Other	11	(2.7)	9	(2.8)	2	(2.2)	
Education:							
Eighth grade or less	42	(10.3)	31	(9.7)	11	(12.4)	ns†
Less than HS	187	(45.9)	146	(45.9)	41	(46.1)	
HS or more	178	(43.7)	141	(44.3)	37	(41.6)	
Monthly income:*							
Less than $500	92	(22.7)	69	(21.8)	23	(25.8)	ns†
$500-999	139	(34.2)	110	(34.7)	29	(32.6)	
$1,000-1,999	91	(22.4)	76	(24.0)	15	(16.9)	
$2,000+	84	(20.7)	62	(19.6)	22	(24.7)	
Homeless	168	(41.3)	134	(42.1)	34	(38.2)	ns†

Notes:
* N = 406, due to refusal to answer.
† not significant.

Table II. Drug use among 407 women sex workers in Miami, Florida.

Drug Use	N	(%)	HIV − (N = 318)	(%)	HIV + (N = 89)	(%)	p
Lifetime:							ns†
Alcohol	396	(97.3)	308	(96.9)	88	(98.9)	
Marijuana	382	(93.9)	299	(94.0)	83	(93.3)	
Cocaine	338	(83.0)	264	(83.0)	74	(83.1)	
Crack	329	(80.8)	252	(79.2)	77	(86.5)	
Heroin	146	(35.9)	113	(35.5)	33	(37.1)	
Inject drugs	107	(26.3)	88	(27.7)	19	(21.3)	
Past Month:							ns†
Alcohol	319	(78.4)	246	(77.4)	73	(82.0)	
Marijuana	271	(66.6)	213	(67.0)	58	(65.2)	
Cocaine	191	(46.9)	156	(49.1)	35	(39.3)	
Crack	301	(74.0)	229	(72.0)	72	(80.9)	
Heroin	74	(18.2)	63	(19.8)	11	(12.4)	
Inject drugs	51	(12.5)	43	(13.5)	8	(9.0)	

Note:
† not significant.

infection. Of the 407 women, for example, 99.0% had engaged in vaginal sex during the past 30 days, and 51.4% experienced unprotected vaginal sex. The only difference noted between women who tested positive for HIV and those who tested negative was that HIV-positive women had been involved in sex work four years longer, on average.

Table III. Sex work among 407 women sex workers in Miami, Florida.

Characteristics	N	(%)	HIV− (N = 318)	(%)	HIV + (N = 89)	(%)	p
Length of sex work career (years):							
0–4	67	(16.5)	63	(19.8)	4	(4.5)	
5–10	91	(22.4)	79	(24.8)	12	(13.5)	
11 or more	249	(61.2)	176	(55.3)	73	(82.0)	
Mean	**15**		**14**		**18**		**0.000**
Number of sex partners (lifetime):*							
1–50	71	(17.4)	56	(17.6)	15	(17.0)	
51–100	80	(19.7)	68	(21.4)	12	(13.6)	
101–500	131	(32.2)	99	(31.1)	32	(36.4)	
501+	124	(30.5)	95	(29.9)	29	(33.0)	
Mean	**1066**		**1105**		**925**		ns†
Number of sex partners (past month):							
1–4	91	(22.4)	68	(21.4)	23	(25.8)	
5–14	160	(39.3)	116	(36.5)	44	(49.4)	
15 or more	156	(38.3)	134	(42.1)	22	(24.7)	
Mean	**20**		**22**		**14**		ns†
Had vaginal sex (last 30 days)	403	(99.0)	315	(99.1)	88	(98.9)	ns†
Had unprotected vaginal sex‡	207	(51.4)	157	(49.8)	50	(56.8)	ns†

Notes:
* N = 406 due to missing data.
† not significant.
‡ of those who reported vaginal sex.

At the 3-month follow-up contact, the sex workers in this study were re-interviewed to assess changes in their drug-using and sexual risk behaviours. A consistent and important finding was the differences at follow-up between the HIV-positive and the HIV-negative women in terms of their risk reduction. As illustrated in Table IV, HIV-positive women were 2.4 times more likely than HIV-negative women to have entered residential treatment for drug abuse, 2.2 times more likely to have decreased their number of sex partners, 1.9 times more likely to have decreased their frequency of unprotected sex, 1.9 times more likely to have reduced their levels of alcohol use, and 2.3 times more likely to have decreased their crack use, regardless of which intervention they had participated in.

Our focus group data confirmed that many of the women indeed reduced or eliminated their use of alcohol and crack after participating in HIV testing and intervention offered them by the study. Although four women said that their first reaction to their HIV diagnosis was to binge on crack, all but one of them subsequently reduced their drug use to below pre-diagnosis levels. One 40-year-old white woman stated:

> It is different, because I know I have to take care of my health now more so than I did then. Even though I do use. I know I need to stop using, because – it's hard for me – because I know when I'm out there using and ripping and running, I'm not going to take care of myself and eat well and take my meds. I didn't really have to worry about that before. That's what I worry about the most.

A 31-year-old African American agreed that her diagnosis and participation in the intervention resulted in less drug use over time:

> As far as getting high ... As a result of being HIV-positive, I didn't get worse, I actually got better, you know what I'm saying? I used to get high every day, I didn't give a damn how I got it, I needed it like that. But I have kind of weaned ... I'm slowly weaning myself off to the point where now I will not get high unless somebody gets me started. But I make sure to take care of my business.

Marijuana was the one drug that women did not generally cut down on, and in fact, some women increased their use of it. The most frequently cited reasons were to substitute for drugs that were perceived to be more harmful, or to make sure they maintained a good appetite. A 46-year-old African American related:

Table IV. HIV seropositivity as a predictor of behavioural change at follow-up in bivariate logistic regression models among 407 women sex workers in Miami, Florida.

Dependent Variable	Regression Coefficient	Odds Ratio	95% CI	P-value
Entered residential treatment	0.893	2.443	(1.02, 5.85)	0.045
Decreased # sex partners	0.807	2.242	(1.10, 4.56)	0.026
Decreased unprotected sex*	0.637	1.891	(1.01, 3.54)	0.046
Decreased alcohol use	0.657	1.928	(1.20, 3.10)	0.007
Decreased crack use	0.812	2.253	(1.40, 3.63)	0.001
Decreased cocaine use	-0.276	0.759	(0.46, 1.27)	0.291
Decreased heroin use	-0.042	0.959	(0.40, 2.29)	0.924

Note:
* N = 282, includes only those reporting vaginal sexual activity at baseline and follow-up.

I just recently stopped when I went in this program because they let me know how it was messing me up.

In terms of physical health care, half of the focus group respondents were seeing a doctor regularly and half were not. With one exception, women under regular medical care had cut back significantly on their use of crack. Although the focus group discussions explored only general self-perceptions of emotional health, all but one of the respondents (who reported continuing feelings of deep depression) reported some level of acceptance of their disease, ranging from feelings of resignation to a renewed enthusiasm for life. A 30-year-old African American woman recalled:

When I found out you could actually live with it, that's when the kick came over for me.

A 43-year-old mother of two responded:

When I'm with my daughters, sometimes I'll be looking [at them] and I'll be depressed. But it's only a momentary thing. I know I'm going to be here because I'm going to make sure I be here, you know? I'm going to see my grandkids . . . I'm going to see all this stuff. I ain't going nowhere.

Sex work activities were often dramatically curtailed, with five of the women no longer selling or trading sex at all. Two others reported large reductions in their sex work, while the remaining five said nothing had changed very much in that regard. All but one of the women who quit sex work had also quit or cut down on their drug use. Disclosure of HIV infection to customers was rare, but only two women reported not always using condoms for sex work. A 21-year-old African American woman with a six-month old daughter said:

Like if there's a trick . . . I'm going to be honest, I don't date as much as I used to, but I just make it mandatory to use condoms. I don't care if he don't want to or whatever.

Another African American woman whose husband is also HIV-positive said that she now uses condoms even when she has sex with him:

If I would have been sober, I would have been like, 'Oh, maybe I should put a condom on. Maybe I shouldn't do this.' But when you're high you're trying to get that money. Since I started going to this program I even made my husband use a condom. I used to say, 'Oh, both of us are positive, it ain't nothing.' Now, what I did, I found one that we could use together, and now, you can't touch me without condoms.

Some women said that they made decisions to stop or cut down on 'dates' because of potential direct adverse health effects, but the more general theme was that sex itself became less interesting, and long-term health more important. A 38-year-old Latina expressed it this way:

No, since I found out I was sick, I'm not into sex. That urge just flew out of my mind. What I've got in mind is, 'get better, girl, go get better, get better.' Sex, no. Excuse me, but if I want to take care of my needs, I do it myself. God is my witness, I'm not into sex.

Three of the 12 focus group participants had been told for the first time that they were HIV-positive by staff in the intervention project described earlier. The others found out at a time prior to their enrollment, while they were in a drug treatment programme, prison, the hospital, or as a result of giving blood. Although the majority found out before they were involved in the HIV-prevention project, almost all attributed reductions in their drug use and sex work, and increased attention to regular doctor visits and healthier living, to the information and social support they received as clients of the project.

Discussion

Although the survey data presented here are drawn from a large sample of women sex workers, those who participated may not have been representative of all street-based sex workers in Miami or of those in other cities. It is believed, however, that the project attracted a broad cross-section of women sex workers in the area near the intervention centre. The subsample of women who participated in the focus groups was small, and we do not have comparable qualitative data from HIV-negative women. Nevertheless, analyses of the focus group transcriptions were quite helpful in contextualizing the observed differences in behaviour change between HIV-positive and HIV-negative women.

This study confirms that testing, counselling and structured risk reduction interventions are effective in motivating HIV-positive, drug-involved women to reduce their sexual risk behaviours that may transmit the virus, as well as their drug use. HIV-negative women in this study also benefited from the intervention, as reported elsewhere (Inciardi & Surratt, 2004). It is quite noteworthy, however, that women who already knew of their HIV infection prior to entry into the study and those who found out through their participation in the project were motivated to change their behaviours to a similar degree and from similar starting points.

The study design does not enable us to distinguish the unique effects of HIV testing and post-test counselling from the impact of the risk reduction intervention. However, the implication is that counselling and testing by itself is not sufficient. Rather, these data, including the focus group discussions, suggest that, among this population, change is more likely when the diagnosis of a life threatening illness is accompanied by a supportive intervention that includes peer recruiters and staff who are sensitive to the needs of women on the street. Studies that directly compare standard testing and counselling alone and in combination with a more in-depth and targeted intervention would be useful to demonstrate this conclusively.

Postscript

During the closing months of 2003, the US National Institutes of Health (NIH) was asked by a congressional committee to justify the funding of almost 200 research grants focusing on a variety of topics that some 'right wing' groups found offensive (Leshner, 2003). The list of grants had been compiled earlier in the year by the Traditional Values Coalition, a conservative advocacy group in Washington, DC, which claimed to represent 43,000 churches across the US. The list included projects headed by researchers studying female condoms, HIV-related stigma, cancer in men living with HIV, the epidemiology of AIDS among opiate users, HIV transmission in rural communities, and HIV prevention programmes for street-based sex workers (Herbert, 2003; Kaiser, 2003; Navarro, 2004). Such grants, argued Andrea Lafferty, executive director of the Traditional Values Coalition,

were a waste of taxpayer dollars. 'We know for a fact that millions and millions of dollars have been flushed down the toilet over the years on this HIV/AIDS scam and sham', Lafferty said (Russell, 2003, p. A3).

The comments by Lafferty and the congressional review were referred to as 'scientific McCarthyism' by Representative Henry Waxman (D-CA), and were strongly criticized by the American Association for the Advancement of Science, the American Foundation for AIDS Research, and the Global AIDS Council, as well as by infectious disease researchers throughout the world. Criticisms of the congressional review were even discussed in the 3 March 2003 episode of NBC's award-winning TV series *The West Wing*. The NIH project from which the data in this paper were drawn was among the first grants to appear on the congressional 'hit list', primarily because of its focus on street sex workers (Goode, 2003).

In response to the critics of research targeting HIV among vulnerable populations, the data in this study document the importance of prevention research among sex workers as well as the significance of science-based interventions for women in the sex industry. As indicated earlier, the HIV-positive women were 2.4 times more likely than the HIV-negative women to have entered residential treatment for drug abuse, 2.2 times more likely to have decreased the number of their sex partners, 1.9 times more likely to have decreased the frequency of unprotected sex, 1.9 times more likely to have reduced their levels of alcohol use, and 2.3 times more likely to have decreased their crack use.

These data are critically important from a public health perspective given that it is well documented in the literature that sex work facilitates the spread of HIV and other infectious diseases into the general population (Ghys et al., 2001; Giang et al., 2000; Lowndes et al., 2000; Morison et al., 2001; Nzila et al., 1991; Singh & Malaviya, 1994; van den Hoek et al., 2001; van Griensven et al., 1998; Wojcicki & Malala, 2001). Our findings support a growing and significant body of research demonstrating that HIV interventions targeting drug-using women reduce HIV risk behaviours (Bolu et al., 2004; Cohen et al., 1988; Corby et al., 1990; Sterk et al., 2003; Wingood, 2003), and that drug abuse treatment is effective in reducing HIV risks (Burrows, 2003; Farell et al., 2003; NIDA, 2002).

Taken together, these findings suggest that rather than placing studies of HIV prevention programmes for sex workers on a 'hit list', support for these and similar initiatives should be expanded dramatically. In addition, future research should address a number of concomitant life problems faced by street sex workers, including high levels of homelessness, poverty, drug abuse, and violent victimizations that serve as barriers to drug abuse treatment and other needed health and social services.

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