

The Trading of Sex for Drugs or Money and HIV Seropositivity among Female Intravenous Drug Users

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ABSTRACT

Objectives. Data from 538 women in a cohort study recruited in 1988–1989 were analyzed to determine whether trading sex for drugs or money was independently associated with human immunodeficiency virus (HIV) seroprevalence in a population of female intravenous drug users.

Methods. The women were grouped according to the number of partners with whom they reported trading sex for drugs or money during the previous 10 years: none, 1 through 49 (low), or 50 or more (high); the prevalence of HIV seropositivity in the three groups was 23.2%, 23.7%, and 47.6%, respectively. Logistic regression was used to compare the low- and high-trade groups separately with the group that reported no trading.

Results. Low trading was not associated with seroprevalent HIV infection. In a multivariate model, high trading (compared with no trading) was significantly associated with HIV seropositivity after adjustment for cocaine use, history of sexually transmitted diseases, and duration of intravenous drug use.

Conclusions. These data indicate that, among intravenous drug-using women, high levels of trading sex for drugs or money were independently associated with HIV infection. This group needs to be targeted for further intensive intervention. (*Am J Public Health.* 1994; 84:382–387)

Introduction

Intravenous drug users are at increased risk for infection with the human immunodeficiency virus (HIV), owing primarily to the sharing of contaminated injection equipment.¹ Specific risk factors for seroprevalent HIV infection among intravenous drug users include high frequency of injection, use of shooting galleries, and cocaine injection.^{2,3} Recent studies have found higher HIV seroincidence rates in female than male intravenous drug users,^{4,5} which has led to the suggestion that sexual transmission is more important for women. The extent to which sexual transmission contributes to the occurrence of HIV infection among intravenous drug users has been difficult to demonstrate, with conflicting results across studies.^{6–10} A national survey of female prostitutes found significantly higher rates of HIV infection among those who reported intravenous drug use,¹¹ suggesting that prostitution might be a means of obtaining money to support a drug habit and that the excess HIV infection in these women was probably related to injection behavior. The purpose of this study was to identify whether trading sex for money or drugs is associated with HIV infection among intravenous drug-using women, independent of drug injection practices.

Materials and Methods

Study Population

The organization and data collection methods for this study have been described elsewhere in detail.^{12,13} In brief, intravenous drug users were recruited by word of mouth from a variety

of community service agencies into a study (the AIDS Link to Intravenous Experiences [ALIVE] Study) of the natural history of HIV infection in a freestanding clinic between February 1988 and March 1989. Eligibility criteria included age older than 17 years, history of injecting drugs within the previous 10 years, and no history of an acquired immunodeficiency syndrome (AIDS)-defining illness at study entry.

Data Collection

After pretest counseling was performed and informed consent was obtained, serum was collected for HIV antibody assays and each participant was interviewed to obtain demographic information; medical history; drug use history, including injection practices, since 1977; and a 10-year history of sexual activity. Participants who reported injecting drugs were asked the last time they had injected. Then all were asked about the following behaviors in the 6 months prior to the last injection: frequency of injection, type of drug used, number of partners shared with, and attendance at shooting galleries. For this study, "current use" was defined as injection within the 6 months prior to interview. We asked all participants about duration of injection in years and then asked for a year-by-year history for the previous 10 years. For women, the 10-year sexual history included the total number of

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different male sex partners, the number of male intravenous drug-using partners, and the number of males with whom sex was traded for drugs or money. In pilot studies, some women were put off by the term "prostitute" but not by the phrase "trading sex for money or drugs"; the latter phrase was adopted for the final instrument used in this study.

Serum samples were assayed for HIV-1 antibodies by enzyme-linked immunosorbent assay (ELISA; Genetic Systems, Seattle, Wash). Confirmation was by Western blot (DuPont Co, Wilmington, Del) techniques.

Data Analysis

Because the risk of HIV infection due to trading sex for drugs or money among women was of primary interest, the sample was restricted to those 538 women for whom this information was available. On the basis of a preliminary analysis, the women were grouped into three categories, according to the number of partners with whom they reported trading sex for drugs or money during the 10 years prior to interview: none, 1 through 49 (low), and 50 or more (high). The cutoff of 50 was chosen to achieve a minimum sample size for meaningful analysis.

For analyses, drug-use variables within the last 6 months were used because recall of specific injection practices was felt to be more accurate for the most recent period and drug injection practices have been shown to be relatively stable over time in this population.^{2,3} Therefore, recent behavior combined with duration of injection (more than 5 years vs 5 years or less) were both incorporated into analyses as a means to adjust for drug injection practices when we examined the association of trading sex for drugs or money and HIV seropositivity.

The high and low traders were each compared in separate analyses with the nontraders to examine the association of trading with HIV seroprevalence. Categorical variables were first analyzed by means of odds ratios and chi-square statistics. Variables on univariate analysis that were significant at an alpha level of .05 or less were systematically examined with multiple logistic regression to assess the independent risk associated with each.¹⁴ Variables were retained in the multivariate model if the variables significantly improved the fit of the model.

TABLE 1—Selected Characteristics of Female Intravenous Drug Users (n = 538), by Their Frequency of Trading Sex for Drugs or Money, Baltimore, Md, 1988 through 1989

	No Trade, % (n = 327)	Low Trade, % (1–49 Partners) (n = 169)	High Trade, % (≥ 50 Partners) (n = 42)
HIV seropositive	23.2	23.7	47.6*
Black	91.1	86.4	88.1
Age < 35 y	63.6	74.6*	76.2
> 2 IV drug-using sex partners	10.7	45.6*	78.6*
Any sexually transmitted disease	59.6	78.1*	81.0*
Any oral contraceptive use	58.3	69.7*	71.4
Duration of IV drug use ≥ 5 y	65.8	71.6	83.3*
Current IV drug use ^a	87.8	87.0	81.0
Daily IV drug use ^b	38.5	40.2	45.2
IV cocaine use ^c	76.8	78.1	71.4
Shared needles ^d	57.8	68.1*	53.7
Gallery ^e	12.8	26.0*	47.6*

Note. HIV = human immunodeficiency virus; IV = intravenous.

^aUsed IV drugs within 6 months of interview.

^bUsed IV drugs at least once per day within 6 months of interview.

^cUsed IV cocaine within 6 months of interview.

^dShared needles within 6 months of interview.

^eVisited shooting gallery within 6 months of interview.

*Significantly different from the nontraders at $P \leq .05$.

Results

Of the 552 female intravenous drug users recruited into the ALIVE study, we had complete data on the trading sex question for 538: 327 (60.8%) reported no trading, 169 (31.4%) traded with fewer than 50 partners, and 42 (7.8%) traded with 50 or more partners. The median number of male sex partners (including trading partners) in the previous 10 years for the no-, low-, and high-trade groups was 3, 8, and 400, respectively.

The prevalence of HIV seropositivity among the nontraders, low traders, and high traders was 23.2%, 23.7% and 47.6%, respectively (Table 1). Compared with the nontraders, the low traders were younger and were more likely to have had sex with more than two intravenous drug users, to have had a sexually transmitted disease, and to have used oral contraceptives. Low traders were more likely than intravenous drug users who did not trade to have shared needles and to have gone to shooting galleries within the 6 months prior to interview, but they were not significantly different from those who had never traded with respect to current injection drug use, frequency of injection, or intravenous use of cocaine.

High traders were more likely than nontraders to have had sex with more than two intravenous drug users, to have

had a sexually transmitted disease, and to have used intravenous drugs for at least 5 years. High traders did not differ from nontraders with regard to frequency of current intravenous drug use, frequency of injection, intravenous cocaine use, or having shared needles, but they were more likely to have attended shooting galleries.

When the analysis was restricted to the low- and no-trade groups (Table 2), univariate analysis showed that having traded sex for drugs or money was not associated with HIV seropositivity. Factors associated with HIV seropositivity were being Black, having had sex with more than two intravenous drug users, history of drug treatment, having used intravenous drugs for 5 or more years, having used intravenous cocaine, and having shared needles with more than one partner. As Table 3 shows, factors independently associated with HIV seropositivity on multivariate analysis were being Black (odds ratio [OR] = 4.75), having had sex with more than two intravenous drug users (OR = 2.31), and having used intravenous cocaine (OR = 3.10).

When the analysis was restricted to the high- and no-trade groups (Table 4), univariate analysis showed having traded sex for drugs or money to be significantly associated with HIV seropositivity (OR = 3.00). Factors associated with

TABLE 2—Unadjusted Odds Ratios for Seroprevalent HIV among Female Intravenous Drug Users Who Reported No or Low Trading of Sex for Money or Drugs (n = 496), Baltimore, Md, 1988 through 1989

	n	% Seropositive for HIV	OR	P
Frequency of trading sex for money or drugs				
Low (1–49 partners)	169	23.7	1.02	
None	327	23.2	1.00	.915
Race				
Black	444	25.5	5.58	
Other	52	5.8	1.00	.002
No. IV drug—using sex partners ^a				
> 2	112	34.8	2.12	
0–2	383	20.1	1.00	.001
Drug treatment				
Ever	289	26.6	1.57	
Never	207	18.8	1.00	.043
Duration of IV drug use				
≥ 5 y	336	26.8	1.89	
< 5 y	160	16.3	1.00	.010
Current IV drug use ^b				
Yes	434	24.7	1.93	
No	62	14.5	1.00	.078
IV cocaine use ^c				
Yes	383	27.4	3.50	
No	113	9.7	1.00	<.001
Shared with > 1 partner ^d				
Yes	177	29.4	1.66	
No	319	20.1	1.00	.019

Note. HIV = human immunodeficiency virus; IV = intravenous; OR = odds ratio.

^aData are missing for 1 subject.

^bUsed IV drugs within 6 months of interview.

^cUsed IV cocaine within 6 months of interview.

^dShared needles within 6 months of interview.

being HIV positive on univariate analysis were being Black, age less than 35 years, having had sex with more than two intravenous drug users, history of any sexually transmitted disease, having used drugs for at least 5 years, having injected drugs within the last 6 months, having injected drugs at least once per day, having used intravenous cocaine, and having shared needles with more than one partner. Lesbian and bisexual sex practices were examined and found not to be associated with HIV seropositivity (OR = 1.13). As Table 5 shows, factors independently associated with HIV seropositivity on multivariate analysis were having traded sex for drugs or money (OR = 2.99), history of any sexually transmitted disease (OR = 1.84), 5 or more years of intravenous drug use (OR = 1.87), and having used intravenous cocaine (OR = 3.54). Additional analyses using continuous rather than categorical exposure variables did not

alter the primary association of interest (data not shown).

In the analysis that was restricted to the high- and low-trade groups, a high frequency of having traded sex for drugs or money was associated with HIV seropositivity (OR = 2.93). Other factors associated with being HIV seropositive on univariate analysis were having had sex with more than two intravenous drug users, having undergone drug treatment, having used intravenous drugs for at least 5 years, having been arrested in the last 10 years, and having used intravenous cocaine. On multivariate analysis, only having traded sex for drugs or money (high trade) and having had sex with more than two intravenous drug users were associated with HIV seropositivity. Additionally, there was an interaction between having traded sex and having had sex with two or more intravenous drug users. Within the low-trade subset, women who had had sex with

TABLE 3—Adjusted Odds Ratios for Seroprevalent HIV in a Population of Female Intravenous Drug Users Who Reported No or Low Trading of Sex for Money or Drugs (n = 496), Baltimore, Md, 1988 through 1989

	OR	95% CI
Race		
Black	4.75	1.42, 15.93
Other	1.00	
No. IV drug—using sex partners		
> 2	2.31	1.43, 3.74
0–2	1.00	
Current IV cocaine use ^a		
Yes	3.10	1.57, 6.09
No	1.00	

Note. HIV = human immunodeficiency virus; IV = intravenous; OR = odds ratio; CI = confidence interval. Low trading was defined as trading with from 1 through 49 partners.

^aUsed IV cocaine within 6 months of interview.

more than two intravenous drug users had an odds ratio for HIV seropositivity of 3.74 (95% confidence interval [CI] = 1.74, 8.05) compared with those who had had sex with two or fewer intravenous drug users. Within the high-trade subset, women who had had sex with more than two intravenous drug users had an odds ratio for HIV seropositivity of 0.37 (95% CI = 0.08, 1.73) compared with those who had had sex with two or fewer intravenous drug users. When only women who reported having had sex with two or fewer intravenous drug users were considered, high traders had an odds ratio for HIV seropositivity of 12.83 (95% CI = 2.83, 58.30).

Discussion

The data presented here are consistent with earlier published reports noting that the exchange of sex for money or drugs is common among intravenous drug—using women.^{15–22} In this study, nearly 40% of the women reported exchanging sex for drugs or money at least once in the previous 10 years.

TABLE 4—Unadjusted Odds Ratios for Seroprevalent HIV in a Population of Female Intravenous Drug Users Who Reported No or High Trading of Sex for Money or Drugs (n = 369), Baltimore, Md, 1988 through 1989

	n	% Seropositive for HIV	OR	P
Frequency of trading sex for money or drugs				
High (≥ 50 partners)	42	47.6	3.00	
None	327	23.2	1.00	.001
Race				
Black	335	27.5	2.84	
Other	34	11.8	1.00	.047
Age				
<35 y	240	30.0	1.88	
>35 y	129	18.6	1.00	.018
No. IV drug-using sex partners ^a				
>2	68	36.8	1.88	
0–2	300	23.7	1.00	.026
Any sexually transmitted disease				
Yes	229	31.4	2.22	
No	140	17.1	1.00	.002
Duration of IV drug use				
≥ 5 y	250	30.4	2.16	
<5 y	119	16.8	1.00	.005
Current IV drug use ^b				
Yes	321	28.0	2.73	
No	48	12.5	1.00	.022
Current use ≥ 1 day ^c				
Yes	145	33.1	1.81	
No	224	21.4	1.00	.013
Current IV cocaine use ^d				
Yes	281	30.6	3.44	
No	88	11.4	1.00	<.001
Shared with >1 partner ^{a,e}				
Yes	111	36.0	2.02	
No	257	21.8	1.00	.004

Note. HIV = human immunodeficiency virus; IV = intravenous; OR = odds ratio.

^aData are missing for 1 subject.

^bUsed IV drugs within 6 months of interview.

^cUsed IV drugs at least once per day within 6 months of interview.

^dUsed IV cocaine within 6 months of interview.

^eShared needles within 6 months of interview.

TABLE 5—Adjusted Odds Ratios for Seroprevalent HIV in a Population of Female Intravenous Drug Users Who Reported No or High Trading of Sex for Money or Drugs (n = 369), Baltimore, Md, 1988 through 1989

	OR	95% CI
Frequency of trading sex for money or drugs		
High (≥ 50 partners)	2.99	1.47, 6.10
None	1.00	
Any sexually transmitted disease		
Yes	1.84	1.07, 3.16
No	1.00	
Duration of IV drug use		
≥ 5 y	1.87	1.05, 3.16
<5 y	1.00	
Current IV cocaine use ^a		
Yes	3.54	1.69, 7.40
No	1.00	

Note. HIV = human immunodeficiency virus; IV = intravenous; OR = odds ratio; CI = confidence interval.

^aUsed IV cocaine within 6 months of interview.

A major finding was a significantly higher rate of HIV infection for high traders (≥ 50 partners) than for nontraders. This statistical association persisted after simultaneous adjustment for multiple confounders, including duration of drug injection, use of intravenous cocaine, and history of sexually transmitted diseases. A significant association of HIV infection and trading sex for money or drugs after adjustment for drug injection practices indicates that the relationship was probably not due to more frequent or riskier drug injection practices among the high traders. The fact that a history of sexually transmitted diseases was independently associated with HIV infection after drug injection

variables were controlled is consistent with a role for sexual transmission of HIV infection in this population. The statistically significant association of HIV seropositivity and high trading after adjustment for history of sexually transmitted diseases indicates that there is an independent effect of frequent trading of sex for money or drugs—that the behavior of trading is risky irrespective of history of sexually transmitted disease.

An unexpected finding was that HIV seropositivity rates were similar between the low traders (1–49 partners) and the nontraders. Because the median number of sex trading partners in the low-trade group was five, and the total

median number of sex partners (including trading partners) in the previous 10 years was similar between the two groups (three for the no-trade group and eight for the low-trade group), the groups might be considered relatively homogeneous with respect to number of sex partners. It is also conceivable that the question about trading sex for money or drugs might have been perceived differently by different study participants; for example, women who reported a low number of trading partners might have included instances where they injected with a partner immediately prior to sex, but other women might not have considered such instances, especially with a regular sex partner, to be an exchange of sex for drugs. Additional studies will need to form questions differently to explore semantic and actual variations.

In the analysis that was restricted to low traders and nontraders, HIV infec-

tion was significantly associated with being Black, having used intravenous cocaine, and having had sex with more than two male intravenous drug users. Although similar findings have been reported by others for injection drug users as a group,^{2,3,8,23} the difference here is that these variables distinguished among subgroups of intravenous drug-using women who had similar HIV seroprevalence rates. The data suggest differing risk profiles within a single population drawn from the same city during the same calendar time. Higher rates of HIV seropositivity among racial/ethnic minorities have been observed in other studies and probably reflect differences in risk behaviors that are inadequately measured with current instruments.²⁴

HIV seroprevalence was higher in the high-trade group than in the low-trade group. In the analysis of risk factors involving these two groups, a significant interaction term showed that having had sex with two or more male intravenous drug users was risky for the low-trade group but, paradoxically, was "protective" for the high-trade group. This finding is consistent with the interpretation that women in the high-trade group were probably less likely to know whether their sex partners were high-risk and therefore less likely to report them. In addition, high traders and low traders may associate with different networks of individuals within which the underlying seroprevalence rates differ. More detailed data, including type of prostitution and frequency of condom use, are needed to better disentangle the effects of drug injection and sexual transmission within different social networks.

Before firm conclusions are drawn, several study limitations should be acknowledged. Because the sample was composed of volunteers, the extent to which this study population is representative of intravenous drug users in Baltimore or elsewhere is unclear. Therefore, this relationship should be examined in other cities with varying seroprevalence rates. The cross-sectional design, although efficient, cannot distinguish risk factors from prevalence correlates; therefore, prevalence-incidence bias cannot be excluded. Additional prospective studies are needed to confirm and expand the findings reported here.

In conclusion, although early studies of intravenous drug users found that

HIV seroprevalence was similar for men and women^{2,5} and some investigators concluded that transmission of HIV infection among intravenous drug users was parenteral rather than sexual,^{6,7} more recent studies have acknowledged a more prominent role of sexual transmission in this population.^{8,9} Further support of the importance of sexual transmission is provided by studies of incident HIV infection among current and former intravenous drug users that have shown higher rates of HIV infection in women than in men.^{4,5} Other investigators have found an association between crack use and HIV seroprevalence^{26,27} that is thought to be mediated by increased sexual activity. This study contributes to the growing literature on risk factors for HIV infection among female intravenous drug users by identifying an independent risk associated with the practice of trading sex for money or drugs in this population. Multiple studies have found that although intravenous drug users have changed drug-using behaviors in response to the AIDS epidemic, progress in the prevention of sexual transmission among intravenous drug users has not kept pace.²⁸ The data presented here provide additional evidence to support redoubled efforts to intervene on the issue of sexual transmission of HIV infection in this vulnerable population. □

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