



HIV Prevalence and Risk Behaviors Among Men Who Have Sex with Men and Inject Drugs in San Francisco

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ABSTRACT *The dual risks of male-to-male sex and drug injection have put men who have sex with men and inject drugs (MSM-IDU) at the forefront of the HIV epidemic, with the highest rates of infection among any risk group in the United States. This study analyzes data collected from 357 MSM-IDU in San Francisco between 1998 and 2002 to examine how risk behaviors differ by HIV serostatus and self-identified sexual orientation and to assess medical and social service utilization among HIV-positive MSM-IDU. Twenty-eight percent of the sample tested HIV antibody positive. There was little difference in risk behaviors between HIV-negative and HIV-positive MSM-IDU. Thirty percent of HIV-positive MSM-IDU reported distributive syringe sharing, compared to 40% of HIV negatives. Among MSM-IDU who reported anal intercourse in past 6 months, 70% of positives and 66% of HIV negatives reported unprotected anal intercourse. HIV status varied greatly by self-identified sexual orientation: 46% among gay, 24% among bisexual, and 14% among heterosexual MSM-IDU. Heterosexual MSM-IDU were more likely than other MSM-IDU to be homeless and to trade sex for money or drugs. Gay MSM-IDU were more likely to have anal intercourse. Bisexual MSM-IDU were as likely as heterosexual MSM-IDU to have sex with women and as likely as gay-identified MSM-IDU to have anal intercourse. Among MSM-IDU who were HIV positive, 15% were currently on antiretroviral therapy and 18% were currently in drug treatment, and 87% reported using a syringe exchange program in the past 6 months. These findings have implications for the development of HIV interventions that target the diverse MSM-IDU population.*

KEYWORDS *MSM, Injection drug user, Methamphetamine, HIV, Epidemiology, MSM-IDU, Sexual risk.*

INTRODUCTION

The dual risks of male-to-male sex and drug injection have put men who have sex with men and inject drugs (MSM-IDU) at the center of the human immunodeficiency virus (HIV) epidemic, with the highest rates of infection among any risk group in the United States.¹ In San Francisco, the estimated prevalence of HIV among gay and bisexual male IDUs is between 42% and 52%^{2,3} and HIV incidence is 3% per

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person year.⁴ MSM-IDU represent an important bridge between high-prevalence and low-prevalence populations, through drug-using and sexual relationships with both gay men and heterosexual women.⁵ HIV prevalence, incidence, and risk behaviors are higher among MSM-IDU than other male IDUs and non-IDU MSM.^{2,4,6-10} In a study of MSM-IDU in Denver, risk behaviors of HIV-positive and HIV-negative MSM-IDU were similar.¹¹ Other studies have shown that gay-identified MSM have a higher prevalence of HIV than MSM who identify as bisexual and heterosexual.¹² Many studies have linked amphetamine and methamphetamine use to high-risk HIV behaviors among MSM,¹³ but relatively little is known about other types of drugs injected by MSM-IDU such as heroin and cocaine. Understanding the confluence of sexual identity, HIV risk behavior, and HIV prevalence among MSM-IDU is critical to shape and focus HIV prevention interventions for MSM-IDU populations. It is equally important to assess whether HIV-positive MSM-IDU are accessing and utilizing available services to manage HIV and help prevent further transmission.¹³

This study analyzes data collected from 357 MSM-IDU in San Francisco between 1998 and 2002, to examine whether and how risk behaviors may differ by HIV serostatus and self-identified sexual orientation. The extent of service utilization among HIV-positive MSM-IDU is also examined.

METHODS

Data are from the Urban Health Study,^{4,14} a serial cross-sectional study that has been using targeted sampling methods¹⁵ to recruit between 600 and 800 IDUs semi-annually in four San Francisco neighborhoods since 1986. Eligibility criteria were being 18 years of age or older and evidence of recent drug injection (visible signs of recent venipuncture). After obtaining informed consent, we collected risk behavior and demographic data using a standardized questionnaire administered in a one-on-one interview session. Respondents were tested for HIV, given pre- and post-HIV test counseling, and referred to medical and social services as appropriate. Blood specimens were analyzed for HIV antibodies using enzyme immunoassay; positive specimens were confirmed using Western blot assay.¹⁶ Study participants were paid \$15 for their contribution to the research. The Committee on Human Research at UCSF approved all study procedures.

This analysis included only male study participants from 1998 to 2002 who reported having male sexual partners and injecting drugs in the past 6 months. Between 1998 and 2002, 5,166 interviews were conducted with male IDUs. In 4,782 of these assessments, study participants reported injecting drugs in the 6 months before interview, and in 512 of these, they reported having male sexual partners in the past 6 months. From these active MSM-IDU observations, 155 were eliminated because they were repeat assessments of the same person (133), the participant did not self-identify as gay, bisexual, or heterosexual (21), or the HIV result was missing (1), for a final sample of 357 study participants.

Variables of interest for this analysis were sexual orientation, including self-reports of being "gay," "bisexual," or "heterosexual"; unprotected anal intercourse, defined as any anal intercourse without a condom in the 6 months before interview and distinguished as receptive or insertive; receptive syringe sharing, defined as an answer greater than zero to the following question: "In the last 6 months, how many times did you inject using works that you know had been used by anybody else (including a close friend or lover)?"; and distributive syringe sharing, defined as an answer greater than zero to the following question: "In the last 6 months, how

many times did you give or loan syringes/needles that you used to someone else who then used them (including a close friend or lover)?” Service utilization was assessed with data collected on current drug treatment, syringe exchange in the past 6 months, and current antiretroviral therapy among those who knew that they were HIV positive.

All bivariate analyses testing differences used the chi-square test or Fisher’s exact test, with $P < .05$ as the criterion for statistical significance. Multivariate models were created using logistic regression analysis, with the retention of statistically significant factors associated with the outcome at the $P < .05$ level. Candidate variables for bivariate and multivariate analyses are listed in Table 1. All statistics were computed using Statistical Analysis System software version 8.02 for windows (SAS Institute Inc, Cary, NC).

RESULTS

Risk Behaviors by HIV Status

Twenty-eight percent of the sample tested HIV antibody positive. HIV-positive MSM-IDU were more likely than HIV-negative MSM-IDU to be older and African American and less likely to be homeless (Table 1). Thirty percent of HIV-positive and 40% of HIV-negative MSM-IDU reported distributive syringe sharing. Thirty-eight percent of HIV-positive and 42% of HIV-negative MSM-IDU reported receptive syringe sharing. In multivariate analysis controlling for potential confounding variables, HIV positives had similar odds as HIV negatives of distributive syringe sharing [adjusted odds ratio (AOR)=0.93; 95% confidence interval (CI)=0.54–1.6] and receptive syringe sharing (AOR=1.1; 95% CI=0.68–1.9). The only drug-related variable significantly associated with HIV status in bivariate analyses was amphetamine injection.

HIV-positive men were more likely than HIV-negative men to report having any anal intercourse with men in the past 6 months (70% vs. 48%; $P < .001$). When controlling for potential confounding factors in multivariate analyses, HIV-positives had higher odds than HIV-negatives to report any anal intercourse (AOR=1.9; 95% CI=1.1–3.3). Among those who reported any anal intercourse with men in the past 6 months, 70% of HIV-positive and 66% of HIV-negative MSM-IDU reported any unprotected receptive or insertive anal intercourse (difference not statistically significant). In multivariate analysis among MSM-IDU who reported any anal intercourse sex in past 6 months, HIV-positives had similar odds to HIV-negatives of unprotected insertive anal intercourse (AOR=1.1; 95% CI=0.52–2.5) and unprotected receptive anal intercourse (AOR=1.6; 95% CI=0.73–3.4). HIV-positive MSM-IDU were less likely than HIV-negative MSM-IDU to report having vaginal sex with women in the past 6 months (30% vs. 50%, respectively; $P = .001$), although there was no statistically significant difference in the proportions of HIV-positive and HIV-negative MSM-IDU who had unprotected sex (59% and 68%, respectively) among those who had vaginal sex with women.

Characteristics of MSM-IDU by Sexual Orientation

HIV status varied significantly by self-identified sexual orientation. Forty-five percent of self-identified gay MSM-IDU tested HIV positive, compared with 25% of bisexual and 14% of heterosexual MSM-IDU (Table 2). Gay and bisexual MSM-IDU were more likely than heterosexual MSM-IDU to have multiple sex partners and were more likely to report having anal intercourse in the past 6 months, with no

TABLE 1. Demographics and risk behaviors by HIV status of men who have sex with men and inject drugs (MSM-IDU) in San Francisco (N = 357)

Variable	Percentage of HIV negative (n = 252)	Percentage of HIV positive (n = 105)	Total (N = 376) %	P
Age (years)				
<30	27	12	22	.007
30–39	34	47	38	
≥40	39	41	40	
Race/ethnicity				
White	67	52	62	.001
African American	17	24	19	
Latino	6	1	4	
Other	10	23	14	
Transgendered (male to female)	4	13	7	.003
Considers self homeless	68	51	63	.003
Self-identified sexual orientation				
Gay	27	53	34	<.001
Bisexual	46	36	44	
Heterosexual	27	10	22	
Drug-related risk (past 6 months)				
Amphetamine injection	76	86	79	.044
Heroin injection	65	55	62	n.s.
Cocaine injection	30	21	27	n.s.
Smoked crack cocaine past month	60	53	57	n.s.
Syringe exchange use	85	83	84	n.s.
Drug treatment	26	19	22	n.s.
Receptive syringe sharing	42	38	41	n.s.
Distributive syringe sharing	40	30	36	n.s.
Re-used syringes past month	63	57	61	n.s.
Sex-related risk (past 6 months)				
Number of male sex partners				
1	41	33	39	n.s.
2–5	32	39	34	
≥6	27	28	27	
Any anal intercourse with men	48	70	54	<0.001
Any unprotected receptive anal sex*	60	68	64	n.s.
Any unprotected insertive anal sex*	63	67	64	n.s.
Any oral sex with men	92	95	93	n.s.
Sex with women	50	30	44	0.001
Any unprotected vaginal sex*	68	59	66	n.s.
Traded sex for money or drugs	58	47	50	n.s.

n.s., not significant at .05 level.

*Among those who engaged in that sex act.

significant difference found between receptive or insertive intercourse. Heterosexual MSM-IDU were more likely than other MSM-IDU to be homeless, to inject cocaine, to engage in distributive syringe sharing, to reuse syringes, and to trade sex for money or drugs. Gay MSM-IDU were much less likely than the other MSM-IDU to report

TABLE 2. Risk behaviors and HIV status by self-identified sexual orientation of men who have sex with men and inject drugs (MSM-IDU) in San Francisco (N = 357)

Variable	Percentage of gay (n = 123)	Percentage of bisexual (n = 156)	Percentage of heterosexual (n = 78)	P
HIV antibody positive	46	24	14	.001
Considers self homeless	55	63	74	.019
Drug-related risk (past 6 months)				
Amphetamine injection	81	78	77	n.s.
Heroin injection	54	64	72	n.s.
Cocaine injection	20	28	37	0.03
Smoked crack cocaine past month	57	56	61	n.s.
Drug treatment	22	21	30	n.s.
Syringe exchange use	86	85	82	n.s.
Receptive syringe sharing	33	44	47	n.s.
Distributive syringe sharing	25	42	49	.02
Re-used syringes past 30 days	51	61	77	.004
Sex-related risk (past 6 months)				
Number of male sex partners				
1	40	31	53	.006
2–5	29	39	32	
≥6	31	30	15	
Any anal intercourse with men	68	53	35	<0.001
Any unprotected receptive anal sex*	73	48	63	n.s.
Any unprotected insertive anal sex*	80	50	75	n.s.
Any oral sex with men	92	96	88	n.s.
Sex with women	3	68	62	.001
Any unprotected vaginal sex*	67	61	79	n.s.
Traded sex for money or drugs	40	58	73	.001

n.s., not significant at 0.05 level.

*Among those who engaged in that sex act.

sex with women. Although 62% of MSM-IDU reported injecting heroin, there was no significant difference in the prevalence of heroin injection by sexual orientation.

Utilization of Services Among HIV-positive MSM-IDU

Among HIV-positive MSM-IDU, 60% reported that they knew they were HIV positive (data not shown in tables). Among MSM-IDU who reported being HIV positive, 15% were on antiretroviral therapy, 18% were in drug treatment, and 87% reported using a syringe exchange program in the past 6 months.

DISCUSSION

This study found a high prevalence of HIV infection among MSM-IDU, as well as a high prevalence of risky sexual and injection behaviors. HIV-positive and HIV-negative MSM-IDU reported similar levels of syringe sharing, unprotected anal sex with men (of those having anal sex with men), and unprotected vaginal sex (of those having sex) with women. The persistence of high-risk behaviors among MSM-IDU, despite decades of outreach, HIV testing, media campaigns, and more,

points to an urgent need to understand this subpopulation better. For example, the study found that many HIV-positive MSM-IDU are having unprotected anal sex. However, the context of this behavior remains unknown. Are practices reported in the gay male community, such as “barebacking,” “serosorting,” and “strategic positioning,”¹⁷ also occurring among MSM-IDU? How and when does disclosure of HIV status intersect with risky behavior?

MSM-IDU have an additional risk for HIV transmission from injection drug use. Well over a third of subjects reported syringe sharing in the past 6 months, with no statistical difference by HIV status. This is a much higher prevalence of sharing than has been found among non-MSM IDU in San Francisco, particularly among HIV-positive IDU.⁴ Knowing more about the context of risk where MSM-IDU use injection drugs would provide understanding about this behavior and inform strategies for interventions. Is syringe sharing more common within certain sexual partnerships (e.g., concordance with HIV status, gender or sexual identity)? How are unsafe sex and unsafe injection behaviors related to one another? Is “serosorting” a factor that influences syringe-sharing decisions? In addition, many studies have shown an association between substance use and risky sexual behavior in gay men. Do these associations hold for MSM-IDU?

The differences found in risk behavior by self-identified sexual orientation indicate that MSM-IDU are not a homogenous group and that sexual identification does indeed appear to influence behavior. Heterosexually identified MSM-IDU were less likely to have anal intercourse, which may explain the lower HIV prevalence in this group. Three quarters of heterosexual MSM-IDU engaged in sex trading (i.e., for drugs or money) may explain the discordance between sexual identity and behavior. Still, a more detailed exploration of the contexts in which heterosexually identified male IDU are having sex with other men is warranted. Gay-identified MSM-IDU were less likely to engage in the sex trade, and far less likely to report female sexual partners, than other MSM-IDU. However, they were significantly more likely to report six or more sexual partners and had a higher overall prevalence of HIV. Bisexual MSM-IDU were as likely as heterosexual MSM-IDU to have sex with women and as likely as gay-identified MSM-IDU to have anal intercourse. These data indicate that bisexual MSM-IDU are an important group to target for HIV interventions, as their sexual partnerships may bridge high-prevalence and low-prevalence populations.⁵

A unique finding of this study is the high level of heroin use among MSM. There were no statistical differences in heroin use by sexual orientation. There is a tendency for studies of substance use among MSM to focus primarily on stimulant use (e.g., amphetamines and methamphetamines). Although only amphetamine injection was associated with HIV prevalence in this study, heroin use should not be overlooked when developing interventions for MSM-IDU. For example, methadone treatment could be an appropriate feature of such interventions.

Few HIV-positive participants were accessing antiretroviral therapy for HIV or drug treatment services. By contrast, antiretroviral treatment among HIV-positive MSM in San Francisco is quite common.¹⁸ MSM-IDU may not be comfortable with service providers that focus on either gay men or injection drug users, suggesting that drug treatment options for MSM-IDU may be needed, specifically including treatment of amphetamine users.¹⁹ An exception to the lack of service utilization among MSM-IDU was syringe exchange, which was reported by almost the entire sample. It may be beneficial to assess how syringe exchange programs are successful at reaching this population to replicate this approach by other service providers.

There are several limitations to this study that need consideration. It did not set out to examine risk and HIV among MSM-IDU prospectively, so that the data are limited in their scope. For example, it did not assess the HIV status of partners with whom HIV positives shared syringes and had unprotected anal intercourse. Studies of MSM have shown that although HIV-positives are more likely to be risky with HIV-positive partners, there is still significant risk taking with partners of negative and unknown HIV status.²⁰ With the exception of HIV antibody status, these data are based on self-reports of the study participants and therefore are subject to recall bias and social desirability effects. The study participants were recruited using non-random sampling techniques, which make it impossible to generalize the findings to the overall population of MSM-IDU. Moreover, the findings may overstate the prevalence of risk behaviors among MSM-IDU because those who had not injected drugs or engaged in sex with other men in the 6 months prior to being interviewed were excluded from the analysis.

This article examined the dual risks of drug use and sex among MSM-IDU by HIV status and sexual orientation. MSM-IDU are a relatively small population, but one at very high risk of both infection and transmission. They are connected, through sexual behavior and drug use, to both high-prevalence groups, such as MSM, and low-prevalence groups, such as female sexual partners and heterosexual IDUs. Given their position at the nexus between these groups and their ongoing rates of high-risk behavior, more detailed investigations of MSM-IDU are needed.

ACKNOWLEDGEMENT

We thank Ricky Bluthenthal, Brent Herrera, and Andrea Scott for their input on this analysis and NIH (R01 DA12109) and San Francisco Department of Public Health for funding.

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