

Methamphetamine Use and Sexual Activity Among HIV-Infected Patients in Care—San Francisco, 2004

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INTRODUCTION

METHAMPHETAMINE is a central nervous stimulant that has become the second-most common drug of abuse world-wide (after cannabis),¹ and in 2002 became the leading cause of inpatient drug-treatment admissions in California.² Methamphetamine is an easily obtained illicit substance that is smoked, snorted, ingested orally, inserted rectally, inserted vaginally, and injected intravenously. A growing body of literature has linked methamphetamine use with risky sexual behaviors that increase the likelihood of transmitting HIV and other sexually transmitted diseases (STDs). However, less is known about the extent of methamphetamine use among HIV-infected persons who might be at risk of harming themselves from methamphetamine's effects or infecting others with HIV while under the influence of methamphetamine.

Methamphetamine use among men who have sex with men (MSM) is relatively common and is associated with risky sexual behavior. The Urban Men's Health Study³ reported that 9.5% of MSM in four large U.S. cities reported methamphetamine use in the prior 6 months during 1996–1998 (13.3% in San Francisco MSM), and the EXPLORE study reported that 13% of MSM in six large US cities reported methamphetamine use in the prior 6 months during 1999–2001 (23% of MSM in San Fran-

cisco).^{4,5} Multiple studies have demonstrated that methamphetamine use among MSM is associated with unprotected anal intercourse (both insertive and receptive) and with intercourse with HIV-serodiscordant partners.^{4–10} Prevalence estimates of methamphetamine use by HIV-positive MSM are variable. In 1998, the Supplement to HIV/AIDS Surveillance (SHAS) project reported that 15% of 9735 HIV-positive MSM from 12 U.S. states had used amphetamines (including methamphetamine) at some time in their lives.¹¹ In 2004, the Seropositive Urban Men's Intervention Trial (SUMIT) reported that 10.1% of 1168 HIV-positive MSM from New York City and San Francisco reported methamphetamine use in the past 3 months.¹⁰ Semple et al.¹² reported in 2003 that binge use of methamphetamine was common (45.5%) among 90 HIV-positive MSM in Los Angeles, as was unprotected sex with serodiscordant partners and follow-up surveillance in 2004 also demonstrated increased multipartnerism associated with methamphetamine use by this cohort.¹³ In a Denver public health survey methamphetamine use by MSM in the prior year was reported as 11% and in MSM living with HIV it was 21%.¹⁴ The Denver survey also suggested that methamphetamine using MSM were three times more likely to have unprotected sex compared to nonmethamphetamine using MSM.

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The use of methamphetamine has been documented in many demographic groups with links between methamphetamine use and riskier sex demonstrated among African American, Filipino, and Latino MSM.¹⁵⁻¹⁷ Methamphetamine use has been associated with increased sexual multipartnerism among MSM, heterosexual men, and heterosexual women.¹ Methamphetamine is associated with intravenous injection^{18,19} and up to 40% of injecting methamphetamine users have been shown to transition directly to injection from other routes of methamphetamine use.²⁰ Women who have sex with women (WSW) in northern California were significantly more likely to report having injected methamphetamine during the prior 6 months compared to heterosexual women.²¹ In a sample of heterosexual men from low income neighborhoods of northern California with a high representation of Hispanic and black, non-Hispanic race/ethnicity, recent methamphetamine users were more likely than nonmethamphetamine users to have anonymous female partners and have two or more female partners in the past 6 months.²² In this study an attempt was made to assess condom use but because of overall low use of condoms by all participants no clear association between recent methamphetamine use and unprotected sex was found.

Methamphetamine use has also been associated with incident HIV and sexually transmitted disease (STD) infection. A large international study of MSM in Europe, the United States, Canada, and Australia demonstrated an association between methamphetamine use and HIV infection.²³ In San Francisco, two separate studies demonstrated increased HIV incidence associated with methamphetamine.^{24,25} Similarly, methamphetamine use has been associated with early syphilis infection in New York City and San Francisco.^{26,27}

HIV-positive individuals incur direct harm from methamphetamine that has been shown to hasten HIV dementia²⁸ and selectively damage dopaminergic central-nervous system neurons in HIV-infected individuals.²⁹ Methamphetamine also interferes with adherence to highly active antiretroviral therapy (HAART) as a result of patient concerns about methamphetamine-HAART interactions (planned non-adherence) and forgetting to take HAART

while under the influence of methamphetamine (unplanned nonadherence).³⁰ Increased HIV viral loads because of HAART nonadherence has been described among persons using methamphetamine.³¹ Methamphetamine use is also associated with physical changes such as dental caries.^{32,33}

Prior studies on methamphetamine use and HIV/STDs have primarily focused on the risk of HIV-uninfected persons becoming infected as a result of riskier sexual behavior while using methamphetamine. This cross-sectional survey was performed to rapidly assess the prevalence of methamphetamine use and the sexual activity among persons who are already HIV-positive and therefore at risk of transmitting HIV to uninfected partners or acquiring other STDs themselves. In addition, because provider knowledge of patients' sexual practices and substance use provides an opportunity for counseling on risk reduction, patient-provider communication was assessed.

METHODS

Survey distribution

We systematically distributed English and Spanish versions of a 1-page, anonymous survey to HIV-positive patients seeking care at two San Francisco clinics. These two clinics operate the University of California at San Francisco's (UCSF) Positive Health Program (PHP) at San Francisco General Hospital Medical Center (SFGH), which serves uninsured and public-insured individuals; and PHP Moffit (Moffit), which primarily serves those with private or public insurance. Together, these two sites provide clinical service to the largest number of HIV-positive persons in San Francisco. The survey was distributed at SFGH from February 16 to March 16, 2004, and at Moffit from August 13 to October 24, 2004. A survey was given to each patient at registration and completed on a voluntary basis prior to the clinical visit. A snack bar was used as an incentive for each returned survey. Survey respondents were asked to indicate if they had previously completed a survey, but were given an incentive even if they were a repeat respondent. There-

fore, no incentive existed for a person to misrepresent a survey as unique in order to garner more snack bars. The surveys were returned at the end of the visit and collected every 1–4 days. Because some patients might have completed the survey under the influence of psychoactive substances, most (20 of 23) questions were designed with single check-box answers to maximize the response rate.

In addition to basic demographic data (English- or Spanish-speaker, age, gender, gender of sex partners), the 23-question survey collected information on sexual activity (number of partners in past 4 weeks and past 12 months); methamphetamine use (past 4 weeks and past 12 months, frequency of use during past 4 weeks, and routes of use); and patient–provider communication on sexual activity and methamphetamine use. Respondents who had used methamphetamine at any time within the preceding 12 months were asked about frequency of use in the past 4 weeks; method of use (oral ingestion, inhalation of smoke, intranasal snorting, intravenous injection, or rectal insertion of dissolved methamphetamine); and to answer a structured five-question screening tool for methamphetamine dependence (the Substance Dependence Scale or SDS). The SDS was developed for assessing opiate dependence³⁴ and was subsequently validated against a standard psychiatric handbook (the *Diagnostic and Statistical Manual of Mental Disorders [DSM-III]*) for assessing amphetamine dependence.³⁵ Respondents were also asked to provide written comments on those methamphetamine reduction/cessation programs they had found helpful. A subset of patients at the Moffit site were asked an additional question about their use of methamphetamine during sex.

Statistical analyses

Using EpiInfo 6,³⁶ we compared two or more categorical variables using prevalence risk ratios (RR) with 95% confidence intervals (CI), or as percent prevalence and *p* value using the two-tailed Fisher's exact test for univariate data or Chi-square test for trend. The Student's *t* test was used to compare means and the Wilcoxon

Rank Sum Test (WRST) was used to compare medians.

For the analyses, three gender/orientation groups were constructed based upon each respondent's gender and the gender of their sex partners: MSM (including bisexual men), heterosexual men, and women (heterosexual and WSW). A subanalysis comparing the 22 WSW respondents with the 54 heterosexual women respondents revealed no significant differences between these subgroups (data not shown), and they were combined into the single category of women. A subanalysis performed on each group to compare responses at the two survey sites (SFGH and Moffit) revealed that only one question had significantly different responses by site (patient comfort discussing methamphetamine use with their provider); therefore, the responses from the two sites were combined for all analyses. We also performed each analysis stratified by groups to control for confounding and examine effect modification.

Human subjects review

The investigation was reviewed by the CDC (Human Subjects Review numbers 2004-00133 [SFGH] and 2004-00195 [Moffit]) and designated as nonresearch public health surveillance in accordance with the Code of Federal Regulations, Title 45, Part 46: The Public Service Act.

RESULTS

Participation

Of 731 distributed surveys, 642 (87.8%) were returned to the collection boxes. Of 642 respondents, 58 (9.1%) indicated that they had filled out the survey before, and these duplicate surveys were excluded from further analysis. Thirteen respondents were transgender and excluded from the analysis because of small sample size and inability to distinguish female-to-male from male-to-female transgender. Review of the unique surveys to remove partial reporting (e.g., <50% of questions answered) further reduced the sample to the final analysis set of 537 respondents (73.5% of distributed surveys).

Demographics

Of the 537 respondents, 368 (68.5%) were MSM, 88 (16.4%) heterosexual men, and 81 (15.1%) women (Table 1). The median age of the three groups was similar (43, 45.5, and 44 years, respectively), and 98.7% were English-speaking.

Sexual practices

Most (92.5%) patients stated they would be comfortable discussing sexual practices with their provider, yet less than half (47.2%) were asked. Significantly more sex partners were reported by MSM in the preceding 4 weeks (1.8 ± 3.5 [mean \pm standard deviation] for MSM, 0.7 ± 1.2 for heterosexual men, and 0.7 ± 0.9 for women; $p < 0.01$) and in the preceding 12 months (9.8 ± 23.4 for MSM, 1.6 ± 3.0 for het-

erosexual men, and 1.2 ± 2.3 for women; $p < 0.01$). A subanalysis on provider communication with patients who reported 2 or more partners revealed that providers were more likely to ask patients with 2 or more partners in the past 4 weeks about their sexual practices (61.4% of those with ≥ 2 partners versus 42.7% of those with ≤ 1 partner, $p = 0.03$), with a non-significant trend toward asking patients with 2 or more partners in the past 12 months about their sexual practices (55.7% versus 42.3%, $p = 0.13$). There was no evidence of confounding when stratified by group.

Methamphetamine use

Overall, 18.3% of patients reported that they had used methamphetamine in the preceding 4 weeks and 35.1% that they had used metham-

TABLE 1. CHARACTERISTICS OF HIV-POSITIVE PATIENTS IN CARE IN SAN FRANCISCO—2004

Respondents, n = 537	MSM n = 368	%	Heterosexual				P
			Men n = 88	%	Women n = 81	%	
Age in years; median (IQR)	43 (38.5–48.5)		45.5 (40.5–51.0)		44 (40.0–50.0)		
English-speaking	385	99.2	85	96.9	80	98.8	
Spanish-speaking	3	0.8	3	3.4	1	1.2	
Comfortable talking to provider about sex	334/361	82.5	80/85	94.1	70/77	90.9	0.74
Provider asks about sex	183/358	51.1	29/83	34.9	32/78	42.1	0.02
Comfortable talking to provider about methamphetamine use	299/339	88.2	68/78	87.2	56/70	80.0	0.18
Provider asks about methamphetamine use	145/359	40.4	27/83	32.5	28/76	34.2	0.31
No. partners past 4 weeks: mean (SD)	1.8 (3.5)		0.7 (1.2)		0.7 (0.9)		<0.01
No. partners past 12 months: mean (SD)	9.9 (23.4)		1.6 (3.0)		1.1 (5.2)		<0.01
Used methamphetamines in past 4 weeks	68/347	19.6	13/81	16.0	11/73	15.1	0.56
Used methamphetamines in past 4 weeks and dependent	41/65	63.1	5/11	45.5	7/10	70.0	0.46
Used methamphetamines in past 12 months	137/347	38.5	23/76	30.3	14/73	19.2	<0.01
Used methamphetamines in past 12 months and dependent	79/133	59.4	13/21	61.9	10/13	78.9	0.47
Route of methamphetamine use in past 12 months							
Oral ingestion	15/132	11.4	2/22	8.1	1/13	7.7	0.85
Smoked	88/132	51.5	7/22	31.8	5/13	38.5	0.18
Snorted	62/132	47.0	1/22	4.5	3/13	23.1	<0.01
Intravenous injections	46/132	34.8	14/22	63.6	7/13	53.8	0.02
Rectal insertion	28/132	21.2	0/22	0.0	1/13	7.7	0.03

MSM, men who have sex with men; IQR, interquartile range; SD, standard deviation.

phetamine in the preceding 12 months. Methamphetamine users were slightly younger (median age, 41 years, intraquartile range [IQR] = 38–45) than nonusers (45 years, IQR = 40–50.5); $p < 0.01$. Most (86.9%) patients responded that they would be comfortable discussing methamphetamine use with their provider, yet only 37.8% of patients reported being asked. More respondents from Moffit (92.3%) reported being comfortable discussing methamphetamine use than those from SFGH (73.6%), $p = 0.03$. A subanalysis on provider communication with those patients who reported methamphetamine use indicated that providers were asking methamphetamine users about methamphetamine more frequently than they asked nonusers (past 4 weeks: 69.0% versus 30.5% respectively, $p < 0.01$; past 12 months: 62.4% versus 26.0% respectively, $p < 0.01$). No evidence of confounding was found when stratified by group.

Significantly more MSM (39.5%) reported methamphetamine use in the past 12 months than heterosexual men (30.3%) or women (19.2%); $p < 0.01$. Among methamphetamine users in the preceding 4 weeks, 61.6% met criteria for dependence by the SDS, as did 61.1% of methamphetamine users in the preceding 12 months. Dependence did not differ significantly by group.

The most common route for methamphetamine use in the preceding 4 weeks was smoking (40.4%), followed by intravenous injection (33.8%), snorting (33.3%), rectal insertion (14.8%), and oral ingestion (9.1%). A significant association was found between dependence and intravenous injection of methamphetamine (RR = 1.3, 95% CI = 1.1–1.7) but not for oral, smoked, snorted, or rectally inserted methamphetamine. Women and heterosexual men more commonly reported injecting methamphetamine than MSM ($p = 0.02$) (Table 1). By comparison, MSM more commonly reported snorting ($p < 0.01$) or rectal insertion ($p = 0.03$) than women or heterosexual men (Table 1).

Among those who met SDS criteria for methamphetamine dependence during the past 12 months, 26.9% reported frequent methamphetamine use (once per week or more in the preceding 4 weeks), 26.9% infrequent methamphetamine use (less than once per week), and 46.2% had not used in the past 4

weeks. Among the 46.2% of dependent persons who had not used methamphetamine in the past 4 weeks, 32 provided written comments, and 15 (46.8%) of 32 were either recently or currently in substance-abuse treatment (e.g., inpatient treatment or Narcotics Anonymous). A subanalysis of dependent users revealed that providers were more likely to ask frequent users about methamphetamine than nonusers (78.6% versus 58.2%, $p < 0.01$). No significant associations were found between frequency of use and route of use.

Methamphetamine use and sexual practices

Methamphetamine users were significantly more likely to have had multiple (≥ 2) sex partners in both the past 4 weeks and past 12 months than nonusers. In the past 4 weeks, 48.9% of methamphetamine users versus 16.8% of nonusers reported multiple partners (RR = 2.9, 95% CI = 2.1–3.9), with no evidence of confounding when stratified by group. In the past 12 months, 62.2% of methamphetamine users versus 32.0% of nonusers reported multiple partners (RR = 2.0, 95% CI = 1.6–2.4). However, this effect was significantly ($p = 0.02$) modified by sexual orientation and gender. The relative risk of multipartnerism associated with methamphetamine use during the past 12 months was 1.5 (95% CI = 1.2–1.8) among MSM, 5.2 (1.9–14.5) among heterosexual men, and 4.9 (1.3–18.5) among women. A subset of 144 patients was asked whether they used methamphetamine during sex; 68.8% had used methamphetamine during sex in the past 4 weeks and 74.3% had used methamphetamine during sex in the past 12 months.

DISCUSSION

This investigation demonstrates that methamphetamine use was common among HIV-positive persons in medical care in San Francisco during 2004 and was associated with a greater number of recent sex partners. The high reported prevalence of methamphetamine use during sex (>60%), and the strong association between methamphetamine use and risky sexual behavior,^{4–9,37,38} means that these HIV-pos-

itive individuals might place serodiscordant partners at greater risk for becoming infected with HIV. The association of multipartnerism with methamphetamine use might also place these HIV-positive individuals at increased risk for becoming infected with or transmitting other STDs.²³⁻²⁷ In addition to confirming reports of frequent methamphetamine use among MSM, this study's finding of common use among women (19.2%) and heterosexual men (30.3%) is noteworthy because these are populations for which there is less known about sexual risk-taking related to methamphetamine use.

The finding that fewer than half of this sample is being asked about their sexual practices or methamphetamine use by their providers is also of concern. HIV-positive individuals might experience greater harm from methamphetamine use than HIV-uninfected individuals.^{28,29} Given the reports of HAART nonadherence related to methamphetamine use,^{30,31} they are also at increased risk for missing medication doses, which has been shown to increase HIV viral load.^{39,40} Because these persons are in medical care and report high comfort levels discussing their experiences with providers, they are excellent candidates for frank, open discussion of sexual risks and substance abuse as recommended by the Centers for Disease Control (CDC) and others.⁴¹ Several prior studies have documented the need for providers to discuss risk reduction with their HIV-positive patients.^{42,43} Although there was a trend for providers in this study to ask the most sexually active patients about sex and frequent methamphetamine users about methamphetamine, there remain many missed opportunities for discussion and intervention. Our findings should encourage providers to ask screening questions about sexual activity and methamphetamine use at every visit.

More than 60% of methamphetamine users in this study meet screening criteria for dependence. Effective interventions to reduce or halt methamphetamine use have been difficult to develop, although studies of cognitive-behavioral therapy and contingency-management programs have shown promise.^{38,44-46} Prolonged treatment success is possible, as demonstrated by the Matrix treatment program in which recent

methamphetamine use among 114 HIV-positive individuals dropped from 86.8% at entry to 17.5% 2-5 years after treatment.⁴⁷ Unfortunately, in the absence of treatment, sexual risk-taking behavior by our sample group seems likely. Campsmith et al.⁴⁸ reported that after HIV diagnosis, use of crack cocaine (a stimulant similar to methamphetamine) was a significant predictor of unprotected sex and multiple sex partners. Of concern, another study demonstrated that injection-drug use was a significant correlate of substance-abuse treatment drop-out among MSM in San Francisco.⁴⁹ Our study found that methamphetamine injection was the only use route significantly associated with dependence; therefore, this group might present additional treatment challenges.

This study had several limitations: the cross-sectional design cannot address causality; the self-completion format might reduce response rate; the use of the SDS for assessing dependence might be imprecise; the lack of information on high-risk sexual behaviors other than partner number; there is no information of HAART adherence; and the small sample size for women and heterosexual men limits statistical power. However, the cross-sectional design should limit recall bias by simultaneously obtaining information on sexual partners, methamphetamine use, and patient-provider communication. The anonymous self-completion format should have reduced the likelihood of respondents giving socially desirable answers to questions on methamphetamine use or multipartnerism. The five-question SDS has been shown to have a 71.3% sensitivity and 77.1% specificity when tested against the *DSM-III*,³⁵ and we encourage its use as a rapid screening tool for providers who seek to learn more about methamphetamine use by their patients. The association of methamphetamine use and higher risk sex and diminished HAART adherence has already been published by others.^{4-10,30,31} Our survey of MSM, heterosexual men, and women provides a better understanding of methamphetamine prevalence among HIV-positive patients in care and needed to be an instrument that is quickly and easily completed even by those that may be impaired by use of psychoactive substance. Making a longer survey by adding additional questions on HAART use,

frequency of condom use and type of sexual activities may have limited the response rate and biased the estimate. Further surveillance is also needed to improve our knowledge of less-studied groups (e.g., women and heterosexual men).

In summary, we describe a high prevalence rate of methamphetamine use among HIV-positive persons in medical care in San Francisco regardless of sexual orientation and gender, and associations of this use with having sexual intercourse and multiple sex partners. Because these patients are in clinical care, knowledge that they use methamphetamine and engage in sexual risk behavior provides an opportune moment for clinical intervention. We believe that patients receiving HIV care should be routinely screened regarding their sexual practices and methamphetamine use, and counseling on risk-reduction or substance-abuse treatment should be provided when indicated.

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