DIFFERENCES IN HIV SEXUAL RISK BEHAVIORS BETWEEN HETEROSEXUAL AND NONHETEROSEXUAL MALE USERS OF METHAMPHETAMINE

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Previous studies examining HIV sexual risk behaviors among male methamphetamine users have primarily focused on men who have sex with men (MSM) while ignoring heterosexual methamphetamine users. In this study, active male users of methamphetamine are differentiated based on sexual orientation. Targeted sampling guided the recruitment, and face-to-face survey interviews were conducted with 108 active male methamphetamine users. Participants were classified into heterosexual (n = 69) and non-heterosexual (n = 39) users. Between-group differences were found based on socio-demographics, drug use histories, and HIV sexual risk behavior. Heterosexual males were more likely than their nonheterosexual peers to be younger, less educated, unemployed, and less likely to be tested for HIV. Nonheterosexual males were more likely than heterosexual males to identify methamphetamine as their primary drug of choice, commence poly-drug use at a later age, and report more sexual partners in the past year. Findings from this study may lead to the development and/or refinement of successful prevention and intervention strategies that are more culturally sensitive to heterosexual and nonheterosexual male users of methamphetamine.

Multiple epidemiological surveillance systems point to methamphetamine use as one of the fastest growing drug problems in the United States. Drug treatment, arrest, emergency room, and mortality data all indicate an increasing use of methamphetamine, especially in the Southeastern U.S. (Community Epidemiological

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Work Group [CEWG], 2005; Drug Enforcement Administration [DEA], 2005; Substance Abuse and Mental Health Services Administration [SAMHSA], 2005). Along with this inhocreased prevalence, a growing body of literature examines the epidemiology (Anglin, Burke, Perrochet, Stamper, & Dawud-Noursi, 2000; Gibson, Leamon, & Flynn, 2002), drug treatment (Hser, Evans, & Huang, 2005, Shoptaw et al., 2005), behavioral (Halkitis, Shrem, & Martin, 2005; Maxwell, 2005), and neurological (Chapman, Hanson, Kesner, & Keefe, 2001; Nordahl, Salo, Natsuaki, Galloway, Waters, & Moore, 2005) aspects associated with methamphetamine use. These studies have largely been conducted with abstaining adult methamphetamine users, often those identified in formal substance abuse treatment. In addition, many of these investigations included male and female participants without differentiating based on the user's sexual orientation. Those researchers who did account for sexual orientation often conducted research that involved samples consisting of men having sex with men (MSM) or of heterosexuals and thus, are not comparative.

Research has demonstrated the emerging influence of methamphetamine in the MSM community (Molitor, Traux, Ruix, & Sun, 1998; Newmeyer, 2003; Prestage et al., 2001), frequently linking it to high risk HIV sexual behaviors such as having multiple sexual partners (Halkitis, Parsons, & Wilton, 2003), decreased condom use (Fernandez et al., 2004), and an increased probability of HIV infection and having another STD (Gorman, Nelson, Applegate, & Scrol, 2004; Shoptaw, Peck, Reback, & Rotherman-Fuller, 2003). Other research has found a decrease in HIV seropositive disclosure (Larkins, Reback, Shoptaw, & Veniegas, 2005) and a reduction in HIV medication adherence (Reback, Larkins, & Shoptaw, 2003) among methamphetamine-using MSM. Multiple social contexts where MSM meet others and use methamphetamine, such as circuit parties (Kurtz, 2005; Lee, Galanter, Dermatis, & McDowell, 2003; Mattison, Ross, Wolfson, & Franklin, 2001), bath houses (Binson, Woods, Pollack, Paul, Stall, & Catania, 2001), sex clubs (Halkitis, Parsons, & Stirratt, 2001), and internet chat rooms (Benotsch, Kalichman, & Cage, 2002; Dew & Chaney, in press) have been identified.

Whereas research has addressed methamphetamine use among MSM, our knowledge regarding heterosexual male methamphetamine users is much more limited. Available data on heterosexual male methamphetamine users are mostly derived from studies that address gender differences among only heterosexuals (Semple, Patterson, & Grant, 2004a, 2004b, 2005). Compared to women, these investigations have found heterosexual men to show a slower progression of methamphetamine use (Gibson, Leamon, & Flynn, 2002), lower levels of depression (Semple, Patterson, & Rant, 2005), reduced treatment efficacy (Hser, Evans, & Huang, 2005) and higher prevalence of injection drug use (Brecht, O'Brien, Mayrhauser, & Anglin, 2004). In heterosexual samples that did not differentiate

for gender, methamphetamine users were likely to have significantly more sexual partners, more unprotected anal and vaginal sex, and higher rates of STDs than heterosexual nonusers of methamphetamine (Molitor, Traux, Ruiz, & Sun, 1998). Compared to heterosexual nonusers, methamphetamine using heterosexuals were also four times more likely to engage in sex with an IDU and two times more likely to pay money for sex (Molitor et al., 1998). Although differences among male and female heterosexual users of methamphetamine have been found, we did not find empirical evidence documenting the differences in at-risk behaviors between heterosexual and nonheterosexual users. Consequently, we do not know how to differentially target men with heterosexual and nonheterosexual orientations.

The present study characterizes a sample of both heterosexual and nonheterosexual active male methamphetamine users by exploring distinctions in demographics, drug use history, and sexual risk behavior. Considering the importance in ascertaining differences between these active male users, the current study seeks to examine the following research questions: (a) Do heterosexual and nonheterosexual active users of methamphetamine differ by socio-demographics? (b) How are the drug trajectories between these two groups dissimilar? (c) What sexual at risk behaviors are active male methamphetamine users engaging in and do these activities vary by sexual identity? Research has found that both heterosexual and nonheterosexual users of methamphetamine engage in multiple drug and sexual risk behaviors that put them at risk for HIV and other sexually transmitted diseases. Consequently, public health officials must target both groups in order to reduce the potential proliferation of HIV and other STDs. Information derived from this study may guide the development of successful prevention and intervention strategies that target both heterosexual and non-heterosexual males.

METHOD

STUDY PROCEDURES

The data presented are part of a larger project, TRENDS, an investigation of emerging drug use patterns in Atlanta, Georgia, between September 1999 and April 2003. An emphasis was placed on heroin and methamphetamine because epidemiological indicators had found significant increases in the local use of these substances (National Institute on Drug Abuse, 2001; SAMHSA, 1999). Epidemiological indicators of prevalence and at-risk groups were identified via emergency room admissions, law enforcement statistics, expert opinions from local public health and social service authorities, and members of the target population. Community identification (CID) methods were used to develop targeted sampling strategies in a population of adult drug users (Tashima, Crain, O'Reilly, & Elifson, 1996). Street outreach techniques, such as ethnographic mapping, were used to access multiple communities and social settings. These appraisals provided baseline

information to locate study communities, blocks, specific drug-using locations, and potential members of the target population. This type of mapping is useful when the parameters of a study population are unknown, as is the case with drug users. Ranging in age from their mid twenties to late forties, nine women and five men of various racial and ethnic backgrounds were trained by the principal investigator and other project leaders to complete the recruiting and interviewing. Once the sampling sites were selected, targeted sampling was used to obtain a diverse representation of drug users. Snowball or chain referral and theoretical sampling were then used to ensure a wide range of drug use experiences. These methods have successfully been used by the authors in previous studies of active methamphetamine, ecstasy, cocaine, and heroin users (Dew, Elifson, & Sterk, 2006; Sterk & Elifson, 2000; Sterk, Theall, & Elifson, 2006). For the purpose of this study, we focus on male methamphetamine users.

Persons eligible for participation in the TRENDS project had to meet the following criteria: (a) be 18 years of age or older at time of the interview; (b) reside in the metropolitan Atlanta area; (c) have used methamphetamine at least once in the previous 30 days and at least six times in the six months prior to the interview; (d) not currently be in substance abuse treatment, prison, or jail; and (e) not be cognitively impaired by drug and/or alcohol use at time of interview. All interviews were conducted in English.

Interviews were scheduled for individuals who met the criteria for and were interested in participation. The interviews were held at mutually agreed upon central locations and included such venues as the project offices, the participant's home, a local restaurant or cafeteria, coffee shop, community centers, and the interviewer's car. For purposes of safety and inscribing of ethnographic notes, the primary interviewer was always accompanied by an additional field member. The consent procedures, approved by both Georgia State and Emory University's institutional review boards, were reviewed and signed prior to the collection of any data. Further screening of participants occurred prior to the interview in order to confirm suitability. Prior to the collection of data, individuals were asked the date of their last use of methamphetamine in order to verify that use occurred in the last month. All participants that had been initially screened and provided an interview time met the requirements for participation at the time of the face-to-face interview. Study participants were also notified that all study materials were protected by a certificate of confidentiality. The average length of time to complete the interview was one hour, and participants received a $15.00 compensation for their time.

STUDY SAMPLE

The sample in the present analysis consisted of 108 actively using male adult methamphetamine users in Atlanta, Georgia (age: M = 27.2 years, SD = 8.5, range 18-48 years). Of the 108 participants, 64% (n = 69) self-identified as heterosexual (age: m = 24.8 years, sd = 6.9, range 18-46 years) and 36% (n = 39) as nonheterosexual (age: m = 31.5 years, sd = 9.4, range 19-48 years). Nearly 80% of all participants self-identified as White, and one out of 10 reported being African American. Almost one half of the study participants reported having some college education or more. Approximately two fifths of the study respondents were unemployed or unable to work due to disability (38%), with another two fifths indicated they work full time (40%). One half of the study participants reported monthly incomes of less than $1,000. One out of every four study participants reported having been homeless in the past 12 months. About one in 10 men self-reported being HIV positive.

The frequency of methamphetamine use in the past 30 days was high (M = 12.1 days, SD = 9.8, range 1-30 days) and the preferred route of administration was snort/intranasal (51%), followed by inject (22%). Forty-six percent (n = 54) of the study participants reported spending more than $100 on methamphetamine in the past 30 days, whereas 12% (n = 18) reported spending more than $500 during the same time period. Forty-eight percent of the study participants identified methamphetamine as their current drug of choice, followed by marijuana (21.3%).

MEASURES

Data were collected by means of an instrument developed specifically for the study, based on formative research among a similar population. Additional items utilized in the overall assessment were derived from instruments that have been shown to produce both valid and reliable results from drug users. Included are items from the Risk Behavior Assessment (RBA) as developed by cooperative agreement sites and NIDA (Needle et al., 1995).

Demographic characteristics. Selected demographic items included gender, age, racial/ethnic background, educational achievement, present employment situation, total monthly income, current living arrangement, history of homelessness, geographic area currently residing, relationship status, and sexual orientation.

Drug use history. A study participant's history of substance use was assessed by a series of questions that addressed commencement (including age and method of administration) and drug use trends in the past 30 and 90 days (comprising route of administration, amount of substance used, and money spent). The evaluation of previous drug use included the following substances: tobacco, alcohol, crack, powder cocaine, heroin, unprescribed opiates, methamphetamine, amphetamine, hallucinogens, marijuana, ecstasy, and ketamine. A study participant's primary

self-identified drug of choice was obtained and types of individuals (e.g., relatives, steady partner, and friends) with whom the person had bought and shared drugs were considered. Additional questions regarding methamphetamine use included dichotomous (yes/no) choices related to experienced side effects within the past 30 days (e.g., nose irritation, chest irritation, irregular heart beat, and paranoia) and ordinal assessments of the individual's perception of being out of control (ranging from 1 = "never" to 4 = "always"), desire to cease use (ranging from 1 = "never" to 5 = "I can't stop"), and ability to stop (ranging from 1 = "impossible" to 4 = "easy").

Sexual risk behavior. An array of questions that assessed behaviors that place one at risk for HIV, hepatitis C, and other sexually transmitted infections (STI) were posed. A study participant selected a dichotomous answer (yes/no) to the following questions:

- Have you had sex with a person who injected drugs?
- Have you ever had sex with a person who you paid with money or drugs?
- Have you ever exchanged sex for drugs?

Nine Likert-scale questions (ranging from 0 = "never" to 4 = "always") were used to determine the frequency of engaging in high risk sexual activity, for example:

- How often during the past year did you have sex while high on alcohol or drugs?
- How often during the past year did you have sex while your partner was high on alcohol or drugs?
- How often during the past year did you have two or more sexual partners at the same time?

The study participants were also asked to provide the total number of sexual partners in the past year. Information regarding the frequency of and reasons for getting tested for HIV and hepatitis C was obtained. Individuals were asked how many times one had been tested for HIV/AIDS and hepatitis C as well as what influenced the decision to get tested (e.g., "You thought you were at risk," "A health care worker suggested it or it was part of a routine medical exam," "My partner wanted me to get tested"). Having personal knowledge of HIV/AIDS was determined by dichotomous questions (yes/no) that asked if the study participant knew anyone who was HIV positive, living with AIDS, or died from AIDS. A participant's self-reported HIV and hepatitis C serostatuses were assessed by responding to a two-part question, "How

many times have you been tested for HIV and hepatitis C? Please tell me what the results of these tests were." Blood and tissue specimens were not collected in order to verify respondent's self-report.

DATA ANALYSIS

Bivariate relationships between the predictor variables and the dependent variable (sexual orientation) were examined. Likelihood ratio chi square, Fisher's exact tests, analysis of variance or Mann-Whitney U tests, where appropriate, were used to identify differences according to sexual orientation. Linear regression was used whenever the independent variable was a continuous measure. Due to small expected cell sizes, significant associations between sexual orientation and selected variables of interest were determined by probability values $< .05$. All the statistical tests were two-tailed.

RESULTS

The socio-demographic characteristics by sexual identity are presented in Table 1. As opposed to nonheterosexual users, heterosexual methamphetamine users were significantly more likely to be younger, White, less educated, and to earn less than $1,000 per month. Heterosexual and nonheterosexual methamphetamine users significantly differed in their current living situation. Nonheterosexual participants were significantly more likely to earn more than $4,000 per month ($p<.01$) and to live in one's own private house or apartment ($p<.05$). Nearly one out of every four heterosexual users reported being homeless in the last three months as compared to one out of every 10 nonheterosexual users of methamphetamine. No significant differences were identified between heterosexual and nonheterosexual users based on parental or current relationship status.

Poly-drug use typified both heterosexual and nonheterosexual male users of methamphetamine. Nearly all of the study participants reported lifetime use of tobacco (89%), alcohol (98%), and marijuana (97%). A majority reported lifetime use of powder cocaine (88%), hallucinogens (86%), ecstasy (64%), unprescribed opiates (55%), and crack (52%) at least once (data not shown). As shown in Table 2, heterosexual users were significantly more likely than their non-heterosexual peers to report lifetime use of tobacco ($p < .05$), crack cocaine ($p < .05$), unprescribed opiates ($p < .01$), and amphetamine ($p < .01$). Heterosexual methamphetamine users were also more recent smokers of marijuana in the past 30 days ($p < 01$). Although both groups reported lifetime use of illicit substances, heterosexual males tended to initiate their drug use at an earlier age. Compared with nonheterosexual study participants, a larger proportion of heterosexuals began using tobacco ($p < .01$), powder cocaine ($p < .01$), unprescribed opiates ($p < .05$), amphetamine ($p < .01$),

TABLE 1
SOCIO-DEMOGRAPHIC CHARACTERISTICS DISTINGUISHED BY SEXUAL IDENTITY (N=108)

	Heterosexual Users (n =69)	Nonheterosexual Users (n=39)	χ^2 or Fisher's exact test
Mean Age (S.D.)	24.8 (6.9)	31.5 (9.3)	
Racial/Ethnic Background (%)			15.78**
African American	2.9	23.1	
White	87.0	66.7	
Hispanic	1.4	5.1	
Other	8.6	2.6	
Education (%)			24.87**
1st-11th grade	24.3	7.8	
High school diploma/GED	31.9	17.9	
Post high school technical training certificate	2.9	0.0	
Some college	36.2	38.5	
College degree	2.9	28.2	
Post-college education	1.4	7.7	
Total Legal Personal Income (past month) (%)			25.80**
$0 - $499	41.1	10.5	
$500- $999	21.4	28.9	
$1,000 - $1,999	23.2	13.1	
$2,000 - $2,999	8.9	23.5	
$3,000 - $3,999	3.6	2.6	
Over $4,000	1.8	21.1	
Location of current living (%) <.05			15.64*
Own private house or apartment	39.1	53.8	
A public housing or section 8	0.0	10.3	
Someone else's house/apartment	39.1	17.9	
A hotel	2.9	2.6	
On the streets	10.1	7.7	
Other	8.6	7.8	
Last time you were homeless? (%)			9.62*
Never	52.2	76.9	
More than one year ago	17.4	5.1	
Between 6 months and 1 year	1.4	5.1	
Less than 6 months ago	29.0	12.9	
Have children (% yes)	18.8	10.3	2.83
Current relationship status (%)			0.99
Single	56.5	55.3	
Separated, divorced, or widowed	5.8	5.3	
Married or common law married	2.9	2.6	
Living with partner	14.5	13.2	
In a steady relationship with a partner (does not live with you)	11.6	13.2	
In a steady relationship with a partner (does live with you)	8.7	10.5	

NOTE: Percentages may not reflect overall total (105) due to missing responses.
*p<.05
**p<.01

hallucinogens ($p < .01$), methamphetamine ($p < .05$), and marijuana ($p < .05$) prior to being 17 years old.

As shown in Table 3, no between-group differences were identified in regards to the frequency of methamphetamine use in the past 30 and 90 days and preferred method of administration in the past 90 days. Over 20% of both heterosexual and non-heterosexual participants report injecting as the desired route of use. Nonheterosexual

TABLE 2
SUBSTANCE USE OF PARTICIPANTS ACCORDING TO SEXUAL IDENTITY (N=108)

Substance History	Use < Age 17			Lifetime Use			Use Past 30 Days		
	Het (%)	Nonhet. (%)	χ^2	Het (%)	Nonhet. (%)	χ^2	Het (%)	Nonhet. (%)	χ^2
Tobacco	85.5	53.8	28.40**	94.2	82.1	4.02*	79.7	61.5	13.79
Alcohol	89.7	86.8	4.25	98.6	97.4	0.17	88.4	76.9	11.47
Crack Cocaine	7.2	2.5	7.47	58.8	39.5	3.85*	15.9	17.9	10.87
Powder Cocaine	37.7	5.1	29.22**	87.0	89.5	0.15	50.7	33.3	24.89*
Heroin	4.3	5.1	3.32	40.6	34.2	0.42	8.6	7.6	3.47
Other unprescribed opiates	20.2	10.2	16.25*	65.2	36.8	7.98**	30.4	7.6	26.02*
Methamphetamine	42.0	28.0	14.68*	100.0	100.0	0.00	100.0	100.0	24.06
Amphetamine	21.7	2.5	25.22**	54.5	27.8	6.39**	11.6	2.5	5.93
Hallucinogens	49.2	15.3	26.41**	89.7	78.4	2.51	30.4	12.9	5.81
Marijuana	71.0	53.8	17.60*	95.6	100.0	0.19	84.4	61.5	33.28**
Ecstasy	15.9	5.1	7.24	63.8	64.1	0.01	43.4	35.9	4.84

*p<.05
**p<.01

men were more likely than heterosexual men to report methamphetamine as their primary drug of choice ($p < .05$). The heterosexual study participants were more likely than their nonheterosexual peers to share their methamphetamine with relatives ($p < .01$) and with dealers ($p < .05$). In addition, heterosexual users were more likely than nonheterosexuals to buy their methamphetamine with relatives ($p < .05$) or alone ($p < .05$), and nonheterosexuals were more likely to purchase methamphetamine with someone exchanging drugs for sex ($p < .05$). Heterosexual users experienced significantly more chest irritation, irregular heart beat, and paranoia as a consequence of their methamphetamine use in the past 30 days than their nonheterosexual peers.

As shown in Table 4, study participants in both groups reported engaging in sexual behavior that put them at risk for contracting HIV, hepatitis C, and other STIs, although non-heterosexuals tended to engage in this behavior more often. Although not statistically significant, nearly one half of all heterosexuals and over 40% of the nonheterosexuals report having had sex with an injection drug user. Nonheterosexual study participants were more likely than heterosexuals to have nearly three times the number of sexual partners in the past year ($p < .01$). A greater proportion of nonheterosexual methamphetamine users also acknowledged having traded sex for drugs ($p < .05$). No between-group differences existed with regard to having sex while high on alcohol or drugs or having sex with a partner under the influence of alcohol or drugs. Condom use in the past year was erratic for both groups. Over 44% of heterosexual males reported never using a condom during the past 12 months. One out of three non-heterosexual participants admitted never using a condom in the previous 12 months.

Members of both groups were similarly informed of HIV/AIDS as demonstrated by nearly equal mean scores on the following type statements:

TABLE 3
METHAMPHETAMINE-RELATED BEHAVIORS BY SEXUAL IDENTITY (N=108)

	Heterosexual (n =69)	Nonheterosexual (n=39)	χ^2 or t test
Mean number of days used in past 30 (S.D.)	13.3 (9.8)	10.0 (9.5)	2.82
Mean number of days used in past 90 (S.D.)	35.4 (28.3)	27.9 (30.1)	1.65
Preferred method of administration in past 90 days (%)			2.31
Oral	7.8	2.7	
Intranasal/Snort	53.1	62.2	
Smoke	10.9	13.5	
Inject	26.6	21.6	
Current drug of choice (%)	45.6	55.3	17.08*
Bought drug with in past 30 days (%)			
Relatives	14.5	0.0	6.92*
Friends	76.8	64.1	2.98
People who give you drugs for sex	1.4	12.8	6.63*
Nobody (by yourself)	37.7	17.9	5.37
Shared drug with in past 30 days (%)			
Relatives	20.6	0.0	9.24**
Friends	92.6	82.1	2.80
People who sell drugs	58.8	33.3	6.44*
Experienced as a result of use in past 30 days (%)			
Nose irritation	35.7	48.6	1.54
Nose bleed	19.6	10.8	1.29
Chest irritation	33.9	13.5	6.85*
Irregular heart beat	58.9	27.0	9.12**
Headaches	39.3	27.0	1.48
Paranoia	60.7	32.4	7.13**
Loss of appetite	76.8	75.7	0.02
Use often or always out of control in past 30 days (%)	12.5	13.5	0.74
Wish often or always to stop using in past 30 days (%)	26.8	27.0	0.97
Impossible or very difficult to stop using (%)	30.3	24.3	1.48

*p<.05
**p<.01

- You can tell from looking at a person if they have the HIV virus.
- HIV, the virus that causes AIDS, is present in semen, blood, vaginal fluid, and breast milk.
- Using a condom can reduce your chances of becoming infected with HIV

Although no between-group differences existed for previous Hepatitis C testing, a disparity in prevalence of HIV testing among the two groups was significant ($p < .01$) with nearly 20% of heterosexual males not being tested compared to none of the nonheterosexual study participants. Furthermore, reasons to obtain an HIV

TABLE 4
SEXUAL RISK BEHAVIORS AND KNOWLEDGE OF HIV/AIDS AND HEPATITIS C BY SEXUAL IDENTITY (N=108)

	Heterosexual (n =69)	Non-Heterosexual (n=39)	*P*
Sexual At-Risk Behavior (% Yes) [a]			
Have you ever had sex with a person who injected drugs? (% yes)	49.3	41.2	NS
Have you ever had sex with a person who you paid for money or drugs? (% yes)	18.2	24.2	NS
Have you ever exchanged sex for place to stay? (% yes)	14.5	17.9	NS
Have you ever traded sex for drugs (% yes)	21.7	36.8	NS
Mean number of sexual partners past year? (S.D.)[b]	7.3 (14.7)	19.1 (37.7)	<.01**
Have sex while high past year? [c]			NS
Never	1.8	5.3	
Rarely	19.6	15.8	
Sometimes	41.1	47.4	
Almost Always/Always	37.5	31.5	
Almost always or always have sex while your partner was high on alcohol/drugs (%)[c]	27.3	34.2	NS
Sometimes or almost always have two or more sexual partners at the same time in past year (%)	16.1	34.2	<.05*
No use of condoms in past year (%)	44.2	33.0	
HIV/AIDS & Hepatitis C			
Knowledge of HIV/AIDS Questionnaire: Mean (S.D.)[b]	6.6 (1.2)	6.7 (1.1)	NS
Never been tested for HIV (%)[a]	19.8	0.0	<.01**
Never been tested for Hepatitis C (%)[a]	47.6	63.6	NS
Self-identified risk for Hepatitis C infection (%)[a]	46.2	53.8	NS
Influences to get tested for HIV (%)			
Thought he was at risk	32.7	50.0	<.01**
Nurse/Dr. recommendation/routine medical exam	16.4	2.6	<.05*
Included in admission to treatment or jail	28.4	9.4	<.05*
Know of someone who is HIV+	58.0	94.9	<.01**
Know of someone living with AIDS	43.5	71.8	<.01**
Know of someone who has died of AIDS	47.8	64.1	NS

*p<.05
**p<.01
[a] significance determined by *Fisher's Exact* test (1-sided)
[b] significance determined by ANOVA
[c] significance determined by Likelihood ratio chi-square

test also differed by sexual orientation. Heterosexual men were more likely than nonheterosexual men to be tested following a suggestion from a health care worker or partner ($p < .05$), or it was included in the admissions routine for drug treatment, jail, or prison ($p < .05$). Nonheterosexual users were persuaded more often than heterosexual users to be tested because of one's own perception of risk ($p < .01$). Nonheterosexual users were considerably more likely than their heterosexual peers to be HIV positive ($p < .01$), know someone with HIV ($p < .01$), or living with AIDS ($p < .01$). Neither group was more likely to know of someone who had died from AIDS.

DISCUSSION

This study is one of the first to differentiate male methamphetamine users based on sexual orientation. The major finding of this study was that among this targeted sample of active male methamphetamine users, significant differences in socio-demographics, drug use patterns, and at risk sexual behavior were found between heterosexuals and nonheterosexuals. Demographically, these two groups were distinctive with heterosexual men reporting fewer primary life coping resources as characterized by lower monthly income, less educational achievement, and a larger probability of temporary living arrangements than their nonheterosexual peers. The findings are noteworthy because heterosexual men may be more likely than nonheterosexual men to experience potential barriers to medical, substance abuse treatment, and other mental health resources due to lack of insurance, financial resources, or dependable housing (Mojtabai, 2005). Although methamphetamine is mostly used by whites, results from this study indicate that methamphetamine use is not limited to this population. In this study, African American use of methamphetamine appears in greater proportions than recent epidemiological indicators suggest (Community Epidemiological Work Group, 2005; SAMSHA, 2005). Yet, methamphetamine use among African Americans appears to be mostly limited to gay and bisexual men, its use having largely failed to enter the African American heterosexual male community. Future epidemiological mapping of methamphetamine trends among African Americans is critical because of its potential for future proliferation in this region.

Although lifetime poly-drug use was high among both heterosexual and nonheterosexual participants, their drug trajectories differ in important ways. The earlier commencement of drug use by male heterosexual methamphetamine users may have significant consequences on school performance, affective, physical and neurological development, relationships with parental figures, and other psychosexual maturity. In contrast, nonheterosexual users of methamphetamine may experience more recurrent problems related to their employment. Although no significant differences existed between the two groups regarding frequency of methamphetamine use, heterosexual users were more likely to use marijuana regularly and identify marijuana as their primary drug of choice. Elevated frequency of smoking marijuana in this methamphetamine using sample is consistent with previous research (Hirschfield, Remien, Humberstone, Walavalkar, & Chiasson, 2004; Newmeyer, 2003). Higher prevalence of injection drug use (IDU) among heterosexual men in the past 90 days is a significant concern given the younger mean age of heterosexual users, frequent polydrug use, and sporadic HIV testing.

The findings from this study support previous research that links methamphetamine use with at risk sexual behavior among MSM, especially the number of sexual

partners, and irregular use of condoms (Halkitis, Shrem, & Martin, 2005; Kurtz, 2005; Lee, Galanter, Dermatis, & McDowell, 2003). The participation in sexual activities with two or more partners at the same time by nonheterosexual users provides a potential explanation of how this group averaged 20 sexual partners within a 12 month period. However, in this sample, inconsistent use of condoms was evident among both groups of men, not just nonheterosexuals. The lack of HIV and hepatitis C testing is particularly problematic with heterosexual users and substantiates the need for prevention and intervention efforts that target both male populations.

Despite significant findings, limitations to our study should be considered. First, all data from this study were collected via uncorroborated self-reports, which may have been influenced by social desirability. Therefore, the accuracy with which respondents reported their involvement with methamphetamine and other drugs cannot be known. However, previous researchers in the substance abuse field have found high reliability and validity in self-reported data from other substance-using populations (Day, Collins, Degenhardt, Thetford, & Maher, 2004; Neale & Robertson, 2003; Parra, O'Neill, & Sher, 2003). A second potential limitation relates to recall bias. Respondents were asked to describe polydrug use and an array of beliefs and attitudes in time periods ranging from present day, within past 30 and 90 days, and over a lifetime. The exact influence of how recall bias might influence the data cannot be determined. A third possible limitation is the sampling strategy used in data collection. Because all data were obtained from individuals residing in metropolitan Atlanta, Georgia, results may not be generalizable to other regions of the United States, as well as to more suburban and rural areas of this Southern state. Furthermore, this study is not necessarily representative of all methamphetamine users in Atlanta, Georgia because a random sample was not drawn. We did, however, recruit participants from diverse settings and at varying times of day in order to increase the representativeness of the sample. Finally, the small sample size limits the extent to which the findings can be generalized to other populations of male methamphetamine users. The targeted sampling approach used resulted in a relatively small percentage of non-White study participants and therefore, the results need to be interpreted with caution when applied to ethnically diverse users.

As methamphetamine continues to be a growing drug problem facing this country, especially in the Southeast, it is essential to ascertain a better understanding of its users. While much emphasis has been placed on MSM who use the drug, little empirical attention has been devoted to heterosexual male users of methamphetamine. This study has provided greater insight into heterosexual male users by comparing their socio-demographics, drug use histories, and at risk sexual behaviors to nonheterosexual male users. The results from this investigation can lead

to the development of successful effective prevention and intervention strategies that are tailored to meet the needs of heterosexual and nonheterosexual male users of methamphetamine.

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