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Methamphetamine dependence and HIV risk behavior

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Abstract

We examined human immunodeficiency virus (HIV) related risk behaviors among methamphetamine (MA) dependent users. Secondary data analysis was performed on data from a large clinical trial: the Methamphetamine Treatment Project (MTP) (N=784). All MA-dependent participants were enrolled in an outpatient treatment program, receiving either a standard psychosocial intervention (Matrix Model) or Treatment-as-Usual. HIV-related risk behavior, including injection and unsafe sexual practices, was assessed using the AIDS Risk Assessment at baseline, treatment discharge, and 6-, 12, and 36 months following treatment participation. Results indicate that HIV-risk behaviors substantially decreased over time. Treatment factors (retention and completion) and frequency of MA use were both positively associated with increased reduction of HIV risk behaviors. Findings suggest that treatment of MA dependence is promising for reducing behaviors that have been shown to transmit HIV.

Keywords

HIV risk; Methamphetamine; Injection use; Unsafe sexual behaviors

1. Introduction

National epidemiological data indicate that roughly one million individuals in the United States (U.S.) are infected with the human immunodeficiency virus (HIV), with rates on the rise since 2001 (CDC, 2005). Injection practices (CDC, 2003) and risky sexual behaviors (Leigh & Stall, 1993) among illicit drug abusing populations have greatly contributed to the rapid growth and spread of HIV in the U.S. Much attention regarding high rates of HIV among illicit drug users in the U.S. has centered on heroin and cocaine/crack users (Gyarmathy, Neaigus, Miller, Friedman, & Des Jarlais, 2002; Neaigus, Miller, Friedman, & Des Jarlais, 2001). However, a growing number of studies have identified methamphetamine (MA) use as a significant cofactor associated with increased HIV infection (Schwarcz, Scheer, McFarland, Katz, Valleroy, et al., 2007; Colfax, Mansergh, Guzman, Vittinghoff, Marks, et al., 2001; Colfax, Vittinghoff, Husnik, McKirnan, Buchbinder, et al., 2004; Colfax, Coates, Husnik, Huang, Buchbinder, et al., 2005; Buchacz, McFarland, Kellogg, Loeb, Holmberg, et al., 2005). Most

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of this work to date has been on men who have sex with men (MSM) populations (Peck, Shoptaw, Rotheram-Fuller, Reback, & Bierman, 2005; Halkitis, Parsons, & Stirratt, 2001; Reback, Larkins, & Shoptaw, 2004); Frosch, Shoptaw, Huber, Rawson, & Ling, 1996; Gorman, Morgan, & Lambert, 1995; Paul, Stall, & Davis, 1993; Shoptaw, Reback, Frosch, & Rawson, 1998; Semple, Patterson, & Grant, 2002). Very little HIV risk related literature exists among non-MSM identified MA users (Semple, Patterson, & Grant, 2004; Semple, Grant, & Patterson, 2006).

Studies of MA users, not specifically selected as MSMs, report that MA use is associated with numerous HIV related risk factors. Rawson, Washton, Domier, and Reiber (2002) observed that MA-dependent users engage in a higher frequency of sexual activity, have more sexual partners and participate in more risky sexual behavior (i.e., no condom use, anal sex) than users of other types of drugs. Molitor, Truax, Ruiz, and Sun (1998) found that heterosexual MA users are likely to have more sex partners, higher rates of unprotected anal and vaginal sex, and lower rates of condom use when compared to non-MA users. Semple et al. (2004) observed a similar trend among female MA-using heterosexuals who reported multiple partners, many anonymous sex partners, infrequent condom use and frequent unprotected anal intercourse. Other studies have found that MA-injecting non-MSM users are also at great risk of HIV infection as they tend to report increased sexual desires compared to non-injecting MA users (Hall & Hando, 1994; Klee, 1993).

Research has shown that behavioral-based treatments for drug abuse can be effective vehicles for reducing HIV infection among illicit drug abusers (Metzger, Navaline, & Woody, 1998). Studies among heroin and cocaine users receiving treatment show that risky drug use injection and unsafe sexual practices greatly reduce or cease after treatment (Schroeder, Epstein, Umbricht, & Preston, 2006; Woody, Gallop, Luborsky, Blaine, Frank, et al., 2003). Similar treatment effects have been observed among MSM MA-dependent users (Reback, Larkins, & Shoptaw, 2004).

With HIV rapidly expanding among illicit drug abusers, the present paper contributes to this body of knowledge by examining HIV risk behavior among an adult MA-dependent sample who participated in a multi-site randomized behavioral intervention trial not specific to MSM populations. Although all participants received psychosocial treatment, the trial was not a controlled comparison of treatment versus no treatment; hence this study only serves to provide some preliminary information on the changes in HIV risk behavior associated with behavioral treatment participation.

2. Methods

2.1. Sample

Analyses are based on secondary data from a multisite clinical trial called the Methamphetamine Treatment Project (MTP) comparing a standard psychosocial based treatment (Matrix Model) to Treatment-as-Usual in 8 treatment programs located in Montana, Hawaii and California between 1999 and 2002 (Rawson, Marinelli-Casey, Anglin, Dickow, Frazier, Gallagher, et al., 2004). Funded by the Substance Abuse and Mental Health Services Administration (SAMHSA), Center for Substance Abuse Treatment (CSAT), the trial included 978 MA-dependent adults who were eligible for study participation if they met DSM-IV criteria for MA-dependence; used MA in the month before treatment entry; were proficient in the English language; were 18 years old or older; and resided in the same geographical location as the treatment facility as defined by city and zip code.

2.1.1—The Matrix Model is a manualized multi-component psychosocial treatment approach consisting of 16 weeks of thrice-weekly group sessions, including cognitive-behavioral, family

education, social support, and individual counseling combined with urine drug testing (Obert, McCann, Brethen, Marinelli-Casey, & Rawson, 2000).

2.1.2—Treatment-As-Usual conditions followed no standard treatment guidelines. Interventions represented eight diverse treatment approaches, including individual or group-based counseling sessions that were of different intensities (i.e., once per week versus thrice weekly) and ranged from 8 to 16 weeks in length (Galloway, Marinelli-Casey, Stalcup, Lord, Christian, et al., 2000).

2.2. Study Variables & Measures

Data examined included participant sociodemographic (gender, age, and ethnicity) and treatment characteristics (condition, retention, and completion), current (past 30 day use at admission) and lifetime MA use collected at baseline and follow-up periods using the Addiction Severity Index ASI; (McLellan, A.T., Kushner, H., & Metzger, D., Peters, R., Smith et al., 1992).

Treatment characteristics, including study condition (Matrix versus Treatment-as-Usual), retention, and completion status were obtained from treatment records. The length of treatment (retention) was measured by weeks in treatment based on the first day of admission to the last day of treatment discharge and treatment completion was defined as those who completed the prescribed treatment regimen with no more than two consecutive missed weeks of treatment versus those who did not complete treatment.

Risky behaviors as measured by self-reported injection and high risk sexual practices were collected from the Texas Christian University (TCU) AIDS Risk Assessment (Simpson, Camacho, Vogtsberger, Williams, Stephens et al., 1994) at baseline and follow-up periods. This measure is an 18-item inventory assessing high-risk sexual and drug use behaviors commonly associated with exposure to HIV. Most items require an answer specifying the number of times or number of people involved in the behavior being assessed. A sexual risk behavior composite was calculated, summing individual sexual risk items, with a higher score indicative of engaging in more risky sexual activities. For logistic regression purposes, sexual risk composite scores were coded to 0 (if no risky behaviors) or 1 (if they engaged in risky behavior, regardless of the number of times).

2.3. Data Analysis

Chi-square and independent-samples *t* tests were used to examine the associations between the study variables. Linear and logistic regression modeling were used to assess factors that contributed to change in risky behaviors (injection and unsafe sexual practices) over time at follow-up periods: discharge, 6-, 12-, and 36-months after treatment participation. To reduce potential reporting bias associated with demand characteristics, assessments were performed by an interviewer who did not have any relationship to the Matrix or Treatment-as-Usual interventions that clients received.

Follow-up response rates for the MTP project were high. Of the 978 participants randomly assigned at baseline to the two different treatment conditions: 787 completed discharge interviews, 871 completed the 6-month follow-up interview, 880 completed the 12-month follow-up interview, and 587 were recruited to participate in a 3-year follow-up interview. All analyses were performed using the Statistical Package for Social Sciences for Windows (Version 13.0, Chicago, IL). *P* values less than .05 indicate statistical significance.

3. Results

3.1. Participant Characteristics

At baseline, roughly half of the participants were female (51.1%), the majority were Caucasian (65.5%), the average age was 32.8 ± 7.8 (range: 18–60) years old, and most participants had an average of 12.2 years of education ($sd = 1.7$). At the 3-year follow-up, 67.6% of the sample was Caucasian, 59.8% was female and the mean age was 36.2 ($sd = 8.0$) years (range: 21 to 59). Current MA use in the past month averaged 11.4 ± 9.5 days at baseline, 4.4 ± 7.9 days at discharge, 4.2 ± 8.2 days at 6-month follow-up, 3.4 ± 7.5 days at 12-month follow-up, and 3.7 ± 7.9 days at the 3 year follow-up. Lifetime MA use averaged 7.5 ($sd = 6.0$) years at baseline. Treatment duration for the total sample ranged from 8 to 16 weeks, with retention averaging 6.8 weeks ($sd = 6.0$) and 31.0% completing treatment, regardless of treatment condition.

3.2. Change in Risky Behaviors (Baseline to Treatment Discharge)

Change in HIV risk behavior (injection and unsafe sexual practices) was examined from baseline to treatment discharge. The proportion of the sample who injected MA within the previous 30 days significantly reduced from baseline to treatment discharge (14.6 % to 5.4%, based on a matched baseline to discharge 784 sample). Sub-analysis of high-risk injection practices (injectors only; $n = 128$ from baseline to discharge) showed that high-risk practices were significantly reduced (Table 1). Analyses on sexual risk behavior indicate that high risk sexual practices substantially reduced after treatment participation (baseline to treatment discharge), including sex without condoms in general, with IV users, and with MA users as well as sex while high (Table 2).

3.3. Treatment Impact on Risky Behaviors (Baseline to Treatment Discharge)

We examined the extent to which treatment participation, measured via retention, completion, and treatment condition was associated with a reduction in high-risk HIV practices (injection and unsafe sexual behaviors). Results did not show any significant differences in HIV risk practices (injection or unsafe sexual practices) by treatment condition (Matrix vs. Treatment-as-Usual).

There were significant associations between retention and HIV risk outcomes: for those with retention rates greater than the mean (6.79 weeks) the injection behavior (measured as days of injecting in the past month) dropped substantially from 16.0 days at baseline to 5.6 days at discharge, compared to those with retention rates lower than the mean (16.0 at baseline to 8.92 at discharge). Regression modeling confirm these associations after controlling for sociodemographic factors and MA use (past 30 days) at baseline: there was a substantial reduction in injection behavior for those who stayed in treatment for longer periods of time (Regression Coefficient, $B = -.18$, $p < .05$) as well as for completers (15.8 days at baseline to 1.6 days at discharge) than non-completers (16.1 at baseline to 8.5 at discharge) ($OR = .64$, 95% $CI = .4102201, .9946447$).

In terms of sexual risk behaviors, we found a similar trend - higher retention rates above the mean (6.79 or higher) was associated with reduced risky sexual behaviors (sex risk composite score at baseline mean = 2.32; discharge mean = 1.87, $p < .01$). Similarly, less risky sexual behavior was significantly related to treatment completion among MA users (mean risk behavior completers = 1.6 vs. mean risk behavior non-completers = 2.2, $p < .001$). Regression models, controlling for sociodemographic and MA use in the past month at baseline, confirmed that longer treatment retention ($B = -.043$, $p < .001$) and treatment completion ($B = -.565$, $p < .001$) are significantly associated with less risky behavior based on the sex risk composite score at discharge. Results also indicate that persons using MA more frequently in past month at

discharge were more likely to engage in HIV risk behaviors than those using MA less frequently at discharge ($B = 1.21$, $p < .001$).

3.4. Long-Term Treatment Association on Risky Behaviors: 3-Year Follow-Up

Controlling for treatment participation factors (completion and condition), current MA use in past month, and sociodemographic characteristics, we examined change in HIV risk behaviors at the 3-year follow-up. Results show that injection practices significantly reduced from baseline to the 3 year follow-up (17.1% to 4.4%, on a matched 569 baseline to follow-up sample). Further, analyses indicate that high-risk sexual practices (as measured by sexual risk composite) substantially reduced from baseline to 3-year follow-up: 24.46 ($sd = 14.9$) to the 3-year follow-up 12.75 ($sd = 7.2$) ($p < .05$) (Figure 1).

Linear regression results indicate a significant association between the frequency of MA use at follow-up and HIV risk behavior, such that frequent MA use (in past month) is associated with increased HIV risk behaviors compared to less frequent MA use at follow-up ($B = 3.37$, $p < .001$), controlling for baseline MA use, sociodemographic factors, and treatment factors.

4. Discussion

Results from this paper support previous research showing that treatment for MA dependence appears to be associated with significant reductions in HIV risk behavior. The findings add to the large base of studies, mostly MSM-related, showing that MA use is highly associated with high-risk sexual and drug use practices among a non-identified MSM MA-dependent sample.

Results highlight that treatment participation is important in the reduction of HIV risk behaviors. We found that longer treatment retention and treatment completion were significantly related to greater reductions in risky sexual behavior and injection practices among MA users. Longer retention and completion status was also associated with greater reductions in HIV risk behaviors 3 years after treatment.

These results suggest that successful treatment participation may be an effective approach to decreasing HIV risk injection and unsafe sexual practices among MA-dependent users. Though not available during the MTP interventions, it may be likely that this impact can be increased to an optimal degree if specific HIV risk reduction interventions are integrated into treatment programs for MA users.

This study highlights important areas of clinical concern with regards to the unique risks associated with HIV risk among MA-dependent users. As indicated by the results, participants using MA more frequently were more likely to engage in high risk HIV-related behaviors than those using MA less frequently. Understanding this association can provide clinicians with useful insight for tailoring treatment strategies more appropriately among MA users reporting frequent MA use in conjunction with high risk behaviors.

There are limitations associated with this study. Study findings are limited to self-report and do not provide any detailed information about actual HIV infection rates. Because data are based on self-report, memory or recall of behaviors may be problematic for sexual or injection-related events that occurred during the month prior to the interview. While the data captures reductions in self-reported injection and high risk sexual behaviors, there is no data on the reasons for why such behaviors were stopped; hence there may be other possibilities other than treatment itself that account for such reductions. Our analyses of such factors associated with reductions in sexual behaviors and injection practices are limited to a few variables and thus should be interpreted as simply relational in nature. More data on other variables would obviously contribute to a better understanding of how MA users reduce high-risk behaviors.

Past research indicates that communication about safer sex between partners, HIV-related knowledge, and favorable condom use attitudes are important variables to examine when assessing HIV risk behaviors among drug users (Carey, Carey, Maisto, Gordon, Schroder et al., 2004). Lastly, reductions in HIV risk behavior can only be generalized among individuals more likely to be retained for follow-up interviews.

Overall, this study makes an important contribution to the literature, given the limited information available on HIV risk behaviors among MA users who sought treatment not specific to MSM populations. To extend on this research, future studies can look into integrating specific risk reduction strategies for drug abusing populations into behavioral treatment interventions. For example, one promising approach is to focus on a users "sense of responsibility to protect a partner" by way of engaging in safer practices such as condom use (Ross, Timpson, Williams, Amos, McCurdy, et al., 2007). Preliminary research shows that this strategy serves as an important predictor of HIV-risk reduction behavior among drug using populations.

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Figure 1.
Change in High-Risk Sexual Behavior Composite from Baseline to 3-year Follow-Up (N=569)

Table 1

High-Risk Drug Use Activities - Comparison of Baseline to Discharge (N=128)

	Baseline	Discharge
Mean times inject in past 30 days ***	19.7	7.8
Mean times use dirty needles in past 30 days ***	3.9	0.91
Mean times share cooker, cotton, etc. in past 30 days **	6.5	1.4

*
p<.05**
p<.01***
p<.001

Table 2

High-Risk Sexual Behaviors - Comparison of Baseline to Discharge (N=784)

<i>In past 30 days</i>	Baseline	Discharge
Mean times sex without condoms *	14.7	13.2
Mean times sex w/out condom with IV user **	2.3	1.4
Mean times sex w/out condom with MA user **	6.5	1.4
Mean times sex while high ***	9.1	4.9
Mean times sex w/out condom for trading sex for drugs/money	0.14	0.12
Mean times sex without condom involving anal sex	0.27	0.19

*
p<.05**
p<.01***
p<.001