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Stimulant Use and HIV Disease Management Among Men in Same-Sex Relationships

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Abstract

Background—Research conducted to date has focused primarily on identifying individual-level, psychological determinants of stimulant use and HIV disease management. The present cross-sectional study examined relationship factors as correlates of stimulant use and HIV disease management among men who have sex with men (MSM).

Methods—In total, 266 male couples completed a baseline assessment for a cohort study examining the role of relationship factors in HIV treatment. A computer-based assessment of relationship factors, self-reported alcohol and substance use, and self-reported anti-retroviral therapy (ART) adherence was administered. All HIV-positive participants also provided a blood sample to measure viral load.

Results—After controlling for demographic characteristics and relationship factors, men in a primary relationship with a stimulant-using partner had more than six-fold greater odds of reporting any stimulant use in the past three months. Among HIV-positive participants on ART ($n = 371$), having a stimulant-using partner was independently associated with 67% lower odds of reporting perfect 30-day ART adherence and more than two-fold greater odds of displaying a detectable HIV viral load. In contrast, more partner-level alcohol use was independently associated with greater odds of reporting perfect 3-day ART adherence and lower odds of displaying a detectable HIV viral load.

Conclusions—Partner-level stimulant use is an important risk factor for individual-level stimulant use and difficulties with HIV disease management among MSM. To optimize the

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Conflict of Interest: No conflict declared

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effectiveness of HIV treatment as prevention, clinical research is needed to develop couples-based interventions targeting stimulant use as a potential driver of detectable HIV viral load.

Keywords

Adherence; Cocaine; HIV; Methamphetamine; Treatment as Prevention; Viral Load

1. INTRODUCTION

Early initiation of anti-retroviral therapy (ART) optimizes health outcomes among HIV-positive persons (Cohen et al., 2011), and reductions in HIV viral load among those on ART decrease the likelihood of onward HIV transmission (Montaner et al., 2010). However, HIV-positive persons who use stimulants such as methamphetamine are at greater risk for experiencing difficulties with effectively managing ART regimens that contribute to elevated viral load and potentially faster disease progression (Carrico, 2011; Carrico et al., 2011; Ellis et al., 2003; Hinkin et al., 2007). Because stimulant users are also more likely to engage in HIV transmission risk behavior (Johnson et al., 2008; Morin et al., 2007; Parsons and Bimbi, 2007), higher HIV viral load may facilitate transmission of medication-resistant strains of HIV to uninfected sexual partners (Colfax et al., 2007; Gorbach et al., 2008; Mayer et al., 2013). Taken together, stimulant use has negative implications for both HIV prevention and care.

Social Control Theory has been applied to a range of health contexts (including same-sex male couples with HIV) to delineate the pathways whereby primary relationships may influence health behaviors (Johnson et al., 2012; Lewis and Butterfield, 2005; Lewis and Rook, 1999; Moos, 2007). Specifically, primary partners of individuals who engage in health risk behaviors are theorized to respond with positive or negative tactics to promote behavior change. The potential relevance of social control processes is supported by observations that marital functioning influences health behaviors in studies conducted with heterosexual couples (Kiecolt-Glaser and Newton, 2001). Among HIV-positive men who have sex with men (MSM), markers of greater relationship quality are also associated with better HIV disease management (Johnson et al., 2012). On the other hand, a substance-using primary partner has previously been identified as an important predictor of relapse in heroin users (Shah et al., 2006; Termorshuizen et al., 2005), which may be attributable to more permissive norms regarding heroin use and impaired social control. Informed by Social Control Theory, the goals of the present study with HIV-positive men in same-sex relationships were two-fold: (1) examine if partner-level stimulant use and indicators of poorer perceived relationship quality are associated with greater odds of stimulant use; and (2) determine whether partner-level stimulant use is independently associated with poorer ART adherence and detectable HIV viral load.

2. METHODS

Participants completed the baseline assessment for an interval cohort study examining the role of relationship factors in HIV treatment among HIV-positive men in same-sex relationships (Johnson et al., 2012). Inclusion criteria were as follows: (1) in a relationship for at least three months with someone to whom you feel committed above anyone else and

with whom you have had a sexual relationship (i.e., currently in a “primary” relationship); (2) both partners at least 18 years old, born male and currently identify as male; (3) at least one partner is HIV-positive and on an ART regimen for 30 days or more; (4) English speaking; and (5) able to provide informed consent.

2.1. Procedures

Self-report measures of relationship factors, alcohol and substance use, and ART adherence were completed using audio computer-assisted self-interviewing without the presence of the partner or interviewer. A peripheral venous blood sample was collected from HIV-positive participants. All procedures were approved by the Committee on Human Research at the University of California, San Francisco.

2.2. Measures

2.2.1. Demographics—Age, ethnicity, education, length of current relationship, couple HIV Status (i.e., seroconcordant HIV-positive or serodiscordant), time since HIV diagnosis, time since starting ART, and number of ART pills per day were assessed by questionnaire.

2.2.2. Relationship Factors—Several measures of relationship quality were administered. The 4-item Couples Satisfaction Index (Funk and Rogge, 2007) measured relationship satisfaction (Partner: $M = 15.0$, $SD = 4.3$). Adapted scales from Kurdek (1995) assessed relationship commitment (Partner: $M = 32.5$, $SD = 5.7$), autonomy (Actor: $M = 33.2$, $SD = 8.7$), and intimacy (Actor: $M = 37.7$, $SD = 9.0$). Finally, relationship communication was assessed with a 5-item constructive communication subscale (Christensen and Shenk, 1991; Actor: $M = 33.5$, $SD = 7.6$). All relationship factors displayed adequate internal consistency (i.e., Cronbach’s α range: 0.74–0.93).

2.2.3. Alcohol Use Disorders Identification Test (AUDIT)—The AUDIT is a validated 10-item measure that screens for hazardous alcohol consumption and alcohol use disorders (Saunders et al., 1993).

2.2.4. Stimulant Use—Participants provided separate ratings of how often they used powder cocaine, crack, or methamphetamine in the past three months. Responses ranged from 0 (not at all) to 7 (daily). Participants who reported any stimulant use (1) were compared to those reported no stimulant use (0).

2.2.5. ART Adherence—ART adherence was assessed using two self-report measures. The AIDS Clinical Trials Group (ACTG) measure provides the percentage of ART medications taken over the prior three days (Chesney et al., 2000). The visual analog scale (VAS) measures the proportion of ART medications taken in the past 30 days by asking participants to place an “x” along a line ranging from 0% to 100% (Walsh et al., 2002). Because self-report measures often overestimate ART adherence (Simoni et al., 2006), we chose to compare those who reported 100% ART adherence (1) to participants who reported less than 100% adherence (0).

2.2.6. HIV Viral Load—HIV viral load testing was performed to detect HIV RNA at or above 50 copies/ml (Roche Molecular Systems, Inc.).

2.3. Statistical Analyses

Actor-partner models comprise a dyadic analysis method used to examine the mutual influence that members of dyads have on each other's outcomes (Kenny et al., 2006). To examine correlates of any stimulant use in the past three months, each participant's perceived relationship factors were included as predictors of his own stimulant use (i.e., actor effects). In addition, the stimulant use and perceived relationship factors of the primary partner were included as predictors the actor's stimulant use (i.e., partner effects).

Any stimulant use and all significant relationship factors from our prior research (Johnson et al., 2012) were included for actors and partners in models examining correlates of ART adherence and HIV viral load. Because alcohol use has been consistently associated with poorer ART adherence (Hendershot et al., 2009), the AUDIT scores for the actor and partner were also included as predictors. A HIV-positive partner may also have more opportunities to model behaviors that optimize HIV disease management. Consequently, couple HIV status was examined as a moderator of the associations of actor and partner stimulant use with indices of HIV disease management. Estimation of actor-partner regression models was performed via generalized estimating equations (GEE), with an exchangeable correlation structure and robust standard errors to properly account for correlated outcomes for partners who are members of the same couple. Finally, we examined whether the associations of actor and partner stimulant use with indices of HIV disease management were mediated by relationship factors. The user-written command KHB in Stata 12 was employed to test the significance of indirect effects to determine if mediation was present (Kohler et al., 2011). For all analyses, missing data were minimal (<5%) and listwise deletion was employed.

3. RESULTS

3.1. Demographics

Most of the 532 participants were HIV-positive (78%), Caucasian (56%), middle-aged ($M = 45.8$, $SD = 10.4$) gay or bisexual (98%) men. Participants had been in their current primary relationship for 6.6 ($SD = 6.8$) years on average and most were in HIV-positive seroconcordant relationships (56%). More than one in four participants (29%) reported any stimulant use in the past three months. HIV-positive participants ($N = 414$) had been diagnosed for 13.4 ($SD = 8.0$) years and had been taking ART for 9.6 ($SD = 7.0$) years on average. Most HIV-positive participants were currently prescribed ART (91%). Those on ART were taking a median of three ART pills per day and 50% had a detectable HIV viral load.

3.2. Correlates of Any Stimulant Use

As shown in Table 1, having a stimulant-using partner was independently associated with more than 6-fold greater odds of reporting any stimulant use in the past three months (Adjusted Odds Ratio [AOR] = 6.47, 95% CI = 3.44 – 12.17, $p < .0001$).

3.3. Correlates of ART Adherence and HIV Viral Load

As shown in Table 2, HIV-positive seroconcordant couples had close to seven times the odds of perfect 3-day ART adherence relative to HIV serodiscordant couples, when the partner reported stimulant use (AOR = 6.87; 95% CI = 1.83, 25.73; $p < .01$). In addition, having a stimulant-using partner was independently associated with lower odds of reporting perfect 30-day ART adherence (AOR = 0.33, 95% CI = 0.15 – 0.72; $p < 0.01$) and more than two-fold greater odds of displaying a detectable HIV viral load (AOR = 2.32, 95% CI = 1.42 – 3.80; $p < 0.01$). On the other hand, a higher partner AUDIT score was independently associated with greater odds of reporting perfect 3-day ART adherence (AOR = 1.18, 95% CI = 1.06 – 1.31, $p < .01$) and lower odds of displaying detectable HIV viral load (AOR = 0.94, 95% CI = 0.90 – 0.98, $p < .01$). Mediation analyses indicated that the indirect effects of partner-level stimulant use on ART adherence and detectable viral load via relationship factors were not statistically significant.

4. DISCUSSION

Consistent with adapted Social Control Theory (Lewis and Rook, 1999), the present study observed that having a stimulant-using partner was independently associated with substantially greater odds of engaging in stimulant use. This may be because a stimulant-using partner is less likely to implement social control processes to promote reductions in a risk behavior that is perceived to be normative. Bearing in mind that MSM often use stimulants for sexual enhancement (Green and Halkitis, 2006), a stimulant-using primary partner may also serve as a trigger for using stimulants together as a couple. Although relationship factors were not significantly associated with stimulant use in this study, further research is needed to examine the role of permissive partner norms regarding stimulant use as well as positive and negative tactics implemented to decrease stimulant use among male couples. This could inform efforts to adapt couples-based, substance abuse treatments such as behavioral couples therapy for stimulant-using male couples (O'Farrell and Fals-Stewart, 2000).

This study also is among the first to observe that partner-level stimulant use is independently associated with poorer HIV disease management. It is noteworthy, however, that the associations of partner-level stimulant use with poorer ART adherence and detectable HIV viral load were not mediated by relationship factors. Future longitudinal research should examine if lower concordance of perceived relationship quality, disruption of daily routines, food insecurity, and intimate partner violence mediate the deleterious effects of partner-level stimulant use on poorer HIV disease management (Horvath et al., 2013; Johnson et al., 2012; Pantalone et al., 2010; Weiser et al., 2009). There was also some indication that having a HIV-positive partner buffered against the negative association of partner-level stimulant use with poorer ART adherence. This may be because a HIV-positive primary partner has more opportunities to model behaviors that support ART adherence as a form of positive social control (Lewis and Butterfield, 2005; Lewis and Rook, 1999). This study also replicated prior research with this sample where higher partner-level alcohol use was independently associated with *greater* odds of reporting perfect 3-day ART adherence and *lower* odds of displaying a detectable HIV viral load (Woolf-King et al., 2013). Longitudinal

research is needed to determine if discrepant couple-level patterns of stimulant and alcohol use differentially predict difficulties with HIV disease management.

Findings from this study should be interpreted in context of some important limitations. First, stimulant use was assessed using self-report measures that did not adequately characterize patterns of use, route(s) of administration, or screen for the presence of a stimulant use disorder. Future studies should include more comprehensive assessments of stimulant use and polysubstance use. Second, longitudinal research is needed to determine whether and how partner-level stimulant use may serve as a risk factor for ongoing stimulant use as well as difficulties with HIV disease management. Despite these limitations, findings from this study highlight that interventions targeting stimulant-using male couples could optimize the effectiveness of HIV treatment as prevention.

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Table 1

Correlates of any self-reported stimulant use in the past three months (N = 532)

	AOR (95% CI)
Age	0.97 (0.95, 0.99)*
HIV-Positive	1.11 (0.50, 2.51)
Concordant HIV-positive status	1.01 (0.59, 1.72)
Race/Ethnicity	—
White	—
Black	0.75 (0.39, 1.42)
Latino	0.71 (0.38, 1.34)
Other	1.44 (0.75, 2.76)
College graduate or greater	1.00 (0.62, 1.63)
Income	1.00 (0.92, 1.09)
Years in current primary relationship	0.98 (0.94, 1.01)
Actor's relationship factors	
Satisfaction	0.98 (0.90, 1.06)
Commitment	0.97 (0.92, 1.02)
Autonomy	0.99 (0.97, 1.02)
Intimacy	1.03 (1.00, 1.06)
Communication	0.97 (0.93, 1.00)
Partner's relationship factors	
Satisfaction	1.01 (0.92, 1.11)
Commitment	0.97 (0.93, 1.03)
Autonomy	0.99 (0.96, 1.01)
Intimacy	1.01 (0.98, 1.04)
Communication	1.01 (0.97, 1.04)
Any partner stimulant use (past 3 months)	6.47 (3.44, 12.17)**

* p < .05;

** p < .01

Table 2

Correlates of self-reported ART adherence and HIV viral load (N = 371).

	Perfect ACTG 3-Day Adherence	Perfect VAS 30-Day Adherence	Detectable Viral Load
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Relationship length (years)	0.97 (0.92, 1.03)	1.01 (0.97, 1.05)	0.95 (0.92, 0.99)*
Concordant HIV-positive status	2.76 (1.27, 5.96)**	1.46 (0.80, 2.67)	1.48 (0.91, 2.39)
Actor			
Years on ART	0.99 (0.95, 1.04)	0.92 (0.88, 0.96)**	1.01 (0.98, 1.05)
Autonomy	1.00 (0.96, 1.04)	1.02 (0.99, 1.05)	1.00 (0.97, 1.03)
Intimacy	1.01 (0.97, 1.05)	1.01 (0.98, 1.05)	1.03 (1.00, 1.06)
Communication	0.98 (0.92, 1.05)	1.01 (0.97, 1.05)	0.99 (0.96, 1.02)
AUDIT	0.96 (0.90, 1.02)	0.92 (0.85, 0.98)**	1.04 (1.00, 1.08)
Any Stimulant Use	0.48 (0.22, 1.05)	0.53 (0.26, 1.06)	1.19 (0.75, 1.89)
Partner			
Satisfaction	1.01 (0.92, 1.12)	1.00 (0.91, 1.09)	0.98 (0.91, 1.05)
Commitment	1.03 (0.96, 1.10)	1.03 (0.96, 1.11)	0.99 (0.95, 1.04)
AUDIT	1.18 (1.06, 1.31)**	1.05 (1.00, 1.10)	0.94 (0.90, 0.98)**
Any Stimulant Use	1.05 (0.45, 2.46)	0.33 (0.15, 0.72)**	2.32 (1.42, 3.80)**
Concordant HIV+/Any Stimulant Use	6.87 (1.83, 25.73)** †	—	—
HIV Discordant/Any Stimulant Use	1.11 (0.47, 2.59) †	—	—

ART: Anti-Retroviral Therapy; AUDIT: Alcohol Use Disorders Identification Test

AOR = adjusted odds ratio; CI = confidence interval;

* p < .05,

** p < .01;

† the interaction of couple HIV status and partner's stimulant use is significant at p=.03 in the 3-day adherence model.