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Stimulant use patterns and HIV transmission risk among HIV serodiscordant male couples

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Abstract

Substance use is linked to HIV risk at both the individual and the couple-level. We examined whether stimulant use was associated with condomless anal intercourse (CAI) with primary and outside partners among serodiscordant male couples (*N* = 117 couples). Stimulant use by one partner was associated with a decreased odds of CAI with primary partners (AOR = 0.09, 95% CI: 0.01, 0.89). When both partners reported stimulant use, HIV-negative partners had an increased odds of CAI with outside partners (AOR = 6.68, 95% CI: 1.09, 8.01). Understanding couples' stimulant use in HIV risk is an important area for future research.

INTRODUCTION

Stimulant use plays a critical role in the HIV/AIDS epidemic among men who have sex with men (MSM).[1-3] Stimulant use is associated with increased condomless anal intercourse (CAI), alcohol abuse, and drug use with primary and outside partners.[4,5] Among HIV-positive men, stimulant use is associated with suboptimal antiretroviral adherence and viralogic outcomes.[6,7] Although data indicate that viral suppression and consistent condom use reduce HIV transmission among HIV serdiscordant couples, many couples engage in intradyadic (within couple) CAI,[8-10] and also have CAI with outside partners.[11,12]

Studies suggest that specific relationship dynamics are associated with difficulties in managing HIV risk within the context of partnerships. Longer relationship duration, intimacy, commitment, closeness, and inhibited communication about HIV risk are all associated with engaging in CAI with both primary and outside partners.[10,13-23] Though in its nascence, research has found that substance use may influence sexual agreements and sexual behaviors among MSM couples.[24,25] However, studies have yet to examine the link between stimulant use and CAI among HIV serodiscordant male couples, despite research

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showing that romantic partners influence one another's health behaviors, such as alcohol and illicit drug use. Studies have found high concordance among couples in alcohol use, [26,27] and individuals tend to partner with those who have similar substance use patterns.[27] Social control theory provides a useful framework to understand how individuals employ direct and indirect efforts to influence the health behavior of significant others.[28-30] Social control processes can shape health behaviors indirectly through the internalization of norms. For example, partners may feel an obligation to use because of their partners substance use behaviors. Social control also operates directly when a partner attempts to curtail, regulate, or deter their partner's unhealthy behaviors, and some evidence suggests that direct social control tactics can backfire by creating resistance to engaging in healthy behaviors.[30] The purpose of this study was to assess whether partners' reports of stimulant use were associated with an increased odds of engaging in CAI with primary and outside partners, over and above existing correlates of CAI among serodiscordant male couples.

METHODS

A convenience sample of 117 HIV-serodiscordant male couples completed computer-assisted self-interviews without-the presence of the partner or interviewer, and HIV-positive partners had blood drawn for HIV RNA viral load assays. The detailed methods of this study have been published previously.[26] To be eligible, both partners must have reported each other as their primary partner for at least 3 months, defined as "someone to whom you feel committed above anyone else and with whom you have had a sexual relationship." In addition, participants were: (1) at least 18 years old; (2) born male and identified as male; (3) if HIV-positive, on an acknowledged antiretroviral therapy (ART) regimen for at least 30 days; (4) English speaking; and (5) able to provide informed consent. All procedures were approved by the senior author's Institutional Review Board.

Measures

Demographics—Participants reported their age, sexual identity, race and ethnicity, HIV serostatus, education, and income level. Participants also provided the duration of the primary relationship (in years) and HIV-positive partners reported length of time since HIV diagnosis (in months).

Relationship Quality—Measures of relationship quality were included as covariates. Participants completed the Inclusion of Other In Self Scale (IOS), which assess relationship closeness[27] and a set of adapted scales from Kurdek's [28] work with couples to assess commitment (four items; $\alpha = 0.96$) and intimacy (six items; $\alpha = 0.76$). Constructive communication was assessed with a 5-item subscale adapted from the Constructive Patterns Questionnaire-Short Form ($\alpha = 0.89$).[29]

Alcohol Use—Alcohol use was assessed with the 10-item Alcohol Use Disorders Identification Test (AUDIT),[30] which identifies individuals whose alcohol use places them at risk for the development of alcohol use disorders. The 10 items were summed for a total score ranging from 0 to 40. Participants were scored as "hazardous drinkers" if they had an AUDIT score ≥ 8.[31] Couple-level dichotomous variables were created: (1) couples in which

both partners reported hazardous drinking; (2) couples in which only one partner reported hazardous drinking; and (3) couples in which neither partner reported hazardous drinking.

Stimulant Use—. Participants reported how often they used powder cocaine, crack, or methamphetamine in the past 3 months. Responses ranged from 0 (not at all) to 7 (daily). Each of the stimulant use items were highly positively skewed and thus dichotomized, such that responses were classified into “use” versus “no use.” Couple-level dichotomous variables were created: (1) couples in which both partners reported using stimulants; (2) couples in which only one partner reported using stimulants; and (3) couples in which neither partner reported using stimulants.

Sexual Behavior—Two dichotomous sexual behavior variables were created: (1) CAI with primary partner; and (2) CAI with other partners. CAI was assessed by asking whether the participant engaged in anal sex with his primary partner and outside male partners in the past 3 months (‘‘yes/no’’). Participants were then asked how often condoms were used during anal sex. CAI was coded if the participant reported anal sex and condoms were not used every time.

Statistical Analyses

A logistic regression model was employed to examine the associations between couples’ substance use and CAI with a primary partner because the primary outcome variables exist at the couple-level; that is, both members of the couple share the same value on the outcome. Actor-partner interdependence models (APIM) estimated the associations between couples’ substance use patterns and each partner's reports of engaging in anal sex with outside partners, using a structural equation modeling approach (Kenny et al., 2006). We also assessed associations between couples’ substance use patterns and each partner's reports of engaging in any sexual activity with outside partners. All models were adjusted for age, relationship duration (in months), closeness, intimacy, commitment, and communication, and hazardous drinking (one or both partners). Models containing race/ethnicity, sexual identity, income, and education as additional covariates were also tested and results did not differ substantively; therefore, the models presented are not controlled for these covariates. For each model, we report the adjusted odds ratio (AOR), representing the change in odds of the outcome relative to the reference group per unit change in the independent variable; the 95% CI for the odds ratio; and the p-value testing the null hypothesis that the odds ratio = 1.00 (i.e., the null hypothesis of no association). All analyses were conducted in Mplus 6.1.[32]

RESULTS

The sample's mean age was 46.70 years (*SD* = 10.96). In total, 16.8% of the men identified as Latino and 11.6% as Black. Slightly less than half (40.5%) reported earning less than $20,000 annually, and 92.0% of the sample self-identified as gay, 6.0% as bisexual, and 2.0% as “other.” The mean time since HIV diagnosis was 13.54 years (*SD* = 8.01) and relationship length was 7.53 years (*SD* = 7.80). Of the HIV-positive partners, 73 (62.9%) had an undetectable viral load.

Approximately 27% (*n* = 32 men) of the HIV-positive partners and 23% (*n* = 27 men) of the HIV-negative partners reported stimulant use in the past 3 months. In total, 21% (*n* = 25 men) of HIV-positive partners and 20% (*n* = 23 men) of the HIV-negative partners screened positive for hazardous drinking. In regards to couple substance use partners, approximately 10% (*n* = 15) of the couples consistent of both members reporting stimulant use and one-quarter of the couples consisted of only one partner reporting stimulants use (*n* = 29 couples; 17 HIV-positive men and 12 HIV-negative men). Similar patterns emerged for drinking patterns. In one in ten couples, both partners reported hazardous drinking (*n* = 10), and in one quarter of the couples, one partner reported hazardous drinking (*n* = 28). In regards to the co-occurrence of stimulant use and drinking, half of the couples who screened positive for hazardous drinking consisted of both couple members reporting stimulant use and 20% had one partner who reported stimulant use.

As shown in Table 1, a logistic regression model was conducted to examine CAI with primary partners. Couples in which one partner reported stimulant use were less likely to report intradyadic CAI (AOR = 0.09, 95%CI: 0.01, 0.89, $p < 0.05$). HIV-positive partners' age was negatively associated with reporting CAI (AOR = 0.92, 95%CI: 0.86, 0.99, $p < 0.05$). No other variables were associated with CAI with primary partners.

Among couples in which both partners reported using stimulants (Table 2), the HIV-negative partner was more likely to report CAI with outside partners, compared to couples in which neither partner reported stimulant use (AOR = 6.68, 95%CI: 1.09, 8.01, $p < 0.05$). With regards to covariates, age was negatively associated with CAI with outside partners for HIV-positive men (AOR = 0.93, 95%CI: 0.86, 0.99, $p < 0.05$) and age was positively associated with CAI with outside partners for HIV-negative men (AOR = 1.14, 95% CI: 1.00, 1.31, $p < 0.05$). No other variables were associated with CAI with outside partners. Neither couples' stimulant nor alcohol use were associated with engaging in sexual activity with outside partners (data not shown).

DISCUSSION

Results highlight the complex relationship between substance use and sexual behavior in male couples. HIV-negative men in couples in which both partners reported stimulant use were more likely to report CAI with outside partners. However, when only one partner reported stimulant use, there was a decrease in the likelihood of reporting CAI with one's primary partner.

HIV serodiscordant couples have described HIV transmission concerns as a source of stress that influences their relationship functioning and psychological well-being.[20,33] Condom use may be a reminder of a couple's serodiscordant status[10] while stimulant use may be a way to cope with HIV-related stressors within the relationship.[34] Similarity in substance use patterns between romantic partners has been associated with positive relationship functioning, compared to couples whose substance use is dissimilar.[35,36] Thus, couples in which one partner uses stimulants may be at greater risk for relationship problems because of substance use related conflict.[37] This may inhibit engaging in CAI, but may also have a

detrimental impact on relationship quality. Future research is warranted to understand reasons for substance use (e.g., recreational or avoidance coping).

MSM may use stimulants for sexual enhancement,[38] and romantic partners have a profound influence on each other's behaviors.[39] When both partners use stimulants, they may be less likely to engage in direct or indirect social control processes that promote risk reductions in sexual behavior. As such, couples with partners who both use stimulants may be less likely to have norms that promote reductions in stimulant use, alcohol use, and condomless sex. These partners may also directly encourage or not deter each other's substance use behaviors. Additional research is needed to examine the role of social control tactics in substance use among male couples to reduce HIV transmission risk.

There are several limitations to the present study. First, the study relied on a convenience sample recruited in the San Francisco Bay Area where there have been tremendous efforts to ensure HIV-positive adults are connected to care. Second, all of the HIV-positive partners were prescribed an ART medication regimen, which means that these findings may not be generalizable to couples who don't have access to care. Third, we did not assess whether HIV-negative men were taking pre-exposure prophylaxis (PrEP), which mitigates the risk of CAI. Fourth, only 13% of the couples reported any CAI and only 9 men reported any discordant CAI with outside partners. Of the couples who reported engaging in CAI with their main partner, five couples consisted of only the HIV-positive partner reporting stimulant use and two in which only the HIV-negative partner reporting stimulant use. The current sample was sufficient to support the analyses conducted; however, the sample size was not sufficient to examine differences by partner serostatus in stimulant patterns and CAI or couples who engaged in CAI with their primary partner when the HIV-positive partner had a detectable versus undetectable viral load, or by discordant CAI. In addition, the majority of men did not report stimulant use, which limited our ability to examine how differences in frequency of use are associated with HIV transmission risk. This cross-sectional study used self-report methods that may have been subject to recall error and social desirability bias, although ACASI technology was employed to minimize these biases. Finally, the men in the study were predominantly white and in their forties, which may be different from younger cohorts and men of color. These results are best viewed as broadly supporting future research on the need to attend to serodiscordant male couples' stimulant use patterns in understanding HIV transmission risk.

This study provides support for the inclusion of stimulant use assessment and treatment in couples-based HIV prevention. To the extent that stimulant use increases CAI with outside partners for HIV-negative men and decreases ART adherence among male couples, [6,38-40] the effectiveness of biomedical strategies, may be enhanced by addressing couples' substance use.[40]

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Table 1

Correlates of Intradyadic Condomless Anal Sex with Main Partner (N = 117 couples)

	AOR	95% CI	*P* value
Stimulant Use			
Both partners use	0.90	0.13, 6.45	0.919
One partner uses	0.09*	0.01, 0.89	0.039
Neither partner uses	--	--	--
Alcohol Use			
Both partners hazardous	0.35	0.04, 2.74	0.315
One partner hazardous	0.55	0.13, 2.46	0.438
Neither partner hazardous	--	--	--
Age			
HIV-positive partner	0.92*	0.86, 0.99	0.031
HIV-negative partner	0.94	0.88, 1.01	0.097
Closeness			
HIV-positive partner	1.06	0.63, 1.78	0.832
HIV-negative partner	1.23	0.74, 2.06	0.423
Intimacy			
HIV-positive partner	0.98	0.91, 1.07	0.677
HIV-negative partner	0.95	0.88, 1.03	0.234
Commitment			
HIV-positive partner	1.05	0.91, 1.21	0.509
HIV-negative partner	1.10	0.96, 1.26	0.511
Communication			
HIV-positive partner	1.11	0.94, 1.30	0.509
HIV-negative partner	0.95	0.82, 1.10	0.511
Relationship length[a]	0.99	0.98, 1.00	0.191
Detectable Viral Load	0.95	0.88, 1.02	0.141

Notes:

* $p < 0.05$

[a] Relationship duration is a couple-level variable, the mean of self-reported relationship length by both partners.

Table 2

Correlates of condomless anal sex with outside partners (N = 117 couples)

	HIV-positive partner			HIV-negative partner		
	AOR	**95% CI**	***P* value**	**AOR**	**95% CI**	***P* value**
Stimulant Use						
Both partners use	0.56	0.05, 6.50	0.944	6.68*	1.09, 8.01	0.044
One partner uses	0.80	0.24, 2.69	0.840	0.88	0.25, 2.94	0.840
Neither partner uses	--	--	--	--	--	--
Alcohol Use						
Both partners hazardous	0.91	0.08, 7.44	0.645	2.30	0.12, 7.85	0.585
One partner hazardous	0.88	0.25, 3.09	0.716	0.80	0.27, 2.69	0.933
Neither partner hazardous	--	--	--	--	--	--
Age						
Actor	1.03	0.97, 1.10	0.323	0.92	0.84, 1.02	0.099
Partner	0.93*	0.86, 0.99	0.025	1.14	1.00, 1.31	0.049
Closeness						
Actor	0.74	0.42, 1.28	0.279	0.97	0.22,4.24	0.963
Partner	1.58	0.86, 2.89	0.139	0.54	0.10, 3.02	0.482
Intimacy						
Actor	0.98	0.90, 1.07	0.671	1.00	0.86, 1.16	0.972
Partner	1.04	0.95, 1.13	0.428	0.97	0.84, 1.12	0.679
Commitment						
Actor	0.95	0.83, 1.09	0.457	0.87	070, 1.10	0.242
Partner	0.97	0.87, 1.09	0.612	1.10	0.81, 1.48	0.551
Communication						
Actor	1.00	0.89, 1.13	0.951	1.28	0.88, 1.84	0.193
Partner	0.94	0.79, 1.11	0.449	0.87	0.70, 1.08	0.196
Relationship length[a]	1.00	1.00, 1.02	0.083	0.99	0.97, 1.02	0.513

Notes:

* $p < 0.05$

[a] Relationship duration is a couple-level variable, the mean of self-reported relationship length by both partners.