Published in final edited form as:

AIDS Care. 2013 May ; 25(5): 559–565. doi:10.1080/09540121.2012.720363.

ALCOHOL USE PREDICTS SEXUAL RISK BEHAVIOR WITH HIV-NEGATIVE OR PARTNERS OF UNKNOWN STATUS AMONG YOUNG HIV-POSITIVE MEN WHO HAVE SEX WITH MEN

Douglas Bruce, Shoshana Kahana, Gary W. Harper, M. Isabel Fernández, and the ATN

Abstract

Although the relationship between substance use and heightened sexual risk behaviors have been documented in samples of young men who have sex with men (YMSM) and HIV-positive adult MSM, there is a dearth of research on the role of substance use in the sexual risk behaviors of HIV-positive YMSM. We examined associations between alcohol and other drug use with sexual risk behaviors among a sample of HIV-positive YMSM (N=200). There were no significant predictors of either receptive or insertive unprotected anal intercourse (UAI) with HIV-positive partners among the substance use variables. Failure to use a condom after drinking alcohol ($\beta=2.00$, $p<.01$) was significantly associated with insertive UAI with HIV-negative partners or partners of unknown status. Failure to use a condom after drinking alcohol ($\beta=1.36$, $p<.05$) and age ($\beta=0.35$, $p<.05$) were significantly associated with receptive UAI with HIV-negative partners or partners of unknown status. Findings from this paper underscore the role of alcohol in facilitating unprotected anal intercourse among HIV-positive YMSM and their HIV-negative and status-unknown partners.

Introduction

With HIV incidence rising among young men who have sex with men (YMSM; Prejean et al., 2011; CDC, 2010), particularly African Americans, secondary prevention efforts take on increasing significance. One factor associated with both the initial acquisition and subsequent transmission of HIV through unprotected sexual activity is drug and alcohol use. Although, the relationship between substance use and heightened sexual risk behaviors (typically defined as not using condoms and/or having multiple sexual partners) have been documented in samples of YMSM (Celentano et al., 2006; Mustanski, 2008; Mutchler et al., 2011) and HIV-positive adult MSM (Parsons, Kutnick, Halkitis, Punzalan, & Carboni, 2005; Purcell, Parsons, Halkitis, Mizuno & Woods, 2001; Purcell, Moss, Remein, Woods & Parsons, 2005), there is a dearth of research on the role of substance use in the sexual risk behaviors of HIV-positive YMSM.

The extant literature on substance use and sexual risk among HIV-positive YMSM has been somewhat equivocal, with one study suggesting that alcohol and/or other drug use was not associated with condom use during last oral or anal intercourse (Phillips et al., 2011). Another study (Vandevanter et al. 2011) reported that alcohol and other substance use was related to unprotected sex among Black and Latino HIV-positive YMSM, with participants endorsing that substance use altered judgment about engaging in high-risk sexual behaviors, specifically increasing and enhancing sexual desire, lowering inhibitions, and allowing an escape from responsibility. This brief report examines associations between alcohol and other drug use with sexual risk behaviors among HIV-positive YMSM.

Methods

This study constitutes a post-hoc analysis of survey data collected as part of a mixed methods study of 200 YMSM living with HIV/AIDS recruited from 14 clinical sites within the Adolescent Medicine Trials Network for HIV/AIDS Interventions (ATN). Study design and procedures have been published elsewhere (XXX). The study obtained a Certificate of Confidentiality from the U.S. Department of Health and Human Services in order to assure subject research data safety, and the research protocol was approved by the IRBs at all participating sites.

Measures

Frequency of alcohol use and marijuana use during the past 90 days was assessed using the following categories: daily, weekly but not daily, monthly but not weekly, less than monthly. Hard drug use was assessed by any cocaine, methamphetamine, or ecstasy use during the past 90 days ("yes"/"no"). Number of drinks on a typical drinking occasion was also assessed.

Sexual risk behavior during the past 90 days was assessed across four types of unprotected anal intercourse (UAI): (1) any insertive UAI with male HIV-negative partner(s) or partner(s) of unknown status, (2) any receptive UAI with male HIV-negative partner(s) or partner(s) of unknown status, (3) any insertive UAI with male HIV-positive partner(s), and (4) any receptive UAI with male HIV-positive partner(s).

Participants were also asked if they had failed to use a condom during UAI in the past 90 days despite original intentions to do so after (a) drinking alcohol (b) smoking marijuana, or (c) using a hard drug.

Data Analysis

Alcohol and marijuana use frequency categories in Table 1 were collapsed in the following ways: at least weekly alcohol use ("yes"/"no"), at least weekly marijuana use ("yes"/"no"). We conducted bivariate correlation analysis of the UAI outcome variables, the collapsed substance use frequency variables, substance use-and-condom variables, and selected participant characteristics (age, race/ethnicity, sexual orientation, education, employment, being on antiretroviral therapy). Substance use and substance use-and-condom variables that approached statistical significance with the UAI variables in the correlational analysis ($p < .20$) were entered into logistic regression equations while controlling for demographic variables to determine significant predictors of the four UAI outcome variables. All data were examined for non-normality.

Results

Sample characteristics

Demographic characteristics of the study participants have been reported elsewhere (Bruce, Harper, Suleta, & the ATN, 2012; Harper, Fernández, Bruce, Hosek, Jacobs, & the ATN, 2011). The sample (N=200) was predominately African American (66%) and Latino/Hispanic (18.5%), identified as gay (78%) or bisexual (12%), with a mean age of 21.15 years and a mean time since HIV diagnosis of 28.5 months. Over half the sample (54.5%) reported being unemployed, 26.% had not completed high school, 37% had graduated from high school and an additional 31% were currently in college or had completed some college or technical college courses. Less than half (47.5%) reported currently being on antiretroviral therapy (ART).

Substance Use and Sexual Risk Behavior

During the past 90 days, 81% of participants drank alcohol, 59% smoked marijuana, and 24% had used cocaine, methamphetamine or ecstasy. Participants tended to report more frequent marijuana use than alcohol use, with 23% reporting daily marijuana use compared to 2% reporting daily alcohol use, and almost 40% reporting at least weekly marijuana use compared to slightly more than one-quarter reporting at least weekly alcohol use. The majority of alcohol drinkers reported drinking between 1–4 drinks per typical drinking occasion.

More participants reported any anal intercourse with HIV-negative or status-unknown male partners (64.5%) than with HIV-positive male partners (40.5%) in the past 90 days. Proportions of participants engaging in unprotected anal intercourse (UAI) were relatively similar across partner type or type of UAI (receptive or insertive), ranging from 20.5% reporting insertive UAI and 22.5% reporting receptive UAI with HIV-negative or status-unknown partners to 21.5% reporting insertive UAI and 21.0% reporting receptive UAI with HIV-positive partners.

Participants stating they had failed to use a condom after engaging in substance use despite initial intention to use condoms ranged from 5.5% after any hard drug use to 14.5% after alcohol use. Substance use and sexual risk behavior variables are summarized in Table 1.

Regression Analyses

Correlation analysis is reported in Table 2. Sequential logistic regression equations were employed to determine significant predictors of the four UAI outcome variables. In the first step, we controlled for demographic variables that had approached statistical significance with the UAI outcome variables in the correlational analysis ($p < .20$). In the second step, we entered substance use variables that had approached statistical significance in the correlational analysis. There were no significant predictors of either receptive or insertive UAI with HIV-positive partners in the final regression models.

Table 3 presents the final regression models for UAI with HIV-negative or unknown status partners. Model 1 statistically predicted insertive UAI with HIV-negative partners or partners of unknown status ($\chi^2 = 27.51$, $df = 4$, $p < .001$). Failure to use a condom after drinking alcohol ($\beta = 2.00$, $p < .01$) was significantly associated with insertive UAI with HIV-negative partners or partners of unknown status.

Model 2 statistically predicted receptive UAI with HIV-negative partners or partners of unknown status ($\chi^2 = 16.75$, $df = 3$, $p < .001$). Failure to use a condom after drinking alcohol ($\beta = 1.36$, $p < .05$) and age ($\beta = 0.35$, $p < .05$) were significantly associated with receptive UAI with HIV-negative partners or partners of unknown status.

Discussion

Findings from this paper underscore the role of alcohol in facilitating unprotected anal intercourse among HIV-positive YMSM and their HIV-negative and status-unknown partners. Although frequency of alcohol use among the sample was considerably less than that reported in studies of HIV-positive adult MSM (Purcell, et al., 2001), the failure to use a condom after drinking was the most significant predictor of both insertive and receptive UAI with HIV-negative and status-unknown partners. It is worth highlighting that no substance use variable in our sample was related to UAI with HIV-positive male partners. Previous analyses of this sample investigating associations between risk reduction beliefs and UAI found significant associations between serosorting beliefs and viral load beliefs with UAI with HIV-positive male partners (Bruce, Harper, Suleta, & the ATN, 2012). The findings in

this paper when coupled with our previous research suggest that while HIV-positive YMSM may intentionally engage in UAI with HIV-positive partners based on their endorsement of certain risk reduction beliefs, intention to use condoms with HIV-negative or status-unknown partners may be mitigated by situational alcohol use.

Alcohol use reported in this study was substantially lower than in national samples of emerging adults (Johnson, O'Malley, Bachman, & Schulenberg, 2010), and past 90-day hard drug use was lower than in previous studies of gay male emerging adults in the U.S. (Kipke et al., 2007; Thiede et al., 2003). Conversely, marijuana use reported in this study greatly exceeds that of national samples of emerging adults and previous studies on LGB emerging adults (Johnson, et al., 2010), although the marijuana use variables did not display significant effects on the sexual risk measures in the regression analyses. Also, our sample was drawn from sites participating in the ATN, and as a result could have had access to a number of risk reduction programs that may be tested or implemented at such sites; therefore, the risk behaviors reported by our participants might be expected to be lower than those in the wider population of HIV-positive YMSM.

Our findings regarding high rates of UAI among alcohol using HIV-positive YMSM with HIV-neg/unknown partners are consistent with those reported previously on HIV-positive adult MSM, although we found no association between UAI and hard drugs as had been described in previous studies with HIV-positive adult MSM (Purcell, et al., 2001; Purcell, et al., 2005). Previous studies of MSM have shown sex under the influence of alcohol to be a strong predictor of UAI with status-unknown partners (Ekstrand, Stall, Paul, Osmond, Coates, 1999). Perhaps because of its relatively easy access or the social acceptability of its use, alcohol may serve as a prime disinhibiting substance for this age group compared to older HIV-positive MSM.

Underlying mechanisms that have been proposed to explain the use of alcohol in unprotected or risky sexual contexts include sensation seeking (Newcomb, Clerkin, & Mustanski, 2011), alcohol expectancies (i.e., positive or negative beliefs about the consequences of using alcohol; Maisto, Palfai, Venable, Heath, Woolf-King, 2011) or alcohol myopia (Steele & Josephs, 1991) in which alcohol intoxication induces a focus on the most salient cues (intimacy, immediate pleasure) in the environment with less salient cues (safer sex) requiring additional cognition. These models may help to refine our understanding of the cognitive and decision-making factors, including coping and avoidance of HIV status, which HIV-positive YMSM engage in regarding their sexual practices, particularly while under the influence of alcohol. In addition, further research also needs to more fully investigate the interaction of individual factors (e.g., alcohol expectancies) and situational factors, including drinking venue, type of sexual partner (e.g., known or causal), and setting in which sexual encounters occur among HIV+ YMSM who use alcohol. Work by Wilson et al. (2008) and Grov et al. (2011) have identified important situational or event-level factors, such as venue where sexual partner was met or setting in which first sexual encounter occurred, that are important predictors for sexual risk behavior and lack of HIV disclosure, respectively, among adult MSM.

The findings from this paper must be interpreted in light of several limitations. The current sample focused on HIV-positive YMSM who were engaged in care, and thus might not generalize to all HIV-positive YMSM. Additionally, though our findings focus on the primary relationship between alcohol and UAI with HIV-negative or status-unknown partners, the relationship between UAI after alcohol use and UAI after marijuana use was highly collinear. Thus, many of our findings likely apply to marijuana use as well, although UAI after marijuana use fell out of the regression analyses when UAI after alcohol was included. Also, the relatively large standard error and wide confidence interval exhibited by

the UAI after alcohol use variable as a predictor in the logistic regression models implies uncertainty in the estimation of its overall effect, and a more sensitive measure of alcohol-influenced condom use might have resulted in a more specific estimation.

In summary, our findings have clinical implications for the minimization of sexual risk practices for HIV-positive YMSM who are under the influence of alcohol. Successful interventions will need to directly target cognitions and beliefs related to sexual risk, alcohol use and overall health behaviors as well as to help youth identify broader situational factors which may lead to high-risk behavior.

Acknowledgments

The Adolescent Medicine Trials Network for HIV/AIDS Interventions (ATN) is funded by grant Nos. 5 U01 HD 40533 and 5 U01 HD 40474 from the National Institutes of Health through the National Institute of Child Health and Human Development (Bill Kapogiannis, MD) with supplemental funding from the National Institutes of Drug Abuse (Nicolette Borek, PhD) and Mental Health (Susannah Allison, PhD). Additional funding from the National Institute of Mental Health under grant K01MH089838 aided in the development of this paper. We would like to thank the principal investigators and site coordinators at the clinical sites within the ATN who recruited the participants for this study. ATN070 was scientifically reviewed by the ATN's Behavioral Leadership Group. We would also like to thank individuals from the ATN Data and Operations Center (Westat) including Julie Davidson, MSN and Jacqueline Loeb, MBA; and individuals from the ATN Coordinating Center at the University of Alabama at Birmingham including Craig Wilson, MD; Cindy Partlow, MEd; and Marcia Berck, BA. Additionally, we would like to acknowledge the thoughtful input given by participants of our national and local Youth Community Advisory Boards. Finally, our deep gratitude goes to the participants in this study whose thoughtful input made this study possible.

The views and opinions expressed in this report are those of the authors and should not be construed to represent the views of NIDA or any of the sponsoring organizations, agencies, or the U.S. government.

References

- Bruce D, Harper GW, Suleta K. the ATN. Sexual risk behavior and risk reduction beliefs among HIV-positive young men who have sex with men. *AIDS and Behavior*. 2012 first published on February 15, 2012. 10.1007/s10461-012-0155-8
- Celentano DD, Valleroy LA, Sifakis F, MacKellar DA, Hylton J, et al. Associations between substance use and sexual risk among very young men who have sex with men. *Sexually Transmitted Diseases*. 2006; 33:265–271. [PubMed: 16434886]
- Centers for Disease Control and Prevention. HIV surveillance report, 2008. Vol. 20. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2010. Available: <http://www.cdc.gov/hiv/surveillance/resources/reports/2008report/index.htm>
- Ekstrand M, Stall R, Paul J, Osmond D, Coates T. Gay men report high rates of unprotected anal sex with partners of unknown or discordant HIV status. *AIDS*. 1999; 13:1525–33. [PubMed: 10465077]
- Grov C, Hirshfield S, Remien RH, Humberstone M, Chiasson MA. Exploring the Venue's Role in Risky Sexual Behavior Among Gay and Bisexual Men: An Event-Level Analysis from a National Online Survey in the U.S. *Archives of Sexual Behavior*. 2011 first published online October 20, 2011. 10.1007/s10508-011-9854-x
- Harper GW, Fernández MI, Bruce D, Hosek SG, Jacobs RJ. the ATN. The role of multiple identities in engagement in care among gay/bisexual male adolescents living with HIV. *AIDS and Behavior*. 2011 first published on October 31, 2011. 10.1007/s10461-011-0071-3
- Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. Secondary school students (NIH Publication No 10-7584). Vol. I. Bethesda, MD: National Institute on Drug Abuse; 2010. Monitoring the Future national survey results on drug use, 1975–2009.
- Kipke MD, Weiss G, Ramirez M, Dorey F, Ritt-Olson A, Iverson E, Ford W. Club drug use in Los Angeles among young men who have sex with men. *Substance Use and Misuse*. 2007; 42(11): 1723–1743. [PubMed: 17934992]

- Maisto SA, Palfai T, Vanable PA, Heath J, Woolf-King SE. The effects of alcohol and sexual arousal on determinants of sexual risk in men who have sex with men. *AIDS and Behavior*. 2011;10.1007/s10508-011-9846-x
- Mustanski B. Moderating effects of age on the alcohol and sexual risk taking association: an online daily diary study of men who have sex with men. *AIDS and Behavior*. 2008; 12:118–126. [PubMed: 18034298]
- Mutchler MG, McKay T, Candelario N, Liu H, Stackhouse B, et al. Sex drugs, peer connections, and HIV: Use and risk among African American, Latino, and Multiracial young men who have sex with men (YMSM) in Los Angeles and New York. *Journal of Gay & Lesbian Social Services*. 2011; 23(2):271–295. [PubMed: 21731406]
- Newcomb ME, Clerkin EM, Mustanski B. Sensation seeking moderates the effects of alcohol and drug use prior to sex on sexual risk in young men who have sex with men. *AIDS and Behavior*. 2011; 15(3):565–575. [PubMed: 20960048]
- Parsons JT, Kutnick AH, Halkitis PN, Punzalan JC, Carboni JP. Sexual risk behaviors and substance use among alcohol abusing HIV-positive men who have sex with men. *Journal of Psychoactive Drugs*. 2005; 37(1):27–36. [PubMed: 15916249]
- Purcell DW, Moss S, Remein RH, Woods WJ, Parsons JT. Illicit substance use, sexual risk, and HIV positive gay and bisexual men: Differences by serostatus of casual partners. *AIDS*. 2005; 19(suppl 1):S37–S47. [PubMed: 15838193]
- Purcell DW, Parsons JT, Halkitis PN, Mizuno Y, Woods WJ. Substance use and sexual transmission risk behavior of HIV-positive men who have sex with men. *Journal of Substance Abuse*. 2001; 13(1–2):185–200. [PubMed: 11547619]
- Phillips G, Outlaw AY, Hightow-Weidman LB, Jones KC, Wohl AR, et al. Sexual behaviors of racial/ethnic minority young men who have sex with men. *AIDS Patient Care & STDs*. 2011 Aug; 25(Suppl 1):S47–53. [PubMed: 21682587]
- Prejean J, Song R, Hernandez A, Ziebell R, Green T, et al. Estimated HIV incidence in the United States, 2006–2009. *PLoS One*. 2011; 6(8):e17502. [PubMed: 21826193]
- Steele CM, Josephs RA. Alcohol myopia: Its prized and dangerous effects. *American Psychologist*. 1991; 45(8):921–933. [PubMed: 2221564]
- Thiede H, Valleroy LA, MacKellar DA, Celentano DD, Ford WL, Hagan H, et al. Regional patterns and correlates of substance use among young men who have sex with men in 7 U.S. urban areas. *American Journal of Public Health*. 2003; 93(11):1915–1921. [PubMed: 14600066]
- VanDevanter N, Duncan A, Burrell-Piggott T, Bleakley A, Birnbaum J, et al. The influence of substance use, social sexual environment, psychosocial factors, and partner characteristics on high-risk sexual behavior among young Black and Latino men who have sex with men living with HIV: A qualitative study. *AIDS Patient Care & STDs*. 2011; 25(2):113–121. [PubMed: 21235387]
- Wilson PA, Cook S, McGaskey J, Rowe M, Dennis N. Situational predictors of sexual risk episodes among men with HIV who have sex with men. *Sexually Transmitted Infections*. 2008; 84:506–8. [PubMed: 19028956]

Table 1

Substance Use and Sexual Risk Behavior (N=200)

	n	%
Alcohol use, past 90 days		
Have never drank alcohol	14	7.0
Haven't drank alcohol in past 90 days	24	12.0
Once a month or less	66	33.0
More than once a month, less than weekly	45	22.5
At least weekly, not daily	49	24.5
Daily	2	1.0
Number of drinks on typical drinking occasion		
Have never drank alcohol	14	7.0
1–2	85	42.5
3–4	68	34.0
5–6	17	8.5
7–9	10	5.0
10 or more	6	3.0
Marijuana use, past 90 days		
Have never smoked marijuana	51	25.5
Haven't smoked marijuana in past 90 days	31	15.5
Once a month or less	23	11.5
More than once a month, less than weekly	17	8.5
At least weekly, not daily	32	16.0
Daily	46	23.0
Hard drug use, past 90 days		
Any cocaine use	27	13.5
Any methamphetamine use	21	10.5
Any ecstasy use	34	17.0
Any cocaine, methamphetamine, or ecstasy use	48	24.0
UAI after drinking alcohol despite intention to use condom, past 90 days	29	14.5
UAI after smoking marijuana despite intention to use condom, past 90 days	18	9.0
UAI after using hard drugs despite intention to use condom, past 90 days	11	5.5
Any HIV-negative or unknown status anal intercourse partners	129	64.5
Any HIV-positive anal intercourse partners	81	40.5
Insertive UAI with HIV-negative or unknown status partners, past 90 days	41	20.5
Receptive UAI with HIV-negative or unknown status partners, past 90 days	45	22.5
Insertive UAI with HIV-positive partners, past 90 days	43	21.5
Receptive UAI with HIV-positive partners, past 90 days	42	21.0

Table 2

Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Insert UAI with HIV -	---															
2 Recept UAI with HIV -	.52**	---														
3 Insert UAI with HIV +	.27	.37**	---													
4 Recept UAI with HIV +	.09	.43**	.52**	---												
5 UAI after Alcohol	.39**	.28**	.09	.11	---											
6 UAI after Marijuana	.36**	.27**	.14	.23	.46**	---										
7 UAI after Hard Drugs	.23	.17	-.05	-.01	.33**	.21	---									
8 Typical# Drinks	.08	.26**	.03	.26*	-.05	-.01	.05	---								
9 Weekly Alcohol Use	.10	.16	.06	.19	.00	.01	.00	.23**	---							
10 Weekly Marijuana Use	.15	-.10	-.14	-.09	.06	.15	.05	.07	.05	---						
11 Any Coke, Meth, X	.18*	.14	.11	.19	.05	.06	.22	.21**	.22**	.26**	---					
12 Race/Ethnicity	-.04	.02	-.11	.07	-.08	-.04	.01	.08	-.05	-.05	-.05	---				
13 Sexual Orientation	.22*	-.02	-.06	-.19	.07	-.06	-.06	-.08	-.04	-.04	-.04	.14*	---			
14 Age	.14	.24**	.27*	.10	-.03	.03	-.02	.09	.24*	-.05	.26*	-.04	.04	---		
15 Employment	.04	.18*	.19	-.12	.08	.09	-.11	-.09	.019	-.24**	-.11	.03	.08	.18**	---	
15 On ART	-.08	-.04	.03	.09	.10	.09	-.14	-.01	.08	-.02	-.04	-.07	.04	.02	-.15*	---
17 Education	.02	.02	-.05	-.12	.10	-.08	-.10	-.15*	.12	-.18	-.09	-.06	.06	.25**	.33**	.13

* p<.05

** p<.01

Regression Models

[illegible]