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Problem drinking is associated with increased prevalence of sexual risk behaviors among men who have sex with men (MSM) in Lima, Peru

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Abstract

Background—Alcohol use is an important but understudied HIV risk factor among men who have sex with men (MSM), particularly in Latin America. We studied the relationship between problem drinking and sexual risk among MSM in Lima, Peru.

Methods—We recruited 718 participants from 24 neighborhoods for a study on sexually transmitted infections and community-building among MSM. Multivariate analysis was used to identify factors independently associated with problem drinking, which was defined via the CAGE Questionnaire.

Results—Of 718 participants, 58% met criteria for problem drinking. In univariate analysis, problem drinkers were significantly more likely to report failing to always use condoms, use alcohol or drugs prior to their most recent sexual encounter, report a history of sexual coercion and to engage in transactional sex. Problem drinkers also reported significantly higher numbers of recent and lifetime sexual partners. In multivariate analysis, factors independently associated with problem drinking included a history of sexual coercion [OR 1.8 95%, CI 1.2–2.6], having consumed alcohol prior to the most recent sexual encounter [OR 2.1 95%, CI 1.5–2.9], receiving compensation for sex in the last six months [OR 1.6, 95% CI 1.1–2.2] or having reported a prior HIV+ test [OR 0.5, 95% CI 0.2–0.9].

Discussion—We found a high prevalence of problem drinking among MSM in Lima, Peru, which was associated with increased sexual risk in our study. Of note, individuals who were

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Contributors

RG Deiss wrote the first draft of the manuscript and conducted all data analysis for the paper. JL Clark and KE Konda reviewed the manuscript and assisted in the design of the trial. SL Leon was the Study Coordinator and reviewed the manuscript. JD Klausner reviewed the manuscript and provided suggestions for revision. CE Caceres was the Site Investigator and TJ Coates served as Principal Investigator for the study. All authors contributed to and have approved the final manuscript.

Conflict of interest

The authors report no conflicts of interest.

already HIV-infected were less likely to be problem drinkers. Further studies and targeted interventions to reduce problem drinking among MSM are warranted.

Keywords

Alcohol; HIV; Sexual risk; Men who have sex with men (MSM); Sexually transmitted infection; Latin America; Peru; CAGE questionnaire

1. Introduction

The association between alcohol use and sexual risk behavior is well-known, and many recent studies have sought to delineate this relationship (Cook and Clark, 2005; Weinhardt and Carey, 2000). As a psychogenic substance, alcohol increases risk behavior through impairment of decision-making, disinhibition of personality characteristics and alteration of expectations with respect to sexual encounters (Cook and Clark, 2005). Among men in sub-Saharan Africa, qualitative research has shown that alcohol is frequently consumed with an expectation of casual sex and increased arousal (Woolf-King and Maisto, 2011). Thus, it is not surprising that alcohol has been associated with HIV infection, particularly among high-risk populations where alcohol use may be higher.

This association may be even more relevant in developing countries, where both prevalence of HIV/STI infection and alcohol consumption are high (Hahn et al., 2011). A large body of evidence in Africa has demonstrated a relationship between HIV infection, sexual risk behavior and alcohol use. Several cross-sectional studies have found frequent alcohol use to be associated with HIV infection, (Allen et al., 1992; Clift et al., 2003; Fisher et al., 2008; Fritz et al., 2002) and two longitudinal studies have found frequent drinking to be associated with acquisition of HSV-2 (Tassiopoulos et al., 2007; Yadav et al., 2005), a known co-factor for HIV transmission. More commonly, cross-sectional studies have found associations with sexual risk behaviors, including infrequent condom use (Fritz et al., 2002; Geibel et al., 2008; Kalichman et al., 2006; Lane et al., 2008; Simbayi et al., 2006, 2004), multiple/casual partners (Alemu et al., 2007; Bing et al., 2008; Fisher et al., 2008; Kalichman et al., 2006; Mnyika et al., 1997; Simbayi et al., 2006, 2004; Weiser et al., 2006), transactional sex (Dunkle et al., 2007; Fisher et al., 2008; Kalichman et al., 2006; Simbayi et al., 2006, 2004) and sexual coercion (Abrahams et al., 2004; Simbayi et al., 2006; van der Stratan et al., 1998). Most of these studies have involved heterosexual men and women, though similar patterns of alcohol-mediated sexual risk-taking have been observed among men who have sex with men (MSM; Geibel et al., 2008; Lane et al., 2008).

Few studies of alcohol use and sexual risk behavior have taken place in Latin America, despite evidence of widespread alcohol consumption and increasing prevalence of HIV and other sexually transmitted infections (STIs). According to the World Health Organization, the prevalence of alcohol abuse in Peru is increasing, with 7.7% of men classified as having alcohol use disorders and 7.0% being heavy episodic drinkers (WHO, 2011). Among specific populations, problematic drinking may be even higher. A 2007 national survey found that 22% of men in rural Lima abused or were dependent on alcohol (INSM, 2008). Elsewhere, in two studies of Lima shantytowns (“distritos emergentes”), Galvez-Buccollini et al. (2009a) found that 31% of men reported heavy episodic drinking, and 33% of men were “hazardous drinkers” as defined by the Alcohol Use Disorder Identification Test (AUDIT; Galvez-Buccollini et al., 2009b). Elsewhere, alcoholism (defined by the *Prueba de Alcoholismo Latinoamericano Version Larga*) and sexual orientation were independently associated with HIV infection in a case control study (Chincha et al., 2008), though problem drinking among MSM remains underexplored.

The relationship between sexual risk behavior and problem drinking is of particular importance in Peru given the high prevalence of both among MSM. The overall prevalence of HIV infection in Peru is 0.4%, though it is highly concentrated among MSM with an estimated prevalence of 10.9% (UNAIDS, 2012). High prevalence of other STIs, particularly genital herpes, gonorrhea and syphilis have been found among MSM in a number of studies (Clark et al., 2008; Lama et al., 2006; Sanchez et al., 2009). In addition, sexual risk behaviors, including inconsistent condom use, sex exchange and sex with multiple casual partners appear to be common among MSM (Clark et al., 2007; Sanchez et al., 1996). In Peru, consumption of alcohol before sex is a common practice and has been reported among heterosexual and heterosexually-identifying men (Konda et al., 2011; Maguiña et al., 2012; Sanchez et al., 1996), though systematic analyses of problem drinking among MSM have been lacking.

The use of standardized measures for alcohol consumption offers several advantages in defining the relationship between sexual risk and problem drinking. Studies examining the relationship between sexual risk and alcohol use have typically described any use, frequency of use or intoxication during sexual encounters, and therefore it has been difficult to draw conclusions surrounding this relationship (Leigh and Stall, 1993). The CAGE questionnaire (Ewing, 1984) has been used in studies of adherence and HIV disease progression and allows researchers to identify individual-level characteristics that define alcohol use and dependence (Samet et al., 2004, 2010). For this reason, we sought to further explore the association between alcohol and sexual risk behavior among MSM in Peru. We hypothesized that individuals with higher rates of alcohol consumption would also demonstrate higher incidence of sexual risk behaviors and sexually transmitted infections.

2. Methods

The current study is a sub-analysis of data from the baseline survey of the *Comunidades Positivas* (Positive Communities and Enhanced Partner Therapy in Peru), or CPOS study (Martinez et al., 2010). Participants in the city of Lima and surrounding areas were recruited from 16 low-income neighborhoods between March and May, 2008, and in eight additional neighborhoods between September and December, 2009 via venue-based sampling. Potential recruitment sites were identified through ethnographic methods previously employed by our study group to identify social networks and common meeting places among MSM and trans-gendered persons (TGP). Eligible study participants included biological males aged 18–45 who reported at least one sexual encounter with a male or transgender partner in the past 12 months, acknowledged sexual preference toward other men or TGP, lived or worked near the intervention area, planned to stay in the intervention area for the whole study period (18 months) and were willing to consent to study participation.

2.1. Data collection

Storefronts or other local spaces were utilized to conduct interviews, collect specimens and dispense treatments. All participants completed a behavioral survey which was administered via Computer-Assisted Personal Interviewing (CAPI), except for questions pertaining to HIV history where Audio Computer-Assisted Self-Interviewing (ACASI) was used to avoid reporting bias due to fears of stigma among HIV positive participants. Variables assessed in the interview included demographic characteristics, general health and health care seeking behavior, HIV testing history/ status, sexual risk behaviors (including detailed questions on the last three sex partners) and substance use. We also asked questions pertaining to frequency of alcohol use and episodes of heavy drinking, along with the questions which comprise the formal CAGE questionnaire (Ewing, 1984).

All participants underwent pre-test counseling for HIV infection and STIs including syphilis, HSV-2, chlamydia and gonorrhea. Participants were treated for symptomatic STIs at the time of the initial visit. A 10 ml blood sample was collected from each participant, along with pharyngeal swabs and self-obtained rectal swab samples. Participants returned for STI and HIV results within two weeks of this initial visit and received post-test counseling and treatment for asymptomatic bacterial STIs. Newly diagnosed HIV infection cases were referred to the National HIV Antiretroviral Treatment Program, where treatment is provided free of charge.

HIV serologic status was determined with EIA and Western Blot confirmation (BIO-RAD Laboratories, Redmond, WA). HSV-2 antibody status was determined by HerpeSelect 2 ELISA IgG (Focus Diagnostics, Cypress, CA), with levels of 3.5 or greater indicating seropositivity. Syphilis infection, defined as a titer > 1:8, was determined by the rapid plasma reagin (RPR) test (BioMerieux, Boxtel, Netherlands), followed by TP-PA confirmation (Fujirebio, Japan). Oral and rectal swabs were evaluated for *C. trachomatis* and *N. gonorrhoeae* (GenProbe, San Diego, CA). For quality control purposes, 10% of all samples other than syphilis tests were sent to the San Francisco Department of Public Health Laboratory for confirmatory testing. Quality control tests for syphilis infection were performed at the Naval Medical Research Unit-6 Bacteriology Laboratory in Lima, Peru.

2.2. Data analysis

Problem drinking (the main outcome variable) was defined using the CAGE questionnaire with a positive screen meeting at least two of the following four criteria: attempts to reduce drinking, morning drinking, criticism by others or feelings of guilt over drinking (all over the past 12 months). An alpha statistic was calculated from our data sample using the four questions which comprised the CAGE questionnaire ($\alpha = 0.76$). Univariate logistic regression and nonparametric tests were used to compare problem drinkers (CAGE-positive) with others. Dichotomous and continuous variables were compared using the Pearson χ^2 and Mann–Whitney test, respectively. Two-sided P values < 0.05 were considered statistically significant. Variables pertaining to sexual risk, demographics and health-related factors with P values below 0.10 were included in a multivariate logistic regression model, with problem drinking as the dependent variable.

Our regression model did not include variables relating to frequency of alcohol use, as these captured data similar to our dependent variable. We did include alcohol use immediately prior to a participant's most recent sexual encounter into the model, as this was event-specific and related to sexual risk. In addition, we included only a single variable to account for number of partners as all measures of total partners were highly correlated. Missing data was coded as such, with frequencies of unusable data calculated for every variable to determine if it affected the validity of the data. To diminish recall bias, we chose number of partners in the last three months as the best measure of the frequency of sexual encounters. Likelihood ratio tests were used to compare nested models, and we also checked for significant two-way interactions and performed Hosmer–Lemeshow goodness-of-fit tests (Hosmer, 2000). Finally, in order to test the association between problem drinking and sexual risk factors, we conducted exploratory analyses with CAGE-positivity and alcohol consumption as independent variables, and unprotected anal intercourse as a dependent variable.

3. Results

A total of 718 participants met inclusion criteria and were recruited to participate in the study. Selected demographic characteristics are available in Table 1. Of all participants, 58% met criteria for problem drinking as defined by the CAGE questionnaire. Of note,

prevalence of HIV/STI infection did not differ significantly between problem-drinkers and others, or between subpopulations, including transgendered individuals.

Individuals classified as non-problem drinkers were nonetheless significantly more likely to report prior HIV testing as well as known HIV infection at the time of the study (Table 1). Among the 41 individuals who reported known HIV infection, 63% were receiving HAART and there was no significant difference with respect to treatment between problem-drinkers and non-problem drinkers. The two groups differed further on questions pertaining to self-identity, with problem drinkers more commonly identifying themselves as transgendered, and non-problem drinkers as gay/homosexual (Table 1).

With respect to sexual risk, both groups reported high prevalence of failing to always use condoms within the last six months, with a significantly higher prevalence among problem drinkers (Table 2). Problem drinkers further reported significantly higher prevalence of paying for and being compensated for sex within the last six months, lifetime history of sexual coercion, earlier age of sexual initiation and higher numbers of recent and lifetime sexual partners (Table 2). The two groups appeared to share similar sexual practices, with no significant differences in the prevalence of insertive and receptive anal intercourse or sex with women in the last six months (Table 2). Finally, in our exploratory model, alcohol consumption before sex remained independently associated with unprotected anal intercourse ($P < 0.01$), though CAGE-positivity did not.

In multivariate analysis, factors associated with problem drinking included a lifetime history of sexual coercion [Adjusted OR 1.8, 95% CI (1.2, 2.6)], having consumed alcohol prior to the most recent sexual encounter [Adjusted OR 2.1, 95% CI (1.5, 2.9)], receiving compensation for sex in the last six months [Adjusted OR 1.6, 95% CI 1.5 (1.1, 2.2)] or having reported a prior HIV+ test [Adjusted OR 0.5, 95% CI (0.2, 0.9)].

4. Discussion

We found a high prevalence of problem drinking among all MSM in Lima, Peru, with problem drinkers reporting increased prevalence of numerous sexual risk behaviors, including inconsistent condom use. These findings correspond with a number of studies from developing countries, where problem drinkers have been shown to engage in a number of sexual risk behaviors (Alemu et al., 2007; Bing et al., 2008; Dunkle et al., 2007; Geibel et al., 2008; Kalichman et al., 2006; Lane et al., 2008; Mnyika et al., 1997; Simbayi et al., 2006, 2004; Weiser et al., 2006). In addition, our findings further expand on prior studies of Peruvian MSM, which have found high prevalence of sexual risk behaviors (Clark et al., 2008; Sanchez et al., 2007). We did not find significant difference with respect to HIV/STI prevalence between problem drinkers and others, though a slight trend was noted for increased prevalence of chlamydial infection among the former.

That individuals with known HIV infection were less likely to be problem drinkers was a surprising finding given the low prevalence of known HIV-infection at the time of study entry (5.7%). Several U.S. studies examining interventions to reduce alcohol consumption among HIV-infected individuals have yielded mixed results (Aharonovich et al., 2006; Parsons et al., 2007; Samet et al., 2005; Velasquez et al., 2009), though in a study targeting MSM, significant reductions in drinking were obtained through individual and peer counseling (Velasquez et al., 2009). Taken together, our studies demonstrate that a positive diagnosis provides an opportunity for behavior change and may result in decreased participation in drug and sexual risk behaviors.

The prevalence of problem drinking in our study was much higher than a previous national survey (WHO, 2011) and other reports (Galvez-Buccollini et al., 2009a, 2009b; INSM, 2008), which may result from several factors. First, we used a screening tool to identify problem drinking, which may be more effective than simply asking participants how often they drank, as alcohol quantity is commonly underreported. Second, the prevalence of problem drinking varies widely among Latin American sub-populations and may be especially elevated in high-risk populations, which necessitates the need for standardized measurement. For instance, in a small study of 52 indigenous men from Venezuela, 81% were classified as problem drinkers using the AUDIT (Seale et al., 2002), while country-level data provided by the World Health Organization (WHO) estimated the prevalence of hazardous drinking to be 7.4% (WHO, 2011.).

Perhaps unsurprisingly, drinking before sex was independently associated with problem drinking, though this finding should be interpreted with caution as problem drinkers may consume alcohol more frequently irrespective of sexual encounters. Drinking before sex was also independently associated with alcohol consumption in our exploratory model, which suggests the importance of situational drinking on sexual risk behavior. These findings are consistent with prior studies in Peru, where alcohol use prior to sex was associated with a higher number of casual partners (Sanchez et al., 1996) and to increased sexual risk-taking among heterosexual-identified men (Konda et al., 2011). Nonetheless, the association underscores the close (and often temporal) relationship between alcohol consumption and sexual risk, with drinking before sex being a relatively common practice among men in Peru (Sanchez et al., 1996; Maguiña et al., 2012). While no study has shown a conclusive link between situational drinking and HIV/STI infection, event-specific drinking has been shown to lead to failure to use condoms (Kiene et al., 2008; Myer et al., 2002), which facilitates disease transmission.

A lifetime history of sexual coercion was also independently associated with problem drinking in our study, which is a finding of unclear significance. The relationship nonetheless demonstrates that profiles of risk behavior may not only be situational but are rooted in the life experiences of high-risk individuals. Similar findings have been observed in other settings: among MSM in Thailand, history of sexual coercion has been associated with inconsistent condom use (Chemnasiri et al., 2010), increased number of sexual partners and drug abuse (Guadamuz et al., 2011). Both these studies and our findings demonstrate that history of sexual coercion may be an important contributor to substance abuse problems, including problem drinking, and further research is needed to better understand this relationship.

Our study had several limitations. First, our study was a secondary analysis of a broader study on community-building among MSM in Lima, Peru. In addition, our study is cross-sectional and therefore causal inferences with regard to risk behaviors and problem drinking among MSM cannot be drawn. This limitation is common in studies of alcohol and HIV/STI infection, in that frequently, it is not known whether problem drinking leads to sexual risk-taking and HIV/STI acquisition, or whether problem drinking itself forms part of a composite risk profile encompassing both sexual risk and substance abuse. In South Africa, Kalichman et al. (2008) have argued that many closely associated risk behaviors derive from “sensation seeking,” which may be true in our study as well, given the cultural beliefs and sexual expectations surrounding alcohol (Galvez-Buccollini et al., 2009b). Beyond individual risk profiles, alcohol abuse is frequently accompanied by additional mental health disorders (Altice et al., 2010; Patel, 2007), which were not examined in our study.

Studies of alcohol use in developing countries are frequently limited by the lack of culturally appropriate methods to measure problematic drinking (Kalichman et al., 2007). In Peru,

binge drinking is frequent and may not be captured by typical assessments of drinking quantity (Galvez-Buccollini et al., 2009a; WHO, 2011). In our study, we used the CAGE questionnaire, which has been validated in multiple settings, and which offers significant advantages over standard questions regarding frequency and quantity of alcohol consumption. The alpha statistic for our sample was acceptable and delineated potential problem drinkers from those who consumed less alcohol, though further research is required to adequately develop and validate measurements of problem drinking in the context of Peruvian MSM.

We found a high prevalence of both problem drinking and sexual risk behaviors among MSM in Lima, Peru. While it has proven difficult to disentangle the relationship between problem drinking, sexual risk and HIV/STI infection, our study shows that problem drinking may contribute significantly to sexual risk-taking, and that these behaviors may be closely related. The lower prevalence of problem drinking among MSM already diagnosed with HIV further implies that behavior modification even among high-risk individuals is an attainable goal. Additional study and longitudinal interventions to reduce alcohol consumption among high-risk individuals are warranted.

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Table 1

Demographics and selected health characteristics of MSM, categorized by problem-drinking.

	Non-problem drinkers (%) (*n* = 303)	**Problem-drinkers (%) (*n* = 415)**	***P*-value[a]**	**Significant adjusted odds ratios (95% CI)**
Demographics				
Age (median, IQR[b])	29 (23, 36)	29 (23, 35)	0.62	
Born outside of Lima	43	49	0.15	
Completed high school	70	73	0.41	
Support oneself financially	89	88	0.73	
Have dependent (child or adult)	58	55	0.45	
In last year, have sometimes run out of money for basic needs	54	62	**0.04**	
In last year, have sometimes borrowed money	40	52	<**0.01**	
Self-identify as transgendered	23	33	<**0.01**	
Self-identify as gay/homosexual	55	44	<**0.01**	
Health-related characteristics				
Report prior STI diagnosis	33	28	0.21	
Report prior test for HIV	81	74	**0.05**	
Reported HIV+ at time of study	8.3	3.9	**0.01**	**0.5 (0.2, 0.9)**
–Of these, taking HAART	68 (*n* = 25)	53 (*n* = 15)	0.35	
Found HIV+ by Western Blot	17	15	0.48	
HSV-2 infection	64	66	0.81	
C. trachomatis infection (oral or rectal)	19	25	0.09	
N. gonorrhea infection (oral or rectal)	13	13	0.73	
History of syphilis infection (RPR/TPPA+)	24	25	0.75	
Active syphilis infection (titer > 1:8)	8.9	10	0.51	

Bold values reflect statistical significance ($p < 0.05$).

[a] Variables from Tables 1 and 2 with $P < 0.1$ included in the multivariate model.

[b] Interquartile range.

Table 2

Sexual risk behavior MSM, Categorized by problem-drinking.

	Non-problem drinkers (%) (*n* = 303)	**Problem-drinkers (%) (*n* = 415)**	***P*-value[a]**	**Significant adjusted odds ratios (95% CI)**
Used alcohol at last sexual encounter	**36**	**53**	<**0.01**	**2.1 (1.5, 2.9)**
Used drugs at last sexual encounter	**3.7**	**8.8**	<**0.01**	
Used condoms less than always in last six months	**58**	**66**	**0.03**	
Insertive anal intercourse in last six months	35	34	0.81	
Receptive anal intercourse in last six months	92	93	0.74	
Sex with woman in last six months	7.9	8.1	0.73	
Received compensation for sex in last six months	**45**	**62**	<**0.01**	**1.6 (1.1, 2.2)**
–Always used condom in these encounters[b]	64	55	0.26	
Paid for sex in last six months	**19**	**28**	<**0.01**	
–Always used condom in these encounters[c]	59	54	0.34	
Median age at first sexual encounter (IQR[d])	**15 (13, 17)**	**14 (12, 16)**	<**0.01**	
Median number of partners in last three months (IQR[d])	**2 (1, 6)**	**3 (2, 10)**	<**0.01**	
Median number of partners in last six months (IQR)	**4 (2, 10)**	**6 (2, 20)**	<**0.01**	
Median number of partners in last year (IQR)	**7 (3, 20)**	**10 (4, 45)**	<**0.01**	
Median number of lifetime partners (IQR)	**40 (15, 200)**	**100 (20, 500)**	<**0.01**	
Ever forced to have sex	**20**	**36**	<**0.01**	**1.8 (1.2, 2.6)**
–Age when first forced into sex[e]	18 (13, 21)	17 (13, 20)	0.48	
–Number of times forced into sex[e]	1 (1, 4)	1 (1, 3)	0.63	

Bold values reflect statistical significance ($p < 0.05$).

[a] Variables from Tables 1 and 2 with $P < 0.1$ included in the multivariate model.

[b] n = 121, 255 among non-problem drinkers and problem drinkers, respectively.

[c] n = 48, 114 among non-problem drinkers and problem drinkers, respectively.

[d] Interquartile range.

[e] n = 61, 151 among non-problem drinkers and problem drinkers, respectively.