Title

High-Risk, but Hidden: Binge Drinking among Men Who Have Sex with Men and Transgender Women in Lima, Peru, 2012-2014

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HIGH-RISK, BUT HIDDEN: BINGE DRINKING AMONG MEN WHO HAVE SEX WITH MEN AND TRANSGENDER WOMEN IN LIMA, PERU, 2012-2014

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Abstract

Background: Binge drinking (BD) is common in Peru, but may not be routinely detected by standard assessments of hazardous drinking.

Objectives: We describe prevalence and risk behaviors of men who have sex with men (MSM) and transgender women (TW) in Peru who met criteria for BD as compared with those who met criteria for hazardous drinking.

Methods: In a cross-sectional sample of MSM and TW from Lima (2012-2014), we calculated prevalence of BD (consuming 6 alcoholic drinks per occasion by AUDIT-3 criteria), conducted bivariate analyses of associations of BD with demographic and behavioral characteristics, and compared prevalence and behaviors of BD to those of hazardous drinkers (identified by AUDIT-10 criteria).

Results: Of 1,520 MSM (n=1,384) and 137 TW (n=137) with median age 27 years, 74.4% of MSM and 86.9% of TW met criteria for BD. Among MSM, BD was associated with a greater likelihood of using alcohol (41.6% vs. 13.8%; p<0.01) or drugs (7.8% vs. 2.8%; p<0.01) prior to a recent sexual contact. Among TW, BD was associated with greater frequency of alcohol use

(44.9% vs. 11.1%; p<0.01) or unprotected anal intercourse (58.8% vs. 33.3%; p=0.04) during 1 of their three most recent sexual contacts. There was a higher prevalence of BD (75.5%) than hazardous drinking (53.2%) in our sample, with binge drinkers exhibiting similar sexual risk behaviors to hazardous drinkers.

Conclusions: Binge drinking is common among MSM and TW in Lima, associated with risky sexual behavior, and may not be adequately captured by AUDIT-10 criteria.

Keywords

Binge drinking; Alcohol use; Men who have sex with men (MSM); Transgender women (TW); Screening

Introduction:

Alcohol use among men who have sex with men (MSM) and transgender women (TW) in Peru is common (Deiss et al., 2013) and frequently associated with high-risk sexual behaviors (Herrera et al., 2016; Vagenas et al., 2013). In the urban center of Lima, typical patterns of alcohol use include communal consumption of shared bottles of beer, which contributes to groups engaging in binge drinking (BD; consumption of six or more drinks on one occasion) (Delgado et al., 2017). The prevalence of BD is estimated at 13.5% in the general Peruvian population, and as high as 23.6% among males (WHO, 2014). In the U.S., people who drink heavily are more likely to experience negative health outcomes than those who do not (Jackson, 2008), reflecting the dis-inhibitory effects of alcohol use (Jones, Christiansen, Nederkoorn, Houben, & Field, 2013). While numerous studies show an association between BD and unprotected anal intercourse (UAI) among MSM in the United States (Hess et al., 2012; Rowe, Liou, Vittinghoff, Coffin, & Santos, 2016; Wong, Kipke, & Weiss, 2008), the only study from Peru specifically addressing BD was limited to MSM social media users (Young, Nianogo, Chiu, Menacho, & Galea, 2016). Further research is needed to describe the prevalence and consequences of BD among the general MSM population and among TW in Peru.

Previous studies of alcohol use among MSM and TW in Peru have focused on alcohol consumption prior to sex (Delgado et al., 2017) or presence of alcohol use disorders (AUDs) as measured by the Alcohol Use Disorders Identification Test scale (AUDIT-10) (Ludford et al., 2013). While the AUDIT-10 is commonly used to measure hazardous drinking, its utility for identifying BD may vary according to the dominant patterns of alcohol use in a specific population (Tuunanen, Aalto, & Seppa, 2007). Because the AUDIT-3 includes only the scale item related to BD, it provides an abridged version of the AUDIT-10 that may more accurately capture problem-drinking behaviors in areas where BD is not necessarily connected with other correlates of hazardous drinking, such as addiction and impaired social functioning. Because BD is common in Peru and may not be detected by standard assessments of alcohol consumption (Deiss et al., 2013), we aimed to evaluate the prevalence and explore the correlates of BD among MSM and TW in Lima using a standardized international assessment tool for BD, the AUDIT-3. Our secondary objective was to compare the sexual risk behaviors of binge drinkers (identified by the AUDIT-3) and hazardous drinkers (identified by the AUDIT-10). We hypothesized that not all binge

drinkers in our sample would meet criteria for hazardous drinking by AUDIT-10 criteria, a potential difference that could fail to identify subgroups who could benefit from interventions for sexual and gender minorities with overlapping problems of substance use and high-risk sexual behavior.

Materials and Methods:

Participants and Recruitment

Self-reported data were provided by MSM and TW who screened for two studies of sexual partner management and notification following sexually transmitted infection (STI) diagnosis in Peru (ClinicalTrials.gov ,). Participants were screened at STI clinics and venues frequented by MSM/TW in Lima and Callao, Peru between August 2012 and June 2014 (Clark et al., 2018; Clark, 2017). Screening was limited to individuals who: 1) were at least 18 years old, 2) were assigned male sex at birth, and 3) reported oral and/or anal sex with a male or transfeminine partner in the preceding year.

Study Procedures

All participants completed a computer-assisted self-interview (CASI) behavioral survey. The survey assessed reported sexual orientation (heterosexual, bisexual, homosexual) and role (*activo* [insertive], *pasivo* [receptive], *moderno* [versatile]), partner-specific sexual acts (anal, vaginal, oral intercourse) with the three most recent sexual partners, position during intercourse (insertive, receptive, both), condom use, and substance use measures as detailed below.

Afterwards, physicians collected urine samples and rectal and pharyngeal swabs for *Neisseria gonorrhoeae* (GC) and *Chlamydia trachomatis* (CT). All specimens were tested for GC and CT infection using the Gen-Probe Aptima II assay (Hologic, San Diego, CA, USA) at the U.S. Naval Medical Research Unit-6 Bacteriology Laboratory in Callao. Blood was tested for syphilis by rapid plasma reagin (RPR) assay (RPRnosticon, Biomérieux, Marcy l'Etoile, France) with positive results confirmed by *Treponema pallidum* particle agglutination assay (Serodia TPPA, Fujirebio, Malvern, PA, USA) and serial dilution of titers when appropriate. All participants underwent physical examination, pre-test counseling, HIV/STI testing, post-test counseling, and syndromic treatment for symptomatic STIs (if present). Participants received ten *Nuevos soles* (approximately $3.50 USD) reimbursement for transportation costs, as well as five sachets of lubricant at their visit.

Alcohol Consumption Measures

All participants completed a previously validated Spanish translation of the AUDIT-10 survey (Ludford et al., 2013). We classified BD as a positive response to question three of the AUDIT-10 (frequency of consuming six or more drinks in a single occasion), referred to as the AUDIT-3. This definition is consistent with the definition prescribed by the World Health Organization – ingestion of six or more drinks in a single occasion for men (WHO, 2014). The AUDIT-10 was scored from 0 to 40, with higher scores indicative of more hazardous drinking patterns. Hazardous drinking was defined as an AUDIT-10 score of eight or greater. This score is a validated AUDIT-10 cut-point for identifying biological males

who report drinking at hazardous levels (Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). Participants who had missing responses for any AUDIT items (n=27) were excluded from this analysis.

Consent/Permissions

The Institutional Review Boards of the Asociación Civil Impacta Salud y Educación and the University of California, Los Angeles reviewed and approved all study procedures. Written informed consent was obtained from all participants prior to participation.

Data Analysis

Bivariate analyses with chi-squared tests were used to estimate the association of participant characteristics and sexual risk behaviors with binge drinking, stratified by gender identity (MSM [male] or TW [female]). Wilcoxon's Rank Sum test was used to measure differences in the distribution of non-parametric numeric variables between participants who met criteria for BD versus those who did not.

Due to the traditional use of the AUDIT-10 for identifying hazardous drinking among MSM and TW in Peru, a secondary bivariate analysis with chi-squared tests was used to estimate associations of sexual risk behaviors with MSM and TW meeting criteria for the AUDIT-3 and the AUDIT-10. The aim of this comparison was to determine if the "additional" individuals who screened positive for binge drinking according to the AUDIT-3 exhibited similar substance use and sexual risk behavior to participants who met criteria for hazardous drinking according to traditional measures (AUDIT-10).

Variables significant at a level of $p<0.10$ in bivariate analyses were included in the multivariate regression models. To measure associations between independent variables and outcomes, we computed prevalence ratios with the Poisson regression using robust estimation of standard errors (Barros V. N & Hirakata, 2003; Behrens, 2004; Coutinho, 2008). All analyses were conducted using Stata 12.0 (StataCorp, College Town, TX). With the exception of the AUDIT scales, complete case analysis was performed for variables with missing data. Less than 5% of data were missing for any single variable.

Results:

Characteristics and Sexual Risk Behaviors Associated with BD Among MSM

Of 1,383 MSM (median age 27 years), 74.4% (1,029) met criteria for binge drinking (Table 1). BD was more frequent among younger (27 [24,36] vs. 28 [23,32] years; $p<0.01$) men, and less frequent among men with greater than a secondary education (62.8% vs. 73.4%; $p<0.01$). Binge drinkers were more likely to report alcohol (41.6% vs. 13.8%; $p<0.01$) or drug use (7.8% vs. 2.8%; $p<0.01$) prior to sex with one or more of their last three partners.

Characteristics and Sexual Risk Behaviors Associated with BD Among TW

Of 137 TW (median age 27 years), 86.9% (119) met criteria for binge drinking. Binge drinkers were more likely to report alcohol use prior to sex (44.9% vs. 11.1%; $p<0.01$) or UAI (58.8% vs. 33.3%; $p=0.04$) with one or more of their last three partners.

Risk Profiles of MSM and TW Meeting Criteria for the AUDIT-10 and the AUDIT-3

We performed a secondary analysis comparing the risk profiles of participants meeting criteria for the AUDIT-10 (the standard instrument used to measure hazardous drinking among MSM and TW in the contemporary HIV/AIDS literature in Peru) and AUDIT-3, to determine if MSM and TW reporting high-risk sexual behaviors in the context of substance use may be missed by traditional instruments to screen for hazardous drinking (Table 2).

Among MSM, the AUDIT-3 identified 1,029 participants (74.4%) as binge drinkers, compared to 709 (51.3%) hazardous drinkers according to the AUDIT-10 (absolute difference=320/1,383). Fifteen (2.1%) of the hazardous drinkers captured by the AUDIT-10 were not binge drinkers, per the AUDIT-3. The sexual risk behavior profiles of both groups were similar, and different from the rest of the sample. Men determined to be binge drinkers by the AUDIT-3 reported higher frequency of alcohol (41.6% vs. 13.8%; p<0.01) and drug use (7.8% vs. 2.8%, p<0.01) prior to sex than non-binge drinkers. MSM who screened positive for hazardous drinking on the AUDIT-10 also reported higher frequency of alcohol use prior to sex (48.6% vs. 19.6%, p<0.01), drug use prior to sex (9.8% vs. 3.1%, p<0.01), and UAI with one or more of their last three partners (65.6% vs. 57.6%, p<0.01) than non-hazardous drinkers.

Among TW, the AUDIT-3 identified 119 participants (86.9%) as binge drinkers compared to 99 (72.3%) hazardous drinkers with the AUDIT-10 (absolute difference=20/137). Three (3.0%) of the hazardous drinkers captured by the AUDIT-10 were not binge drinkers, per the AUDIT-3. The risk profiles of both groups were similar, and different from the rest of the sample. TW determined to be binge drinkers by the AUDIT-3 reported a higher frequency of alcohol use prior to sex (44.9% vs. 11.1%; p<0.01), and more frequently reported UAI with one or more of their last three partners (58.8% vs. 33.3%; p=0.04) than non-binge drinkers. TW who screened positive for hazardous drinking on the AUDIT-10 reported a higher frequency of alcohol use prior to sex (51.0% vs. 13.2%; p<0.01) and drug use prior to sex (23.2% vs. 2.6%; p<0.01) than non-hazardous drinkers.

Poisson Regression of Characteristics and Risk Behaviors Associated with BD

After adjusting for age, education, sexual orientation, meeting AUDIT-10 criteria, alcohol use and/or drug use prior to sex with one or more of the last three partners, MSM who met criteria for hazardous drinking according to AUDIT-10 criteria (aPR, 95% CI: 1.91, 1.76-2.06) were more likely to be binge drinkers compared to men who did not meet AUDIT-10 criteria (Table 3). MSM who endorsed alcohol use prior to sex with one or more of their last three partners (1.12, 1.07-1.18) were also more likely to be binge drinkers than those men who did not use alcohol prior to sex with any of their last three partners.

After adjusting for meeting AUDIT-10 criteria, prevalent bacterial STI, alcohol use prior to sex and/or UAI with one or more of the last three partners, TW who met criteria for hazardous drinking according to AUDIT-10 criteria (aPR, 95% CI: 1.55, 1.20-2.01) were more likely to be binge drinkers compared to men who did not meet AUDIT-10 criteria.

Discussion:

Binge drinking was common in our sample of Peruvian MSM and TW at high risk for HIV and other STIs, and was associated with younger age, lower education, and pre-coital alcohol and drug use among MSM, and with both alcohol use prior to sex and UAI among TW. As BD represents the dominant pattern of alcohol use in the Peruvian social context, binge drinkers are a critical population for HIV prevention efforts and provide insight into the ways in which psychoactive substances like alcohol may affect assessment and enactment of sexual risk behaviors (WHO, 2014). However, a substantial number of binge drinkers in our sample did not meet criteria for hazardous drinking according to the AUDIT-10, the screening tool traditionally used to identify problematic drinking among sexual and gender minorities (Herrera et al., 2017; Ludford et al., 2013; Vagenas et al., 2014). Binge drinkers may therefore be excluded from interventions targeted to MSM and TW hazardous drinkers, despite their overlapping patterns of high-risk sexual behavior and substance use. By focusing on local cultural contexts of alcohol use in Peru, particularly widespread patterns of episodic BD, our results more effectively capture the intersections of alcohol use and HIV risk behavior among MSM and TW, and make an important step towards developing integrated substance use-HIV/STI prevention interventions worldwide.

Our study is the first to show an association between BD and alcohol and drug use prior to sex among both MSM and TW. This finding is critical as alcohol use preceding sex has also been associated with event-specific UAI in previous studies in the Peruvian context (Delgado et al., 2017). This association is likely a result of impaired information processing when under the influence of alcohol, whereby attention may be focused on immediate positive consequences rather than the potential negative consequences of behavior (Galvez-Buccollini et al., 2008). While a previous study showed an association between Peruvian MSM social media users reporting BD and UAI (Young et al., 2016), ours is the first to also highlight the association between BD and UAI among TW in Peru. Accordingly, use of the AUDIT-3 to screen for BD may be important in identifying MSM and TW with overlapping patterns of substance use and high-risk sexual behavior.

These results underscore the need to refine the concept of hazardous drinking measured by the AUDIT-10, and to tailor subsequent analyses to local cultural patterns of substance use. While the AUDIT-10 captures individuals who exhibit chronic and relapsing hazardous alcohol use that interferes with daily activities and interpersonal relationships, it may miss others who engage in culturally acceptable, episodic BD – behavior that is associated with impulsivity and impaired decision-making, including high-risk sexual behavior (Townshend, Kambouropoulos, Griffin, Hunt, & Milani, 2014). For clinicians working under time constraints, and depending on local cultural context, the one-question AUDIT-3 may offer a reasonable alternative to the ten-question AUDIT-10 for identifying MSM and TW who engage in risky sexual behavior in association with substance use. The AUDIT-3 focus on binge drinking may even be more effective than the full AUDIT-10 for addressing the intersection of substance use and high-risk sexual behavior in Peru and other areas where BD is common and culturally sanctioned.

The strengths of this study center on our results showing that close to two-thirds of MSM and TW who are at high risk for HIV and other STIs also reported BD, that this behavior was associated with substance use prior to sex and UAI, and that current measures of problem drinking are not sufficient to identify this population with intersecting problems of substance use and HIV risk. Nonetheless, several limitations should be considered when interpreting these results. First, the original study did not include a clinical interview to assess for BD, so only the AUDIT-3 was used to identify binge drinkers. While this item is a standardized international assessment tool, it has not been fully validated with this specific population. Second, our results may not be generalizable to all MSM and TW in Lima since we collected a convenience sample of individuals who volunteered to be screened for a trial of partner notification at one clinical site. As the recruitment site is a center for HIV and STI research, our sample is likely to be higher risk than the general MSM and TW populations, though it is likely to accurately represent the target population for integrated substance use and HIV prevention efforts.

Binge drinking is common among MSM and TW in Peru, and associated with both substance use prior to sex and condomless anal intercourse. The AUDIT-3 may identify a previously underserved population of MSM and TW who report risky sexual behavior in the context of substance use, but are excluded from combined HIV and substance use prevention interventions that are limited to sexual and gender minorities that meet criteria for hazardous drinking as defined by the AUDIT-10. By tailoring screening instruments to local sociocultural contexts, researchers may be able to both better identify and more accurately describe MSM and TW who exhibit high-risk sexual behavior in the context of substance use. Alternative public health strategies are needed to address local patterns of substance use in Peru and to develop successful combination substance use and HIV/STI prevention interventions.

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Table 1.

Characteristics and sexual risk behaviors reported by MSM and TW participants in Lima, Peru, 2012-14, stratified by binge drinking behavior; N=1,520

Characteristic or risk behavior	MSM (n=1,383)			TW (n=137)		
	Total	Non-BD (n=354)	BD (n=1,029)	Total	Non-BD (n=18)	BD (n=119)
Age (1,380 MSM; 136 TW)	27 (23,33)	28 (24,36)	**27 (23,32)**	27 (22,33)	24 (22,28)	27 (22,33)
Education (1,380 MSM; 136 TW)						
<Secondary	146 (10.6)	25 (7.1)	**121 (11.8**	47 (34.6	6 (33.3)	41 (34.8)
Secondary	330 (23.9)	69 (19.5)	**261 (25.4)**	53 (39.0)	7 (38.9)	46 (39.0)
>Secondary	904 (65.5)	260 (73.4)	**644 (62.8)**	36 (26.5)	5 (27.8)	31 (26.3)
Sexual orientation (1,383 MSM)						
Heterosexual	59 (4.3)	8 (0.3)	51 (5.0)			
Bisexual	410 (29.6)	103 (29.1)	307 (29.8)			
Homosexual	914 (66.1)	243 (68.6)	671 (65.2)			
Sexual role (1,370 MSM; 137 TW)						
Activo	293 (21.4)	73 (20.9)	220 (21.6)	6 (4.4)	1 (5.5)	5 (4.2)
Pasivo	362 (26.4)	93 (26.6)	269 (26.4)	100 (73.0)	14 (77.8)	86 (72.3)
Moderno	715 (52.2)	184 (52.5)	531 (52.0)	31 (22.6)	3 (16.7)	28 (23.5)
AUDIT-10 positive (>=8; 1,383 MSM, 137 TW)						
Yes	709 (51.3)	15 (4.2)	**694 (67.4)**	99 (72.3)	3 (16.7)	**96 (80.7)**
No	674 (48.7)	339 (95.8)	**335 (32.6)**	38 (27.7)	15 (83.3)	**23 (19.3)**
Prevalent bacterial sexually transmitted infection (1,383 MSM; 137 TW) *						
Yes	561 (40.6)	148 (41.8)	413 (40.1)	42 (30.7)	2 (11.1)	40 (33.6)
No	822 (59.4)	206 (58.2)	616 (59.9)	95 (69.3)	16 (88.9)	79 (66.4)

Bold text = p <0.05

*
Bacterial STI = prevalent syphilis, gonorrhea, or chlamydia infection

Table 2.

Characteristics and sexual risk behaviors reported by MSM and TW participants in Lima, Peru, 2012–14, stratified by AUDIT-3 and AUDIT-10 positivity; N=1,520

Characteristic or risk behavior	MSM (n=1,383)					TW (n=137)				
	Total	AUDIT-3 Negative (n=354)	AUDIT-3 Positive (n=1,029)	AUDIT-10 Negative (n=674)	AUDIT-10 Positive (n=709)	Total	AUDIT-3 Negative (n=18)	AUDIT-3 Positive (n=119)	AUDIT-10 Negative (n=38)	AUDIT-10 Positive (n=99)
Alcohol use prior to sex with >=1 of the last 3 partners (1,376 MSM; 136 TW)										
Yes	474 (34.4)	49 (13.8)	**425 (41.6)**	132 (19.6)	**342 (48.6)**	55 (40.4)	2 (11.1)	**53 (44.9)**	5 (13.2)	**50 (51.0)**
No	902 (65.6)	305 (86.2)	**597 (58.4)**	540 (80.4)	**362 (51.4)**	81 (59.6)	16 (88.9)	**65 (55.1)**	33 (86.8)	**48 (49.0)**
Drug use prior to sex with >=1 of the last 3 partners (1,377 MSM; 137 TW)										
Yes	90 (6.5)	10 (2.8)	**80 (7.8)**	21 (3.1)	**69 (9.8)**	24 (17.5)	1 (5.6)	23 (19.3)	1 (2.6)	**23 (23.2)**
No	1,287 (93.5)	344 (97.2)	**943 (92.2)**	652 (96.9)	**635 (90.2)**	113 (82.5)	17 (94.4)	96 (80.7)	37 (97.4)	**76 (76.8)**
Unprotected anal intercourse with >=1 of the last 3 partners (1,383 MSM; 137 TW)										
Yes	853 (61.7)	206 (58.2)	647 (62.9)	388 (57.6)	**465 (65.6)**	76 (55.5)	6 (33.3)	**70 (58.8)**	18 (47.4)	58 (58.6)
No	530 (38.3)	148 (41.8)	382 (37.1)	286 (42.4)	**244 (34.4)**	61 (44.5)	12 (66.7)	**49 (41.2)**	20 (52.6)	41 (41.4)

Bold text = p <0.05.

Table 3.

Crude and adjusted Poisson regression models for binge drinking among MSM and TW participants in Lima, Peru, 2012-14, stratified by sexual identity; N=1,520

Characteristic or risk behavior	MSM (n=1,383)				TW (n=137)			
	PR	95% CI	aPR*	95% CI	PR	95% CI	aPR#	95% CI
Age	**0.99**	**0.98, 0.99**	0.99	0.99, 1.00				
Education (<Secondary is the reference variable)								
Secondary	0.95	0.87, 1.05	1.07	0.99, 1.15				
>Secondary	**0.86**	**0.79, 0.94**	1.05	0.98, 1.13				
Sexual orientation								
Bisexual	**0.87**	**0.77, 0.97**	0.90	0.81, 1.00				
Homosexual	**0.85**	**0.76, 0.95**	0.91	0.82, 1.00				
AUDIT-10 positive^								
Yes	**1.97**	**1.82, 2.13**	**1.91**	**1.76, 2.06**	**1.60**	**1.24, 2.08**	**1.55**	**1.20, 2.01**
Prevalent bacterial sexually transmitted infection (syphilis, gonorrhea, or chlamydia)^								
Yes					1.15	**1.02, 1.28**	1.07	0.97, 1.19
Alcohol use prior to sex with >=1 of the last 3 partners^								
Yes	**1.35**	**1.28, 1.43**	**1.12**	**1.07, 1.18**	**1.20**	**1.06, 1.35**	1.05	0.96, 1.16
Drug use prior to sex with >=1 of the last 3 partners^								
Yes	**1.21**	**1.12, 1.31**	0.98	0.92, 1.05				
Unprotected anal intercourse with >=1 of the last 3 partners^								
Yes	1.15	0.99, 1.32	-	-				

Bold text = p-value <0.05

^ No is the reference for these variables