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Binge Drinking among Men Who Have Sex with Men and Transgender Women in San Salvador: Correlates and Sexual Health Implications

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ABSTRACT *High rates of heavy alcohol use among men who have sex with men (MSM) and transgender women (TW) have been linked to increased vulnerability for HIV and poor mental health. While theories explaining elevated drinking levels among sexual minorities have been forwarded, few investigations have assessed the potential pathways using empirical data, particularly with an explicit focus on self-stigma and among MSM and TW in low- and middle-income countries. This study examined the relationship between stigma-related stress (specifically, self-stigma and concealment of one's sexual orientation) and binge drinking in a sample of MSM and TW (n=670) in San Salvador, El Salvador, recruited using respondent-driven sampling. Levels of alcohol consumption among participants were high: only 39 % of the sample did not drink alcohol or did not binge drink, while 34 % engaged in binge drinking at least weekly. Among MSM, high self-stigma was associated with binge drinking at least weekly (adjusted relative risk ratio (aRRR)=2.1, p<0.05). No such relationship was found with less than weekly binge drinking. Among both MSM and TW, having a female partner was associated with binge drinking less than weekly (aRRR=3.3, p<0.05) and binge drinking at least weekly (aRRR=3.4, p<0.05), while disclosure of sexual orientation to multiple types of people was associated with binge drinking less than weekly (aRRR=2.9 for disclosure to one–two types of people, p<0.01; aRRR=4.0 for disclosure to three–nine types of people, p<0.01). No such relationship was found with at least weekly binge drinking. Binge drinking at least weekly was marginally associated with a number of sexual health outcomes, including high number of lifetime partners (adjusted odds ratio (aOR)=1.7, p<0.10), inconsistent condom use with a non-regular partner (aOR=0.5, p<0.10), and decreased intention to test for HIV in the next 12 months (aOR=0.6, p<0.10). With the exception of inconsistent condom use with a non-regular partner (aOR=0.4, p<0.05), binge drinking less than weekly was not associated with increased sexual risk behavior and was actually associated with increased intention to test for HIV in the next 12 months (aOR=2.8, p<0.01). These findings support multiple pathways linking stigma-related stress to alcohol use. Specifically, those with high self-stigma and identity concealment may be using alcohol as a maladaptive coping and emotion regulation strategy, while those who have disclosed their sexual orientation to multiple types of people may be more engaged with the sexual minority community, likely in bars and other venues where permissive norms for alcohol use prevail. That this frequency of binge drinking does not appear to be associated with increased sexual risk behavior (and may even be associated with*

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increased intention to test for HIV in the next 12 months) lends further support to the suggestion that these individuals with healthy concepts of the self (as indicated by high levels of disclosure and low levels of risky sexual behavior) may engage in binge drinking because of the influence of the social environment. Further research is needed to establish the pathways linking stigma-related stress to heavy alcohol use so that points of intervention can be identified.

KEYWORDS *Substance use, Binge drinking, Sexual health, Internalized homonegativity, Sexual orientation disclosure, Men who have sex with men, Transgender women, El Salvador, Respondent driven sampling*

INTRODUCTION

Heavy alcohol use is an important public health problem among men who have sex with men (MSM) and transgender women (TW) in the USA that has been linked to increased vulnerability to HIV/STI[1,2] and poor mental health.[3] The prevalence of binge drinking among MSM in the USA exceeds that among the adult male population.[4,5] Comparison studies for substance use are not available for TW, although there is evidence of high levels of drinking among this group in the USA.[6,7] Heavy alcohol use among MSM and TW has also been noted as a problem in the Central America region. A 2008 integrated biological and behavioral surveillance study conducted among MSM and TW in El Salvador reports that 53 % of respondents in San Salvador and 58 % of respondents in the next largest city of San Miguel consumed alcohol in the past 30 days. In terms of binge drinking, 28 % of respondents in San Salvador and 30 % of respondents in San Miguel consumed five or more drinks on one occasion, four or more times in the last 30 days (the equivalent of binge drinking on average at least once per week).[8] Similar high levels of drinking have been found elsewhere in urban Central America: 69 % of MSM and 66 % of TW in Guatemala City consumed alcohol in the past month. Of those who drank in the past month, 31 % consumed more than 10 alcoholic drinks on one occasion.[9] In Managua, 76 % of MSM and 82 % of TW consumed alcohol in the past month. Of those, 42 % of MSM and 66 % of TW consumed four or more drinks on one occasion.[10]

Several hypotheses explaining elevated drinking levels among sexual minorities have been forwarded. According to minority stress theory as it has been applied to sexual minorities, internalization of negative societal attitudes and concealment of one's sexual orientation are two of the proximal stressors that impact sexual minorities.[11] Internalization of negative societal attitudes about one's sexual orientation resulting in feelings of self-hate and shame is referred to as "self-stigma" or, specifically for gay men, "internalized homonegativity (IH)." In turn, stigma-related stress is hypothesized to lead to alcohol use disorders through various pathways, including reliance on alcohol consumption as a maladaptive coping and emotion regulation strategy and the establishment and maintenance of social norms within the minority group that support alcohol consumption.[12]

Reliance on alcohol consumption as a coping and emotion regulation strategy involves the "strategic use of alcohol to escape, avoid or otherwise regulate negative emotions."[13], p. 991. There is some empirical evidence that stigma-related stress is associated with avoidant coping strategies: Nicholson and Long[14] showed a positive correlation between IH and avoidant coping strategies (which include trying to make oneself feel better by drinking or taking drugs), though Wagner et al.[15] found no association between IH and

coping in a highly resilient sample with low levels of IH. With respect to the use of alcohol to *escape* negative emotions, Coleman et al.[16] posit that alcohol use can serve the function of escaping confrontation with one's own homophobia.

A second pathway operates through the establishment and maintenance of permissive norms for alcohol consumption. In this context, norms refer to the influence of the environment on an individual's alcohol consumption.[12] The theory holds that high levels of stigma-related stress require that sexual minorities seek out the protective effects of positive group solidarity and cohesiveness.[11] However, to engage with the sexual minority community, MSM and TW must rely on bars and other venues where alcohol use is normative. Exposure to this environment influences the adoption of social norms that support alcohol use.[12] This pathway may work to establish high levels of alcohol use even (and perhaps especially) among individuals with high levels of self-acceptance. For example, acceptance of the self through the coming out process and stronger ties to the sexual minority community may increase exposure to venues where permissive norms for alcohol use prevail. Thus, even for individuals who have themselves developed effective ways of processing and coping with self-stigma, stigma in the wider social environment influences alcohol use by constraining the range of available options for social interaction for MSM and TW.

While these explanations have been put forward to explain high rates of alcohol use among sexual minorities,[12] few investigations have assessed the potential links using empirical data. This is especially true in low- and middle-income country settings. Moreover, few studies have examined the factors contributing to heavy drinking using IH measures explicitly (see Baiocco et al.[17] as an exception). The purpose of this study is to examine the relationship between stigma-related stress (specifically, internalization of negative societal attitudes (IH) and concealment of one's sexual orientation (relationship status and disclosure of sexual orientation)) and binge drinking in a sample of MSM and TW in the capital city of San Salvador, El Salvador. In a context where some amount of social drinking is normative, it is critical to distinguish between different levels of drinking. This study divided binge drinking into "less than weekly" and "at least weekly" categories to accommodate the nuance around the various pathways leading from stigma-related stress to problem drinking. A demonstration of the differences in effect of less than weekly versus at least weekly binge drinking on sexual health outcomes will lend weight to this approach.

METHODS

A cross-sectional study using respondent-driven sampling (RDS) to recruit a diverse sample of MSM and TW was conducted in San Salvador, El Salvador from November 2011 to February 2012. Study protocol followed standard techniques for RDS.[18] Recruitment chains were initiated by five seeds, purposely selected based on their social standing and wide social networks to increase the probability of successful referrals and recruitment chains. Seeds were also selected to increase the likelihood of sexual diversity in the study sample and included two gay/homosexual men, two bisexual men, and one bisexual TW.[18] Each participant received up to three recruitment coupons to distribute to social acquaintances who met study eligibility criteria. This included being 18 years of age or older; having had anal sex with a man or TW in the past 12 months; having lived, worked, or studied in San Salvador for a minimum of 3 months; and being in possession of a recruitment coupon.

A structured survey was administered to research participants ($n=670$) by interviewers with substantial experience in the administration of surveys with sensitive HIV and sexual risk behavior questions. The team included gay-identified men, a TW, and a heterosexual woman. Interviews were conducted in private rooms in a study office centrally located near shopping outlets and public transportation routes. Data was entered on personal digital assistants. Interviews were approximately 45 min in duration. Participants were provided US$5.00 as compensation for time spent completing the study interview and US$3.00 for each successful recruit referred to the study. A de-identified coupon numbering system was used to establish appropriate compensation based on referrals. Size of MSM and TW social network was determined by sequential questioning related to eligibility criteria (number of MSM and TW the respondent (1) knows; (2) who are 18 years of age or older; (3) who have resided, worked, or studied in San Salvador for at least the last 3 months; and (4) who the respondent has seen in the last 2 weeks), based on standard RDS techniques.[18]

This study was approved by the Tulane University Biomedical Institutional Review Board and the National Committee for Ethics and Clinical Investigation in El Salvador. Consent was obtained prior to participation. Potential participants were told about the study purpose and procedures, potential risks and protections, and remuneration. The voluntary nature of study participation was stressed. Informed consent was documented with signed consent forms.

Measures

Demographics Demographic characteristics included age (three categories: 18–24, 25–34, and 35–65), education (two categories: did not graduate from secondary school and graduated from secondary school or post-secondary school), and monthly income (three categories: no income, US$1–250, and US$260–3000).

Social Support Participants were administered Zimet et al.'s 12-item Multidimensional Scale of Perceived Social Support (MSPSS).[19,20] This measure of social support emphasizes emotional and affective forms of support globally and among three referent groups: family, friends, and significant others. Responses were measured on a 4-point Likert response scale (adapted from MSPSS's 7-point response scale), ranging from "strongly disagree" to "strongly agree" (Cronbach's alpha=0.94 in this study). Example items include, "My family is willing to help me make decisions," "There is a special person in my life who cares about my feelings," and "I can talk about my problems with my friends." The aggregate score for this measure was split at the median to create categories for high and low levels of perceived social support.

Health Behaviors Participants were asked how often they drank five or more alcoholic drinks on the same occasion in the last 30 days. A three-level binge drinking variable was constructed. Those who did not drink alcohol in the last 30 days or who did not drink five or more alcoholic drinks on any one occasion in the last 30 days were assigned to the lowest alcohol category. Those who engaged in one–four episodes of binge drinking in the last 30 days (the equivalent of binge drinking on average less than once per week) were assigned to the "less than weekly" binge drinking category. The "at least weekly" binge drinking category was comprised of those who engaged in five or more episodes of binge drinking in the last 30 days (the equivalent of binge drinking on average weekly or more often). As

a measure of behavioral intention related to sexual health, intention to test for HIV in the next 12 months was included. Intention to test was measured by a single questionnaire item. Inclusion of this measure augments the analysis of associations between binge drinking and sexual health outcomes.

Identity and Acceptance Several measures were included to capture self-identification of gender and sexual orientation and acceptance of sexual orientation. Participants were asked to self-report their gender identity and sexual orientation. For gender identity, response options included the following: man, woman, transgender woman, or other. Respondents selecting woman and transgender woman were collapsed into one category. For sexual orientation, response options included gay or homosexual, bisexual, heterosexual, or other.

As a component of identity acceptance, male-identified respondents were also administered Mayfield's 23-item internalized homonegativity scale (Cronbach's alpha = 0.90 in this study).[21] Responses were measured on a 4-point Likert response scale. Example items include, "I am disturbed when people can tell I am gay," "I feel ashamed of my homosexuality," and "I believe it is morally incorrect for men to have sex with men." The aggregate score for this measure was split at the median to create categories for high and low levels of internalized homonegativity. This measure is appropriate for use only among male-identified respondents and therefore was not administered to TW. Thus, bivariate and multivariate models using this measure are restricted to MSM only.

As a proxy for acceptance of sexual orientation, current relationship status was constructed as a three-level variable: has a male partner, has a female partner, and is single. Participants were also asked whom they had told that they engage in sexual relationships with men or transgender women. Response options included father, mother, brothers, sisters, male friends, female friends, co-workers, doctors, and nurses or other health care providers. An additive index of the number of types of people to whom participants had disclosed their sexual behavior was constructed. The index was divided into three categories for use in the analyses: no disclosure, disclosure to one–two types of people, and disclosure to three–nine types of people.

Sexual Risk Lifetime sexual risk characteristics included lifetime number of sexual partners (median split) and lifetime exchange of sex (receipt of clothing, food, money, drugs, or somewhere to sleep in exchange for sex with someone). For the last three partners in the past 6 months, sexual relationship concurrency (defined as sexual partnerships that overlap in time) was assessed. Dates of first and most recent sexual encounter were elicited for each sexual partner and used to determine overlap. Age discordance (defined as being at least 10 years younger than a sexual partner) and consistent condom use with non-regular partners were constructed from the data on the last three partners in the past 6 months. A summary measure of sex-related alcohol use was constructed from the question, "The last time you had sex with <name> did both or either of you drink alcohol or beer?," asked of the last three partners in the past 6 months. Relationship concurrency, age discordance, and sex-related alcohol use were constructed from the subsample of respondents who were sexually active in the last 6 months ($n = 623$). The denominator for the consistent condom use measure was comprised of the number of respondents who had a non-regular partner in the past 6 months ($n = 408$).

Other Ever experience of sexual assault was assessed by a single item asking if the participant had ever been forced to have sex even if he/she did not want to. For the purposes of this item, sex was defined as "penetration of the penis in the anus, vagina or mouth."

Statistical Analysis

All univariate analyses were conducted using Respondent Driven Sampling Analysis Tool 6.01 (RDSAT) and the multiplicity estimator for the weighting of data (www.respondentdrivensampling.org). Individualized weights for the various outcome variables were generated in RDSAT and exported to STATA SE version 12.0. Binge drinking was modeled at the bivariate and multivariate level using a multinomial logistic regression approach, with the low alcohol category as the reference category. Two separate models of binge drinking were run, one containing IH (and thus excluding TW) and the other excluding IH (and thus including TW). Unadjusted and adjusted relative risk ratios (RRR) are presented for these models. Weighted bivariate and multivariate logistic regressions were run for the various health outcomes (lifetime number of partners, concurrency, age discordance, consistent condom use with non-regular partners, and intention to test for HIV). Adjusted odds ratios (OR) are presented for these models.

The multivariate sexual health outcome models included the following covariates: age, education, monthly income, gender identity, sexual orientation, lifetime exchange of sex, and ever experience of sexual assault. In addition, the "intention to test" model included ever tested for HIV. The two binge drinking models included these same covariates (excluding ever tested for HIV), as well as perceived social support. The binge drinking model that included IH did not include the gender identity variable as this analysis was conducted among MSM only. This study used an a priori approach to variable selection: all control variables were retained in the multivariate model regardless of their significance at the bivariate level.

RESULTS

Sample characteristics are presented in Table 1. The sample was relatively young: about 70 % were 18–24 years old and only 8 % were 35 or older. Sixty percent of the sample had at least a secondary school degree, yet monthly income levels were low: 28 % had no monthly income and 44 % earned between US$1 and US$250 per month.

Levels of alcohol consumption were high: only 39 % of the sample did not drink alcohol or did not binge drink. Thirty-four percent engaged in at least weekly binge drinking, defined as five or more episodes of binge drinking in the last 30 days. A smaller proportion, 27 %, engaged in less than weekly binge drinking, defined as one to four episodes of binge drinking in the last 30 days. Sixty-five percent of the sample intended to test for HIV in the next 12 months.

In terms of identity and acceptance indicators, 82 % of the sample self-identified as male, while 18 % identified as female or transgender woman. Roughly the same proportion of the sample identified as gay/homosexual (41 %) as they did bisexual (40 %), with 19 % of the sample identifying as heterosexual. Only 11 % of the sample had a female partner. The rest of the sample was divided evenly between having a male partner (45 %) and being single (45 %). No disclosure and disclosure to one–two types of people accounted for roughly equal proportions of the sample (about 35 % each). A slightly smaller proportion of the sample, 30 %, disclosed to three–nine types of people.

TABLE 1 Sample characteristics, MSM and TW in San Salvador 2011–2012

	Number	Weighted % (95 % CI)
Demographic characteristics		
Age		
18–24	426	69.7 (64.2–75.5)
25–34	171	22.4 (17.7–27.4)
35–65	73	7.9 (4.9–10.8)
Education		
Did not graduate secondary	270	40.5 (34.8–46.2)
Graduated secondary and/or post-secondary	397	59.5 (53.8–65.2)
Monthly income		
No income	141	27.8 (23.0–32.4)
US$1–250	288	43.5 (38.4–48.6)
US$260–3000	240	28.7 (24.3–33.5)
Health behaviors		
Binge drinking		
No drinking or no binge drinking in last 30 days	260	39.3 (34.3–44.6)
Binge drinking 1–4 times in last 30 days	182	26.6 (21.9–31.4)
Binge drinking 5+ times in last 30 days	228	34.1 (29.2–39.2)
Intention to test		
Does not intend to test for HIV in next 12 months	197	34.6 (29.7–40.0)
Intends to test for HIV in next 12 months	449	65.4 (60.0–70.3)
Identity and acceptance		
Gender identity		
Man	506	81.5 (76.9–85.7)
Transgender woman (includes woman)	164	18.5 (14.3–23.1)
Sexual orientation		
Gay/homosexual	298	41.3 (35.5–46.5)
Bisexual	210	40.2 (34.6–46.3)
Heterosexual	162	18.5 (14.5–23.0)
Relationship status		
Male partner	253	44.6 (39.4–49.6)
Female partner	62	10.8 (7.6–14.1)
Single	350	44.6 (39.9–49.9)
Disclosure of sexual relationships with men or TW		
No disclosure	194	34.7 (29.6–39.7)
Disclosure to 1–2 types of people	241	35.5 (30.6–40.5)
Disclosure to 3–9 types of people	235	29.8 (25.0–35.1)
Sexual risk behavior		
Sex work, ever		
No	305	52.4 (46.9–57.7)
Yes	365	47.6 (42.3–53.1)
Sexual partnerships that overlap in time (concurrency), last 6 months		
No	393	67.7 (61.7–72.4)
Yes	230	32.3 (27.6–38.3)
Age discordance, last 6 months		
Not 10+ years younger than any of last three partners	522	87.6 (83.5–90.3)
10+ years younger than any of last three partners	101	12.4 (9.7–16.5)
Consistent condom use with non-regular partners, last 6 months		
No	77	17.6 (12.0–23.5)
Yes	331	82.4 (76.5–88.0)
Respondent or any of last three sex partners in the last 6 months drank alcohol at last sex		
No	430	73.7 (68.1–77.7)

TABLE 1 ***Continued***

	Number	Weighted % (95 % CI)
Yes	193	26.3 (22.3–31.9)
Other		
Sexual assault survivor, ever		
No	495	79.3 (75.1–82.9)
Yes	173	20.7 (17.1–24.9)

Weighted percents calculated using RDSAT software

Of all the sexual risk behaviors, engaging in sex work was the most common: 48 % of the sample had ever sold sex. Thirty-two percent of the sexually active subsample had concurrent sexual partnerships in the last 6 months, defined as having sexual partnerships that overlap in time. Twelve percent of the sexually active subsample had an age discordant relationship with a sexual partner in the last 6 months, defined as being at least 10 years younger than a sexual partner. Condom use with non-regular partners was relatively high: over 80 % of those with a non-regular partner in the past 6 months consistently used condoms with all non-regular partners. With respect to sex-related alcohol use, 26 % of the sexually active subsample indicated that they or any of their last three sex partners in the past 6 months drank alcohol at last sex.

The level of perceived social support was high: aggregate scores for the 12-item perceived social support scale ranged from 12 (scale minimum) to 48 (scale maximum) with a median of 40. Aggregate scores for the 23-item internalized homonegativity scale ranged from 23 (scale minimum) to 83 (short of the scale maximum of 92) with a median of 50. The median lifetime number of sexual partners was 16.

In a regression of binge drinking among MSM on a number of explanatory variables, internalized homonegativity was associated with at least weekly binge drinking (results in Table 2). In particular, for MSM with high levels of IH compared to MSM with low IH, the relative risk of having engaged in five or more episodes of binge drinking in the last 30 days relative to not binge drinking is higher by a factor of 2.1. No such relationship exists with less than weekly binge drinking.

In the model including IH (and thus excluding TW), the direction and significance of relationships were the same as in the model excluding IH. Relationship status and disclosure effects are presented only for the model excluding IH as this model

TABLE 2 RRR for relationships between IH and binge drinking, among MSM ($N=478$ in unadjusted model, $N=466$ in adjusted model)

	Binge drinking 1–4 times in last 30 days		Binge drinking 5+ times in last 30 days	
	Unadjusted RRR (95 % CI)	Adjusted RRR (95 % CI)	Unadjusted RRR (95 % CI)	Adjusted RRR (95 % CI)
Internalized homonegativity				
Low	Ref	Ref	Ref	Ref
High	0.94 (0.51–1.73)	0.95 (0.49–1.83)	2.46** (1.40–4.31)	2.05* (1.12–3.77)

Reference category: no drinking or no binge drinking in last 30 days

*$p<0.05$; **$p<0.01$; adjusted for age, education, monthly income, sexual orientation, sex work (ever), sexual assault (ever), perceived social support, disclosure of sex with men or TW, and relationship status

includes TW. In the model excluding IH (and thus including TW), having a female partner confers significant risk for binge drinking (see Table 3). For those with a female partner compared to those with a male partner, the relative risk of having engaged in one–four episodes of binge drinking in the last 30 days relative to not binge drinking is higher by a factor of 3.3. The relative risk of having engaged in five or more episodes of binge drinking in the past 30 days relative to not binge drinking is 3.4 times higher for those with a female partner compared to those with a male partner. Being single carries with it slightly elevated risk relative to having a male partner, though the effect was only marginally significant in the multivariate model. Taken together, these findings indicate a protective effect of having a male partner for less than weekly and at least weekly binge drinking.

Disclosure influences the risk of less than weekly binge drinking (see Table 3). The relative risk of having engaged in one–four episodes of binge drinking in the last 30 days relative to not binge drinking is 2.9 times higher for those who disclosed to one–two types of people compared to those who had not disclosed. For those who disclosed to three–nine types of people compared to those who had not disclosed, the relative risk of having engaged in one–four episodes of binge drinking in the last 30 days relative to not binge drinking is higher by a factor of 4.0. No such relationship exists with more frequent binge drinking. Though disclosure to three–nine types of people may confer a slightly elevated risk of having engaged in five or more episodes of binge drinking, the relationship is only marginally significant and the effect size is modest compared to those in the less than weekly binge drinking category. Thus, disclosure is related to less than weekly binge drinking, with more disclosure associated with a higher chance of less than weekly binge drinking.

Binge drinking was related to a number of sexual health outcomes (see Table 4). Binge drinking five or more times in the last 30 days was associated with a higher lifetime number of partners, inconsistent condom use with non-regular partners in the past 6 months, and lower intention to test for HIV in the next 12 months, though the relationships were only marginally significant. Even though they are not statistically significant, relationships between at least weekly binge drinking and concurrency and at least weekly binge drinking and age discordance are shown, as both were statistically significant (for age discordance, only marginally so) in the unweighted models (results not shown). Taken together, these models suggest an association between at least weekly binge drinking and risky sexual behavior/suboptimal sexual health intentions.

No such relationship exists for less than weekly binge drinking, with the exception of consistent condom use with a non-regular partner (those who engaged in one–four episodes of binge drinking in the past 30 days were 0.4 times as likely as those in the low alcohol category to have consistently used condoms with non-regular partners in the past 6 months). With respect to intention to test, less than weekly binge drinking was actually associated with a *greater* intention to test for HIV in the next 12 months. Those who engaged in one–four episodes of binge drinking in the last 30 days were 2.8 times as likely as those in the low alcohol category to indicate an intention to test for HIV in the next 12 months. Thus, while at least weekly binge drinking appears to be associated with poorer sexual health outcomes, less than weekly binge drinking is *not* accompanied by elevated levels of risky sexual behavior (with the exception of consistent condom use with non-regular partners) and may even be associated with *more* optimal sexual health intentions.

TABLE 3 RRR for relationships between relationship status, disclosure of sexual orientation, and binge drinking ($N=654$ in the adjusted model; $N=670$ in the unadjusted model for disclosure; $N=665$ in the unadjusted model for relationship status)

	Binge drinking 1–4 times in last 30 days		Binge drinking 5+ times in last 30 days	
	Unadjusted RRR (95 % CI)	Adjusted RRR (95 % CI)	Unadjusted RRR (95 % CI)	Adjusted RRR (95 % CI)
Relationship status				
Male partner	Ref	Ref	Ref	Ref
Female partner	1.32^ (0.89–6.05)	3.29* (1.14–9.51)	2.94* (1.29–6.68)	3.40* (1.33–8.65)
Single	1.90* (1.08–3.34)	1.62 (0.85–3.08)	1.94* (1.17–3.21)	1.76^ (0.93–3.32)
Disclosure of sexual orientation				
No disclosure	Ref	Ref	Ref	Ref
Disclosure to 1–2 types of people	3.34** (1.67–6.70)	2.86** (1.37–5.95)	1.65^ (0.94–2.90)	1.48 (0.78–2.80)
Disclosure to 3–9 types of people	4.46*** (2.20–9.08)	3.96** (1.80–8.70)	1.75^ (0.97–3.14)	1.87^ (0.93–3.76)

Reference category: no drinking or no binge drinking in last 30 days

^$p<0.10$; *$p<0.05$; **$p<0.01$; ***$p<0.001$; adjusted for age, education, monthly income, gender identity, sexual orientation, sex work (ever), sexual assault (ever), and perceived social support

TABLE 4 Adjusted OR for relationships between binge drinking and various sexual health outcomes

	Lifetime number of partners ≥16 ($N=665$)	Partnerships that overlap in time (concurrency) ($N=618$)	10+ years younger than any of last three partners (age discordance) ($N=618$)	Consistent condom use with non-regular partners ($N=407$)	Intends to test for HIV in next 12 months ($N=643$)
	Adjusted OR (95 % CI)	Adjusted OR (95 % CI)	Adjusted OR (95 % CI)	Adjusted OR (95 % CI)	Adjusted OR (95 % CI)
Binge drinking					
No drinking or no binge drinking in last 30 days	Ref	Ref	Ref	Ref	Ref
Binge drinking 1–4 times in last 30 days	1.09 (0.60–1.95)	0.78 (0.43–1.44)	0.92 (0.42–1.99)	0.41* (0.17–0.96)	2.81** (1.44–5.49)
Binge drinking 5+ times in last 30 days	1.71^ (0.96–3.05)	1.22 (0.67–2.21)	1.27 (0.60–2.66)	0.51^ (0.23–1.12)	0.57^ (0.32–1.00)

^$p<0.10$; *$p<0.05$; **$p<0.01$; all models adjusted for age, education, monthly income, gender identity, sexual orientation, sex work (ever), and sexual assault (ever); intention to test model also adjusted for ever tested

The results were the same when the 12-month sex work variable was used in place of the lifetime sex work variable in the models assessing sexual risk behavior in the last 6 months (results not shown). For consistency, the lifetime sex work variable is used in all models.

DISCUSSION

This study examined the relationship between stigma-related stress (specifically, internalization of negative societal attitudes (IH) and concealment of one's sexual orientation (relationship status and disclosure of sexual orientation)) and binge drinking in a sample of MSM and TW in San Salvador. Approximately 61 % of the sample engaged in binge drinking in the past 30 days. While this level is substantially higher than that in the general population of El Salvador (estimated at 16 % for males and 5 % for females),[22] it may be reflective of social norms around drinking in MSM and TW communities in Central America.[8–10] In any case, the data indicate a high base level of binge drinking in the sample, which is consistent with theory linking stigma-related stress to alcohol use through various pathways.

Factors influencing at least weekly binge drinking in this study included having a female partner and a high level of IH. These findings are consistent with the maladaptive coping strategy pathway posited by Cooper et al.[13] and with previous empirical work demonstrating a link between IH and heavy drinking.[17,23] Those with a female partner may be engaging in identity concealment, leading to higher levels of stress and subsequent alcohol use as an avoidant coping strategy. At least weekly binge drinking is also associated with disclosure to thee–nine types of people and being single, though the effects are only marginally significant. At least weekly binge drinking in these groups may be consistent with the permissive social norms process: those with high levels of disclosure and who are single may spend more time in social environments where alcohol use is normative. This finding is consistent with other work linking gay bar attendance to heavy alcohol use.[24–27] The marginal relationship for those who are single may also be due to the absence of a protective effect of having a stable male partner, as evidenced in other empirical work.[28,29]

No drinking or no binge drinking is more likely among participants with a male partner, a low level of sexual orientation disclosure, and a low level of IH. Having a male partner and a low level of IH may indicate a higher degree of identity synthesis, which may moderate the relationship between stress and pathogenesis of mental health and alcohol use disorders.[12] Moreover, those who are in stable relationships with male partners may spend less time in the social spaces that support permissive norms for alcohol use. Similarly, no disclosure may indicate less engagement with the sexual minority community and thus less exposure to these permissive social norms.

Finally, less than weekly binge drinking was associated with medium and high levels of disclosure. This group of disclosers may engage in less than weekly binge drinking because their high level of engagement with the sexual minority community exposes them to permissive norms for alcohol use, or as a way of coping with stigma-related stress that arises from negative reactions to their sexual orientation disclosure. The fact that less than weekly binge drinking is not associated with other risky sexual behaviors/suboptimal sexual health intentions that are typically influenced by stigma-related stress suggests that disclosure is acting through the social norms pathway, but more data on disclosure reactions are needed to confirm this speculation.[17,30] Less than weekly binge drinking is also associated with having a female partner. Just as for at least weekly binge drinking, this relationship likely works through the maladaptive coping strategy pathway.

It is well-established that greater levels of alcohol consumption impair the decision-making process, leading to riskier sexual practices.[31,32] The results of this study suggest that, with the exception of consistent condom use with a non-regular partner, less than weekly binge drinking is *not* related to risky sexual behavior among MSM and TW in San Salvador. Specifically, less than weekly binge drinking confers no increased risk for high lifetime number of partners, sexual relationship concurrency, or age discordance and is actually associated with *increased* intention to test for HIV in the next 12 months. At least weekly binge drinking, on the other hand, is marginally associated with high lifetime number of partners, less consistent condom use with non-regular partners, and decreased intention to test for HIV in the next 12 months. In unweighted models, at least weekly binge drinking is also associated with sexual concurrency and marginally associated with being the younger partner in an age discordant partnership. These findings are consistent with other work linking heavy drinking among MSM to sexual risk behavior.[29,33–35]

Thus, the findings of this study support multiple pathways linking stigma-related stress to alcohol use. Internalization of negative societal attitudes (indicated by a high level of IH) and concealment of one's sexual orientation (indicated by having a female partner) were found to be associated with at least weekly binge drinking, indicating a reliance on alcohol consumption as a maladaptive coping and emotion regulation strategy.[7,24,36] On the other hand, medium and high levels of sexual orientation disclosure were found to be associated with less than weekly binge drinking. According to the permissive norms pathway, these individuals are presumed to be engaging with the sexual minority community, likely in bars and other venues where permissive norms for alcohol use prevail.[17,36–38] An examination of sexual health outcomes confirms that these individuals do not necessarily engage in increased risky sexual behavior, further supporting the theory that individuals with otherwise healthy concepts of the self (as indicated by high levels of disclosure and low levels of risky sexual behavior) may engage in binge drinking because of the influence of the social environment.[28,39]

These findings have several implications for research and practice. In a social context that supports a base level of binge drinking, research must distinguish between normative and excessive levels. Moreover, more research is needed to establish the pathways linking stigma-related stress to alcohol use disorders and other health outcomes so that points of intervention can be identified. Interventions to address high levels of IH among MSM that address both individual cognitive processes and the social and structural determinants of IH are needed.[17,39] Interventions to support disclosure of sexual orientation (when it is appropriate to do so) must acknowledge the association between disclosure and potential increases in binge drinking, aiming to mitigate the negative consequences of disclosure while retaining the positive aspects of social connection to the sexual minority community.

The RDS recruitment strategy allowed for recruitment of many MSM and TW in a relatively short timeframe, and the resulting sample displayed adequate variation on the variables of interest. Several assumptions must be satisfied for the RDS estimator to yield unbiased population estimates.[40] Measures taken in this study to prevent violations of the assumptions included placing the study site in an easily accessible, centralized location and using a series of probing questions to aid respondents in accurately estimating network size. Moreover, from other RDS studies conducted in El Salvador and across the Central American region,[8–10] there is evidence to suggest that MSM and TW are a socially networked group. While these measures and existing evidence imply that violations of the assumptions were

minimized, it is possible that the assumptions were not fully satisfied, thus yielding biased population estimates. Finally, the individualized weights generated by RDSAT and then applied to the multivariate analyses considered only homophily of the outcome variables and not of the other variables in the models. Therefore, results should be interpreted with caution.

In addition, the interpretation of marginally significant ($p<0.10$) results should be made with caution, especially in light of the fact that the significance level was not adjusted for multiple comparisons. The comparison of unweighted and weighted findings suggests that the RDS strategy contributed to reduced power; this may account for the marginal significance detected in several of the sexual health outcome models. Moreover, despite the lack of significance at the alpha=0.05 level, the findings demonstrate a consistent pattern across several models, further suggesting that the marginal significance may be due to inadequate power and not to a true lack of difference in sexual health outcomes based on level of binge drinking.

The main limitation of this study is the cross-sectional nature of the study design, prohibiting the determination of causal relationships. It is also unclear if the findings can be generalized to the larger MSM and TW population in San Salvador, especially considering that the majority of the sample (70 %) is under age 25. The analyses did not consider event-level data on binge drinking and sexual risk behavior and evaluated associations only at the global level; the lack of specificity in global-level associations may explain the marginal associations observed between binge drinking and sexual risk behaviors. Data was elicited through self-report and this may have led to social desirability bias. While TW were included as part of the study population, a measure of internalized stigma for transgender persons was not available and is an important area for future research. Finally, information on reactions to sexual orientation and identity disclosure was not available, precluding an interpretation of the effect of a negative or positive response to sexual orientation disclosure on binge drinking. Despite these limitations, the results presented in this study make a unique contribution to the literature on binge drinking among both MSM and TW in low- and middle-income settings.

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