ORIGINAL RESEARCH ARTICLE

Alcohol use and HIV sexual risk among MSM in Chennai, India

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Summary: Men who have sex with men (MSM) in India are a core risk group for HIV. Heavy alcohol consumption is associated with increased sexual risk-taking behaviours in many cultures, in particular among MSM. However, no studies to date have explored alcohol use and HIV risk among MSM in India. MSM in Chennai, India ($n = 210$) completed an interviewer-administered behavioural and psychosocial assessment. Bivariate and multivariable logistic regression procedures examined behavioural and demographic associations with weekly alcohol consumption. Twenty-eight percent of the sample ($n = 58$) reported using alcohol at least weekly to the point of being buzzed/intoxicated, which was associated with older age, being married to a woman, being panthi (masculine appearing, predominantly insertive partners) versus kothi (feminine acting/appearing and predominantly receptive partners), weekly tobacco use, unprotected anal sex and unprotected vaginal sex in the three months prior to study enrolment (all $P < 0.05$). In a multivariable model, unprotected vaginal sex in the previous three months and being married to a women were unique variables associated with weekly alcohol use (all $P < 0.01$). Further investigation of alcohol use within the context of sexual risk taking is warranted among Indian MSM. Panthis and MSM who are married to women may be particularly likely to benefit from interventions to decrease alcohol intake and concurrent unsafe sex.

Keywords: men who have sex with men (MSM), alcohol, HIV, sexually transmitted infections (STI), prevention, intervention, India

INTRODUCTION

India has the greatest number of HIV infections in Asia and the second highest total number of infected persons globally.[1,2] The Indian HIV epidemic is primarily driven by sexual transmission which accounts for more than 80% of HIV infections,[1] and has moved beyond the high-risk 'core' groups of MSM, female sex workers, injecting drug users (IDUs) and truckers into the general population.[1,3,4] Understanding risk factors, such as alcohol use, among 'bridge' groups, especially among men who have sex with men (MSM), may be important in developing effective HIV prevention interventions.

Having a homosexual sexual orientation in India is not necessarily or typically tied to one's identity.[5–7] 'Western' constructs (e.g. 'gay') and terms used to describe male–male sexual subcultures cannot be automatically used in South Asia. Behaviour and sexual partnerships can be highly varied and, as a result, concepts of identity may be complicated and fluid. In most of these constructs, same-sex behaviour does not preclude sex with women or traditional marriage. Hence, MSM who are married to women in India may act as a bridge population between high- and low-risk groups for both men and women, facilitating transmission of HIV and

sexually transmitted infections (STIs) between their wives, female partners, female sex workers and other men or transgender individuals. Although data are limited, studies suggest that MSM behaviours occur in complex and diverse ways beyond those who self-identify as homosexual.[8–11] Subgroups of MSM include the following: *kothi* (feminine acting/appearing and predominantly the receptive partner in anal sex), *panthi* (masculine appearing, predominantly the insertive partner in anal sex), and *double deckers* (often times bisexual, and will be both insertive and receptive partner in anal sex). While kothi tends to self-identity, panthi and double deckers are labels given by kothis to their masculine partners based on their sex role and behaviours.[5,7,12]

The use of alcohol to the point of inebriation continues to be prevalent among USA MSM and is consistently linked to risk factors for HIV infection and other STIs.[13–16] For example, a household-based sample of urban MSM ($n = 2172$) found that alcohol use (85%) was highly prevalent and heavy-frequent alcohol use (8%) was not uncommon.[16] Moreover, baseline data from the EXPLORE study, a randomized behavioural intervention trial conducted in six USA cities with 4295 HIV-negative MSM, found that 26% of MSM reported drinking alcohol at least three days per week, and 11% were heavy drinkers (i.e. they consumed at least 4 drinks per day or consumed an amount equal to 6 drinks per occasion), which was associated with unprotected anal sex[14] and HIV seroconversion over study follow-up.[15]

Studies of alcohol use and risky sex in India have been largely focused on men in general. These studies have found

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alcohol use to be associated with not only higher rates of HIV/STI risk behaviours, but also with higher HIV and STI rates among men in India.[16-20] Although a growing number of studies have explored sexual risk among MSM in India,[4,8,9,11,21-24] no studies to date have investigated the correlates of alcohol use and concurrent sexual risk among an exclusively MSM sample. Importantly, MSM in India experience multiple and complex challenges, including stigmatization, isolation, homophobia, criminalization and discrimination, which may put them at augmented risk for alcohol abuse and/or unprotected sex.[25,26] Additional research is needed to understand and address alcohol use and HIV risk among MSM in India.

The purpose of the present analysis was to preliminarily examine demographic, sexual risk and psychosocial characteristics that may be associated with alcohol use among MSM in Chennai, India. Prior research with this sample of Indian MSM found high rates of alcohol use and unsafe sexual behaviours.[24] As a follow-up to this research, the present paper examines the correlates of alcohol use and concomitant sexual risk among that MSM sample, filling an important gap in current research with Indian MSM. These data may assist in the development of a behavioural intervention that aims to reduce alcohol use and concurrent HIV risk taking among MSM in India.

METHODS

Participants and procedures

Participants ($n = 210$) were recruited through peer outreach workers at an MSM non-government organization in Chennai called Sahodaran, a sexual health organization for Indian MSM that conducts outreach. Study visits occurred at the India Council of Medical Research Tuberculosis Research Centre (TRC), a governmental research institution involved in studies of HIV prevention. Participants completed an interviewer-administered psychosocial assessment battery and underwent standard-of-care HIV pre- and post-test counselling. Additional specifics on procedures and HIV testing algorithms for this study are mentioned elsewhere.[24] The study was approved by the Institutional Review Boards at Massachusetts General Hospital and Harvard Medical School as well as the Ethics Board at the Tuberculosis Research Centre.

Study instruments

Demographics and contextual variables
Participants were asked about their age, MSM subpopulation identity (e.g. kothis, panthis, double deckers and other sexual identities), religion (Hindu, Christian or Muslim), marital status and whether they had children, education level, employment status and their openness about sexual identity to family.

Depression
Depressive symptoms were assessed with the Center for Epidemiologic Studies Depression Scale,[27] a validated survey of clinically significant distress as a marker for clinical depression (coefficient alpha = 0.90; Cronbach's alpha = 0.89).[28] The 20-items were scored on a 4-point Likert scale from 0 to 3, with a score of 16 or greater indicative of clinically significant depressive symptoms.

Current alcohol and tobacco use
Alcohol and tobacco use in the 12 months prior to study enrolment were measured with a 7 point frequency scale with the following descriptors: 'never', 'once a year or less', 'once a month', 'a few times a month', '1–2 times a week', '3–4 times a week', 'daily or almost daily'.

Sexual risk
Participants were asked about their total number of male and female sexual partners in the three months prior to study enrolment, as well as whether or not they engaged in any unprotected anal insertive or receptive sex with another man and unprotected vaginal sex with a woman in the three months prior to study enrolment. These questions were adapted from widely used assessments of sexual risk taking among MSM in the USA.[14,29]

Self-reported STIs
Participants were also asked whether or not they had an STI diagnosis in the past six months (including hepatitis A, B, and C, gonorrhoea, chlamydia, syphilis, herpes simplex virus, and genital or anal warts).

Condom use self-efficacy
Condom use self-efficacy was assessed using a brief self-efficacy scale (4 items) that asked about the degree to which a person believes that they can use condoms in increasingly difficult situations.[30]

Data analysis

SAS® version 9.1.3[31] statistical software was used to perform each analysis, where statistical significance was determined at $P < 0.05$.

Primary outcome
The outcome of interest for all analyses was a dichotomous assessment of weekly alcohol use to the point of being 'buzzed/drunk'. Participants who reported consuming alcohol on a weekly basis in this manner or more frequently were considered 'weekly alcohol users'; those who used alcohol less than weekly were not considered 'weekly alcohol users'.

Bivariate associations to weekly alcohol use
Demographic and psychosocial factors, sexual risk, and HIV and STI history were examined for their association to weekly alcohol use using bivariate logistic regression procedures.

Multivariable models
Variables that were statistically significant in the bivariate regression analyses were retained in a multivariable logistic regression model. This model was constructed in alignment with meeting convergence criteria in SAS. Because there were multiple indicators of sexual risk taking in this analysis, multicollinearity among these variables was assessed; intercorrelation among the independents above 0.80 was considered to be problematic. For significant bivariate predictors that were multicollinear with each other, the variable thought to be theoretically most important in the analysis was chosen and retained in

the final multivariable model, whereas the others were dropped. The final multivariable model was constructed using the backward elimination procedure, which involves starting with all candidate variables and testing them one-by-one for statistical significance, deleting any that are not significant.

RESULTS

Descriptive statistics

Demographic and psychosocial characteristics of the study sample by weekly alcohol use are outlined in Table 1.

Substance use
Twenty-eight percent ($n = 58$) of the sample reported that they used alcohol at least weekly to the point of inebriation, and 25% reported at least weekly tobacco use.

Table 1 Demographics, sexual risk taking and other psychosocial variables by weekly alcohol use ($n = 210$)

	Greater than or equal to weekly alcohol consumption ($n = 58$)	Less than weekly alcohol consumption ($n = 152$)
Age range	19–52	18–61
Mean age (SD)	30.7 (7.9)	28.3 (7.7)
Condom use self-efficacy – mean (SD) higher scores = higher self-efficacy	6.3 (1.6)	6.4 (1.3)
Number of male sex partners in the past 3 months – mean (SD)	17.5 (58.7)	9.5 (14.4)
Number of female sex partners in the past 3 months – mean (SD)	2.3 (3.7)	0.9 (1.7)
MSM subpopulation identity		
Panthi	48%	34%
Kothi	24%	26%
Double decker	28%	40%
Religion		
Hindu	81%	80%
Christian	9%	14%
Muslim	10%	6%
Frequency married to women	38%	16%
Education		
Graduate or professional degree	0%	3%
College degree	9%	14%
High school degree	22%	26%
Middle school	53%	42%
Elementary school	14%	12%
No formal education	2%	3%
Employment status		
Full-time	76%	76%
Part-time	17%	8%
Full- or part-time and in school	0%	9%
Unemployed	5%	7%
Other	2%	0%
Tested positive for HIV	9%	7%
Self-reported STI history past 6 months	7%	6%
Family knows about sexual identity	21%	21%
Depression (CES-D) – screened positive	57%	54%

SD = standard deviation; STI = sexually transmitted disease

Sexual risk taking, HIV testing results and STI history
Those who reported weekly alcohol use had an average of 17.5 (standard deviation [SD] = 59) male sexual partners in the three months prior to enrolment compared with an average of 9.5 (SD = 14) male partners among those without weekly alcohol use. Similarly, MSM with weekly alcohol use (mean = 2.3; SD = 4) reported more than double the mean number of female sexual partners in the three months prior to study enrolment compared with those without weekly alcohol use (mean = 0.9; SD = 2). Nine percent of those who reported weekly alcohol use tested positive for HIV compared with 7% among those without weekly alcohol use. Self-reported STI diagnosis in the six months prior to study enrolment among those with weekly alcohol use was 7% compared with 6% among those without weekly alcohol consumption.

Logistic regression analyses
Bivariate and multivariable logistic regression analyses of factors associated with weekly alcohol consumption in the 12 months prior to study enrolment are outlined in Table 2.

Bivariate associations of demographic and psychosocial variables to weekly alcohol use
Demographic and psychosocial characteristics significantly associated with weekly alcohol use included: age, such that each year increase is associated with an increase in weekly alcohol use (odds ratio [OR] = 1.04; $P = 0.05$); MSM

Table 2 Bivariate and multivariable logistic regression models of predictors of weekly alcohol use ($n = 210$)

	Odds ratio (unadjusted bivariate models)	P value	Odds ratio (adjusted multivariable model)	P value
Unprotected anal (insertive or receptive) sex in the 3 months prior to enrolment				
Yes	2.00	0.05	1.83	0.11
No	1.00	–	1	–
12 or more male sexual partners in the 3 months prior to enrolment				
Yes	2	0.05		
No	1	–	–	–
Unprotected vaginal sex in the 3 months prior to enrolment				
Yes	2.91	0.009	2.82	0.01
No	1	–	1	–
Number of female sexual partners in the 3 months prior to enrolment (continuous)	1.23	0.006	–	–
Age (continuous)	1.04	0.05	1.02	0.43
MSM subpopulation identity				
Panthis	1.57	0.05		
Double decker	0.74	0.13		
Kothi	1.00	–	–	–
Weekly smoking/tobacco use				
Yes	6.01	0.0001	–	–
No	1	–		
Married				
Yes	3.11	0.001	2.98	0.005
No	1.00	–	1.00	–

The final multivariable model was constructed in alignment with convergence criteria in SAS

Due to significant multicollinearity of sexual risk variables, only unprotected anal (male partners) and unprotected vaginal (female partners) sex in the three months prior to enrolment were retained in the final multivariable model

subpopulation identity: panthis were more likely to use alcohol than kothis (OR = 1.57, P = 0.05); weekly smoking/tobacco use (OR = 6.01, P = 0.0001); and being an MSM that is married to a woman (OR = 3.11, P = 0.001).

Bivariate associations of sexual risk-taking variables to weekly alcohol use

Weekly alcohol use was associated with having unprotected anal sex (OR = 2.00; P = 0.05) and unprotected vaginal sex (OR = 2.91; P = 0.009) in the three months prior to study enrolment. Similarly, weekly alcohol use was significantly associated with having 12 or more male sexual partners in the three months prior to study enrolment (OR = 2.00; P = 0.05) and number of female partners, such that with each additional female sexual partner in the three months prior to study enrolment there was an associated increased odds in weekly alcohol use (OR = 1.23; P = 0.006).

Multivariable logistic regression model of weekly alcohol use

In addition to examining bivariate associations, variables that had unique variance in explaining whether or not someone reported at least weekly alcohol use in the 12 months prior to study enrolment were also examined. In a multivariable model, unprotected vaginal sex in the three months prior to study enrolment (AOR = 2.82, P = 0.01) and being married to a woman (AOR = 2.98, P = 0.005) were the only two unique variables that were associated with weekly alcohol use.

DISCUSSION

More than one in four Indian MSM in our sample reported that they used alcohol at least weekly to the point of being buzzed/intoxicated. In bivariate analyses, weekly alcohol use was significantly associated with sexual risk taking in the three months prior to study enrolment. Weekly alcohol users were more than twice as likely to report unprotected anal sex and almost three times as likely to report unprotected vaginal sex. Bivariate psychosocial characteristics significantly associated with weekly alcohol use were older age, identifying as panthi, current weekly tobacco use and being married to a woman, and in the final multivariable model, factors uniquely associated with weekly alcohol use were unprotected vaginal sex and being married to a woman. Consist with prior studies on Indian men in general,[17-21] results suggest that sexual risk taking among MSM is, at least with a proportion of MSM, occurring in the context of alcohol use, particularly among MSM married to women.

With up to 60% of MSM in epidemiological studies married and almost 90% reporting sex with female partners, these data suggest that this subset of urban Indian MSM who are married to women might be a particularly important 'bridge' population that could amplify the HIV epidemic in India. Because most MSM in India usually marry women due to deep-rooted cultural and familial traditions[6,7] and the risk for transmission of HIV infection is not only to other men but also to their female partners or wives and future children. Future studies that generate information about the sexual and social networks of MSM who use alcohol during sex with men, women or both will assist public health officials and researchers to address rising rates HIV/STIs among MSM in

India, as well as provide critical information regarding the potential transmission dynamics between and among MSM and other groups, such as heterosexual women.

The majority of prevention programmes for MSM in India currently involve condom distribution, HIV education, and HIV voluntary counselling and testing.[4] Input from community advisory boards and focus groups of local MSM in India reveal that MSM increasingly feel that they have reached saturation in terms of these methods and messages.[6] Research has also shown that alcohol use may just be one variable in the midst of a myriad of psychosocial concerns among Indian MSM, including coming out and non-acceptance from society and their families, pressure to get married and have children, discrimination, harassment from police and local thugs, ambivalence about and implications of condom negotiation with a sexual partner, and guilt and shame regarding their sexual orientation, all of which interact in complex and multifarious ways with sexual risk behaviours.[25] Taken together, alcohol use may be a means to help cope with the various pressures and other psychosocial concerns among Indian MSM.

If, as our results suggest, a sizable proportion of ongoing sexual risk taking among MSM is occurring in the context of alcohol use, targeting both the HIV risk taking and the concurrent substance problems may be an effective way to address risk taking in the most risky groups, yielding the highest potential for intervention success. Reviews of numerous international clinical trials and studies have demonstrated the efficacy of brief alcohol interventions to reduce the overall level of alcohol consumption, change harmful drinking patterns, prevent future drinking problems, improve health and reduce health care costs.[34-39] Although brief, MSM-specific, goal choice interventions focused on early engagement of problem-drinking have been recommended for USA MSM (e.g. Shoptaw and Frosch[40]), none have explored this among Indian MSM. Findings from the present study indicate that HIV prevention interventions may benefit from incorporating behavioural strategies that target both alcohol use and concomitant sexual risk. Currently, insufficient data are available to know how to best address the role of alcohol use of MSM in the Indian context and additional research is warranted to explore how patterns of alcohol use may contribute to sexual risk taking among Indian MSM.

Study findings should be interpreted with the following limitations in mind. First, as a cross-sectional study, inferences about causality cannot be made. Second, the non-probability sampling method (i.e. convenience sample) means the introduction of possible sampling bias, a less representative sample of the population, and limited generalizability of results. The Indian MSM in this study comprise a specific subset of all MSM at risk for HIV and represent a small sample of men; thus, generalizability of results is limited. However, this is the first study that we are aware of to explore alcohol use and sexual risk among an exclusively MSM sample, providing valuable insight concerning the association between alcohol and sexual risk behaviour among Indian MSM.

To maximize effectiveness, HIV prevention interventions must reach HIV-infected individuals and those at high risk for HIV acquisition who are particularly likely to engage in transmission risk behaviours. MSM who combine alcohol use with unsafe sex may embody one such risk group. As in other contexts, HIV prevention interventions among MSM in India have not yet focused on how alcohol use may increase risk, which may provide valuable insight on how best to intervene to reduce sexual risk among MSM in India. Future

research and intervention development for Indian MSM should incorporate and foreground the concept of 'intertwined syndemics'[38–40] to understand how psychosocial health issues, such as alcohol use, interact with and exacerbate HIV risk among Indian MSM.

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