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Male Alcohol use and unprotected sex with non-regular partners: Evidence from wine shops in Chennai, India

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Abstract

Background—In India, heterosexual transmission accounts for approximately 80% of the spread of HIV, the virus that causes AIDS. Male alcohol use and its putative association with sexual risk are explored to inform HIV prevention interventions.

Methods—A survey of 1196 male patrons of wine shops or bars was conducted from August 2002 - Jan 2003 as part of an ongoing HIV prevention trial in Chennai city in south India. In the analysis, we explored associations between covariates related to sexual behavior and alcohol use and our outcome of unprotected sexual intercourse with non-regular partners among men

Results—Nearly half (43%) of the respondents reported any unprotected sex with non-regular partners and 24% had four or more recent sexual partners. Over 85% reported using alcohol at least 10 days a month (17% reported drinking everyday). During a typical drinking day, 49% reported consuming five or more drinks. Alcohol use before sex was reported by 89% of respondents. Unprotected sex with non-regular partners was significantly higher among unmarried men

(OR=3.25), those who reported irregular income (OR=1.38), who used alcohol before sex (OR=1.75) and who had higher numbers of sexual partners (OR=14.5).

Conclusions—Our findings suggest that future HIV prevention interventions in India might consider discussing responsible alcohol use and its possible role in sexual risk. These interventions should particularly consider involving unmarried men and weigh the role of structural factors such as access to income in developing prevention messages.

Keywords

alcohol use; sexual risk behavior; HIV/AIDS; India

1. INTRODUCTION

International studies exploring the association of alcohol use and sexual risk have reported mixed findings. While randomized study designs have provided some support for this association, cross-sectional survey research has not. Randomized designs have shown that under controlled conditions those exposed to alcohol and a sexual vignette report increased intentions to engage in unsafe sex, but have low sexual risk perceptions (Weinhardt and Carey, 2000). Studies also show that individual differences in impulsivity, cognitive responses and differential reaction to alcohol may account for risky sexual outcomes (Stoner et al., 2006; Hendershot and George, 2006). Studies that have explored alcohol use related factors and their associations with sexual risk have not been widely reported from India where there are now over 5 million individuals infected with HIV (National AIDS Control Organization, 2006) since the first case of HIV was reported in 1986 (Simoes et al., 1987). However, research on alcohol use and its health effects suggests that alcohol abuse is widely prevalent and its effects need more study and discussion in the public health arena.

In India, two effects of alcohol use are of particular concern. First, the possible effect of alcohol use on individual health and second is the likely social and economic impact of alcohol use and abuse. There are 31 states in the Indian union and alcohol use prevalence estimates vary from state to state, ranging from 6% (in a state under prohibition) to 75%. Studies investigating dependence consistently report that approximately half of those who drink alcohol show signs of dependence (Benegal, 2005). Using self-reports, a survey in New Delhi found that 43.4% of respondents met the DSM III alcohol dependence criteria that consider both pathological use patterns and the presence of tolerance or withdrawal symptoms in the individual (Mohan et al., 2001). The data on hazardous drinking further suggests need for interventions on responsible alcohol use. Hazardous drinking has been defined in the literature as a score of 8 or greater in the 10-point assessment of the Alcohol Use Disorders Identification Test (Saunders et al., 1993). AUDIT scores from studies of male alcohol users in West and North India report 21% and 48% of surveyed respondents, respectively, met the definition of hazardous drinking (Chagas Silva et al., 2003). Hazardous drinking in Indian settings is associated with health and economic concerns and tends to be characterized by short periods of heavy consumption (D'Costa et al., 2006). While the impact of alcohol abuse on human health is remarkable, the social and economic consequences of alcohol use are particularly relevant to public health in India. Alcohol use in India has long been associated with intimate partner violence, sexual coercion and other violent acts towards family members (Go et al., 2003). Alcohol users in a household, particularly poor households, spend a large proportion of their disposable income on alcohol thereby depleting resources that might otherwise be spent on health or education (Saxena, Sharma and Maulik, 2003). There is a marked male-female difference in alcohol use – men drink more than women and lower education and socio economic status are also correlated with higher alcohol use (D'Costa et al., 2006). While this evidence can influence alcohol abuse policy formulation, there are other factors that policy

makers and interventionists need to consider. Except for the few of the 28 states in India that are officially under prohibition, taxes from alcohol sales constitute a large proportion of state income – in some states as high as 25% of revenue (Benegal, 2005). Since the globalization of the Indian economy, alcohol sales have increased, access to alcohol is high, and alcohol use among men and women is becoming more acceptable (Basu, 1998). The introduction of alcohol use and intoxication as population-based concerns then has both political and policy implications.

A noteworthy national agency that is beginning to bring alcohol use into the national consciousness is the National AIDS Control Organization (NACO). Behavioral surveillance conducted by NACO shows that 75% of a nationwide sample of female sex workers consumed an alcoholic drink occasionally before sex; among their male clients, 23% reported drinking on a daily basis (National AIDS Control Organization, 2001). Other studies evaluating behavioral factors associated with sexual risk in India report that alcohol use is associated with heterosexual risk markers such as prevalent sexually transmitted diseases and sex with female sex workers (Madhivanan et al., 2005), extra-marital sex (Schensul et al., 2006) and non-use of condoms (Gupta, Sharma and Ramachandran, 2005).

These associations between alcohol use and sexual risk are noteworthy since heterosexual intercourse accounts for 80% of all reported HIV infections in India (National AIDS Control Organization, 2006). Heterosexual risk in India arises from both lack of condom use and having multiple sexual partners (Solomon, Ganesh and Yephthomi, 2004). Reports on reasons for condom non-use in India include male reports of reduction in pleasure and condom unavailability (Sivaram et al., 2004); social norms expecting married women to trust their spouse's sexual fidelity (Chatterjee and Hosain, 2006); and fear of violence against among women (International Council for Research on Women and Center for Development and Population Activities, 2000) if condom use is requested or even suggested. Having multiple sexual partners is a suspected behavioral determinant for increased risk of HIV infection. Studies have shown that between 15 to 19% of Indian married men (Bhattacharjee et al., 2000) and over 45% of unmarried men have multiple partners (Bhatia et al., 2005). Male extra-marital relationships lead to married women becoming infected by their spouses and it is now evident that being married to a man who has multiple partners is one of the single most important risk factors for a monogamous woman with respect to HIV acquisition (Newmann et al., 2000). Understanding the role that male heterosexual behavior plays in fuelling the further spread of HIV in India is key to developing interventions that will meaningfully involve men in prevention efforts.

In this paper, our aim is to explore the determinants of risky sexual behavior among male alcohol users in Chennai in southern India. We defined our outcome as any unprotected sex with a non-regular partner. In choosing our outcome variable, we sought to represent the majority of risky heterosexual encounters reported from India and seek to contribute to the understanding of possible associations between alcohol use and sexual risk in the Indian context.

2. METHODS

2.1 Study Background

We conducted this study as part of the NIMH Collaborative HIV/STD Prevention Trial. This is a five-country community randomized controlled trial (with sites in China, India, Peru, Russia and Zimbabwe) that seeks to test the efficacy of HIV prevention messages delivered by community popular opinion leaders, or CPOLs (National Institute of Mental Health Collaborative HIV/STD Trial Group, 2007). CPOLs are individuals whose friends and close associates look to for advice, affirmation and counsel on a wide variety of issues particularly

sexual behavior (Kelly, 2004). In India, our study is located in the south-eastern coastal city of Chennai where we select and train CPOLs from among patrons of wine shops, community-based retail alcohol outlets.

Wine shops in India are similar to bars in western countries. Unlike in restaurants where one has to purchase food to purchase alcohol and where one is expected to dine-in, wine shops sell alcohol both on a drink-in or a take-out basis. Attached to wine shops is an area called a 'bar' which may have seating arrangements for patrons and where snacks and other food items are often available for purchase. Wine shops are part of the urban landscape in many Indian cities including Chennai and the impact of their presence in a community, and by extension that of their patrons, periodically gets public attention (Times of India, 2005). Two categories of alcoholic beverages are available in India -- foreign made liquor and locally produced brews termed IMFL or Indian Made Foreign Liquor (World Health Organization, 2002). In Chennai wine shops, only IMFL products are sold and despite being called wine shops, wine is not available. The most popular beverages are whisky, rum, brandy and beer. All these products are available in bottles of 750 ml each save beer which is sold in bottles of 600 ml each. The cost of a bottle of whisky ranges from 300–500 Indian rupees (8–11 US Dollars). Rum is less expensive, ranging from 150–250 rupees (6–7 US Dollars) per bottle; brandy averages 200 rupees (6.5 US Dollars) per bottle. Beer is the least expensive and costs 60–80 rupees (under 2 US Dollars) per bottle. Alcoholic beverages in wine shops are sold either by the full bottle or by units of 45 ml (1.5oz) of whisky, rum or brandy or half a bottle (330ml) of beer.

2.2. Sampling Process

Here we outline the process of identifying wine shops and developing our sampling frame.

2.2.1. Identifying wine shops—Wine shops were identified as a potential venue based on four main criteria: burden of risk to benefit from intervention, opportunities for social interaction in bars to increase internal validity, physical distance to reduce contamination, and feasibility of conducting the study. To evaluate these criteria, we conducted ethnographic research (Hellitzer-Allen et al., 1998) which included in-depth interviews with wine shop employees, male patrons and female sex workers. These interviews (n=42) elicited information on frequency of patronage in selected wine shops, variation in alcohol use patterns among patrons, sexual behaviors and types of sexual partners (including commercial transactions) reported by these men. We learned in these interviews that wine shops near key landmarks such as bus stations, train stations and soliciting sites of female sex workers had higher rates of patronage. Sex workers rarely visited wine shops and typically solicited clients through their male brokers who patronized wine shops. We also learned that clients who visit the bar at least thrice weekly are considered regular patrons and it was common for these patrons to bring their friends and socialize in the bar.

2.2.2. Sampling Frame—Following the ethnographic interviews, we obtained a list of licensed wine shops from the concerned government agency. From this list of over 700 wine shops, we purposively selected 100 based on venue identification criteria. In order to conform to the protocol set by the trial Data Coordinating Center in consultation with the Data Safety and Monitoring Board, these 100 wine shops were divided into 24 clusters of 4–5 shops each. From August 2002 to January 2003, we conducted a survey to assess the burden of biological and behavioral risk among patrons in these wine shops. The survey protocol was approved by the ethical review boards of Johns Hopkins University Bloomberg School of Public Health in Baltimore and the YRG Centre for AIDS Research and Education in Chennai. All survey interviewers and data analysts were trained in research ethics before the start of data collection.

2.3. Recruitment and Data Collection

For the survey, we sought to interview 55 male patrons from each of 24 wine shop clusters (N=1320). All those who were between 18–40 years of age and those who visited the wine shop bar at least thrice weekly were eligible to participate in the study. Recruitment was conducted by study staff who systematically selected every third person entering each wine shop bar. At this time, we provided information about the study, including its purpose, proposed survey dates and the risks and benefits of participation. We also sought contact information for future surveys in the trial. During recruitment, some participants reported being unavailable during the survey period due to temporary relocation or anticipated work-related travel. These individuals were not recruited as our earlier work (Sivaram, 2005) indicated that repeated interactions are necessary to ensure understanding of assessment and informed consent procedures. From those who were able and willing to participate in the survey, we collected age and contact information. We also provided cards with information on the survey appointment and noted when (day of week) study staff would be present in the wine shop to answer questions about their participation.

At the appointed survey date, we offered transportation to the assessment center. When participants arrived at the assessment center, informed consent was administered. Following this, participants were administered a computer-assisted personal interview (CAPI) in a private cubicle. This questionnaire was administered in Tamil, the local language. All participants were paid a nominal fee to compensate them for loss of time from work as a result of study participation.

As with the survey, the in-depth interviews which collected qualitative data were also conducted in Tamil. Participants which included wine shop patrons, staff and female sex workers were recruited through snow-ball sampling. They were asked questions on sexual and alcohol use behaviors and socialization in wine shops using field guides administered by trained ethnographers. A total of 42 individuals were interviewed.

2.4. Survey Measures

The survey questionnaire used in the study elicited responses related to general health, sexual health, role of stigma, sexual and alcohol use behaviors, socialization in wine shops. This questionnaire, based on generic versions used in similar prevention trials, was tailored to the Chennai context, translated to local language, Tamil, programmed into CAPI computers and pre-tested before administration. For this paper, we focus on the last two categories of questions – sexual and alcohol use behaviors and socialization. We elicited information on sexual behaviors in the three months prior to the interview. Participants were first asked if they had sex in this time period and if so, to describe their relationships with their sexual partners. To determine relationship with these partners, participants were asked if their most recent partner was a spouse, girl friend, casual partner or a sex worker and we listed up to five recent sexual partners. For each partner, we elicited the number of times they had sex and the number of times in these encounters that they used condoms. With the most recent partner, we also asked about frequency of alcohol use in their last 10 sexual encounters with this partner (“In the last 10 times you had sex with the most recent partner, how many times did you have a drink with alcohol in it before you had sex?”). We also elicited information about individual alcohol use behaviors. We posed questions on frequency of patronage of wine shops, (“In the past 30 days, how many days did you drink alcohol in the wine shop?”) and quantity of alcohol use during wine shop visits (“On a typical drinking day, how many drinks do you consume?”). One drink was defined as one unit purchased. Purchases are typically made in increments of 45 ml of brandy/whisky/rum and/or half a bottle (330 ml) of beer. In the survey, interviewers entered 45 ml (1.5 ounces) of brandy/whisky/rum consumed and 330 ml or half a bottle of beer consumed as one drink. For instance, if one consumes a bottle of beer which is 600 ml, this

was entered as two drinks. Finally, we measured socialization by assessing familiarity with wine shop patrons (“Are you familiar with all, some or none of the other patrons in the wine shop?”). This helped assess the level of social interaction in these wine shops based on which we could plan the CPOL intervention. All data entered into the computer were sent electronically to the Data Coordinating Center in the US and then made available for analysis after data cleaning.

2.5. Data Analysis

Two sets of analyses were conducted, qualitative analysis and statistical analysis of the survey data.

2.5.1. Qualitative analysis—In-depth interviews were recorded in local language, transcribed to English and analyzed for content using Atlas.ti (32). The data were reviewed for three main codes: alcohol consumption patterns, sexual behavior and use of alcohol, factors influence alcohol use and sexual risk. Matrices were developed for each code to enable organization of the data and to identify similarities and contrasts across related themes.

2.5.2. Statistical Analysis—The purpose of the analysis was to explore possible predictors of unprotected sex with non-spousal partners. We created the outcome variable by taking into account the reported relationship with most recent partner and any condom use with this partner. Reports of only one sexual partner who was identified either as a spouse or a steady partner and reports of consistent condom use at all times with casual partners or sex workers formed the reference category of the outcome, as we assumed that they were at low risk for HIV infection (assuming that the reports were reliable and valid). Any unprotected sex with a non-spousal partner (such as sex workers or casual partners) formed the other category of the outcome. We explored three main categories of suspected causal determinants: sexual behaviors, alcohol use behaviors and socialization in the wine shop. Number of sexual partners was examined as the primary suspected causal influence. This was coded as a categorical variable where 2–3 partners and 4 or more partners were compared to a reference category of one partner only. We examined alcohol consumption at wine shops and alcohol use before sex as primary covariates for sexual risk behaviors. Assessments were made for frequency of alcohol use (using alcohol 10–29 days a month and drinking everyday were compared to drinking less than 9 days a month) and for occurrence of heavy episodic drinking (coded as a dichotomous response – drinking less than five vs. five or more drinks at a setting). Finally, familiarity with wine shop patrons was coded as a categorical variable where the interviewee noted whether they knew all, some, or none of the other patrons in the wine shop.

Descriptive analyses tabulating the socio-demographic characteristics of the sample were conducted first. To estimate associations of covariates associated with unprotected non-spousal sex, logistic regression models were used to estimate the possible influence of individual socio-demographic characteristics (age, education, marital status, access to income), alcohol use (frequency, quantity and use before sex), sexual risk (number of partners and relationship to partners), and socialization, each introduced as a covariate term in the regression models. In order to explore correlates of non-spousal sex in the multiple regression model, variables that qualified for inclusion (at $p < 0.05$) in the bivariate analyses were included in a logistic regression model process with backward elimination. Based on our own and other work on alcohol use and sexual risk, we planned to explore whether higher degree of socialization or a certain type of partner might have influenced drinking before sex by sub-group variations in the multiple regression analysis. All statistical analyses were performed using SUDAAN, version 9.0. This allowed us to account for the clustering of data within the 24 venues in the trial.

3. RESULTS

A selection of socio-demographic characteristics of survey participants are shown in Table 1. Of the 1320 men we planned to recruit, health cards were given to 1265 (95%) individuals, of whom 1204 (95%) participants took part in the survey. The reason for giving out fewer health cards than was planned was because some patrons reported that they would not be available during the survey period. Age details were collected at the time of recruitment; of those refusing to participate, 34% were between the ages of 18–25 years and 48% were between 26–35 years; the remaining were older than 35 years. Of the 1204 participants, eight were deleted from the analysis due to missing or incomplete data, bringing the analytic sample size to 1196. Of these, 57% reported being currently married and 43% reported being never married or previously married. Twenty-nine percent of participants respectively were 18–24 years and 25–29 years old; the remaining men (42%) were over the age of 30. Nine percent of the participants reported no formal education, 34% reported attending grades 1–6, and 50% reported attending grades 7–11, with 7% reporting high school graduation or more. Over half of respondents (55%) reported that they did not have a regular source of income.

3.1. Sexual behaviors of wine shop patrons

All patrons (n=1196) interviewed reported having been sexually active in the three months prior to assessment (Table 1). As to the responses about the nature of their sexual partners, 49% reported 2–3 sexual partners and 24% reported four or more sexual partners in that time period. We found that 75% of respondents reported at least some unprotected sex with a non-spousal/non-regular partner in the prior three months. Among those reporting on the nature of the relationship with their sexual partners, 57% reported that their most recent partner was their spouse or girlfriend, while 43% reported that a sex worker or other casual partner was their most recent partner.

3.2. Alcohol use among wine shop patrons

Table 1 shows the frequency distributions of alcohol use behaviors. The mean frequency of alcohol use in the past month was 18 days. Sixty-nine percent reported drinking at least 10 days a month and 17% reported drinking everyday. On a typical drinking day, 49% reported drinking five or more drinks. Eighty-eight percent of respondents reported using alcohol before sex in five or more of the last 10 encounters with their most recent partner (mean alcohol use = 3.5 times in past 10 sex encounters). The analysis of qualitative data on the role of alcohol before sex suggested that alcohol was consumed as individuals planned for sex and also as part of foreplay, particularly with a sex worker. The following two quotes illustrate these points.

“When you visit a sex worker, you need courage. Unless I drink, it is not possible. When I smoke and meet an acquaintance, I try to hide the cigarette from him. Once I drink, wherever I go and whatever I do, I will not bother about people watching. That is the power of drinks”. – Married man, age 31 who visits sex workers.

“Sometimes, I am not able to talk or be free with a customer. But if we drink before sex, then I will not be shy. Then I can talk and touch without inhibition because it is not me but the alcohol (that is inside me) that is speaking.” – Sex worker, aged 29

The data also revealed non-sexual factors motivating alcohol use as shown by the quote of this unmarried man.

“I drink because I am frustrated that I am not married even after this age and I am also unemployed. Even if my family asks me to meet a girl for marriage, I do not meet any one as I do not have a job. Another reason I drink is that I have family problems with my sisters who have bad marriages”. – Unmarried man, age 29.

Further, the data show that a large portion of an income and sometimes the entire daily wage is spent on alcohol. Among the survey respondents, 69% reported that they spent over half their daily income on alcohol. Overall 70% of those interviewed reported some familiarity with wine shop patrons.

3.3. Bivariate Analysis

Table 2 presents the variables associated with risky sex based upon unadjusted logistic regression models (i.e., without additional covariates). The odds of frequent use of alcohol before sex was larger among unmarried men and among those who reported irregular income (OR=1.4, $p=0.006$), as compared to the marrieds. Among sexual behavior variables, we found that having a most recent sexual partner who was a non-main partner (a sex worker or casual partner) as compared to main partner (spouse or girlfriend) yielded a higher odds of unprotected sex (OR=1.72, $p=0.002$). Further, we saw a significant gradation of association with unprotected sex as the number of sexual partners increased. The odds of unprotected sex were larger for those reporting frequent drinking (for everyday drinking versus the lowest level, for those reporting at least 10 recent drinking days; $p<0.05$). Heavy drinkers (OR=1.74, $p<0.0001$) and those who drank before sex were also likely to have unprotected sex. Familiarity with some wine shop patrons (OR=1.7) and was also associated with sex risk.

3.4. Multiple Regression Analyses

In the covariate-adjusted analysis (Table 3), unprotected sex with a non-regular partner was more common among the unmarried, and also among respondents reporting having an irregular income. Using alcohol before sex and greater number of sexual partners also were associated with increased odds of having unprotected sex with a non-regular partner. In the analysis we also checked for sub-group variation in associations. We found no meaningful sub-group variation with respect to the association involving unprotected sex and relationship to partners ($p=0.56$), or familiarity with other patrons ($p=0.945$) in these analyses.

4. DISCUSSION

Among male alcohol users, we found unprotected sex with a non-regular partner was more common among those who were currently unmarried, who reported a higher number of sexual partners in the prior three months, who used alcohol before sex, and who did not have a regular source of income. Each of these characteristics has important implications for HIV prevention in India.

Unlike even a decade ago, reports of premarital sex are increasing in India (Sharma, 2001). This trend may be attributable to increased surveillance and research as part of HIV prevention and as well as more relaxed sexual mores noted recently, in part attributable to a rapidly rising economy (Dhawan and Kurup, 2006). These behaviors might also be facilitated by communication in unmarried men's social networks that encourages sexual exploration and promotes perceptions of risk that place more weight on sexual experience than sexual health (Sivaram et al., 2005). Given the intersection of sexual and social networks in Chennai wine shops (Sivaram et al., 2004), we can speculate that young men in wine shops find opportunities to discuss and seek access to sexual partners. These findings support a focus on young unmarried men for HIV prevention in India. These efforts might focus specifically on the risks arising from various types of sexual partners and number of partners. This pattern of evidence suggests that messages that focus on simply promoting condoms (and the 'Prevent AIDS' messages that are part of several campaigns in India (US President's Emergency Plan for AIDS Relief, 2006)) may need to be expanded. Men need to hear about the specifics of risk behavior – with whom to use condoms, when to use condoms, and what is the role of multiple partners – in order to make needed changes to their own risky sexual behaviors.

Our finding that alcohol use before sex is associated with unsafe sex with non-regular partners supports similar findings from other populations in India (e.g., Madhivanan et al., 2005). Taken along with findings of heavy and frequent drinking among wine shop patrons, the data suggest a need to address the role of responsible drinking and binge drinking in HIV prevention messages (e.g., see Carey, 2001). However, these messages might be better informed by more research on other factors influencing this association. Research outside India has shown the role of mental health factors such as loneliness and depression (Williams et al., 2002), as well as stressors associated with marriage and employment influencing alcohol use (McCrary et al., 2006). Our ethnographic findings suggest the role of similar social exclusion in fuelling alcohol use. Whether and how these factors influence sexual risk merits examination in the Indian context.

While understanding individual alcohol use and sexual behavior factors can inform intervention design, the role of structural factors influencing these behaviors cannot be overlooked. Among wine shop patrons who reported irregular income, we found higher likelihood of unprotected sex with non-regular partners. Research on poverty reduction and income inequality has suggested that in even affluent societies, the poor who have less access to economic and social capital are at elevated risk for sexually transmitted infections (Farley, 2006). Understanding HIV risk in the larger context of development, social capital, and economic stability might lead to novel and tangible strategies or tactics to modify HIV-risky behaviors.

Several inherent limitations in our study merit discussion. First, the survey was conducted in 2003–2004 within a specific locale; secular trends may influence the generalizability of our findings; whether they generalize to other places is an open question. We acknowledge that our findings about male heterosexual behaviors represent merely a description and analysis of circumstances in wine shops in Chennai city. Wine shops elsewhere in India may have differing patterns of patronage, consumption and sexual risk. Further, applying similar methods to other wine shops may not yield similar results. This is because the results of this particularistic research (Miettinen, 2001) focus on a single point of time and space, and may, if at all, be generalizable only to similar time-space coordinates. As such, we are unable to make any global recommendations for public policy or action based on this study's evidence. Third, in order to be compliant with the protocol of a large multi-site study, we do have some methodological limitations that can influence the interpretation of our findings. Our measures of alcohol involvement were not standardized along the lines of the AUDIT. In addition, standardized measures were not included to assess social interactions and social networks, or methodologies that might have been used to quantify the association of alcohol use and risky sex. For instance, in our finding that alcohol use before sex predicts non-regular sex, we do not quantify the time before sex that alcohol was consumed. Further, our measures on alcohol consumption were based on quantity purchased and did not account for differing alcohol content in the beverages purchased. Further, while our qualitative data suggests alcohol's role in disinhibition for risky sex, our quantitative survey did not directly assess these measures. We submit that these measures informed the design and content of the CPOL research; however there is a need for studies that use more completely validated measures of alcohol involvement in a prospective or experimental context, if we are to draw firm inferences on alcohol's role as an influence on sexual risk behaviors.

We also acknowledge that there is a possibility of both selection bias and information bias. Wine shops were identified based on ethnographic evidence of risk, among other factors. It is possible the study sample is at higher risk in terms of sexual behavior and alcohol use; the observed odds ratios may be overestimates. Additionally, older patrons and those who travel on work were unable to participate in the study. Further, in some research projects, computer-assisted interviewing has been used to minimize data entry or response errors; nonetheless,

even with these computer-assisted survey methods, there remains the possibility of respondent bias in giving socially desirable responses. Another methodological limitation is that we focused on heterosexual risk behaviors among men; evidence from India suggests concurrent risky behaviors includes homosexual sex or sex with eunuchs among heterosexual men (Hernandez et al., 2006). We did not assess these behaviors, nor did we assess the role of other drug-taking behaviors such as use of injecting drugs.

Despite these limitations, our findings may suggest that responsible alcohol use and its possible role in sexual activities that promote risk of HIV infection and AIDS are topics that deserve discussion in HIV prevention interventions. Wine shops may also be appropriate venues to reach heterosexual men, given familiarity and socialization in these venues. In future research along these lines, it should be possible to use validated measures to understand the dynamics of alcohol use, and to devise longitudinal research, formal experiments, or alternate study designs that can account for the temporal sequence of alcohol use and sexual risk behaviors in a manner that will add to the global body of evidence on this topic, including the specific or particularistic features of the drug-sex-HIV-AIDS nexus in India.

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Table 1

Description of sample characteristics in terms of socio-demographic variables, alcohol use, and sexual behaviors of wine shop patrons in Chennai, India, 2002–3

Variable	Total n (%)
Demographic Variables	
Marital Status	
Currently Married	683 (57)
Previously or Never Married	513 (43)
Age	
18–24 years	350 (29)
25–29 years	346 (29)
30–34 years	242 (20)
35–40 years	258 (22)
Education	
None	108 (9)
1–6 grade	408 (34)
7–11 grade	593 (50)
High school and above	87 (7)
Earning a regular Income	
Yes	539 (45)
No	657 (55)
Sexual Behavior Variables	
Sexually active in the past three months	1196 (110)
Number of sexual partners in the past three months	
One	300 (27)
Two to three partners	546 (59)
Four or more partners	268 (24)
Report any unprotected sex in the past three months with non-regular partners	
Yes	894 (75)
No	302 (25)
Report of relationship with partners	
Non-main partner (sex worker, casual partner)	507 (43)
Main partner (spouse, girl friend)	677 (57)
Alcohol use Variables	
Frequency of alcohol use in the past 30 days	
Drinking 0–9 days	171 (14)
Drinking 10–29 days	827 (69)
Drinking everyday	198 (17)
Amount of alcohol consumed per drinking day (1 drink = 1.5 oz)	
Less than five drinks	590 (51)
Five or more drinks	560 (49)
Spent half or more of daily income on alcohol	
Yes	826 (70)
No	365 (30)
Drinking before sex	
Yes	1051 (89)
No	133 (11)
Familiarity with patrons in wine shop	
Know no one	179 (15%)
Know some patrons	833 (70%)
Know all patrons	184 (15%)

Table 2

Estimated degree of association (odds ratios with 95% confidence intervals) linking suspected causal influences or correlates of males' unprotected sex (among non-regular partners) among Patrons of Wine Shops in Chennai, 2002–3, by categories of covariates under study

Variable Name/No. of observations	Covariate	OR (95% CI) **
Age (age) n = 1,196	Age Group 18–24 years	1.0 **
	25–29 years	0.76 (0.49–1.17)
	30–34 years	0.90 (0.56–1.45)
	35 and older	0.88 (0.53–1.47)
Marital Status n = 1,196	Marital Status Currently Married Men	1.0
	Never/Prev. Married Men	1.49 (1.04–2.12)
Education n = 1,196	Education No education	1.0
	1–6 grade vs. None	0.95 (0.48–1.90)
	7–11 grade vs. None	0.87 (0.45–1.67)
	High school or higher vs. None	0.71 (0.28–1.77)
Earn a regular income n = 1,196	Regular Income Yes	1.0
	No	1.4 (1.11–1.76)
Sexual behavior Non main partner n = 1,184	Relationship with Most Recent Partner Spouse/Girlfriend	1.0
	Sex worker/casual partner.	1.72 (1.24–2.38)
Sexual behavior — partner number n = 1,114	Number of people had sex in last 3 months 1 partner	1.0
	2–3 partners	5.85 (3.85–8.90)
	4+ partners	12.9 (6.54–25.50)
Alcohol use — frequency n = 1,196	Frequency of Alcohol Use 9 days or less	1.0
	10–29 days vs. Drinking everyday	1.34 (0.96–1.86) 1.72 (1.13–2.62)
Alcohol use — Heavy drinking n = 1,150	Heavy Drinking Less than 5 drinks	1.0
	Five or more drinks	1.74 (1.4–2.17)
Alcohol use before sex n = 1,184	Alcohol Use Before Sex No	1.0
	Yes	3.04 (2.08–4.45)
Familiarity with patrons	Know no one	1.0
	Know some patrons	1.71 (1.30–2.26)
	Know all patrons	1.33 (0.88–1.99)

** 1.0 signifies the reference category in the logistic regression.

Table 3

Covariate-Adjusted Odds Ratio Estimates (95% confidence intervals) for associations linking unprotected sex with non-regular partners and covariates among Male Patrons of Wine Shops in Chennai, 2002–3, by Categories of Covariates under study*

Variable Name	Covariate	OR (95% CI) **	p-value
Marital Status	Married Men	1.0	0.002
	Never/Previously married	3.25 (1.63–6.49)	
Regular Income	No	1.0	0.015
	Yes	1.38 (1.07–1.79)	
Alcohol Use Before Sex	No	1.0	0.026
	Yes	1.75 (1.08–2.85)	
Number of people had sex in last 3 months	1 partner	1.0	<0.0001
	2–3 partners	6.62 (4.15–10.55)	
	4+ partners	14.53 (7.23–29.21)	

* Taken from a multiple logistic regression accounting for clustering due to venue. (n = 1,114)

** 1.0 signifies the reference category in the logistic regression.