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## Community-Level HIV/STI Interventions and Their Impact on Alcohol Use in Urban Poor Populations in India

**Stephen L. Schensul,**

Department of Community Medicine and Health Care, Center for International Community Health Studies, University of Connecticut School of Medicine, 263 Farmington Avenue, Farmington, CT 06030-6325, USA, schensul@nso2.uhc.edu

**Niranjan Saggurti,**

Population Council, Delhi, India

**Joseph A. Burlison,** and

Department of Community Medicine and Health Care, Center for International Community Health Studies, University of Connecticut School of Medicine, 263 Farmington Avenue, Farmington, CT 06030-6325, USA

**Rajendra Singh**

International Center for Research on Women, Asia Regional Office, Delhi, India

### Abstract

This paper describes an Indo-US, research and intervention project for HIV/STI prevention and sexual risk reduction in urban poor communities in Mumbai, India in which formative research established the importance of reduction in alcohol use as one of the central features of the intervention. As a part of formative research, in-depth interviews with married women and men indicated that alcohol had a direct negative effect on marital relationships, violence, household economics and men's involvement in extramarital sex. The project utilized diverse community intervention mechanisms over the course of a three year intervention effort. Comparison of pre-post intervention, cross-sectional samples showed a significant drop in overall use of alcohol in the study communities. Analysis of a longitudinal panel sample identified subgroups of married men based on their demographic, behavioral and attitudinal characteristics at baseline who stopped drinking during the intervention period. Results also demonstrated that a reduction in men's alcohol use during the intervention period was associated with a reduction in sexual risk behavior and related variables.

### Keywords

India; HIV/STI; Sexual risk; Alcohol; Community-based intervention

## Introduction

Alcohol prevention interventions fall into three distinct categories: those that focus on brief education and intervention based on early detection of problem drinking [1]; structural interventions that focus on laws and regulations that include limiting youth access and bans on alcohol advertising [2]; and community-based interventions through alcohol education in schools, youth centers and the general population [3].

Community level interventions aim to restructure the drinking environment through media advocacy, working with alcohol retailers to reduce intoxication, reducing underage access to alcohol, increasing perceived risk of intoxication and limiting access to alcohol in the community [4, 5]. Community interventions have focused on influencing critical mediating variables, such as peer influence and normative drinking estimates, functional meanings of alcohol use, attitudes and behaviors and parent-child communication around alcohol use [6]. Peer education efforts have been conducted through the utilization of popular opinion leaders who are trained to deliver messages to their social network about the role of alcohol in sexual behavior, HIV transmission and strategies to encourage and sustain condom use [7]. Community intervention efforts to reduce alcohol consumption have also included increasing knowledge concerning the impact of alcohol and changing attitudes about alcohol consumption [4, 6, 8].

This article focuses on the community intervention component of a multilevel intervention study that was designed to prevent HIV/STI transmission and reduce sexually risky behavior among married men in economically marginal (“slum”) communities in Mumbai, India [9, 10]. Formative research in these communities, made it clear that the behaviors associated with men's sexual risk were perceived by both men and women as inextricably tied to the use of alcohol. As a result, alcohol became an important part of the community education and prevention effort.

In the Indian context, alcohol is frequently seen as the “root of all evil.” This perspective on alcohol and its negative consequences is held particularly by married women in urban poor communities with respect to their husbands' use of alcohol. Wives perceive alcohol to be a stimulus for men's extramarital sex, for husband's violent behavior toward wives and their demands for sex and forceful sex and see it as draining their households' already-limited financial resources. Men see alcohol use as a means of dealing with repetitive and noxious work, as a means of recreation with peers, as a way of addressing the limitations of slum living, as a way of coping with the lack of financial success and as a means to avoid the continued demands of their wives to provide the financial resources to maintain families.

While there has been a long tradition of alcohol use in India [11, 12], the cultural norm has been to view the use of alcohol negatively and to see public drunkenness and alcohol-stimulated family disputes as socially unacceptable with negative impact on the honor (*izzat*) of the family. Benegal [12] has described the negotiation between negative attitudes toward alcohol and permissive attitudes toward manufacturing, selling and profiting as a form of alcohol “ambivalence.” Slum communities are frequently noted for brewing and serving illegal country liquor (*desidaaru*). Many of these illegal *desi* and beer bars (alcohol venues

with seating arrangement) within or near slum communities are locations in which female servers and sex workers solicit clients.

Multiple surveys in India have shown that most men in the general population do not drink and of those that do drink, only a small percentage drink on a daily basis [13– 15]. For the most part, the majority of Indian men who consume any alcohol are low level or moderate drinkers. Nonetheless alcohol is present in all communities (including those states in India that are “dry”) and for a subset of men it contributes to negative behaviors that include sexual risk and spousal physical and emotional abuse [16, 17].

The project to be described in this paper took an ecological approach to men's sexual risk behavior, in which a series of factors were addressed including men's peer networks, the marital relationship, and men's sexual health concerns [9]. A major factor that emerged in the formative research was alcohol use, which was associated with men's involvement in risky extramarital sex [18]. While the negative consequences of alcohol use were not the primary focus of the project, it nonetheless emerged as an unanticipated theme due to its perceived importance in sexual risk by both Indian project staff and community residents. The objective of this paper is to present the impact of the sexual risk reduction program and its alcohol education content on the study communities and among individual men.

## Methods

The data for this paper are drawn from an Indo-US collaborative project (2001–2007) funded by the US National Institute for Mental Health. The main collaborating partners in the study were the University of Connecticut School of Medicine and the Institute for Community Research in the US and the International Institute for Population Sciences in Mumbai, India. The project was the first in a larger program of research and intervention referred to as RISHTA (Research and Intervention in Sexual Health; Theory to Action and meaning “relationship” in Hindi and Urdu). The RISHTA study was approved by the Health Ministry Screening Committee (HMSC) of the Indian Council of Medical Research (HMSC-ICMR) and the institutional review boards (IRBs) of the collaborating Indo-US partners. Written informed consent was obtained from each individual before every qualitative and survey interview.

## The Study Communities

The study was conducted in three communities in a fringe area of Mumbai with an estimated population of 700,000. These communities began with those families that were relocated from the center city slums of Mumbai in the late 1970s. Over a period of two decades the slum population grew rapidly, with Hindu and Muslim migrants coming from impoverished northern states and rural areas of the west and south. New migrants initially constructed illegal and unauthorized structured until they had the resources for improved housing. Households consist primarily of a single room with an average of over six people per household. Men in the study communities are daily wage workers, petty traders and small business owners. The mean income for men is approximately two US dollars per day.

## Research Design

The RISHTA project was developed in three phases: formative research in Phase I, intervention in Phase II and evaluation in Phase III. Formative research involved the mapping of communities, interviews with key informants and in-depth interviews with 52 men and 66 women. It was these interviews that established the importance of alcohol as a factor in sexual risk and formed the basis for instrument development and intervention design and implementation.

The intervention component of the project functioned at two levels: the health care system and the general community. The focus of this paper will be at the community level. All three communities received community education drawing on qualitative ethnographic research in the formative phase and using approaches to community education that were well established in the Indian context. These approaches included the following: (1) *Street dramas* consisting of over 200 performances with three scripts in each of the lanes (roadways for travel in the community that serve to designate neighborhoods) in the three communities [19]. (2) *Community meetings* were held on the day after a street drama to collect reactions from men who attended the street plays and to identify their questions related to sexual health. The answers to questions and further discussion were provided in a second community meeting that took place within the following week. Community meetings were also held on a regular basis with men's groups (*parush mandels*) and more formal community-based NGOs to provide information on sexual risk reduction and to recruit members of these organizations into participation in community level education. In addition, informal group discussions were utilized by RISHTA field staff to provide education, referral and marketing of project activities to clusters of men as they gathered in tea shops, bars and other community gathering locations. (3) *Poster sessions* were held in the community using posters designed by over 60 local secondary school students emphasizing HIV/STI prevention measures and factors involved in sexual risk. Exhibitions of the posters in community gatherings attracted over 7,500 people. The posters were displayed once a month in the three communities. (4) *Banner presentations* involved the placing of banners with RISHTA messages on community lane walls, with RISHTA staff engaging those men who passed by or came to see the banner in discussing sexual risk reduction and related means of prevention. (5) *Videos/movies* on HIV/STI and domestic violence were shown in 22 separate locations to married men in groups of 25–30. (6) *Printed materials* in terms of handbills (leaflets) and booklets involving sexual health information were regularly distributed in the communities; (7) *Interpersonal communication* involved RISHTA staff being available to conduct private conversations with men, identify sexual health problems, make referrals and clarify misconceptions. The scripts or messages for the intervention materials were developed by the project based on formative research findings.

To develop a pre-intervention measurement of key variables, a baseline (BL) survey instrument was administered in 2003 to married men, ages 21–40 years using a two-stage systematic random sampling procedure. In the first stage, geographic subareas (lanes) were randomly selected and in the second stage, eligible households were systematically randomly selected. About 92% (or 2,408) of eligible selected men who were sampled

(2,600) agreed to participate in the survey. A randomly selected sub-sample of 642 men was tested for STIs in the baseline.

An endline survey (EL) was developed and administered in 2006 to evaluate the impact of the intervention. An independent sample of 2,800 was drawn using the sampling procedure similar to the baseline in which, the geographical subareas (lanes) were selected at the first stage, and eligible households in the second stage. A total of 2,722 men agreed to participate in follow-up survey interview and a subset of 910 men for STI testing. This sample of 2,722 includes a longitudinal panel sample of 403 men who were part of both BL and EL sample. Of these 403, 103 men were part of both BL and EL because of the similar sampling design used in the communities at both the time points. For purposes of follow-up in the EL, 349 men were chosen randomly from the BL sample of which 303 were interviewed for EL; almost all most men who were not followed-up had shifted their residence to another community. This article will present the outcome of community level education using the cross-sectional, BL and EL comparative data to identify overall changes at the community level and the longitudinal panel sample of 403 to explore the patterns of change in alcohol consumption and related factors from BL to EL at the individual level.

### Selection and Measurement of Key Variables

The ecological approach to men's sexual risk focused on factors of self-perception, peer relationships, alcohol use and the marital relationship as they are associated with men's extramarital sex. In this paper, self-perception is operationalized both as perceptions of gender equity in response to a masculinity scale and perceptions as a sex partner, a special issue in South Asia related to concerns about sexual performance [9].

*Alcohol consumption* was measured in the BL and EL survey instruments in terms of the type and frequency of alcohol consumption. The survey instrument assessed the type of alcohol used including commercially available beer, "English liquor" (whisky, brandy, rum, gin brewed in India in the Western style) and *desi daaru* (country liquor) brewed in the local communities. For each type of alcohol, the frequency of consumption was determined by a format in which respondents were asked how often they drank alcohol in the last 30 days (1 month). Responses included "daily," "at least once per month" and "never."

*Masculinity scale* (BL  $\alpha = 0.60$ , EL  $\alpha = 0.45$ ) was constructed that assessed men's views on gender equity derived from [20] items involving men's perception of gender equity.

*Spousal abuse* (BL  $\alpha = 0.87$ , EL  $\alpha = 0.85$ ) was derived from eight items that consisted of the frequency of men's self-reported verbal and physically violent behavior.

*Self assessment as a sex partner* was derived from nine items involving men's perception of their sexual performance (BL  $\alpha = 0.75$ , EL  $\alpha = 0.68$ ).

*Risky activities with friends* (BL  $\alpha = 0.75$ , EL  $\alpha = 0.68$ ) was derived from seven items consisting of whether or not the men engaged in activities with friends that included: gambling, drinking, visiting beer bars, playing sports and roaming in the community.

*Extramarital sex* consisted of any penetrative sex of any person outside of marriage including sex with a sex worker, sex with regular, non-spousal or casual partner or sex with a male partner. The means and standard deviations of these variables are presented in Tables 1 and 2.

### Statistical Analysis

The association between the frequencies of alcohol use from BL to EL at the community level was assessed using the chi-square statistic to assess the change in alcohol use status. The change in alcohol use status from BL to EL for individual men interviewed in both BL and EL (the longitudinal panel sample) was assessed as a function of the demographic, behavioral, and attitudinal variables listed above. Specifically, the difference between the number of men who reported alcohol use in BL but not in EL and the number of men who reported alcohol use in EL but not BL was assessed for each dichotomous level of the series of predictor variables. McNemar's statistic was used with the matched panel sample to assess whether the change in alcohol use (number of men stopped drinking versus number who initiated drinking) from BL to EL for each dichotomous variable was significantly larger for one direction than the other. To further confirm the bivariate relationship of alcohol change among the subgroups, general linear modeling (GLM) was used to assess significance using all the above variables.

Further, an analysis to understand the impact of change in alcohol use on the change in selected behavioral measures was conducted using multivariate, repeated measures models. Continuous measures used as dependent variables in GLM were risky activities with friends, self-assessment as sex partner, and the masculinity scale. Change over time from BL to EL results on the dependent measures were of primary interest, hence variables for time or the interaction of time by main effects for change in alcohol use was used. The change in alcohol was computed from individuals' reporting their consumption in BL and EL surveys. Categories of alcohol use/non-use were consistent with those used in the McNemar analysis. Demographic variables and other covariates considered in this multivariate model were: age, education, income. Analyses of dichotomous dependent measures were conducted using generalized estimating equations (GEE). The dependent variables of interest were extramarital sex and spousal abuse. The same set of demographics and covariates were used to adjust the model. The model consisted of main effects for the primary research variables and their interactions with time and time  $\times$  change in alcohol use.

## Results

### Perceptions of alcohol use consequences

The image of alcohol is reflected in married women's narratives drawn from a series of in-depth interviews conducted in 2005 and 2008. Married women viewed alcohol as contributing to spousal violence, child abuse, poor marital communication, a lack of desire to work, extramarital sex, arguments, coercive marital sex, women's health and mental health problems, men's health problems, less financial resources for household and family maintenance, and fights with neighbors [16].

The narratives reflect multiple negative outcomes of women whose husbands drink. As a 35-year-old woman with a 45-year-old husband and three children states, “He uses alcohol (sharaabi) and is a kamchor (doesn't want to work). We have quarrels because of his idleness. Sometimes after drinking alcohol, he gives me bad words...” A 37-year-old woman, with a 45-year-old husband and three children says that, “When I got married, my husband used to drink but not much. Slowly he was addicted. I did everything [he asked], even then he used to fight and abuse me. I used to scream and cry but he was not bothered., He beat me with whatever he had in his hand...” A 21-year-old women with a husband 24 years old and two children commented that, “He [her husband] drinks everyday and abuses me physically. For me it was a shock. I thought that I would have a happy married life. The other bad habits he has is that he always loves to talk to women, especially young girls, he does not behave in a decent way, he uses vulgar language and laughs. I am not sure whether he is involved or having an affair with girls.” A 35-year-old woman, with four children (husband 45 years old) says, “I get upset with him only when he drinks and comes home. It's not as if he is a regular drinker. But he takes alcohol once in 15–20 days. I don't like it at all. Then I fight with him. You see, it is not good. Our children will be called names, people will say, this girl's father is an alcoholic (bewda). This may come in the way of her marriage. I tell him, it is neither good for you nor the family, but he has not discontinued.”

A 26-year-old Muslim woman with a 30-year-old husband and three children states that, “I am not happy with my husband. He is an alcoholic, always abuses me. Whenever he is drunk he beats me and I cannot say anything... he does not work, nor gives money for me and children's expenses. Whatever he earns he spends on alcohol.” A 26-year-old with a husband of 29 years of age and one child describes, “When he comes drunk and I say no him, but he pushes me to have sex... he does not listen to what I am talking, then I do whatever he wants to do. It hurts me but then also I say nothing to him. There are several times, when he slapped and beat me when I deny to him.” A 40-year-old woman, with a 46-year-old husband and four children recounts that, “When he is drunk and has sex his garmi [heat from alcohol] gets inside my body and later causes white [vaginal] discharge.” A 38-year-old woman, with a 42-year-old husband and two children says that “My husband drinks alcohol and also gambles. I try to tell my husband that he should stop all this as it is not good for his health and income is so less and he spends a lot of money but he does not listen.”

Men who drink alcohol also describe how their drinking contributes to family difficulties, poor community reputation, and violence. A 27-year-old man, with a 26-year-old wife and one child says that “Drinking alcohol in the afternoon and in the evening has become my habit. Because of that we [his wife] always have fight. Beating takes place.... Hearing my bad names and noise all people tell that if you take alcohol then sleep quietly in your house. Why do you do disruption (tamasha) in the lane? Because of this people are troubled but this has no effect on me because I am in high due to alcohol.” A 33-year-old man with a 28-year-old wife and three children recounts that “In the evening when I came back from work I did not speak anything to my wife because I come home after taking alcohol. I was in ‘high’ and was not in mood to talk. My wife started telling: ‘I have got check up done from lady doctor. She has prescribed medicines which are to be brought from medical stores. Now give me Rs. 100/- so that I can buy medicine.’ I had money but not for medicine for my wife because if on the next day if I do not get work then I will not have money to drink alcohol. Therefore I

told my wife today I do not have money.” A 37-year-old male, with a 32-year-old wife and no children states that “My wife always tells to leave drinking alcohol. After taking alcohol I do not go for driving my rickshaw. I stay in the home and drink more alcohol. When I do not have money I ask money from my wife. If she does not give money I get very angry and start shouting angrily.” A 33-year-old man with a 32-year-old wife and three children says that, “Due to my drinking habit I lost the job. Now I do any laborer job. Sometimes I get the work and sometimes I do not get the work. So now there is problem of money. Due to drinking of alcohol we [his wife] have frequent quarrels. Many times slapping and beating takes place. Many times my wife has gone to her parent’s house after leaving my house for 1–2 months. Due to her going away for 1–2 months many times I have gone to a sex worker.”

### **Alcohol and exposure to community education**

The EL survey asked the 2,722 randomly sampled men, aged 21–40 years from the three communities whether they had “heard or seen” the RISHTA activities that were a part of community education. Table 3 shows the penetration of Community Education in the three communities. Street plays were the most successful in reaching community residents.

A substantial majority of men in the communities had heard or seen RISHTA activities and about half of those men had directly participated in at least one of those activities.

The question was asked of the EL respondents as to what were the primary messages of the RISHTA community education. Table 4 indicates that despite the fact that program designers focused on sexual risk reduction the most often perceived topic was alcohol use.

### **BL Versus EL Comparisons of Community Alcohol Use**

Table 5 compares the reported use of alcohol in the last month before the BL to the use of alcohol in the month prior to the EL. The comparison shows that there was a significant reduction in all types of alcohol consumption and in total alcohol use from 2003 to 2006. The frequency of daily drinkers showed limited change from 2003 to 2006, but the frequency of non-daily drinkers was much lower at EL than BL.

### **Change in Individual Behavior: Panel Sample**

The longitudinal panel sample consists of 403 men who have responded to both the BL and the EL survey. Among the sample of 403 men, the majority ( $n = 254$ ) did not use any alcohol. Fewer number of men were drinking alcohol at EL ( $n = 135$ ) than the number of men drinking alcohol at BL ( $n = 149$ ). The McNemar analysis was used to test whether men who used alcohol at BL but did not use alcohol at EL, were significantly different in frequency than the men who did not use alcohol at BL, but then reported use of alcohol at EL. As such, the differential alcohol use status can be viewed as an outcome or *dependent* variable. The comparisons for change in alcohol were conducted according to different demographic factors (age, education and residence of wife) and factors associated with alcohol use including self-assessment as a sex partner, the masculinity scale, spousal violence, extramarital sex, and risky behavior with friends. The results are presented in Table 6.



There was no significant difference between the number of men who reported any monthly use at BL and no use at EL ( $n = 53$ ) compared to the number of men who changed from no monthly use at BL to some use at EL ( $n = 39$ ), McNemar  $p = 0.18$ . It should be noted however that there is a strong relationship between BL and EL alcohol use,  $\chi^2(1) = 101.53$ ,  $p < 0.001$ . The variance accounted for,  $r^2 = 0.25$ , is extremely high.

The results on alcohol use by age indicate that older men ( $>30$  years) are significantly more likely to show a change and reduction in alcohol use than the younger men. Among the group of younger ( $<30$  years) age men, there was no significant change in the number of men drinking alcohol from baseline to endline. Among the group of older ( $>30$  years) age men, there was a significant change ( $p < 0.05$ ) in the rate of reported drinking from BL to EL suggesting that a greater number of men are likely to stop drinking than the number of men who initiate drinking. The other sub-groups of men where the majority stopped drinking to a greater extent than they initiated alcohol at EL were: those who were living with wives in the BL, those with more gender equitable attitudes in the BL, those who were reported spousal violence in the BL, those who reported risky activities with friends in the BL and those who reported extramarital sex in the BL. For instance, among the group of men who reported extramarital sex at the baseline, a significantly greater number of men stopped drinking alcohol ( $n = 24$ ) than the men who initiated drinking alcohol ( $n = 6$ ). The last column in Table 6 further tests the McNemar bivariate relationships using the multivariate GLM analysis for all variables. The results provide confirmatory levels of significance for the analytic variables.

### **The Consequences of a Change in Alcohol from BL to EL**

The data from the panel sample was assessed to examine the impact of change or non-change in alcohol use from BL to EL on the behavioral and attitudinal variables as dependent measures. These results (see Table 7) show that men who were drinkers in BL but non-drinkers in EL reported a significant reduction in risky activities with friends, while non-drinkers in the BL but drinkers in EL reported having increased risky behavior with friends from BL to EL. There was a significant increase in more equitable attitudes concerning gender as measured by the masculinity scale; relatively, greater improvement in gender equitable attitudes was found among men who were drinkers in BL but non-drinkers in EL than the other groups of men. Most importantly from the perspective of sexual risk, change in extramarital sex showed a significant relationship to change in alcohol use. The change in extramarital sex was greater among the men who were drinkers in BL but non-drinkers in EL and among non-drinkers (from than the drinkers in BL and EL. These results were found while controlling for key socioeconomic determinants of sexual risk such as age, education and income of the respondent.

### **Discussion**

The RISHTA project began with an ecological model of HIV/STI prevention in the study communities that recognized that men's extramarital risk behavior was an outcome of a range of factors that included gender norms, marital relationship, sexual health concerns, social networks and self-perceptions. Ethnographic fieldwork and in-depth interviews

pointed to the community held view that men's alcohol use played a central role in husbands' and wives' perceptions of men's negative and risky behavior. The narratives of both male and female residents viewed alcohol as having a direct effect on spousal violence, child abuse, poor marital communication, a lack of desire to work, extramarital sex, arguments, coercive sex, women's health and mental health problems, men's health problems, less financial resources for household and family maintenance, and fights with neighbors and that these factors are related to men's involvement in extramarital sex. Narratives linked alcohol and extramarital sex and included factors in the marital relationship that would increase the possibility of sexual transmission of disease from husband to wife. These ecological and culturally based narratives were expressed in the approaches taken by RISHTA staff to the scripts for the street dramas and other forms of community intervention.

The RISHTA project utilized a diverse series of interventions at the community level. The most popular activity was the street drama, which was systematically presented throughout the three communities on a rotating basis. Follow-up meetings after the street drama, meetings with community organizations, video shows and distribution of printed materials, and banner presentations maintained an ongoing presence of RISHTA community intervention staff throughout the 3 years of intervention.

The EL survey showed that the intervention activities of the RISHTA project had substantial penetration into the three study communities. From the perception of the EL survey sample, residents identified the most frequent RISHTA messages as focusing on the negative consequences of alcohol use.

Alcohol use in the EL cross-sectional sample showed a significant reduction from the rates in the BL cross-sectional sample across the communities. While there was no control community without community level intervention with which to compare, the reductions are significant and there were no other programs dealing with alcohol in these communities during this time period.

The use of McNemar analysis with the longitudinal panel sample provided an opportunity to examine the change in alcohol use from BL to EL from the point of view of identifying the sub-groups in the study communities that demonstrated positive change in alcohol use as defined by demographic characteristics and by attitudinal and behavioral factors. The results showed that a profile of men demonstrating a shift from reported use of alcohol in BL to no reported use in EL included those men at BL that possessed the following characteristics: older, less educated and living with their wives, with a positive assessment of themselves as sex partners, less gender equitable attitudes, involved in greater spousal violence and greater numbers of risky behavior with friends and having extramarital sex. This profile identifies men involved in behaviors that carry greater risk for HIV/STI transmission both for men outside marriage and for women within marriage. It also demonstrates that men with these factors can be open to modification of their alcohol use.

GLM and GEE assessed the impact of change in alcohol use on attitudes and behaviors related to sexual risk, while controlling for demographic variables. The results from panel sample on impact of change in alcohol use on selected dependent measures showed that men

who were drinkers in BL but non-drinkers in EL reported a reduction in risky activities with friends, more gender equitable attitudes on the masculinity scale and reduced extramarital sex behavior, even after controlling for key socioeconomic determinants of sexual risk such as age, education and income of the respondent. For HIV/STI interventionists, these results demonstrate that alcohol use can identify individuals with a propensity for change in key risk behaviors and attitudes and that change in alcohol behavior can result in positive change in these factors.

There is an anomaly in the McNemar analysis, which shows that for those men with lower risky activities with friends in BL, there is a significant change from no reported alcohol use at BL to alcohol use at EL. While further research is necessary to sort out possible explanations, it may be the case that community education is less effective in reaching the relatively lower risk groups who have as a result, less knowledge concerning the risks of alcohol use and may begin using alcohol over time. It may also be the case that men who evidence a positive change in alcohol use from BL to EL may be more likely to substitute greater risky activities with friends as a means of escaping the difficulties of slum community life.

The RISHTA project initiated a series of community intervention activities in the effort to reduce men's sexual risk behavior and to prevent the transmission of HIV/STI. A critical part of that effort as seen by members of the study communities and as portrayed in the literature was the role of alcohol in potentiating sexual risk behavior. As a part of RISHTA's approach, alcohol and its negative impact on risk became a central feature in the community intervention scripts and messages. The data presented in this article indicate that the inclusion of alcohol in community intervention had two positive effects: messages and education to reduce overall community use of alcohol served to positively impact on factors which played a role in sexual risk; and these alcohol reduction efforts assisted in identifying and reaching men whose alcohol use put them in a risk category for greater HIV/STI transmission for themselves and their wives. These results suggest that community intervention in sexual risk and HIV/STI requires an alcohol component and that community-based alcohol reduction programs need to include a component of sexual risk reduction.

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## References

1. Babor T, McRee B, Kassebaum P, Grimaldi P, Ahmed K. Screening, brief intervention, and referral to treatment (SBIRT), toward a public health approach to the management of substance abuse: a review of the literature. *J Subst Abuse*. 2007; 28:7–30.
2. Dent CW, Grube JW, Biglan A. Community level alcohol availability and enforcement of possession laws as predictors of youth drinking. *Prev Med*. 2005; 40(3):355–62. [PubMed: 15533551]
3. Wagenaar AC, Murray DM, Toomey TL. Communities mobilizing for change on alcohol (CMCA): effects of a randomized trial on arrests. *Addiction*. 2000; 95(2):209–17. [PubMed: 10723849]
4. Holder HD, Gruenewald PJ, Ponicki WR, et al. Effect of community-based interventions on high-risk drinking and alcohol-related injuries. *JAMA*. 2000; 284(18):2341–7. [PubMed: 11066184]

5. Holder HD, Saltz RF. A community prevention trial to reduce alcohol-involved accidental injury and death: overview. *Addiction*. 1997; 92:S155–71. [PubMed: 9231442]
6. Komro KA, Perry CL, Williams CL, Stigler MH, Farbakhsh K, Veblen-Mortenson S. How did Project Northland reduce alcohol use among young adolescents? Analysis of mediating variables. *Health Educ Res*. 2001; 16(1):59–70. [PubMed: 11252284]
7. Sivaram S, Srikrishnan AK, Latkin CA, et al. Development of an opinion leader-led HIV prevention intervention among alcohol users in Chennai, India. *AIDS Educ Prev*. 2004; 16(2):137–49.
8. Saltz RF, Welker LR, Paschall MJ, Feeney MA, Fabiano PM. Evaluating a comprehensive campus-community prevention intervention to reduce alcohol-related problems in a college population. *J Stud Alcohol Drugs Suppl*. 2009; (16):21–7. [PubMed: 19538909]
9. Schensul S, Verma R, Nastasi B. Responding to men's sexual concerns: research and intervention in slum communities in Mumbai, India. *Int J Mens Health*. 2004; 3(3):197–220.
10. Schensul S, Saggurti N, Singh R, Verma R, Nastasi B, Mazumder P. Multilevel perspectives on community intervention: an example from an Indo-US HIV prevention project in Mumbai, India. *Am J Community Psychol*. 2009; 43(3):277–91. [PubMed: 19357946]
11. Sharma KS, Tripathi BM, Pelto PJ. The evolution of alcohol use in India. *AIDS Behav*. 2010; doi: 10.1007/s10461-010-9730-z
12. Benegal V. India: alcohol and public health. *Addiction*. 2005; 100(8):1051–6. [PubMed: 16042631]
13. Saggurti N, Verma RK, Jain A, et al. HIV risk behaviours among contracted and non-contracted male migrant workers in India: potential role of labour contractors and contractual systems in HIV prevention. *AIDS*. 2008; 22
14. Saggurti N, Schensul SL, Singh R. Alcohol use, sexual risk behavior and STIs among married men in Mumbai, India. *AIDS Behav*. 2010; doi: 10.1007/s10461-010-9728-6
15. International Institute for Population Sciences (IIPS) and Macro International. National Family Health Survey (NFHS-3), 2005–2006: India, vol 1. Mumbai: IIPS; 2007.
16. Berg MJ, Kremelbery D, Dwivedi P, Verma S, Schensul JJ, Gupta K, Chandran D, Singh SK. The effects of husband's alcohol consumption on married women in three low-income areas of greater Mumbai. *AIDS Behav*. 2010; doi: 10.1007/s10461-010-9728-6
17. Singh SK, Schensul JJ, Gupta K, Maharan BR, Kremelbery D, Berg M. Determinants of alcohol use, risky sexual behavior and sexual health problems among men in low income communities in Mumbai, India. *AIDS Behav*. 2010; doi: 10.1007/s10461-010-9732-x
18. Schensul S, Nastasi B, Verma R. Community-based research in India: a case example of international and transdisciplinary collaboration. *Am J Community Psychol*. 2006; 38(1):95–111. [PubMed: 16838073]
19. Pelto PJ, Singh R. Community street theatre as a tool for interventions on alcohol use and other behaviors related to HIV risks. *AIDS Behav*. 2010; doi: 10.1007/s10461-010-9726-8
20. Campbell, DT, Stanley, JC. *Experimental and quasi-experimental designs for research*. Chicago, Illinois: Rand McNally; 1966.

**Table 1**  
**Frequencies of dichotomous analytic variables**

<b>Variable</b>	<b><i>n</i> (%)</b>
Born in Mumbai	139 (34.5)
Muslim religion (versus Hindu and others)	205 (50.9)
Wife resides in husband's house (BL)	360 (89.3)
Wife resides in husband's house (EL)	347 (86.1)
Extramarital sex in past 12 months (BL)	59 (14.7)
Extramarital sex in past 12 months (EL)	2 (0.5)

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**Table 2**  
**Means and standard deviations of continuous analytic variables**

<b>Variable</b>	<b>Mean (SD)</b>
Age	32.6 (5.2)
Highest grade completed	6.5 (3.8)
Alcohol use (BL)	3.6 (0.6)
Alcohol use (EL)	3.6 (0.6)
Risky activities with friends (BL)	1.7 (0.2)
Risky activities with friends (EL)	21.0 (1.1)
Masculinity scale (BL)	1.7 (0.2)
Masculinity scale (EL)	1.7 (0.2)
Self assessment as sex partner (BL)	1.2 (0.3)
Self assessment as sex partner (EL)	1.1 (0.2)
Spousal abuse scale (BL)	0.1 (0.1)
Spousal abuse scale (EL)	0.1 (0.1)
Self assessment as a husband scale (BL)	2.9 (0.3)
Self assessment as a husband scale (EL)	2.9 (0.2)

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**Table 3**  
**Community-level access to RISHTA ( $n = 2,722$ )**

<b>Activity</b>	<b>Heard or seen (%)</b>	<b>Of those who had heard or seen, how many participated (%)</b>
Street play	1,527 (56.2)	1,134 (74.2)
Poster presentation	1,366 (50.2)	1,055 (77.2)
Banner presentation	891 (32.8)	604 (67.9)
Printed information	793 (29.2)	629 (80.4)
Community meetings	233 (8.6)	153 (65.1)
Movie/video	226 (8.3)	132 (57.1)
Interpersonal communication	181 (6.7)	134 (73.6)
Total number of men with any contact	1,818 (66.8)	976 (53.7)

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**Table 4**  
**RISHTA messages from the perception of the EL respondents ( $n = 2,722$ )**

Message	<i>n</i> (%)
Alcohol use	1,225 (45.1)
Sexual health problems/STI	849 (31.2)
HIV/AIDS	839 (30.9)
Extramarital sex	815 (30.0)
Domestic violence	649 (23.9)
Marital relationships	619 (22.8)
Gender roles/masculinity	340 (12.5)
Condom use	465 (9.1)

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Table 5

## Alcohol BL/EL (all three study communities)

Variable	Percentage BL ( <i>n</i> = 2,408)			Percentage EL ( <i>n</i> = 2,722)			$\chi^2$ value	<i>p</i> value
	Never	Monthly	Daily	Never	Monthly	Daily		
Any alcohol	66.5	30.8	2.7	73.3	23.6	3.1	33.529	<0.001
Beer	76.2	23.3	0.5	84.3	15.0	0.1	82.275	<0.001
Desi daaru	88.2	10.1	1.7	90.0	7.8	2.2	98.044	<0.001
English liquor	75.7	23.3	1.0	83.4	15.8	0.8	50.230	<0.001

**Table 6**  
**Socio-demographic and behavioral and attitudinal subgroups and their association with change in drinking status from BL to EL among the longitudinal panel sample (n = 403)**

Characteristics	Drinkers at both BL and EL	Non-drinkers in BL but drinkers in EL	Drinkers at the BL but non-drinkers in EL	Non-drinkers at BL and EL	p value*	p value**
Total	96	39	53	215	0.18	
Men's age (years)						0.093
Younger (n = 207)	55	24	24	104	1.00	
Older (n = 196)	41	15	29	111	0.049	
Education						0.081
Less than 7 years (n = 176)	41	15	28	92	0.066	
More than 7 years (n = 227)	55	24	25	123	1.00	
Wife residence						0.048
Yes (n = 360)	90	29	48	193	0.040	
No (n = 43)	6	10	5	22	0.30	
Self assessment as a sex partner						0.099
More positive (n = 231)	53	26	25	127	1.00	
Less positive (n = 170)	42	13	28	87	0.028	
Masculinity scale						0.014
Less gender equitable (n = 194)	55	15	35	89	0.007	
More gender equitable (n = 208)	41	24	18	125	0.44	
Spousal violence						0.017
Yes (n = 121)	43	7	22	49	0.008	
No (n = 281)	53	32	31	165	1.00	
Risky behavior with friends						<0.001
High (n = 124)	62	3	38	21	<0.001	
Low (n = 256)	32	34	15	175	0.009	
Extramarital sex						0.001
Yes (n = 100)	26	6	24	44	0.001	
No (n = 301)	69	33	29	170	0.70	

\* Comparison between those men who changed positively versus those negatively according to their socio-demographic and behavioral characteristics; using McNemar Test

\*Comparison between the categories of independent variables on change in alcohol use: using general linear modeling (GLM) analyses; controlled for the remaining variables in the table

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Table 7

**Consequences of change in alcohol use on selected dependent measures among the longitudinal sample of men (*n* = 403; model adjusted for age, education and income of respondent)**

Alcohol use in BL and EL	Risky behavior with friends <sup>a,***</sup>		Assessment as a sex partner <sup>a,NS</sup>		Gender-equitable attitudes <sup>a,**</sup>		Spousal abuse <sup>b,NS</sup>		Extramarital sex <sup>b,***</sup>	
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline
Drinkers at both BL and EL	1.581 (0.014)	1.580 (0.013)	2.79 (0.032)	2.81 (0.023)	1.61 (0.024)	1.65 (0.021)	44.8 (0.051)	35.5 (0.049)	17.8 (0.039)	6.3 (0.023)
Non-drinkers in BL but drinkers in EL	1.77 (0.022)	1.63 (0.021)	2.74 (0.051)	2.87 (0.038)	1.73 (0.038)	1.64 (0.033)	18.0 (0.061)	18.0 (0.061)	2.6 (0.025)	7.7 (0.043)
Drinkers at the BL but non-drinkers in EL	1.56 (0.019)	1.77 (0.013)	2.79 (0.043)	2.89 (0.031)	1.58 (0.032)	1.71 (0.028)	41.6 (0.068)	15.1 (0.049)	29.3 (0.062)	1.9 (0.019)
Non-drinkers at BL and EL	1.75 (0.01)	1.76 (0.009)	2.80 (0.022)	2.88 (0.016)	1.73 (0.016)	1.75 (0.014)	22.8 (0.029)	14.0 (0.024)	12.1 (0.022)	2.8 (0.011)
<i>p</i> value	<0.001		0.406		<0.001		0.229		0.01	

Dependent measures in the analyses are: risky behavior with friends (higher the score, lower is the risky activities with friends); positive self assessment as a sex partner (higher the score, better is the assessment); gender equitable attitudes (higher the score, more equitable attitudes); spousal abuse (no, yes); extramarital sex (no, yes)

Independent variable comparisons: alcohol use in baseline (BL) and endline (EL)

NS not significant statistically

\*\*\* *p* <0.01

<sup>a</sup>General linear modeling (GLM) analyses

<sup>b</sup>Generalized estimating equation (GEE) analyses