



Sam Houston State University

Department of Economics and International Business

Working Paper No. 18-02

March 2018

Prevalence and socio-demographic correlates of alcohol consumption: survey findings from five states in India

Kaushalendra Kumar
International Institute for Population Sciences (IIPS)
Mumbai, India.

Santosh Kumar
Department of Economics and International Business
Sam Houston State University
Huntsville, TX, USA
skumar@shsu.edu
(Corresponding Author)

Anil Kumar Singh
Department of Economics
Shyam Lal College (E)
University of Delhi
Delhi, India.

Abstract

We investigate the association between socio-demographic characteristics and alcohol consumption in India. Analytical data were derived from household surveys conducted by the study team that included 6,088 adults in five states of India (male=3,803, female=2285). Multivariate logistic regression models were fitted to investigate the socio-demographic association with both alcohol use and types of alcoholic beverages. More than one-third of the sample respondents (38.6%, 95%CI = 29.2-48.8%) reported to be current drinkers and approximately one-fifth (21.7%, 95%CI = 4.2-31.7%) were heavy drinkers and 7.4% (95%CI = 4.6-11.6%) were heavy episodic drinkers. In multivariate analyses, age greater than 50 years (OR = 0.70, 95%CI = 0.56-0.86), being female (OR = 0.08, 95%CI = 0.06-0.09), schooling greater than 12 years (OR = 0.61, 95% CI = 0.50-0.75), owing land (OR = 0.74, 95%CI = 0.65-0.86), and living in a pucca house (OR = 0.85, 95% CI = 0.74-0.98) were negatively associated with current drinking status. Higher income (OR = 1.30, 95%CI = 1.08-0.57) and living in urban areas (OR = 1.54, 95%CI = 1.33-1.78) were positively associated with current drinking. Substantial differences in the socio-demographic correlates of alcohol use and types of alcoholic beverages exist in India. Intervention and prevention strategies should include drinkers characteristic as well.

Keywords: Alcohol use; Socio-demographic determinants; Country liquor; Home-brewed; India.

JEL Codes: A1; I1

1. INTRODUCTION

Approximately 38% of the global adult population consumed alcohol in 2010 and almost half of the global adult population have never consumed alcohol (WHO, 2014). The global per capita consumption in 2010 was 6.2 litres of alcohol annually but the per capita consumption among drinkers was 160% higher than the global average of 6.2 litres. The prevalence of alcohol consumption is rising and has increased by 55% between 1992 to 2012 (Devaux and Sassi, 2015). Alcohol consumption is a public health concern worldwide because it is one of the leading causes of mortality and disability-adjusted life years (DALYs) lost globally (IHME, 2015; Rehm et al., 2009). Globally, alcohol use accounted for 4.1% and 3.5% of deaths and DALYs, respectively (IHME, 2015).

Over the last decade, alcohol consumption has been rising steadily in India and has emerged as a leading public health challenge. According to the most recent estimate, alcohol use accounts for 3.5% of the deaths and 2.9% of the DALYs in India (IHME, 2015). In 2014, the WHO report estimates that 15% of people 15 and older reported to be current drinkers in 2010 and per capita alcohol consumption increased by 37.5% from 1.6 litres to 2.2 litres of recorded pure alcohol between 2003-05 to 2010-12 (WHO, 2014). This suggests that despite the low prevalence of alcohol drinking in India (15%), per capita consumption of alcohol among drinkers is very high indicating a higher prevalence of high-frequency and high-volume drinking pattern among drinkers. Among drinkers, total per capita consumption of pure alcohol is highest in India among countries in the WHO South-East Asia region. Drinkers consume on average 28.7 litres of pure alcohol per capita per year in India while drinkers in Australia, USA, and Germany consume approximately 15 litres of pure alcohol per year (WHO, 2014). As expected, drinking men were more likely to be high-volume drinkers than women (32.1 liters vs 10.6 litres) in India. The factor that contributes the most to the higher consumption of pure alcohol among Indian drinkers is the preference for hard liquors and distilled spirits (Prasad, 2009). Spirits, that has the highest ethanol concentration, accounts for 95% of the alcoholic beverages consumed in India. Furthermore, higher consumption of alcohol may increase the risk of non-communicable diseases such as cancer, coronary heart disease, and intentional injuries (Room *et al.*, 2005).

The health risks due to increasing prevalence of alcohol use in India is further exacerbated by consumption of unrecorded alcohol, illicit liquor, surrogate alcohol, and other hazardous drinking behaviour among drinkers (Rathod et al., 2015; WHO, 2014). Unrecorded alcohol consumption, defined as alcohol produced outside the formal channel of the government system, accounts for 25% of all alcohol consumption worldwide in 2012 (WHO, 2014). The WHO 2014 report on alcohol and health, the best available estimate, found that unrecorded alcohol consumption that is mostly home-brewed and counterfeit is as high as 50% in India. Country liquor, industrially produced illicit alcohol, and home-brewed alcohol are the most common categories of unrecorded alcohol in India (Benegal et al., 2003). Compared to recorded alcohol consumption, data on unrecorded alcohol is not easily available and is harder to obtain because they are not part of the formal tax or sales system. Furthermore, the majority of the countries do not gather information on unrecorded consumption and therefore estimates of unrecorded consumption are generated through either expert opinions or survey data that are further susceptible to measurement error and under-reporting. Given the illicit nature of unrecorded consumption, it is very difficult to provide reliable estimates of consumption of unrecorded alcohol and survey-based estimates are generally lower bound due to under-reporting. The consumption of unrecorded alcohol may pose greater health risks because consumers of unrecorded alcohol are more likely to be chronic and irregular heavy drinkers (Rehm et al., 2014). Due to lower cost of unrecorded alcohol, people have higher propensity to consume higher levels of average alcohol consumption. Furthermore, unrecorded alcohol was associated with heavy drinking by individuals in low socio-economic groups, especially in rural and tribal population (Gupta et al., 2003; Chowdhury et al., 2006). In a study conducted in neighboring Nepal, authors found a significant increase in the risk of alcohol liver disease due to consumption of unrecorded or home-brewed alcohol, after adjusting for total quantity consumed (Pradhan et al., 2015).

The purpose of this study is twofold. Given that the most reliable and updated estimates of alcohol consumption in India is from 2010 and is based on aggregated data and expert opinions, there is a need to generate reliable estimates of recorded and unrecorded alcohol drinking because expert opinions are subjective and more prone to bias and measurement error. The overarching goal of this study is to provide new and updated estimates of recorded and unrecorded alcohol consumption and alcohol use patterns in

India based on population surveys implemented in five states in 2014. The updated and reliable data is crucial for policy measures and to assess its effects. Additionally, this study further explores socio-demographic factors that are associated with patterns of alcohol consumption behaviors in India.

1.1. Alcohol consumption in India

Alcohol is the second most commonly used substance in India after tobacco. However, only a handful of studies were conducted to assess the prevalence and patterns of alcohol use in India. Based on small and community- or state-based studies, the prevalence of alcohol use was estimated to be 20.7% in Andaman and Nicobar in 2007-09, 9.4% in rural Tamil Nadu in 2012, and 13.3% in Madhya Pradesh in 2013-14 (Kumar S et al., 2013; Manimunda et al., 2017; Rathod et al., 2015). The 2003 National Household Survey of Alcohol and Drug Abuse found that 21.4 of the respondents were current users of alcohol (used in the last 30 days) and only 2% of women were current drinkers Ray et al. (2004), but it has risen to 25% for the men and 5% for women in 2010-2012, according to the WHO (2014) report (Ray et al., 2004; WHO, 2014). Nonetheless, there is a paucity of reliable data on the prevalence of alcohol use and factors associated with its use, which are likely to vary across states and regions.

Alcohol consumers in India prefer hard liquors and distilled spirits over other alcoholic beverages and therefore, spirits account for 93% of the alcoholic beverages consumed in India (WHO, 2014). Estimates reported in these studies are based on recorded alcohol consumption, but there is a large share of unrecorded alcohol consumption among the socio-economically deprived populations in rural areas.

In terms of drinking frequency and quantity, 30-50% of alcohol consumers are hazardous drinkers in India (Bonu et al., 2005; Rathod et al., 2015). Considering the widespread availability of unrecorded alcohol and lower price relative to recorded alcohol, we further study the socio-demographic differential between recorded and unrecorded alcohol consumption in India. Specifically, the socio-demographic predictors of recorded, country liquor, and home-brewed alcohol was assessed.

1.2. Social determinants of alcohol consumption

The evidence on the association between the socio-demographic factors such as age, gender, income, socioeconomic status, and alcohol consumption in developing countries is limited, mixed, and lacks statistical inference due to small sample size.

Analyzing National Sample Survey of 0.5 million people, Neufeld et al. (2005) reported that men and members of Scheduled Castes (SC) and Scheduled Tribes (ST) (historically marginalized communities in India) were more likely to be alcohol user than women and other caste, respectively. Similarly, Subramanian et al. (2005) also found that members of scheduled tribe and caste and men with no education had a higher probability of alcohol consumption. In contrast, Rathod et al. (2015) found no evidence of religion, caste, and occupation on alcohol consumption, while hazardous drinking was negatively associated with land ownership, out of pocket healthcare expenditure and participation in the national employment programme. Results from these aforementioned studies indicate that there is much to understand about factors that influence alcohol use and drinking patterns and more extensive research based on large population surveys is needed to understand the dynamics of alcohol consumption in India. The foremost aim of our study is to fill this gap and provide reliable estimates on prevalence and consumption of different types of alcoholic beverages and highlight factors that determine alcohol use in a multivariate framework.

2. MATERIALS AND METHODS

The present study is based on household-level data from the Survey of Unrecorded Alcohol in India (SURA-India) study, conducted during January to December 2014 in five states of India: Andhra Pradesh, Maharashtra, Madhya Pradesh, West Bengal, and Kerala, representing the geographical, socio-demographic, political, and economic diversity of India. Study participants were asked about their socio-demographic characteristics and alcohol use in the past 12 months through pilot-tested structured interviews in the local language of each state. Verbal and written informed consent was obtained prior to interviews. The study interviewed respondents aged 15 and older and no minors were interviewed.

Ethics

The study protocol was approved by MORSEL Institutional Review Board (IRB). All participants provided consent and data were collected anonymously.

2.1. Sampling design

Applying multi-stage stratified sampling, around 1,200 interviews (total: 6,088) were conducted. Considering the state as the sampling frame, districts were stratified based on percent SC/ST population, percent female literacy, and percent households belonging to the low wealth quintile. Giving equal weight to each of the socio-economic indicators, a composite socio-economic status (SES) index was constructed for each district. All districts in each state were classified into either the high SES or low SES group using the median SES index as the cut-off point. In the first stage, two districts from each state were randomly selected, one from the higher and one from the lower SES groups. In the second stage, using 2011 Census data, 40 rural villages and 10 urban wards were selected by adopting a probability proportion to size (PPS) design in each selected district.

In stage 3, 20 households were randomly selected through “random walk sampling method”. Every fifth household in the selected village/ward were selected. Finally, the individual participant who had the most recent birthdate was selected from the pool of all adult members (older than 15 years) for the interview. Further, two slums were randomly selected in each selected district headquarter and 50 respondents were randomly selected from each of these two slums. This sample design yielded a sample of 800 rural and 400 urban participants in each state (see (Kumar, 2017) for details of sample design). The overall response rate is quite high (85%) which implies that selection bias and therefore under-reporting due to non-refusal is limited.

2.2. Definition of alcohol measures

Alcohol consumption was self-reported by respondents. Respondents who either never had a drink of any alcoholic beverage (lifetime abstainers) or who had consumed alcohol more than 12 months ago (former drinkers) were not asked about the frequency and quantity of alcohol use. Respondents who had consumed any alcoholic beverage at least once in the last 12 months (current drinkers) were asked the detailed questions on the frequency and quantity consumed. Alcohol consumption was estimated by asking about the quantity (number of drinks per drinking day and size of a typical drink) and

average frequency of the consumption of alcoholic beverages in the past 12 months. Beer, wine, and spirits were categorized as recorded alcohol, while home-brewed, counterfeit, contraband, and surrogate alcohol were categorized as unrecorded alcohol. Furthermore, country liquor was considered recorded in Maharashtra, Madhya Pradesh, and West Bengal but was illegal in Andhra Pradesh and Kerala, therefore was categorized as unrecorded in these two states.

The frequency of alcohol consumption was measured with the following ten response options: every day, 5-6 times a week, 3-4 times a week, 1-2 times a week, 2-3 times a month, once a month, 6-11 times in past 12 months, 2-5 times in past 12 months, once in past 12 months, and never in past 12 months. The number of drinks and size of a respondent's usual drink was assessed with reference to pictures of beverage-specific containers and vessels, and drink quantity was measured in milliliters (ml). The quantity of the drink was based on the following response options: 30 ml peg, 60 ml peg, 90 ml peg, 180 ml bottle, 750 ml bottle, 1.5 liter bottle, 500 ml can, 650 ml can, and other size. The total volume of alcohol consumption is calculated using average frequency and the average quantity of alcohol consumption in last one year. Finally, pure alcohol consumption is calculated using beverage-specific pure ethanol content² and the total volume of alcohol consumption.

2.3 Main Outcome Measures. Following the WHO definition, alcohol drinking behavior is defined based on the frequency and volume of any alcohol consumption (Thomas et al., 2001).

- Current drinkers (CD) are those who had consumed any alcoholic beverage at least once in the past 12 months.
- *Daily drinkers* are those who had consumed any alcoholic beverage daily or almost daily in the past 12 months.
- *Heavy drinkers* (HD) are defined as those whose mean daily pure alcohol consumption is more than 48 grams/day (pure alcohol consumption has been calculated using the average alcohol content of each beverage type). As per WHO AUDIT guideline heavy drinkers are those who consume more than 60 grams/day pure alcohol. In our sample, very few individuals had consumed

² Percentage share of pure ethanol in beverage drinks are as follows: Beer (6%), Wine (11%), Country Liquor (40.1%), Spirit (42.8%), Home Made Alcohol (25%).

more than 60 grams of pure alcohol; therefore, in order to have enough observations as HD, we used 48 grams/day of pure alcohol as the cutoff point for heavy drinkers. Moreover, the 48 grams threshold is representative of several thresholds commonly used in other studies (WHO, 2000; Kuntsche et al., 2006). For example, a study by Bloomfield et al. (2008) conducted in Denmark used 30 grams of pure alcohol for men to classify heavy drinkers.

- *Heavy episodic drinkers* (HED) are those who consumed 6+ standard drinks in a single day at least monthly (WHO, 2014). In contrast to WHO definition, the reference period is 24 hours rather than an occasion. Standard drink size was determined by respondent's reported size of usual drink for each beverage. -
- *Recorded drinkers* are those who consumed at least one of the following drinks, beer, wine, and spirits in the past 12 months.
- *Country liquor drinkers* are those current drinkers who reported to have consumed country liquor in the past 12 months.
- *Home-brewed drinkers* are those current drinkers who reported to have consumed home-brewed drinks in the past 12 months. For drinkers who consumed multiple alcoholic beverages (for example, spirits and home-brewed), we use the total volume of pure alcohol consumed from different beverage types to classify drinkers. If total pure alcohol intake was higher in spirits than home-brewed drink, then drinkers were classified as recorded drinkers.

2.4 Socio-demographic Covariates. All covariates were selected based on previous literature and were measured at the time of the survey through interviews. Previous research has found that household income, education, employment status is associated with current drinking status (Bloomfield et al., 2008). Age was assessed in years, using participants' self-reported year of birth. Education was assessed in years of schooling completed using standardized categories: 0-4 years of schooling or illiterate; 5-8 years of schooling; 9-11 years of schooling; 12-20 years of schooling. Information on gender, marital status, occupation, whether household owns land (an indicator of household wealth), and household caste was also collected during the interviews. Respondents' monthly income was categorized as less than Rupees 4,000, between 4,000-8,000, and more than Rupees 8,000. Finally, poverty status, structure of the house, and place or residence (rural versus urban) were also included in the

analytical models as covariates.

2.3. Statistical methods

To analyze if there was an association between any of the sociodemographic determinants and alcohol use, we use bivariate and multivariate logistic models. Bivariate association was modeled by using Chi-square test and one-way ANOVA for statistical significance. Multivariate logistic regression model was applied to estimate the association of each socio-demographic characteristic with different measures of alcohol use (current drinker, daily drinker, heavy drinker, heavy episodic drinker, recorded drinker, country liquor drinker, and home-brewed drinker). Separate models were estimated for each outcome variable. All models were adjusted for state of residence in order to account for time-invariant characteristics of state that may affect alcohol use. Robust standard errors were estimated to account for heteroscedasticity in the error terms. Data processing and statistical analysis were performed using STATA version 14.2.

Alcohol per capita consumption (APC) and grams of pure alcohol per capita per day are two of the most widely used measure of levels of alcohol consumption (WHO, 2014). In order to estimate per capita consumption of pure alcohol, we follow the guidelines of the WHO 2014 report on APC and grams of pure alcohol per day. We use the following formula to estimate the total volume of pure alcohol in litres in the past 12 months:

$$\begin{aligned} & \textit{Alcohol volume in pure alcohol per year} \\ & = \textit{Drinking days per year} \times (\textit{quantity} \times \%ABV) \end{aligned}$$

where ABV denotes alcohol by volume. We applied 6% ABV for beer, 42.8% for spirits, counterfeit, contraband, and surrogate, 11% ABV for wine, 40.1% for country liquor, 25% for home-brewed (Nayak et al., 2008). Further, APC is converted into “grams of pure alcohol per day” by the following formula:

$$\textit{Grams per day} = \textit{APC} \times 1000 \times \frac{0.793}{365} \textit{days}$$

3. RESULTS

3.1. Study sample

Table 1 reports the socio-demographic and economic characteristics of the sampled respondents. The survey was administered to individuals aged 15 years and above and gathered information on a total sample of 6,088 respondents. The sample was spread across five Indian states. Respondents were, on average, 40.3 years of age. Male respondents (41.6 years) were slightly older than the female respondents (38.07 years). In terms of age categories, around half of the sample (48%) was in 30-49 years age group. Two-third of the respondents are male (62.5%) and the majority of the sample were currently married (86%). Two-fifths (40%) of the respondents are either illiterate or have at most four years of schooling, and more than one-fifths (22%) of the respondents has completed at least 12 years of schooling. The average years of schooling in the sample is 6.49 years. The sample is equally distributed across three major social groups (scheduled caste/scheduled tribe (SC/ST), other backward class (OBC), and Other caste). More than two-fifths (42%) of the study sample's personal monthly income was Rs. 4000 to Rs. 8000. By occupation, 37% sample was labourer and around one fifth (19.4%) of the sample was not engaged in any economic activity. Approximately, 36.2% of the respondents were unemployed (homemaker and student). Finally, the rural sample consisted 65.5% of the total sample of 6,088 respondents. The socio-demographic characteristics of the sample by age groups and states are reported in the supplementary tables 1 and 2.

3.2. Patterns of drinking

The prevalence of drinking use was 38.6% in the sample. Almost half (53.6%) of the sampled respondents are lifetime abstainers because they have never consumed alcohol. Former drinkers, people who had consumed alcohol in their lives but have not consumed in the previous year, constitutes 7.8% of the sample.

Analysis of drinking frequency revealed that 19.5% of the current drinkers consumed alcohol almost daily (every day and 5-6 times a week) and 37.45% of the CD consumed alcohol weekly (3-4 times a week and 1-2 times a week). Based on this drinking frequency, 57% of the CD is weekly drinkers (1-7 times a week). About 24% of the CD is monthly drinker because they consumed alcohol at least once a month (1-3 times per month) and another 19% are occasional drinkers, consuming less than monthly.

On a typical drinking day, one-fifth of the CD reported to have one drink (20.5%), while more than half of the CD reported that they had 2-4 alcoholic drinks, on average (55.6%). The percentage of CD who consumed 5-6 drinks and 7-8 drinks was 13.87% and 5.58%, respectively. Very few respondents had consumed more than 11 drinks on a typical drinking day (1.5%). Overall, the general drinking pattern indicates that three-fourth of the CD take 1-4 drinks on a typical drinking day (76.1%).

3.3. Types of alcoholic beverages

Analysis of the beverage-specific frequency and quantity module of the data revealed that majority of the CD preferred to consume spirits over other alcoholic beverages. Spirits was the most consumed drink (45% reported to have consumed spirits), while wine was the least consumed drink (only 5% of the CD consumed wine in the past year). Country liquor and home-brewed drink were consumed by 31% and 29% of the current drinkers, respectively. Finally, a quarter of the CD consumed beer in the past year. Many respondents consumed multiple types of alcoholic beverages. The data shows that about 9.2% of the CD consumed home-brewed as well as country liquor, while 7.5% of the CD consumed home-brewed and spirits. The percentage of CD who consumed spirits and country liquor both was 6.3%. The prevalence of consumption of surrogate, counterfeit, and contraband was very small (less than 2%).

Rural drinkers were more likely to consume spirits and home-brewed drink than the urban drinkers. The prevalence of home-brewed drinking was 10 percentage points higher in rural areas (33.2%) compared to urban areas (23.7%). Beer consumption was more common in urban areas (28.5%) than rural areas (23.3%). There was not much difference in consumption of wine and country liquor between rural and urban areas.

Table 2 shows the drinkers' type and beverage's type by gender of the respondents. Compared to men, women are less likely to be current or daily drinkers. Only 1.2 % of the female respondents were identified as daily drinkers. Among current drinkers, women were more likely to be heavy drinkers (22.8%) than men (10.9%). In terms of beverage type, male drinkers were more likely to drink spirits (48.2%) and country liquor (32.2%) than female drinkers. Home-brewed drink was common among female drinkers (61.8%) than male drinkers (26.1%). The prevalence of wine drinking was 6 times more among female drinkers (20%) than male drinkers (3.4%).

3.4. Total per capita consumption of pure alcohol

The average per capita consumption of pure alcohol per year for the full sample is 4.4 litres. However, among drinkers, per capita consumption of pure alcohol is 11.6 litres per year. This is equivalent to 9.5 and 25.11 grams of pure alcohol per day for the full sample and drinkers only, respectively. The levels of consumption vary a lot across states. The highest consumption levels occur in Kerala (13.6 litres), while Andhra Pradesh has the lowest consumption levels of pure alcohol among drinkers (9.1 litres). The per capita consumption of recorded alcohol (spirits, beer, and wine) was 3.18 litres of pure alcohol, while consumption of country liquor and home-brewed was 1.55 and 0.93 litres of pure alcohol in the full sample, respectively.

3.5. Per capita consumption of recorded and unrecorded alcohol

The WHO 2014 report suggested that 50% of the alcohol consumed in India is unrecorded. According to this report, the average consumption of recorded and unrecorded pure alcohol per capita was 2.2 and 2.2 litres, respectively in 2010-2012. Our study shows that the average per capita consumption of pure alcohol is 4.4 litres and almost a third of per capita consumption is unrecorded alcohol (28%). Recorded alcohol in our study included spirits, beer, wine, and country liquor (only in Maharashtra, Madhya Pradesh, West Bengal), while unrecorded alcohol included home-brewed, country liquor (Kerala and Andhra Pradesh), contraband, counterfeit, and surrogate alcohol. Sale of country liquor was banned in the state of Kerala and Andhra Pradesh at the time of the survey.

The consumption of unrecorded alcohol varied widely across states, with West Bengal being the biggest consumer of unrecorded consumption, especially home-brewed drinks. Table 3 shows the results. The percentage of unrecorded consumption ranged from 8% in Maharashtra to 51% in West Bengal. Approximately, one-third of the per capita consumption was unrecorded in Andhra Pradesh (29%) and Madhya Pradesh (31%).

3.6. Prevalence of the different measures of alcohol consumption

Table 4 reports different types of alcohol consumers by various socio-demographic characteristics. For the sample population as a whole, 38.6% (95%CI = 29.2-48.8%) self-identified themselves as current drinkers. Across age categories, the highest

prevalence of current drinker (40.6%, 95%CI = 32-49.7%) was found in the 30-49 year age group. More than half (56%, 95%CI = 42.9-68.3%) of the male respondents were current drinker compared with only 9.6% (95%CI = 5.5-16.4%) among the female respondents. The proportion of current drinker was highest among the SC/ST (45.3%, 95%CI = 34.1-56.9%) followed by OBC (38.9%, 95%CI = 33.9-44.1%) and other castes (31.8%, 95%CI = 17.7-50.2%). More than two-fifths (42.2%, 95%CI = 32.3-52.9%) of the respondents with more than Rs. 8000 monthly incomes were current drinker. Unemployed groups were more likely to be current drinkers (48.8%, 95%CI = 36.5-61.2%) compared to employed group (20.6%, 95%CI = 13.7-29.7%). The prevalence of current drinkers is higher in the urban areas (44.6%, 95%CI = 37.8-51.6%) than the rural areas (35.4%, 95%CI = 23.6-49.4%). Across the survey states, the percentage of current drinkers was lowest in Maharashtra (27.6%) and highest in Andhra Pradesh (45.6%).

Overall more than one-fifth (21.7%, 95%CI = 14.2-31.7%) of the current drinkers (CD) was heavy drinkers (HD). With age, prevalence of HD increases from 14.6% (95%CI = 8.2-24.7%) in the age group 15-29 year to 24.7% (95%CI = 15-37.7%) in the 50+ aged CD. Among male CD, 22.8% (95%CI = 16.1-31.2%) were HD compared to 10.9% (95%CI = 2.6-36%) among the female CD. Almost one-fourths of the CD having at most 8 years of education were HD, compared with only 12.4% (95%CI = 8.5-17.8%) in the 12+ years educated CD. Prevalence of HD in the Rs. 4000 and above income group was two times of the HD prevalence in the less than Rs. 4000 income group. HD prevalence was higher among unemployed (22.5%, 95%CI = 14.7-32.9%) than employed (18.1%, 95%CI = 10.5-29.5%). Andhra Pradesh had the highest (30.7%) prevalence of HD whereas Madhya Pradesh had lowest prevalence (16%) of HD.

Amongst the current drinker, 7.3% (95%CI = 4.6-11.6%) were heavy episodic drinker (HED). Among female current drinkers, the HED prevalence was 7.8% (95%CI = 5-12.2%) compared with only 2.7% (95%CI = 0.6-11.9%) among the male. The HED prevalence amongst the CD with less than Rs. 4000 income increases from 4.7% (95%CI = 2.1-10.4%) to 8.8% (95%CI = 6.5-11.9%) among the CD with more than Rs. 8001 income. Only 4.7% (95%CI = 1.9-10.9%) of the CD were HED in the rural area compared with 9.1% (95%CI = 5.9-13.9%) in the urban area. One-tenth of the CD were HED in Andhra Pradesh and Kerala, and lowest (4.2%) in West Bengal.

3.7. Multivariate regression results

3.7.1. Determinants of drinkers' types

The results on the adjusted association between socio-demographic characteristics and types of drinkers are reported in table 5. The odds of being a current drinker is 30% lower for respondents aged 50 years or more (OR=0.70, 95% CI = 0.56-0.86), however, younger respondents in the age group of 30-49 years are more likely to be daily drinkers and heavy drinkers. For heavy episodic drinker, age is not a statistically significant determinant of drinking habit. Female drinkers are 92% (OR=0.08, 95% CI = 0.06-0.09) and 94% (OR=0.06, 95% CI = 0.04-0.09) less likely to be current drinker and daily drinker, respectively. Education levels are negatively associated with drinking habits. We found a significant education-gradient in the association between years of schooling and types of drinkers. The odds of being current, daily, and heavy drinkers decrease as the level of education increases. Adults having at least 9 years of schooling are less likely to be CD than the illiterate and 0-4 years educated adults. Respondents with more than 12 years of schooling have 39% lower odds of being a current drinker compared to illiterate or respondents with less than 4 years of schooling (OR=0.61, 95% CI = 0.50-0.75). Similarly, higher education is negatively associated with the status of daily drinker and heavy drinker. In contrast, education is not associated with heavy episodic drinking. Respondents belonging to OBC and other caste category have lower odds of being current drinker, daily drinker, and heavy drinker relative to SC/ST, however, respondent's caste is not associated with HED.

Household income, employment status, and urban residence are positively associated with CD, DD, and HD. We find a significant income-gradient in the association between income and drinking habits. As household income increases, the odds of being CD, DD, and HD increases at increasing rate. Respondents whose income is more than Rs. 8000 are 2.8 times more likely to be heavy drinker compared to respondents with income less than Rs. 4000. However, urbanity is negatively associated with HED, which implies that rural drinkers are more likely to be HED (OR=0.42, 95% CI = 0.28-0.62). Land ownership and having a pucca house are negatively associated with drinker's types. Results further indicate that marital status and below poverty line status have no significant association with all measures of alcohol consumption.

3.7.2. *Determinants of recorded, country liquor, and home-brewed drinking*

The SURA survey found that approximately one-third of per capita consumption of pure alcohol is unrecorded (28%). Given the high share of unrecorded consumption in India, we conduct a separate analysis to understand the determinants of recorded and unrecorded alcohol consumption. Recorded drinkers are those whose consumption of pure alcohol was highest from any of the following drinks: spirits, beer, and wine. The reference group is the current drinkers who did not report drinking of recorded drinks in the past 12 months. About one-third of the current drinkers consumed country liquor and country liquor is one of the most popular alcoholic drinks in rural parts of India. Country liquor is inexpensive and widely available in India. In terms of ABV, it is comparable to spirits (42% ABV). Therefore, given the unique position of country liquor in India, we separately analyze the determinants of country liquor. Current drinkers who did not consume country liquor or home-brewed drinks were selected as the reference categories for the analysis of country liquor and home-brewed drinks, respectively. The results are reported in table 6. The sample for analysis is current drinkers only. We exclude non-drinkers from the analysis done in Table 6. Results show that older respondents are more likely to be CL and home-brewed drinkers and less likely to consume recorded alcohol drinkers. Respondents who are 50 years and older are 1.5 times more likely to be CL and home-brewed drinkers, while 67% less likely to be recorded drinker (OR=0.33, 95%CI = 0.22-0.50). The odds for female to be recorded drinker is 64% lower compared to male (OR=0.36, 95%CI = 0.22-0.58). Female are 3.5 times more likely to be home-brewed drinker, but 61% less likely to be CL drinker. Marital status is positively associated with home-brewed drinking only.

The results on the association between education and alcohol consumption are very interesting. A strong education-gradient was observed. Drinkers with higher education were more likely to consume recorded drinks but were less likely to consume CL or home-brewed drink. Education better-off drinkers (more than 12 years of schooling) were 4.7 times more likely to be recorded drinker (OR=4.72, 95%CI = 2.92-7.64) but 41% less likely to be home-brewed drinker, compared to illiterate or drinkers with less than 4 years of schooling. The likelihood of consuming country liquor decreases as education level increases. Compared to SC/ST, drinkers belonging to other caste were more likely to consume recorded alcohol but less likely to consume home-brewed drink.

Caste was not associated with the consumption of country liquor. Income is positively associated with the likelihood of consuming recorded and country liquor with the association being stronger for households earning more than Rs. 8000 than the <Rs. 4000 group. In contrast, the highest income group has 48% lower odds of being home-brewed drinker (OR=0.52, 95%CI = 0.38-0.71). Employment status is only associated with consumption of recorded alcohol. Urban residence, land ownership, and pucca house are positively associated with recorded drinking. Pucca house, an indicator of higher socioeconomic status, is negatively associated with the consumption of country liquor (OR=0.72, 95%CI = 0.54-0.96). Urban drinkers are less likely to consume home-brewed drink relative to rural drinkers.

4. DISCUSSION

This paper uses data from five Indian states to estimate the prevalence of alcohol consumption and further explore the sociodemographic factors associated with alcohol use. Findings show that around two-fifths (38.6%) of respondents were current drinkers, which varies from 35.4% in the rural areas to the 44.5% in the urban areas. The percentage of adults drinking alcohol daily or almost daily was 9.6%, which was 7.6% in rural area and 13.4% in the urban area. More than one-fifth (21.7%) of CDs were HD, and the prevalence of HD increased with age and income but decreased with education level. One-tenth of the CDs were HEDs in urban areas compared with the only 6.9% in rural areas. Multivariate logistic regression results show that age, gender, education, income, caste, and rural residence were significantly associated with alcohol consumption. There is a significant education and income gradient in alcohol use. Drinkers with higher education are more likely to consume recorded alcohol but less likely to consume country liquor and home-brewed alcohol relative to less educated drinkers. Higher income is positively associated with the use of recorded alcohol and country liquor but negatively associated with the use of home-brewed drinks. There was no difference in alcohol consumption and types of alcohol use by marital status of the respondents.

The previous estimates of alcohol use in India have ranged from a low 9% to as high as 70% depending on the methodology, survey instrument, and study context. The National Family Health Survey (NFHS)-2 reported a prevalence of 11%, while NFHS-3 reported a prevalence rate of 14% (IIPS, 2000; IIPS 2017). The NFHS-4 reports that

29.2% of men and 1.5% of women had consumed alcohol in the past year (IIPS, 2016). The NFHS is a nationally representative survey, however, alcohol use is underestimated because the survey samples respondents in 15-49 age groups and thereby excludes older drinkers. In contrast, communities based studies have found a higher prevalence of alcohol use. A study conducted at a slum in Kolkata, India found that 65.8% of the male respondents were current alcohol consumer Ghosh *et al.*, (2012), while Singh *et al.* (2000) reported that 87.5% of urban males consumed alcohol daily in Amritsar, Punjab.

The estimated prevalence of alcohol use in this study is slightly higher than the WHO estimates of 30%. It could be a reflection of an increase in alcohol consumption over time and also due to the inclusion of dry states in the WHO estimate. Spirits or whiskey is the most common drink. We found that about 45% of the current drinkers consumed spirits, 25% consumed beer, 31% consumed country liquor, and 29% consumed home-brewed drinks. These estimates corroborate the findings of Girish *et al* (2010), who also reported that the most preferred alcoholic drink is Indian-made foreign liquor or whiskey.

Several limitations should be considered while interpreting the findings of our study. First, the study is based on cross-sectional data so no causal inference can be made or we are unable to establish the direction of the association. Second, estimates of alcohol use in this study are based on self-reported consumption by the survey respondents. Self-reported survey data on alcohol use have been found to be lower than sales data. One study in the UK reports that self-reported alcohol consumption in household survey underestimates actual consumption by 40-60% (Bellis et al., 2009). Therefore, the estimated consumption in our study may be lower than the actual consumption due to under-reporting. Third, selection of study participants may have introduced bias in the downward direction because frequent and heavy drinkers are less likely to participate in the survey. The estimates may be further lower due to recall lapse among infrequent and occasional drinkers. Fourth, the sample is underpowered to detect sex difference and geographic differences. Previous research has shown that patterns of alcohol use differ by gender of the drinkers and also by the state of residence. An alcohol use survey conducted in several states in India found that 11% of the variance in alcohol use was due to respondent's area of residence (Subramanian et al., 2004). Fifth, alcohol use also varies seasonally. Individuals in rural areas are more likely to consume alcohol during harvesting season or festivals. Our study does not correct for seasonal fluctuations in

alcohol use. Sixth, the sample is representative at the state level only therefore, country-level prevalence estimates cannot be generated. Despite these limitations, our study has several unique advantages. Our study provides a description of the prevalence and socio-demographic correlates of alcohol use in India based on one of the largest population-based surveys from five states in India. This is one of the few studies to provide estimates on the use of recorded and unrecorded alcohol (mostly home-brewed drinks).

The study findings have several implications. First, our findings suggest that drinkers older than 50 years have higher odds of consuming country liquor and home-brewed alcoholic beverage. As country liquor, home-brewed drinks, and other unrecorded alcohol are less expensive than recorded alcohol; it may contribute to higher prevalence of heavy drinking and thereby to higher health risks for this group of drinkers. Pradhan et al., (2015) found that consumption of home-brewed and other unrecorded alcohol posed an additional risk factor for alcohol liver disease in Nepal. Therefore, appropriate and targeted policies are needed to reduce the harmful effects of country liquor and home-brewed drinks among older population in India. Second, our findings on education and income gradient of consumption of alcohol use necessitate that policy interventions to reduce alcohol consumption in India should include these factors as well. Finally, the lower rate of abstinence in urban areas are expected to lead to alcohol-related problems in coming years as a result of greater availability of alcoholic beverages, demographic factors, and rising incomes.

References

- Benegal, V., Gururaj, G., Murthy, P., 2003. WHO Collaborative Project on Unrecorded Consumption of Alcohol: Karnataka, India. National Institute of Mental Health and Neurosciences (NIMHANS) and World Health Organization (WHO), Bangalore, Karnataka.
- Bellis MA, Hughes K, Cook PA, Morleo M., 2009. Off Measure: How We Underestimate the Amount We Drink. London: Alcohol Concern.
- Bloomfield K, Grittner U, Rasmussen HB, Petersen HC., 2008. Socio-demographic correlates of alcohol consumption in the Danish general population. *Scand J Public Health*. 36, 580-588.
- Bonu, S., Rani, M., Peters, D.H., Jha, P., Nguyen, S.N., 2005. Does use of tobacco or alcohol contribute to impoverishment from hospitalization costs in India? *Health Policy and Planning*. 20, 41-49.
- Chowdhury A. N., Ramakrishna J., Chakraborty A. K., Weiss M. G., 2006. Cultural context and impact of alcohol use in the Sundarban Delta, West Bengal, India. *Soc Sci Med*. 63, 722–31.
- Devaux, M., Sassi, F., 2015. Alcohol consumption and harmful drinking: Trends and social disparities across OECD countries, *OECD Health Working Papers*. OECD Publishing, Paris.
- Gupta P. C., Saxena S., Pednekar M. S., Maulik P. K., 2003. Alcohol consumption among middle-aged and elderly men: a community study from Western India. *Alcohol Alcohol*. 38, 327–31.
- IHME, 2015. GBD Compare. Institute for Health Metrics and Evaluation, University of Washington, Seattle, Washington.
- Kumar, S., 2017. Price Elasticity of Alcohol Demand in India. *Alcohol and Alcoholism*. 52, 390-395.
- Kumar S, G., K.C, P., L, S., E, S., Vinayagamoorthy, Kumar, V., 2013. Prevalence and Pattern of Alcohol Consumption using Alcohol Use Disorders Identification Test (AUDIT) in Rural Tamil Nadu, India. *Journal of Clinical and Diagnostic Research*. 7, 1637-1639.
- Kuntsche S, Gmel G, Knibbe RA, Kuendig H, Bloomfield K, Kramer S, Grittner U., 2006. Gender and cultural differences in the association between family roles, social stratification and alcohol use: a European cross-cultural analysis. *Alc Alcohol*. 41(suppl 1):i37–i46.
- Manimunda, S., Sugunan, A., Thennarasu, K., Pandian, D., Pesala, K., Benegal, V., 2017. Alcohol consumption, hazardous drinking, and alcohol dependency among the population of Andaman and Nicobar Islands, India. *Indian Journal of Public Health*. 61, 105-111.

Neufeld, K.J., Peters, D.H., Rani, M., Bonu, S., Brooner, R.K., 2005. Regular use of alcohol and tobacco in India and its association with age, gender, and poverty. *Drug and Alcohol Dependence*. 77, 283-291.

[Pradhan B](#), [Hadengue A](#), [Chappuis F](#), [Chaudhary S](#), [Baral D](#), [Gache P](#), [Karki P](#), [Rijal S](#): 2015. Alcoholic liver disease in Nepal: identifying homemade alcohol as a culprit. [Clin Exp Gastroenterol](#). 13, 183-89.

Prasad, R., 2009. Alcohol use on the rise in India. *The Lancet*. 373(9657), 17-18.
Rathod, S.D., Nadkarni, A., Bhana, A., Shidhaye, R., 2015. Epidemiological features of alcohol use in rural India: a population-based cross-sectional study. *BMJ Open* 5(12).

Ray, R., Mondal, A., Gupta, K., Chatterjee, A., Bajaj, P., 2004. The Extent, Pattern and Trends of Drug Abuse in India: National Survey. United Nations Office on Drugs and Crimes and Government of India: Ministry of Social Justice and Empowerment, New Delhi, India.

Rehm, J., Kailasapillai, S., Larsen, E., Rehm, M.X., Samokhvalov, A.V., Shield, K.D., Roerecke, M., Lachenmeier, D.W., 2014. A systematic review of the epidemiology of unrecorded alcohol consumption and the chemical composition of unrecorded alcohol. *Addiction* (Abingdon, England) 109(6), 880-893.

Rehm, J., Mathers, C., Popova, S., Thavorncharoensap, M., Teerawattananon, Y., Patra, J., 2009. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *The Lancet* 373(9682), 2223-2233.

Room R, Babor T, Rehm J. Alcohol and public health. *Lancet*. 2005. 365,519–30.

Subramanian, S.V., Nandy, S., Irving, M., Gordon, D., Davey Smith, G., 2005. Role of socioeconomic markers and state prohibition policy in predicting alcohol consumption among men and women in India: a multilevel statistical analysis.

Subramanian SV, Nandy S, Kelly M, et al. Health behaviour in context: exploratory multi-level analysis of smoking, drinking and tobacco chewing in four states. *Econ Polit Wkly* 2004; 39:684–93.

Bulletin of the World Health Organization 83(11), 829-836.

Thomas, F.B., John, C.H.-B., John, B.S., Maristela, G.M., 2001. The Alcohol Use Disorders Identification Test: Guidelines for Use in Primary Care. Department of Mental Health and Substance Dependence, World Health Organization, Geneva.

World Health Organization, 2000. International guide for monitoring alcohol consumption and related harm. Geneva: World Health Organization.

WHO, 2014. Global status report on alcohol and health 2014. World Health Organisation, Geneva.

Table 1: Sample characteristics, India, 2014

<i>Background characteristics</i>	Percentage	Number	
<i>Age group</i>	15-29 years	25.0	1522
	30-49 Years	47.9	2912
	50<years	27.1	1649
<i>Sex</i>	Male	62.5	3803
	Female	37.5	2284
<i>Marital status</i>	Married	85.8	5224
	Never married	10.2	622
	Widowed/divorced/separated	4.0	242
<i>Year of schooling</i>	0-4 years education or illiterate	40.4	2459
	5-8 years education	19.8	1205
	9-11 years education	17.8	1086
	12-20 years education	22.0	1338
<i>Caste / Social group</i>	ST/ST	32.5	1980
	OBC	34.2	2080
	Other Caste	33.3	2028
<i>Personal monthly income</i>	Less than Rs. 4000	21.3	1296
	Rs. 4000 to Rs. 80000	41.7	2540
	Rs. 8001 and More	37.0	2252
<i>Occupation</i>	Employed	63.8	3885
	Un-Employed	36.2	2203
<i>Land</i>	No	60.3	3672
	Yes	39.7	2416
<i>Pucca house</i>	No	59.7	3634
	Yes	40.3	2454
<i>Place of residence</i>	Rural	65.5	3988
	Urban	34.5	2100
<i>State</i>	Andhra Pradesh	19.7	1201
	Maharashtra	19.5	1187
	Madhya Pradesh	19.7	1200
	West Bengal	19.7	1200
	Kerala	21.4	1300
<i>Total</i>	100.0	6088	

Table 2
Percentage of drinkers by gender (%)

		All	Female	Male	<i>P</i>
Types of drinkers	Current drinker	38.5	9.6	56.0	<0.001
	Daily drinker ¹	9.6	1.2	14.7	<0.001
	Heavy drinker ²	21.6	22.8	10.9	<0.001
	Heavy episodic drinker ³	7.3	7.8	2.7	0.006
Types of alcoholic beverages	Spirits	44.9	13.1	48.2	<0.001
	Wine	4.9	20.0	3.4	<0.001
	Beer	25.3	15.4	26.3	<0.001
	Country liquor	31.2	21.8	32.2	0.001
	Home-brewed	29.4	61.8	26.1	<0.001

Notes: ¹Daily or almost daily alcohol drinking; ²Heavy drinking (currently drinking more than 48 gm alcohol); ³Heavy episodic drinking (current drinker consume six or more drinks on one occasion once a month or more). The prevalence of current and daily drinkers is calculated as a percentage of total respondents (n=6,088), while the prevalence of heavy and heavy episodic drinkers is calculated as a percentage of current drinkers (n=2,349).

Table 3: Recorded and Unrecorded alcohol per capita consumption (in litres of pure alcohol), 2014

	Per capita alcohol consumption (in litres of pure alcohol)			
	Total	Recorded	Unrecorded	% Unrecorded
Andhra Pradesh	4.11	2.91	1.19	29
Kerala	5.73	4.42	1.31	23
Maharashtra	3.56	3.27	0.30	8
Madhya Pradesh	5.07	3.51	1.55	31
West Bengal	3.43	1.66	1.76	51

Notes: Recorded included Spirits, Wine, Beer, and Country Liquor (Maharashtra, Madhya Pradesh, West Bengal), while unrecorded alcohol included home-brewed and country liquor in Kerala and Andhra Pradesh. Sale of country liquor is illegal in Kerala and Andhra Pradesh.

Table 4

Prevalence of the difference measures of alcohol consumption by background characteristics, India, 2014

		Current drinker		Daily drinker		Heavy drinker		Heavy episodic drinker	
		%	p-val	%	p-val	%	p-val	%	p-val
Age group	15-29 years	34.2		5.9		14.6		5.4	
	30-49 Years	40.6	<0.001	10.7	<0.001	23.1	<0.001	8.0	0.144
	50<years	39.1		11.0		24.7		7.9	
Sex	Male	56.0	<0.001	14.7	<0.001	22.8	<0.001	7.8	0.006
	Female	9.6		1.2		10.9		2.7	
Marital status	Married	39.4		10.3		22.8		7.7	
	Never married	37.3	<0.001	5.3	<0.001	11.6	<0.001	5.2	0.183
	Widowed/divorced/separated	24.4		5.4		22.0		3.4	
Year of schooling	Illiterate or 0-4 years	39.2		11.0		25.2		6.3	
	5-8 years	40.3	0.187	11.6	<0.001	24.5	<0.001	6.8	0.095
	9-11 years	36.2		9.6		21.4		10.2	
	12+ years	37.9		5.3		12.4		7.7	
Caste / Social group	Scheduled Tribe/Castes	45.3		11.1		22.0		6.6	
	Other Backward Class	38.9	<0.001	10.7	<0.001	23.7	0.061	7.7	0.501
	Other Caste	31.8		7.1		18.6		8.1	
Personal monthly income	Less than Rs. 4000	35.9		5.0		11.2		4.7	
	Rs. 4000 to Rs. 80000	36.7	<0.001	10.0	<0.001	23.5	<0.001	7.2	0.020
	Rs. 8001 and More	42.2		11.9		25.0		8.8	
Occupation	Employed	20.6	<0.001	4.2	<0.001	18.1	0.040	5.5	0.094
	Un-employed	48.8		12.7		22.5		7.8	
Land	No	41.6	0.001	11.3	<0.001	22.7	0.091	7.7	0.359
	Yes	34.0		7.1		19.7		6.7	
Pucca house	No	40.3	<0.001	9.6	0.944	21.3	0.589	7.0	0.343
	Yes	36.1		9.7		22.3		8.0	
Below poverty line	No	43.1	<0.001	11.7	<0.001	24.3	<0.001	8.1	0.101
	Yes	33.5		7.3		17.9		6.3	
Place of residence	Rural	35.4	<0.001	7.6	<0.001	18.8	<0.001	9.1	<0.001
	Urban	44.6		13.4		26.0		4.7	
	Andhra Pradesh	45.6		16.8		30.7		9.9	
	Maharashtra	27.6		10.4		27.4		6.7	
	Madhya Pradesh	44.7	<0.001	6.3	<0.001	16.0	<0.001	5.0	0.001
	West Bengal	32.1		5.6		17.4		4.2	
State	Kerala	42.5		9.0		17.8		9.8	
	Total	38.6		9.6		21.7		7.4	
N		2,349		586		509		173	

Notes: Heavy drinking (currently drinking more than 48 gm alcohol); Heavy episodic drinking (current drinker consuming six or more drinks on one occasion once a month or more). The prevalence of current and daily drinkers is calculated as a percentage of total respondents (n=6,088), while the prevalence of heavy and heavy episodic drinkers is calculated as a percentage of current drinkers (n=2,349).

Table 5

Factors associated with alcohol use and drinking patterns among adult (>15 years of age) from five states in India, 2014

Variables	Categories	Current drinker		Daily drinker		Heavy drinker		Heavy episodic drinker	
		OR (95%CI)	P	OR (95%CI)	P	OR (95%CI)	P	OR (95%CI)	P
Age group	15-29 years®								
	30-49 Years	1.00 (0.83-1.19)	0.987	1.44(1.08-1.94)	0.013	1.52 (1.16-2.01)	0.004	1.32 (0.78-2.23)	0.286
	50>years	0.70 (0.56-0.86)	0.001	1.15(0.83-1.60)	0.381	1.53 (1.11-2.10)	0.008	1.21 (0.67-2.18)	0.513
Sex	Male®								
	Female	0.08 (0.06-0.09)	<0.001	0.06(0.04-0.09)	<0.001	0.36 (0.24-0.54)	0.001	0.39 (0.15-0.96)	0.042
Marital status	Currently married®								
	Never married	0.90 (0.71-1.15)	0.425	0.70(0.45-1.08)	0.114	0.69 (0.46-1.03)	0.142	0.86 (0.41-1.79)	0.690
	Widow/divorced	1.14 (0.76-1.73)	0.509	1.16(0.62-2.17)	0.625	1.53 (0.83-2.83)	0.198	0.85 (0.18-3.94)	0.845
Year of schooling	Illiterate or 0-4 years®								
	5-8 years	0.80 (0.68-0.95)	0.011	0.90(0.71-1.15)	0.420	1.00 (0.78-1.29)	0.532	1.02 (0.64-1.62)	0.911
	9-11 years	0.72 (0.59-0.87)	0.001	0.62(0.46-0.81)	0.001	0.64 (0.47-0.86)	0.009	1.58 (0.95-2.61)	0.074
	12+ years	0.61 (0.50-0.75)	<0.001	0.26(0.18-0.36)	<0.001	0.34 (0.25-0.48)	<0.001	1.03 (0.59-1.79)	0.916
Caste / social group	Scheduled Tribe/Castes®								
	Other Backward Class	0.65 (0.56-0.76)	<0.001	0.78(0.62-0.99)	0.042	0.81 (0.64-1.02)	0.714	0.83 (0.56-1.24)	0.386
	Other Castes	0.57 (0.48-0.68)	<0.001	0.66(0.51-0.85)	0.002	0.69 (0.53-0.90)	0.277	0.91 (0.56-1.47)	0.708
Personal monthly income	Less than Rs. 4000®								
	Rs. 4001 to Rs. 8000	1.07 (0.90-1.27)	0.411	1.80(1.33-2.42)	<0.001	1.85 (1.40-2.43)	<0.001	1.59 (0.95-2.66)	0.076
	Rs. 8001 & more	1.30 (1.08-1.57)	0.006	2.24(1.63-3.08)	<0.001	2.84 (2.09-3.85)	<0.001	1.81 (1.03-3.18)	0.038
Occupation	Unemployed®								
	Employed	1.90 (1.63-2.21)	<0.001	1.54(1.18-2.00)	0.001	1.16 (1.14-1.95)	0.318	1.17 (0.73-1.85)	0.507
Land	No®								
	Yes	0.74 (0.65-0.86)	<0.001	0.72(0.57-0.90)	0.005	0.96 (0.78-1.20)	0.942	0.66 (0.46-0.96)	0.031
Pucca house	No®								
	Yes	0.85 (0.74-0.98)	0.034	0.87(0.70-1.07)	0.212	0.94 (0.75-1.18)	0.834	0.80 (0.54-1.18)	0.266
Below poverty line	No®								
	Yes	0.87 (0.76-1.01)	0.069	0.93(0.74-1.16)	0.534	0.95 (0.76-1.17)	0.343	0.83 (0.55-1.23)	0.365
Place of residence	Rural®								
	Urban	1.54 (1.33-1.78)	<0.001	1.81(1.47-2.22)	<0.001	1.54 (1.26-1.89)	<0.001	0.42 (0.28-0.62)	<0.001
N		6082		6082		2346		2346	

Note: **Bold** font indicates statistical significance. CI=Confidence Interval. ® is the reference category. All models are adjusted for the state of residence. Models for current and daily drinkers were fitted for all participants, while models for heavy and heavy episodic drinkers were fitted for current drinkers only.

Table 6

Socioeconomic determinants of recorded, country liquor, and home-brewed drinkers among adult (>15 years of age) from five states in India, 2014

	Categories	Recorded drinker		Country liquor drinker		Home-brewed drinker	
		OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>	OR (95% CI)	<i>P</i>
<i>Age group</i>	15-29 years®						
	30-49 years	0.50 (0.36-0.70)	<0.001	1.22(0.89-1.67)	0.213	1.16(0.86-1.57)	0.316
	50> years	0.33(0.22-0.50)	<0.001	1.50(1.03-2.19)	0.033	1.56(1.09-2.23)	0.014
<i>Sex</i>	Male®						
	Female	0.36(0.22-0.58)	<0.001	0.39(0.26-0.58)	<0.001	3.50(2.40-5.10)	<0.001
<i>Marital status</i>	Currently married®						
	Never married	1.34(0.84-2.13)	0.211	0.49(0.31-0.78)	0.003	0.94(0.61-1.44)	0.795
	Widow/divorced/separated	1.02(0.45-2.32)	0.958	0.80(0.41-1.56)	0.525	1.84(0.93-3.64)	0.078
<i>Year of schooling</i>	Illiterate or 0-4 years®						
	5-8 years	1.51(1.11-2.04)	0.007	1.04(0.79-1.38)	0.732	0.64(0.48-0.84)	0.002
	9-11 years	3.24(2.22-4.71)	<0.001	0.69(0.49-0.97)	0.035	0.55(0.39-0.79)	0.001
	12+ years	4.72(2.92-7.64)	0.000	0.31(0.20-0.47)	0.000	0.59(0.42-0.83)	0.003
<i>Caste / social group</i>	Scheduled Tribe/Castes®						
	Other Backward Caste	1.18(0.09-1.56)	0.224	1.21(0.93-1.57)	0.142	0.70(0.55-0.90)	0.006
	Other caste	1.43(1.02-2.02)	0.037	1.00(0.74-1.36)	0.971	0.63(0.47-0.85)	0.003
<i>Personal monthly income</i>	Less than Rs. 4000®						
	Rs. 4001 - Rs. 8000	1.44(1.07-1.94)	0.015	1.67(1.27-2.19)	0.000	0.69(0.53-0.90)	0.007
	Rs. 8001 and more	2.58(1.80-3.67)	<0.001	1.62(1.16-2.24)	0.004	0.52(0.38-0.71)	<0.001
<i>Occupation</i>	Unemployed®						
	Employed	0.63(0.45-0.90)	0.012	1.05(0.78-1.42)	0.708	1.01(0.75-1.35)	0.944
<i>Land</i>	No®						
	Yes	1.42(1.07-1.89)	0.015	0.82(0.63-1.05)	0.124	1.11(0.88-1.41)	0.357
<i>Pucca house</i>	No®						
	Yes	1.68(1.24-2.28)	0.001	0.72(0.54-0.96)	0.025	1.09(0.84-1.41)	0.485
<i>Place of residence</i>	Rural®						
	Urban	1.59(1.20-2.10)	0.001	0.84(0.66-1.06)	0.150	0.60(0.48-0.76)	0.000
<i>N</i>		2346		2346		2346	

Note: **Bold** font indicates statistical significance. CI=Confidence Interval. ® is the reference category. All models were fitted for current drinkers only and are adjusted for the state of residence.