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Santosh Kumar
Mukta Gundi
Sagar Atre
Luu Bich Ngoc
Nguyen Thi Thieng
Anu Rammohan

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Santosh Kumar
Sam Houston State University and IZA

Mukta Gundi
Azim Premi University

Sagar Atre
Intellecap Advisory Services

Luu Bich Ngoc
National Economics University

Nguyen Thi Thieng
National Economics University

Anu Rammohan
University of Western Australia

ABSTRACT

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This study describes the prevalence and drinking patterns of alcohol consumption among adults (aged 15+ years) and explores the association between sociodemographic factors and alcohol consumption in Vietnam. A cross-sectional representative survey of 5,200 respondents from 12 provinces was conducted in 2015. Multivariate logistic regression models were fitted to analyze the association between sociodemographic factors (age, gender, education, marital status, income, religion) and alcohol consumption patterns. Nearly three-quarters of males (77%) and one-quarter of females (23%) were current alcohol drinkers. In the multivariate analyses, being male (aOR=10.9, 95%CI = 8.01-14.8, p<0.01), being head of the household (aOR=1.43, 95% CI=1.2-1.8, p<0.01), being married (aOR=1.22, 95%CI=1.1-1.4, p<0.01), having college degree (aOR=1.3, 95% CI=1.07-1.5, p<0.01), higher income (aOR=1.5, 95% CI=1.3-1.6, p<0.001) were positively associated with current drinking. Older respondents (aOR=0.44, 95% CI=0.4-0.6, p<0.01) were less likely to be current users of alcohol. Being male, being household head, marital status, age, and rural residence were negatively associated with consumption of recorded alcohol but were positively associated with consumption of homemade alcohol. High-intake drinking was greater in older age groups and among men. Recorded alcohol was more frequently consumed by younger age groups and in urban areas, while consumption of unrecorded alcohol was higher in rural areas and among low-income households. Targeted policy efforts are needed to reduce the health risk of alcohol consumption among rural and older populations.

Corresponding author:
Santosh Kumar
Department of Economics and International Business
College of Business Administration
Sam Houston State University
SHB 237F, Huntsville, TX 77340
USA

E-mail: skumar@shsu.edu

Introduction

The harmful use of alcohol is a major risk factor for disability and deaths worldwide and is associated with several health targets of the Sustainable Development Goals (SDGs) (WHO, 2018). In 2016, about 1 in 20 deaths in the world, of which more than 75% were among males, and about 5.1 % of the global disability-adjusted life years were attributed to harmful use of alcohol (WHO, 2018). To ensure healthy lives for all at all ages, SDG 3.5 aims to "*Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol*". One indicator to monitor the progress on SDG 3.5 is to monitor alcohol use globally. In 2016, 43% of the world's population had consumed alcohol in the previous 12 months (WHO, 2018). The total alcohol per capita consumption among individuals aged 15 years and older was 6.4 liters or 13.9 grams per day of pure alcohol in 2016.

Over the last few years, Vietnam has become one of the largest consumers of alcohol in the world, with a high prevalence of alcohol-related health problems; 5.3% of households suffered an alcohol-related injury, accidents, or property losses in 2016 (Hanh et al., 2019). Vietnam faces a high burden of alcohol-attributable years of life lost–the alcohol-attributable year of life lost score of 4 is higher compared with other countries in the regions (WHO, 2018).

The alcohol consumption in Vietnam is quite high compared with other countries in the WHO Western Pacific Region. The per capita consumption of pure alcohol among adults rose from 3.8 liters in 2003-2005 to 8.3 liters per capita in 2016, a decadal increase of more than 100% (WHO, 2018).

This rate of alcohol consumption is 14% higher than the rate in the WHO Western Pacific Region of 7.3 liters of pure alcohol. Among drinkers only, this translates to per capita consumption of 22.8 liters of pure alcohol per year in 2016 in Vietnam. Furthermore, 8.3 liters of pure alcohol per year would approximately mean consumption of 500 ml beer per day per adult. Beer is the most common recorded drink. Beer constitutes 91% of the recorded alcohol consumption in Vietnam followed by spirits (8%) (WHO, 2018). Recorded alcohol is a beverage that is recorded in the official statistics and is taxable, whereas unrecorded alcohol are not accounted for in official statistics and are outside the purview of taxation due to the clandestine nature of production and sale

Other studies showed a relatively high prevalence of alcohol use in Vietnam and the prevalence of current drinkers varied a lot across studies. The WHO's STEPwise approach to surveillance (STEPS) survey found that the prevalence of last-month drinkers increased from 37% in 2010 to 44.8% in 2015 (MOH, 2016), while Hanh et al. (2019) estimate last-month drinking prevalence of 80.3%. Similarly, the last-year prevalence of alcohol use varies from 41.8% in 2016 (Pham, Tran & Tran, 2018) to 76.4% (MOH, 2016) to 88.5% in 2017 (Hanh et al., 2019). Using WHO STEPS protocols, a nationally representative population-based survey of 14,706 subjects in 2009-10 found last-year alcohol use rate of 80% and 11% among males and females in the last year, respectively and almost 40% of the men consumed alcohol in quantities considered detrimental to their health (Van Bui et al., 2016).

Globally, 25% of alcohol consumption in 2015 among adults was unrecorded. Unrecorded alcohol includes homemade and informally produced alcohol that is not taxed and is usually produced, distributed, and sold outside the formal market. Consumption of

unrecorded alcohol is one of the highest in Vietnam; the WHO estimates the proportion of unrecorded alcohol use in the range of 31-50% in Vietnam (Probst et al., 2019). The IAC study found that 61% of the total liters of absolute alcohol consumed were unrecorded (Huckle et al., 2020). The proportion of unrecorded alcohol use in Vietnam has increased from 53% (2009-11) to 64% (2015-17) (WHO, 2018).

Although the data and evidence on prevalence and drinking patterns of alcohol use have improved in Vietnam, there is not much systematic information on the socio-demographic determinants of alcohol use particularly of recorded as well unrecorded alcohol use. Prior studies have shown that drinking patterns determine the nature of alcohol-related harms (Huckle et al., 2012). A better understanding of the determinants of alcohol use and drinking patterns in Vietnam, where alcohol consumption is increasing steadily in the last decade, would help policymakers design effective public policies to reduce the harmful effects of alcohol consumption. We conducted a large-scale household survey to provide nationally representative data on prevalence, drinking patterns, and determinants of alcohol use in Vietnam, a lower-middle-income country. We also aim to investigate the sociodemographic correlates of recorded as well as unrecorded alcohol in 12 provinces of Vietnam.

Methods

Ethics

The study protocol was approved by the Institutional Ethics Committee of the Institute for Population and Social Studies, the study collaborating institution in Vietnam.

All participants gave written/verbal informed consent to be part of the study. The consent was taken at the time of the survey.

Sample design

The data comes from a nationally representative population-based survey of alcohol consumption, drinking patterns, and preferences conducted between November 2014 and January 2015. This study employed a multi-stage, stratified, and semi-purposive sampling design. In stage one, two provinces from each of the six regions were selected. In stage two, three-five districts were selected in each province with probability proportional to the population size method, making a total of 36 districts/towns in the sample. In stage three, two wards were randomly selected in each district, thus, a total of 72 wards formed the survey sample. In each selected ward, households were selected through the walking method. Interviewers would start walking from the center of the village in one direction and every third household was selected for the interview. In the selected household, respondents who are 15 years and older, healthy, speak the Vietnamese language were eligible for interview. Among the eligible list of respondents, one adult whose date of birth was nearest to the survey date was selected for the face-to-face interview. This sample design provided a random sample of 5,200 respondents, representative at the national level, for the primary data collection. The survey completion rate was 93.7%. Participants were not rewarded either in cash or in-kind for survey participation.

Data collection and survey instruments

After providing consent, participants answered survey questions about the pattern of alcohol use, respondent's characteristics, and sociodemographic characteristics of the household. The survey questions were sourced from a large pool of recommended and validated alcohol questions by the National Institute on Alcohol and Alcoholism (NIAAA), Standardizing Measurement of Alcohol-Related Troubles (SMART), and Gender, Alcohol, and Culture: An International Study (GENACIS) were used to collect data on respondent's alcohol drinking pattern. Per the WHO and SMART guidelines, additional questions on unrecorded consumption particularly homemade alcohol were also included in our study. The questionnaire contained items on alcohol drinking status, Beverage Specific Quantity Frequency (BSQF) in the past 12 months. BSQF is an appropriate survey instrument to estimate alcohol consumption for each type of alcohol which was one of the main objectives of this study (Nugawela et al., 2016). The BSFQ drinking frequency module had ten categories: 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 the past 12 months, 2-5 times in past 12 months, once in past 12 months, and never.

The volume of alcohol was calculated by multiplying the quantity and frequency of each beverage type over the past year. Finally, pure alcohol consumption is calculated using beverage-specific pure ethanol content[1] and the quantity of alcohol consumption. We used the following formula to estimate the total volume of pure alcohol in liters in the past 12 months:

Alcohol volume in pure alcohol per year=Drinking days per year x (quantity x % ABV)

where ABV denotes alcohol by volume.

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[1] Percentage share of pure ethanol in beverage drinks are as follows: Beer (5%), Wine (11%), Spirits (40%), Homemade alcohol (47.5%).

$$Grams\ per\ day = APC\ x\ 1000\ x \frac{0.793}{365} days\ (\text{WHO, 2014})$$

Variables

Alcohol use

- Current drinkers were defined as respondents who consumed any type of alcoholic beverage at least once in the past 12 months (WHO, 2014; Kumar et al., 2018; Pham, Tran, & Tran 2018; Manthey et al., 2019). However, this measure might suffer from recall bias. To minimize recall bias, we used measures based on alcohol consumption in the last 30 days, 7 days, and every day. Monthly drinkers were those who consumed alcohol at least once in the past month. Weekly drinkers were defined as respondents who consumed alcohol at least once in the last week and daily drinkers reported to have consumed alcohol every day.

- Lifetime abstainers are individuals who have never consumed alcohol. Former drinkers are the individuals who have previously consumed alcohol but have not consumed it in the past 12 months.

- The drinkers were further categorized as light, moderate, and heavy-intake and are based on the average number of grams of pure alcohol consumed per day during the last 12 months. Light drinkers are defined as those who consumed less than 4.9 grams per day of pure alcohol. Moderate drinkers are defined as those with average alcohol consumption of 5-24.9 grams/day, and high-intake drinkers are those with average alcohol consumption of more than 25 grams/day.

- Finally, Vietnam has a high proportion of unrecorded alcohol consumption which is mainly pot-distilled homemade alcohol sourced from rice (WHO, 2018). Based

on beverage type, we categorized current drinkers as recorded and unrecorded alcohol consumers. Recorded-only drinkers are those who only consumed labeled beer, spirits, or wine, unrecorded-only drinkers are those who only consumed homemade, counterfeit, contraband, or surrogate alcohol, and both types are those drinkers who consumed recorded as well as unrecorded alcoholic beverages.

Correlates of alcohol use

The socio-demographic variables included in the study are the respondent's age, gender, and marital status. Gender and marital status are included as binary variables, while age is included using four groups: 15-29 years, 30-44 years, 45-59 years, and more than 60 years. Household religion was included as a dummy variable that indicated the agnostic/atheism status of the household. Agnostic/atheism is the most dominant group (73.3%), followed by Buddhism (18.2%), and the remaining households belonged to Christianity, Muslims, and other religions. Respondents' education was included using three categories: secondary school or below, high secondary school, and college & above. The secondary school in Vietnam runs from grades 6-9, while high secondary school runs from grades 10-12. Based on the distribution of household income, monthly household income was divided into three categories: Below VND 5 million (Vietnamese Dong (VND) is the local currency in Vietnam), between VND 5-10 million, and more than VND 10 million.

Statistical analysis

A multivariate logistic regression model was fitted to examine the association between socio-demographic characteristics of the respondents and alcohol consumption.

Adjusted odds ratios (AORs) and the 95% CI were estimated for each predictor variable. Since the prevalence of alcohol consumption varied from 42% to 68% across regions, region-fixed effects were included in all estimated models. The region fixed-effects are meant to adjust for the confounding effects of time-invariant characteristics of the regions. Robust standard errors clustered by region were estimated to adjust for heteroscedastic error terms. A p-value < 0.05 (two-sided) was considered to denote the statistically significant associations. All statistical analyses were conducted using STATA software version 14.

Results

Characteristics of the sample

Table 1 shows the socio-demographic characteristics of the study sample. Of the 5,200 participants, 59% lived in rural areas and 41% lived in urban areas. The average household size in the sample is 3.84. Close to two-fifth (41.4%) were in the age group of 30-44 years and one-third of the participants were in the 45-59 age group. The distribution of the sample was nearly equally distributed across gender. Most of the participants were married (80%) and nearly three-quarters, or 73.3%, reported being atheists. More than half of the sampled respondents (54.2%) had completed their secondary education and only 18% had completed college education. Income-wise, about 40% of respondents belonged to the lowest income category (< 5 million VND), while 18.6% of the total participants belonged to the highest income category (> 10 million VND).

Prevalence and patterns in alcohol use

Table 2 summarizes results on the prevalence and frequency of alcohol consumption by gender, rural vs. urban, and age groups in our sample. Of the 5,200 respondents, 40% were lifetime abstainers, 9% were former drinkers, and 51% were current drinkers. There were gender differences in alcohol consumption, with nearly 68% of females being lifetime abstainers, compared to 13% among males. Similar to previous studies, 77% of male respondents were current drinkers compared to 23% among females. Nearly 40% of both rural and urban respondents reported being lifetime abstainers, while the remaining 60% reported having consumed alcohol sometime in their lives.

Approximately one-third of current drinkers were monthly drinkers (1-3 days/month) and nearly 30% of the current drinkers consumed any type of alcoholic beverage less than once a month. Around 30% of drinkers in both urban and rural areas reported drinking once to thrice in a month and a similar proportion, around 28-33% reported drinking less than once a month.

Alcohol use is most prevalent in the Central region (Table 3). The province of Gia Lai accounted for the highest proportion of current drinkers (67.8%) followed by Dak-Lak that accounted for the second-highest proportion of current drinkers (65%). Hanoi in the North region ranks third for current drinkers. The provinces of Ben Tre (43.4%) and Binh Duong in the Sothern region (42%) had the lowest proportion of current drinkers, while the provinces of Khanh Hoa in the South and Bac Giang in the North had 50% of current drinkers. Alcohol use was highest among females in the Central region: 48.3% in Gia lai and 44.3% (Dak Lak).

Alcohol consumption data

The most common drink is homemade alcohol, consumed by 78% of the drinkers in our study sample, followed closely by beer (69%). Only 7.4% of alcohol drinkers preferred spirits, while 6.9% of drinkers preferred wine and 4.3% of drinkers preferred other drinks. The average volume of alcohol consumed during the past 12 months was 6.7 liters of pure alcohol. Men consume over six times more alcohol than women; 8.2 liters compared with 1.3 liters of pure alcohol per year. Young people consume the least alcohol and 45-59 years old consume the most; 4.4 liters compared with 8.6 liters. Of the total consumption of 6.7 liters of pure alcohol, homemade and beer's share was 5.0 and 1.6 liters, respectively, which implies that 74.3% and 23.4% of all alcohol consumed were homemade and beer, respectively. The combined share of spirits and wine was 1.5%, while counterfeit, contraband, and surrogate alcohol proportion was 0.8% of the total volume of alcohol consumed in the past 12 months. Per our survey estimates, 75% of the total volume of alcohol consumed is unrecorded in Vietnam, while the share of recorded alcohol is 25%.

Figures 1a and 1b show the varying share of consumption of unrecorded alcohol across provinces- unrecorded alcohol is primarily homemade alcohol in Vietnam. The average consumption varied from 4.0 liters in Bac Giang province (90% of which was unrecorded) to 11.6 liters in Ben Tre province (93% of which was unrecorded). The lowest proportion of unrecorded alcohol consumed was in Khanh Hoa province (42%).

Determinants of current drinking

Male and head of the household were positively associated with last-year drinking (Table 4). Being male (adjusted odds ratio (aOR) = 10.88; 95% CI = 8.02, 14.78), head of the household (aOR = 1.43; 95% CI = 1.17, 1.75) and being married (aOR = 1.22; 95% CI

= 1.08, 1.37) were positively associated with last-year drinking. College degree (aOR = 1.25; 95% CI = 1.07, 1.46) and higher income (5-10 million and > 10 million VND) were positively associated with last-year drinking. Rural residence, high school education, and religion were not associated with last-year drinking status.

The associations between monthly household income and alcohol use were statistically significant only for alcohol use in the past 12 months. Compared to the reference group (< 5 million VND), last-year drinkers in the middle- and high-income categories had significantly higher odds of consuming alcohol according to the fully adjusted models (aOR = 1.27; 95% CI = 1.08, 1.49 for and aOR = 1.45, 95% CI = 1.30, 1.62), respectively. Household income had no predictive power in explaining the prevalence of monthly, weekly, and daily drinking

Determinants of light, moderate, and high intake drinking among current drinkers

Table 5 describes the socio-demographic correlates of light, moderate, and high-intake drinkers among *last-year drinkers*. Being a male, household head, and current drinker aged 30-44 years were negatively associated with being a light drinker.

Relative to females, being male reduced the odds of being a light drinker by 0.11 times (95% CI = 0.08, 0.13) but increased the odds of being a moderate drinker by 5.62 times (95% CI = 3.93, 8.05) or a heavy drinker by 9.02 times (95% CI = 7.15, 11.39). Household heads had 0.81 times reduced odds of being a light drinker as compared to non-household heads. Current drinkers aged 30-44 years old had a significantly lower probability of being light drinkers compared to the reference group (15-29 years) (aOR = 0.71; 95% CI = 0.53, 0.95). Marital status, religiosity, educational level, household income,

and rural residence were not associated with being a light/moderate/heavy drinker, except for the negative association between high income and light drinking status.

Determinants of recorded and unrecorded alcohol consumption among current drinkers

Compared to females, male drinkers had lower odds of consuming recorded only alcohol by 0.16 (95% CI = 0.11, 0.22) and higher odds of consuming both types of alcohol by 3.32 (95% CI = 2.68, 4.12), respectively (Table 6). Household heads were less likely to consume recorded alcohol (aOR = 0.79; 95% CI = 0.73, 0.85). Marital status was negatively associated with consumption of recorded alcohol and was positively associated with unrecorded alcohol consumption (aOR = 0.68; 95% CI = 0.56, 0.82 and aOR = 1.46; 95% CI = 1.12, 1.90), respectively.

Rural drinkers had lower odds of drinking recorded alcohol (aOR = 0.46; 95% CI = 0.54, 1.07) but had higher odds of consuming unrecorded alcohol (aOR = 1.59; 95% CI = 1.07, 2.35). College education was positively associated with consumption of recorded alcohol but the association was statistically insignificant. In contrast, college-educated respondents had lower odds of consuming unrecorded alcohol (aOR = 0.65; 95% CI = 0.42, 0.99). Regarding household income, income was not statistically significantly associated with consumption of recorded alcohol but it was negatively associated with consumption of unrecorded alcohol. The odds of consuming unrecorded alcohol was 0.49 times lower (95% CI = 0.41, 0.59) for respondents in the 5 -10 million income group, while the odds ratio was 0.38 (95% CI = 0.28, 0.50) for respondents with household income more than 10 million VND. Religion and education were not found to be associated with the odds of drinking recorded only, unrecorded only, or both types of alcohol among current drinkers,

except for college-educated drinkers. Respondents with a college education had lower odds of consuming unrecorded alcohol.

Discussion

In a large nationally representative survey, we estimate the prevalence of alcohol use, describe the drinking patterns, and explore the sociodemographic determinants of alcohol consumption in Vietnam. Our study found that about 51% of the Vietnamese population used alcohol in the past 12 months and 40% were lifetime abstainers. Prevalence of alcohol use differed by gender (78% were male and 22% were female) and drinking frequency (70% were monthly drinkers). The prevalence of daily drinking was higher among men (15.5%) than women (3.3%) and older drinkers (aged > 45 years; 19.3%. Drinking prevalence was highest in the Gia Lai province in the Central region (68%) and lowest in the Binh Duong province in the South region (42%).

Our survey estimates consumption of 6.7 liters of pure alcohol per person per year, which is similar to the findings in other large-scale studies (Pham, Tran & Tran, 2018). Men consumed 8.2 liters of pure alcohol while women consumed 1.3 liters of pure alcohol per year. The most consumed recorded beverage was beer, while homemade alcohol was the most common unrecorded beverage. Furthermore, similar to previous studies, our survey found a high proportion of consumption of unrecorded alcohol. We found that about three-fourths of total alcohol consumed in Vietnam was unrecorded alcohol. The IAC study found the proportion of informal alcohol to be 69% (Viet Cuong et al., 2018). Huckle et al. (2020) show that 61% of the total liters of absolute alcohol consumed in Vietnam was

unrecorded, mostly homemade alcohol. Our study supports and extends the relevance of previous findings related to the availability of unrecorded alcohol in Vietnam.

Some limitations to this study merit attention that might limit our ability to interpret the findings. First, due to the cross-sectional nature of the data, causal inference and direction of association cannot be well-established. Second, due to its self-reported nature, the reliability of the data may not valid since the possibility of social desirability bias and underreporting cannot be ruled out. Previous research from the U.K. has found a bias in self-reported surveys, underestimating actual alcohol consumption by about 50% (Bellis, Cook, Hughes, & Morleo, 2010). Thus, we can safely state that actual consumption may be higher than what was reflected in our data. Recall bias could have also affected our findings, especially among non-regular drinkers, who could either under-report or over-report their alcohol drinking frequency and pattern. Third, other cultural (social gatherings and festivals, etc.) and contextual factors (accessibility of alcohol and number of liquor shops in the area, etc.) might affect the quantity of alcohol consumed, which is not controlled in our analysis. Fourth, our study does not attempt to connect alcohol consumption to health. Fifth, the survey period overlaps with lunar calendar years and people get together, drink, and celebrate this event. This may overestimate the prevalence of monthly and weekly drinkers. Finally, this study lacks the lens of intersectionality, as several social, economic, and demographic factors interact in creating patterns in alcohol consumption. The lack of an adequate sample size did not allow us to examine the specific interactions to unearth these intersecting pathways.

Our study brings forth several important findings. Firstly, the frequency of male drinkers, those who consume alcohol every day (15.5%), is alarmingly high, flagging the

large proportion of the population as prone to alcohol-related health hazards. Interestingly, there is not much of a rural-urban divide among current drinkers and everyday drinkers in our survey. As homemade alcohol is easily available in rural areas and is relatively cheap, rural drinkers are potentially at a greater danger as homemade alcohol has been shown to contain toxic chemicals that are hazardous to health. About 84% of rural drinkers consumed homemade alcohol in our survey. Considering the high level of consumption of homemade alcohol and poor health infrastructures in rural areas, the potential public health crisis disproportionately affects rural residents. Therefore, targeted policies need to be designed to reduce the consumption of unrecorded alcohol. Secondly, greater alcohol accessibility, affordability, and availability in the urban settings, and people belonging to the richest income category are expected to consume more alcohol. The new "alcohol Law' adopted by the National Assembly of Vietnam is the right step in controlling and preventing the harmful effects of alcohol consumption. The new law with effect from Jan 2020 aims to curb harmful alcohol use through demand-side (education) as well as supply-side policy interventions (reducing the availability and ease of access to alcohol).

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Table 1: Demographic characteristics of the study participants

Variables		Rural N=3087 (59%) n	%	Urban N=2113 (41%) n	%	Overall N=5200 n	%
Family size		3.85	-	3.83	-	3.84	-
Age group	15-29	599	19.4	337	15.6	936	18.0
	30-44	1033	33.5	602	28.5	1635	31.4
	45-59	991	32.1	759	36.3	1750	33.7
	60 & above	464	15.0	413	19.6	879	16.9
Gender	Female	1480	47.9	1060	50.2	2540	48.9
	Male	1607	52.1	1053	49.8	2660	51.1
Marital status	Married	2530	81.9	1630	77.1	4160	80.0
	Other	557	18.1	483	22.9	1040	20.0
Religion	Atheist	2318	75.1	1495	70.7	3813	73.3
	Other	769	24.9	618	29.3	1387	26.7
Education level	Primary and lower	989	32.1	456	21.6	1445	27.8
	Completed lower secondary	1241	40.2	608	28.8	1849	35.6
	Competed higher secondary	527	17.1	438	20.7	965	18.6
	College and more	326	10.6	610	28.9	936	18.0
Monthly household income (VND)	Less than 5 million	1,468	49.5	548	26.9	2,016	40.3
	5-10 million	1,118	37.7	934	45.9	2,052	41.0
	More than 10 million	380	12.8	555	27.2	935	18.7
Regions	Northern midlands and mountains	501	16.2	249	11.8	750	14.4
	Red river delta	673	21.8	527	25.0	1200	23.2
	North and south-central coast	667	21.6	333	15.7	1000	19.2
	Central highlands	229	7.4	121	5.7	350	6.7
	Southeast	602	19.5	298	14.1	900	17.3
	Mekong river delta	415	13.5	585	27.7	1000	19.2

Notes: Five respondents refused to provide educational information. Vietnamese Dong (VND) is the local currency in Vietnam

Table 2: Prevalence of alcohol consumption by age and gender (%)

|	Female	Male	Rural	Urban	15-25 years	26-45 years	>45 years	Total
Prevalence of alcohol consumption among study sample (%)								
Lifetime abstainer	68.5	13.3	40.3	39.9	47.2	40.1	38.8	40.2
Former drinker	8.9	9.4	8.8	9.9	6.2	7.3	11.3	9.2
Current drinker	22.6	77.3	50.9	50.2	46.6	52.6	49.9	50.6
Frequency of drinking among current drinkers (%), n=2,632								
Everyday	3.3	15.5	12.9	12.7	0.8	7.7	19.3	12.8
5- 6 days/week	0.5	1.5	1.2	1.4	1.2	1.1	1.4	1.3
3-4 days/week	2.8	7.7	7.0	6.2	4.0	7.6	6.5	6.7
1-2 days/week	6.3	21.2	17.5	18.5	13.3	19.5	17.5	17.9
1-3 days/month	20.9	34.0	33.3	27.9	30.9	34.8	28.1	31.1
<1 day/month	66.2	20.1	28.1	33.3	49.8	29.3	27.2	30.2

Notes: A lifetime abstainer is defined as an individual who has never consumed alcohol. Former drinkers are the individuals who have previously consumed alcohol but have not consumed it in the past 12 months. Current drinkers are defined as individuals who consumed alcohol at least once in the past 12 months.

Table 3: Prevalence of current drinkers by province, N=2,632

Provinces	Male %	Male 95% CI	Female %	Female 95% CI	Both %	Both 95% CI
North						
Hanoi	84.2	(80.6, 87.9)	33.9	(28.6, 39.2)	61.8	(58.2,65.4)
Lao Cai	82.7	(76.9, 88.5)	32.4	(25.5, 39.2)	56.6	(51.3,61.7)
Bac Giang	77.6	(71.7, 83.4)	21.6	(15.8, 27.3)	49.8	(44.8,54.6)
Nghe An	72.1	(67.1, 77.0)	15.7	(11.5, 20.0)	45.3	(41.3,49.3)
Nam Dinh	70.3	(64.6, 76.0)	16.5	(11.9, 21.2)	43.8	(39.4,48.1)
Central						
Gia Lai	77.5	(69.9, 85.1)	48.3	(35.3, 61.3)	67.8	(60.8,74.6)
Dak Lak	86.5	(79.1, 94.1)	44.3	(33.7, 54.9)	64.7	(57.4,71.9)
South						
Khanh Hoa	85.4	(80.2, 90.6)	29.8	(23.7, 35.9)	54.8	(49.8,59.6)
Tay Ninh	76.8	(71.1, 82.5)	16.3	(10.9, 21.6)	49.0	(44.1,53.9)
Can Tho	74.3	(69.1, 79.6)	16.1	(11.2, 20.7)	47.4	(43.0,51.7)
Ben Tre	71.5	(66.1, 77.1)	13.5	(9.2, 17.9)	43.4	(39.0,47.7)
Binh Duong	76.8	(71.1, 82.6)	16.3	(12.0, 20.6)	42.0	(37.6,46.3)

Note: Current drinkers are individuals who consumed alcohol at least once in the previous 12 months. CI: Confidence interval.

Figure 1a: Share of recorded and unrecorded alcohol by province (Annual per capita consumption of pure alcohol in liters)
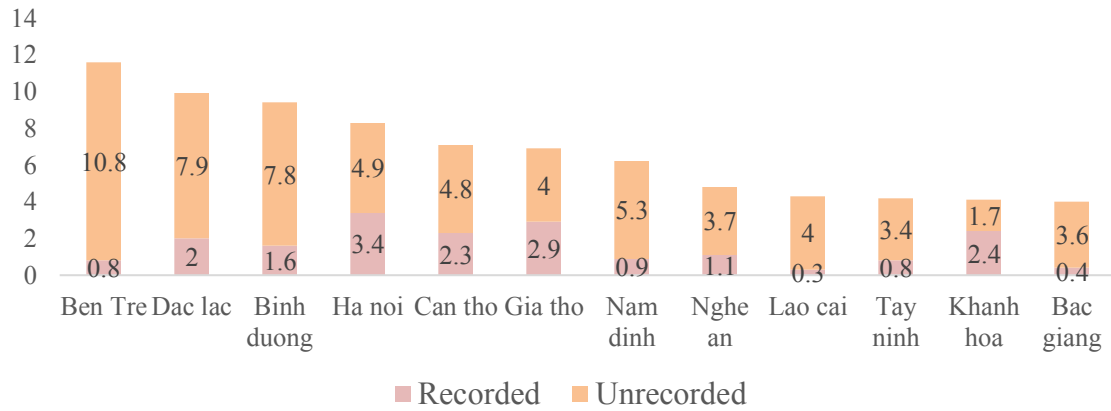
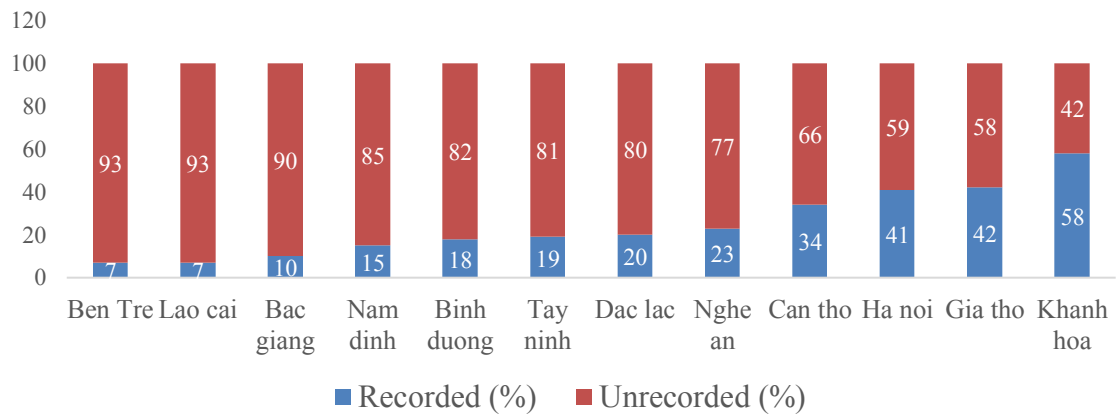**Figure 1b: Share of recorded and unrecorded alcohol by province (%)**

Table 4: Association between respondent's characteristics and current alcohol use in Vietnam

	Current drinkers Consumed at least once a year (last-year drinkers)	Consumed at least once a month (monthly drinkers)	Consumed at least once a week (weekly drinkers)	Consumed daily (daily drinkers)
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Gender				
Female	1 (Ref.)			
Male	**10.88** (8.02, 14.78)	**6.93** (4.90, 9.80)	**5.65** (4.54, 7.03)	**6.30** (4.19, 9.47)
Head of the household (yes)	**1.43** (1.17, 1.75)	**1.37** (1.19, 1.57)	**1.35** (1.06, 1.71)	1.12 (0.79, 1.58)
Married (yes)	**1.22** (1.08, 1.37)	**1.41** (1.13, 1.74)	1.21 (0.86, 1.69)	0.77 (0.47, 1.26)
Religion				
Non-atheist	1 (Ref.)			
Atheist	1.19 (0.81, 1.75)	1.34 (0.87, 2.07)	1.23 (0.77, 1.96)	1.59 (0.89, 2.86)
Education				
Less than high school	1 (Ref.)			
High school	0.99 (0.83, 1.17)	1.18 (0.96, 1.45)	0.89 (0.70, 1.13)	**0.77** (0.62, 0.95)
Some college or higher	**1.25** (1.07, 1.46)	1.05 (0.85, 1.31)	0.88 (0.67, 1.16)	0.74 (0.54, 1.00)
Age group, years				
15-29	1 (Ref.)			
30-44	0.98 (0.87, 1.11)	1.18 (0.89, 1.55)	**1.50** (1.04, 2.15)	**6.68** (3.10, 14.38)
45-59	**0.78** (0.64, 0.96)	1.06 (0.86, 1.31)	1.75 (0.99, 3.10)	**12.34** (6.39, 23.85)
60 +	**0.44** (0.35, 0.56)	1.19 (0.85, 1.65)	1.48 (0.84, 2.62)	**16.95** (6.29, 45.66)
Household income (monthly)				
Less than 5 million	1 (Ref.)			
5-10 million	**1.27** (1.08, 1.49)	1.06 (0.86, 1.32)	1.00 (0.76, 1.31)	1.25 (0.87, 1.79)
More than 10 million	**1.45** (1.30, 1.62)	1.09 (0.79, 1.49)	1.09 (0.83, 1.42)	1.23 (0.78, 1.93)
Rural residence	0.97 (0.75, 1.26)	1.12 (0.73, 1.70)	0.78 (0.48, 1.27)	0.88 (0.67, 1.15)
Observations	4,998	2.538	2,538	2,538

Notes: All models include region-fixed effects. Standard errors are clustered by region. **Bold** denotes statistically significant at 95% significance level. aOR: adjusted odds ratios, CI: Confidence Interval.

Table 5: Socio-demographic correlates of light, moderate, and high-intake drinkers among current drinkers in Vietnam

	Light drinkers		Moderate drinkers		High-intake drinkers	
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Gender						
Female	1 (Ref.)					
Male	**0.11**	(0.08, 0.13)	**5.62**	(3.93, 8.05)	**9.02**	(7.15, 11.39)
Head of the household (yes)	**0.81**	(0.71, 0.92)	1.13	(0.88, 1.46)	1.13	(0.86, 1.47)
Married (yes)	0.83	(0.61, 1.13)	1.16	(0.77, 1.74)	1.10	(0.73, 1.64)
Religion						
Non-atheist	1 (Ref.)					
Atheist	0.85	0.62, 1.17)	1.17	(0.85, 1.61)	1.01	(0.83, 1.23)
Education						
Less than high school	1 (Ref.)					
High school	1.06	(0.86, 1.30)	0.96	(0.78, 1.19)	0.93	(0.74, 1.17)
Some college or higher	1.00	(0.85, 1.19)	1.14	(0.95, 1.37)	0.75	(0.56, 1.00)
Age group, years						
15-29	1 (Ref.)					
30-44	**0.71**	(0.53, 0.95)	1.03	(0.75, 1.40)	**1.90**	(1.17, 3.08)
45-59	0.72	(0.45, 1.14)	1.16	(0.78, 1.72)	**1.53**	(1.03, 2.26)
60 +	0.91	(0.64, 1.29)	1.01	(0.73, 1.40)	1.28	(0.80, 2.03)
Household income (monthly)						
Less than 5 million	1 (Ref.)					
5-10 million	0.86	(0.69, 1.07)	1.20	(0.95, 1.51)	0.94	(0.76, 1.17)
More than 10 million	**0.75**	(0.57, 0.98)	1.25	(0.95, 1.63)	1.13	(0.70, 1.80)
Rural residence	1.26	(0.87, 1.82)	0.82	(0.61, 1.10)	0.90	(0.64, 1.28)
Observations	2,538		2,538		2,538	

Notes: All models include region fixed effects. Standard errors are clustered by region. **Bold** denotes statistically significant at 95% significance level. aOR: Adjusted odds ratios, CI: Confidence Interval. Light alcohol intake is defined as an intake of 0-4.9g/day, moderate alcohol intake is defined as an intake of 5-24.9 g/day, and high alcohol intake is defined as an intake of 25+ g/day.

Table 6: Socio-demographic correlates of recorded and unrecorded alcohol consumption among current drinkers in Vietnam

	Recorded only		Unrecorded only		Both types	
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Gender						
Female	1 (Ref.)					
Male	**0.16**	(0.11, 0.22)	1.26	(0.78, 2.03)	**3.32**	(2.68, 4.12)
Head of the household (yes)	**0.79**	(0.73, 0.85)	1.08	(1.13, 1.40)	1.00	(0.88, 1.14)
Married (yes)	**0.68**	(0.56, 0.82)	**1.46**	(1.12, 1.90)	1.06	(0.89, 1.27)
Religion						
Non-atheist	1 (Ref.)					
Atheist	0.72	(0.33, 1.58)	1.19	(0.81, 1.74)	1.09	(0.74, 1.60)
Education						
Less than high school	1 (Ref.)					
High school	1.06	(0.71, 1.60)	0.89	(0.72, 1.10)	1.06	(0.79, 1.43)
Some college or higher	1.21	(0.87, 1.68)	**0.65**	(0.42, 0.99)	1.14	(0.90, 1.43)
Age group, years						
15-29	1 (Ref.)					
30-44	**0.79**	(0.70, 0.88)	1.08	(0.75, 1.55)	1.11	(0.92, 1.34)
45-59	**0.59**	(0.50, 0.69)	**1.74**	(1.43, 2.02)	0.90	(0.74, 1.11)
60 +	0.77	(0.48, 1.26)	1.56	(1.01, 2.44)	0.91	(0.65, 1.26)
Household income (monthly)						
Less than 5 million	1 (Ref.)					
5-10 million	1.44	(0.98, 2.12)	**0.49**	(0.41, 0.59)	**1.48**	(1.19, 1.84)
More than 10 million	1.55	(0.84, 2.86)	**0.38**	(0.28, 0.50)	**1.64**	(1.19, 2.26)
Rural residence	**0.46**	(0.54, 1.07)	**1.59**	(1.07, 2.35)	1.10	(0.87, 1.38)
Observations	2,538		2,538		2,538	

Notes: All models include region fixed effects. Standard errors are clustered by region. **Bold** denotes statistically significant at 95% significance level. aOR: Adjusted odds ratios, CI: Confidence Interval. Recorded only are drinkers who consumed beer, spirit, or wine only, while unrecorded only are those who consumed homemade alcohol, counterfeit, contraband, or surrogate alcohol only and both types are drinkers who consumed recorded as well as unrecorded alcohol.