

A context-specific instrument to record drinking behaviour: A pilot study on implications of identifying the context of risky drinking

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Abstract

A context-specific quantity-frequency (CSQF) questionnaire has been developed to accurately measure alcohol consumption using probing questions on drinking context. The study aimed to describe the drinking context associated with different drinking intensities in a community of southern Thailand using the CSQF. A cross-sectional survey was conducted among adults aged >15 years in Songkhla Province, Thailand. Among 804 participants, there were 183 current drinkers with 412 drinking events (215 low-, 79 medium-, and 118 high-intensity). More than half of these events occurred in special situations (i.e., holiday, party, and cultural drinking). About half of the drinking events occurred outside the drinker's house and most drinking events occurred among friends. Higher drinking intensity was associated with higher level of education (adjusted odds ratio [aOR] 4.74 for medium- and aOR 5.23 for high-intensity) and with a special drinking situation (aOR 2.46 for medium- and aOR 2.78 for high-intensity).

Keywords: drinking context, drinking behaviour, alcohol survey

INTRODUCTION

Drinking alcohol is a causal factor for many injuries and diseases ([Baan et al., 2007](#); [Shield, Parry, & Rehm, 2014](#)). Alcohol consumption worldwide has social and economic consequences for drinkers and society at large ([Anderson & Baumberg, 2006](#); [Sacks et al., 2013](#)). From a World Health Organization (WHO) report, the countries in Africa, Asia, and the Eastern Mediterranean region have a low prevalence of current drinkers with 30%, 14%, and 5%, respectively, and most drinkers consume only occasionally. In contrast, most drinkers in other regions are regular drinkers ([World Health Organization, 2014](#)).

Similarly, in Thailand, the National Health and Welfare survey 2015 found that most Thai drinkers are occasional drinkers (60% of all drinkers). Drinking is seasonal and also varies by days of the week. During the festive seasons (e.g., the New Year's holidays and Songkran [Water Festival]) there may be holiday periods of five to seven days when people celebrate and drink more. On the other hand, during the three-month Buddhist Lent, usually in July to October, many drinkers stop drinking for the entire period or drink less frequently. All of these variations need to be considered in the data collection on alcohol consumption.

WHO recommends that alcohol survey components include the volume of alcohol consumed, drinking pattern, and drinking context (e.g., festive drinking, drinking in a public place, the proportion of drinking events when getting drunk, drinking with meals, and drinking intensity) ([World Health Organization, 2014](#)). There are several instruments to measure alcohol consumption which have strong and weak points for capturing the volume, pattern, and context of drinking. However, the most frequently used instruments were developed in areas of high prevalence of current regular drinkers ([Greenfield, 2000](#); [Miller, 1973](#); [Russell, Welte, & Barnes, 1991](#)). The instruments ask general questions. A limitation is that when these instruments are applied in areas of low prevalence of current drinkers and where most are occasional drinkers, the interviewees could not remember their drinking situations (e.g., birthday party, graduate ceremony, and New Year). Loss of recall ability is one of the barriers to obtaining accurate data in an alcohol survey, not only in the general population ([Stockwell et al., 2004](#)) but also in a clinical setting such as an ante-natal clinic ([Muggli, Cook, O'Leary, Forster, & Halliday, 2015](#)). Instruments which rely on the recall of consumption over a long time frame are more likely to estimate a lower alcohol consumption due to poor recall of alcohol consumption compared with instruments which used shorter timeframes ([Lemmens, Tan, & Knibbe, 1992](#)). One study found that the decline in recall is very clear after only few days ([Ekholm, 2004](#)). Moreover, for existing instruments, the interviewee tends to report median, not mean alcohol consumption when they were asked to estimate their average amount consumed. This is because they excluded or lost memory of high-intake drinking occasions ([Gmel, Graham,](#)

[Kuendig, & Kuntsche, 2006](#); [Gruenewald & Nephew, 1994](#)). A graduated-frequency (GF) instrument can avoid this problem by asking about the frequency of drinking for each graduated level of consumption level (e.g. frequency of consuming 1-2 drinks, 3-4 drinks, and >5 drinks in a single day) ([Jürgen Rehm et al., 1999](#)). However, some drinkers may not remember their drinking frequency for each consumption level. By initially asking about the context of drinking, their recall ability may be improved.

A range of contextual factors can impact drinking behavior. These include as drinking situation (e.g., weekend, holiday, and cultural), drinking location (e.g., house, pub/bar, restaurant, and workplace), or drinking partner(s) (e.g., friends, family, and strangers) ([Holyfield, Ducharme, & Martin, 1995](#); [Kaplan, Karriker-Jaffe, & Greenfield, 2017](#); [Reboussin, Song, & Wolfson, 2012](#)). The specific social context technique for an alcohol consumption survey was originally developed in 1973 ([Room & Roizen, 1973](#)). It asked eight common drinking situations such as “a man is at a bar with some of his male friends”, “a husband having dinner out with his wife”, and “a man visiting his parents”. After that, many studies have focused on a contextual approach ([Casswell, Huckle, & Pledger, 2002](#); [Hilton, 1986](#); [Single & Wortley, 1994](#); [Wyllie, Zhang, & Casswell, 1994](#)). However, previous strategies to contextualize questions did not thoroughly enquire specific details of the drinking events. So, the results could not provide complete information about drinking behaviour.

The context-specific quantity-frequency (CSQF) questionnaire that we developed was designed to accurately measure alcohol consumption using questions that probe the context of drinking. The aim of this study was to describe the drinking context associated with different drinking intensities in a community of southern Thailand using the CSQF.

METHODS

Study design and sample

This study is part of a larger community-based cross-sectional survey used for developing the CSQF ([Vichitkunakorn, Balthip, Geater, & Assanangkornchai, 2018](#)). The CSQF is a prototype questionnaire and forms the basis of a contextual approach to assess drinking. The larger survey consisted of (i) a validation of the CSQF by comparing it with the traditional beverage-specific quantity-frequency methods to estimate alcohol consumption and (ii) the implications of the CSQF, which is this study.

We recruited a population older than 15 years in order to identify predictors for risky drinkers in the sample and also assess the 3-month per capita consumption in the larger survey.

A multistage sampling technique was used. In the first stage, four sub-districts in both urban and rural areas in Songkhla Province in southern Thailand were selected randomly. In the second stage, eight villages were selected with probability proportional to size. In the third stage, households within each village were listed and 50 households were selected by systematic random sampling. In the fourth stage, two participants in each household were selected using the Kish selection grid ([Kish, 1949](#)).

Data collection and instruments

A face-to-face interview was performed by trained interviewers. The questionnaire included socio-demographic characteristics of participants and alcohol drinking behaviour assessed by the CSQF.

Context-specific quantity frequency (CSQF)

The CSQF was derived from the traditional quantity frequency (QF) approach. However, it asks more about the drinking context. The questions elicit information on location, drinking partner(s), beverage, sharing of beverages, quantity, and frequency for each type of common drinking event in a three-month retrospective timeframe. The response categories were created based on a previous literature review regarding drinking patterns in Thai drinkers and on expert opinions in four different regions in Thailand (i.e., Northern, Northeast, Southern, and Central Thailand) which have different drinking cultures. These seven questions were asked in a loop for five common situations (i.e., usual drinking, holiday, party, cultural event, and music/sport event) (Figure 1).

1. *“During the last 3 months, did you drink in these situations*?”*
2. *“Where did you usually drink ... (for specified situation)... in the last three months?”*
 - Own house, someone else’s house, restaurant, pub/bar, workplace, religious place, local shop (can choose a maximum of three locations for each situation).
3. *“With whom did you usually drink in ... (for each unique combination of situation(s) and location(s))... ?”*
 - Alone, family, male friends, female friends, strangers, colleagues (can choose one drinking partner(s)).
4. *“What beverage did you usually drink at... (for each unique combination of situation(s), location(s), and partner(s)) ...?”*

- Beer, white spirit, whisky, local beverage, wine, wine coolers and vodka (can choose one type of beverage).
5. *“How often did you usually have... (for each unique combination of situation(s), location(s), partner(s), and beverage type(s)) ... in the last three months?”*
 - Every day, 5 to 6 days/week, 3 to 4 days/week, 1 to 2 days/week, 1 to 3 days/3 month (can choose one frequency category).
 6. *“On those days when you had ... (for each unique combination of situation(s), location(s), partner(s), beverage type(s), and frequency categories) ... , which containers did you usually use?”*
 - The interviewer shows pictures of various kinds of containers to the interviewee (can choose one drinking container type).
 7. *“And, how much did you usually have ... (for each unique combination of situation(s), location(s), partner(s), beverage type(s), frequency categories, and container type(s))... per day in that container?”*
 - Answered in terms of the number of containers (can answer only one number).

The CSQF can provide a maximum of three drinking locations in each situation, with a total of five drinking situations. So, each participant had the chance to respond $3 \times 5 = 15$ types of drinking events. A drinking event was a unique combination of one specified drinking situation, location, drinking partner(s), beverage, and volume consumed (Figure 1).

A retrospective three-month time frame was used in this study because we judged that this would be the average timeframe over which most drinkers could remember their drinking history with relatively less recall bias. Also this time frame could capture one or more common drinking events in Thailand (e.g., New Year festival and cultural events).

Data analysis

This study identified two units of analysis. The primary unit of analysis was the participants. The next unit of analysis was their drinking events (if they drank).

Outcome measures

Drinking intensity and average daily consumption

- “Alcohol drinking intensity”: Assuming there was a single drinking event in a day, this was a measure of alcohol consumption in grams of pure alcohol per drinking event (g/drinking day). It can be determined by multiplying the percentage volume of pure alcohol (item 5 of the CSQF) and volume of beverage consumed (in milliliters), and then multiplied by 0.789 (the specific gravity of ethyl alcohol). The volume consumed was calculated by the volume’s container (item 6) multiplied by the actual number of those containers (item 7).
- “Average daily consumption”: This was a measure of the mean quantity consumed per day (g/day) of drinkers. The midpoint was used to represent each frequency level (item 4). For example, “1 to 2 days/week” level was converted to 1.5 days/week or $1.5 \times 13 = 19.5$ days/three months. The average daily consumption in the last three months was calculated by summation of multiplying for each drinking situation (drinking intensity) with the midpoint frequencies, and then dividing by 92 days.

Drinking intensity classification

The drinking-intensity was classified based on criteria for risk of acute harms set out by WHO. The risk is divided into three groups ([World Health Organization, 2000](#)).

- (i) Low-risk: >0-40 g/drinking day for male and >0-20 g/drinking day for female
- (ii) Medium-risk: 41-60 g/drinking day for male and 21-40 g/drinking day for female
- (iii) High-risk: >60 g/drinking day for male and >40 g/drinking day for female

Risk of chronic harm based on average daily intake

WHO’s “International Guide for Monitoring Alcohol Consumption and Related Harm” sets out the criteria to assess risk of chronic harm ([World Health Organization, 2000](#)) based on all-cause mortality for different levels of average daily consumption ([English et al., 1995](#)). Average daily consumption is classified into three levels.

- (i) Low-risk: >0-40 g/day for male and >0-20 g/day for female
- (ii) Medium-risk: 41-60 g/day for male and 21-40 g/day for female
- (iii) High-risk: >60 g/day for male and >40 g/day for female

Statistical analysis

Descriptive data are presented as frequencies and percentages and as medians and interquartile ranges (IQR). A multinomial logistic regression model was fitted to the outcome, with participants categorized into

three groups: lifetime abstainers/former drinkers (reference group); low-risk drinkers; and medium/high-risk drinkers. Multilevel, mixed-effects logistic models were applied to assess the determinants of medium- and high-intensity drinking compared with low-intensity (reference group). These models were chosen given the hierarchical nature of the data with clustering of drinking events (first or lower level) within drinkers (second or higher level). R-software version 3.4.4 ([R Development Core Team, 2015](#)) and lme4 packages ([Bates, Mächler, Bolker, & Walker, 2014](#)) were used for data analysis. Potential predictors (gender, age group, marital status, education level, occupation, household income level, smoking status, drinking situation, location, drinking partner(s), beverage, and sharing of beverages in a group) were included in the initial model. Backward stepwise refinement was performed. A p-value less than 0.05 indicated statistical significance.

Ethical consideration

This study was approved by the Human Research Ethics Committee (HREC) of the Faculty of Medicine, Prince of Songkla University (Ref no: 59-254-18-1). All participants signed a written consent form.

RESULTS

Characteristics of participants and drinking events

Demographic data by drinking status

Among 804 eligible participants (response rate 98.3%), 183 (22.8%) drank in the last three months and completed the CSQF questionnaire. There were 456 (56.7%) lifetime abstainers and 165 (20.5%) former drinkers who had a history of drinking but had not consumed anything for the three months prior to the survey (Table 1). Most of the lifetime abstainers were female (86.0%) but most former (63.6%) or current drinkers (85.2%) were male. The age group and marital status distributions were similar between lifetime abstainers, former, and current drinkers. However, the current drinkers were more likely to have a higher level of education and household income. Among current drinkers, the median of average daily intake was 5.9 g/day (IQR 1.33, 23.93) and the distribution of consumption was positively skewed.

Drinking context by drinking intensity event

From the 183 current drinkers, there were 412 drinking events in the past three months (Table 2). Based on WHO criteria for acute harm, 215 low-, 79 medium-, and 118 high-intensity drinking events were reported. More than half of the drinking events occurred in special situations (i.e., holiday, party, and cultural

drinking). Medium- or high-intensity drinking events were more likely to occur in special situations, particularly during holidays. About half of the drinking events occurred outside the drinker's house, mostly in the homes of other people. The majority of drinking events occurred among friends. Beer and whisky were the most common beverages consumed in all drinking events, with whisky being significantly the most common in high-intensity drinking and beer in low-intensity drinking situations. Most drinking events (65%) occurred in groups in which beverages were shared among 2 to 4, or 5 or more drinkers. Medium- and high-intensity drinking events were significantly more likely to occur in groups compared to low-intensity drinking events.

Influencing factors for risky drinkers

A higher level of education (i.e., high school, bachelor and above) was associated with low risk drinkers (relative risk ratio [RRR] = 1.97, 95% confidence interval [CI] 1.33, 2.92) and medium/high-risk drinkers (RRR = 2.84, 95% CI 1.27, 6.36) rather than with abstainers (Table 3). Current smoking was also more common in low-risk drinkers (RRR = 5.70, 95% CI 3.78, 8.58) and medium/high-risk drinkers (RRR = 12.24, 95% CI 5.49, 27.29) than in lifetime abstainers/former drinkers. The RRRs of these two factors (education level and smoking status) were higher in higher risk drinkers. Only low-risk drinkers were associated with working in agriculture (RRR = 1.78, 95% CI 1.20, 2.63) and high household income level ($\geq 10,000$ Baht/month) (RRR = 1.92, 95% CI 1.24, 2.97).

Influencing factors for medium- and high-intensity drinking events

A higher level of education (i.e., high school, bachelor and above) was an independent predictive factor for having medium- (adjusted odds ratio [aOR] = 4.74, 95% CI 4.73, 4.75) and high-intensity drinking events (aOR = 5.23, 95% CI 1.38, 19.77), rather than low-intensity drinking events (Table 4). Drinking events linked to special occasions were more likely to be of medium- (aOR = 2.46, 95% CI 2.46, 2.47), and high-intensity (aOR = 2.78, 95% CI 1.23, 6.28). Drinking white spirit/whisky and others (i.e., local beverage, wine, wine cooler, and vodka) strongly predicted only the medium-intensity drinking events (aOR = 7.27, 95% CI 7.25, 7.29).

DISCUSSION

Principal findings and relation to other studies

This study showed that the CSQF can provide a comprehensive picture of drinking behaviour. It describes not only the drinking beverage and quantity but also the drinking context (i.e., drinking situation, location,

partner, and sharing of beverages in a group). It allows identification of the social and other factors which predict acute and chronic harms based on WHO criteria. The context-specific questions were also likely to have increased recall ability by stimulating the respondents to think of all of the different situations when they consumed alcohol ([Dawson & Room, 2000](#)) and to have encouraged honest and accurate reporting ([Muggli et al., 2015](#)). The contextual approach can capture the participants' drinking as either usual drinking or drinking associated with special situations. It results in higher alcohol intake estimates ([J. Rehm, 1998](#)) because the CSQF asks about various kinds of drinking situations.

In the current study, consistent with a previous study, the drinking situation associated with special events was associated with higher drinking intensity. For example, alcohol drinking by college students during a spring break was higher than drinking throughout the academic year period ([Greenbaum, Del Boca, Darkes, Wang, & Goldman, 2005](#); [Megan E. Patrick, Lewis, Lee, & Maggs, 2013](#)) and drinking on weekend nights in public drinking premises (i.e., pubs/bars) was likely to be excessive alcohol consumption ([Calafat et al., 2011](#)). This may be explained by differing motives for drinking such as going out with the purpose to engage in risky behaviour or selecting a location because of its party reputation ([Megan E Patrick, Morgan, Maggs, & Lefkowitz, 2011](#); [Smeaton, Josiam, & Dietrich, 1998](#)). The context was also strongly associated with other risk-taking behaviour, including substance use, substance-related driving, and risky sexual behaviour ([Calafat et al., 2011](#)).

There were no significant differences in drinking intensity associated with drinking location and type of drinker partner(s) in our analysis. In contrast, previous studies found that people were less likely to drink during ecotourism or in a religious place ([A. Andersson, Mårdby, Holmgren, & Hensing, 2014](#)). Drinking with friends was associated with an increased risk of binge drinking and getting drunk ([Annika Andersson, Andersson, Holmgren, Mårdby, & Hensing, 2012](#); [A. Andersson et al., 2014](#); [Reboussin et al., 2012](#)), whereas drinking with parents was associated with decreased risks ([Reboussin et al., 2012](#)). Johannes et al. ([Thrul, Labhart, & Kuntsche, 2017](#)) found that a mixed gender drinking group was associated with higher drinking intensity beyond the effect of drinking-group size in young adults.

In summary, the combination of drinking context (i.e., drinking situation, location, drinking partner(s), beverage, and sharing of beverage in a group) could generate different "*drinking motives*" for each drinker. Prior studies point out the same concept, that the within-person variability of drinking motives can be associated with the day and the context, as well as with the consequences experienced ([Arbeau, Kuiken, & Wild, 2011](#); [Megan E Patrick & Maggs, 2008](#)).

Our study found a significant association between primary school or higher education with current drinkers and higher amount of alcohol consumed. This relationship was consistent with that reported in northeast Thailand ([Chanaboon & Kanato, 2015](#)). However, this deviates from the results of studies in other countries that show those who had a lower level of education were more likely to be current drinkers ([Islam et al., 2017](#)), hazardous drinkers based on AUDIT ([Liu, Chen, Lee, Chu, & Chien, 2017](#); [McKee et al., 2000](#); [Obadeji, Oluwole, Dada, & Ajiboye, 2015](#)), excessive drinkers ([Hong, Noh, & Kim, 2017](#); [Xiang et al., 2009](#)), and to have a higher risk of alcohol-attributable hospital admission or death ([Katikireddi, Whitley, Lewsey, Gray, & Leyland, 2017](#); [Liao & Lin, 2015](#)). This difference in findings may be explained by changes in the Thai education system. The 1997 Constitution provided for all Thai people to have a basic compulsory education for at least 12 years through secondary school or high school ([Siwarak, Traimāt, & Vayagool, 1997](#)). So, younger people are more likely to have completed education beyond primary school. In parallel with these increases in education, data from the Thai National Statistical Office showed that the percentage of young people who were currently drinking had been increasing $\geq 5\%$ each year during the previous four years.

Our study found that occupation was a predictor for being a current drinker. This supports previous findings in the literature that some occupations can affect drinking behaviour. For example, agriculturalist, service industry employee ([Jarman, Naimi, Pickard, Daley, & De, 2007](#)), food preparation and serving-related jobs ([Shaikh, Sikora, Siahpush, & Singh, 2015](#); [Zhang & Snizek, 2003](#)), labourer ([Kim, Rifkin, John, & Jacob, 2013](#)), and truck driver ([Birdsey et al., 2015](#)) were found to have a higher risk, whereas professional occupations have a lower risk ([Matano, Wanat, Westrup, Koopman, & Whitsell, 2002](#)). The reason may be explained by work-related stress ([Colell, Sanchez-Niubo, Benavides, Delclos, & Domingo-Salvany, 2014](#); [Siegrist & Rödel, 2006](#); [Virtanen et al., 2008](#)) or job strain theory, that includes physical demand and social engagements associated with alcohol consumption ([Barnes & Zimmerman, 2013](#)) or ready access to alcohol at work.

The dose-response relationship seen between current smoking and current drinkers (low and medium/high-risk drinkers) in this study was consistent with several prior studies ([Bobo & Husten, 2000](#); [Dee, 1999](#); [Ritchey, Reid, & Hasse, 2001](#)). This association can be explained by physical, psychological, and social level mechanisms ([Room, 2004](#)).

Limitations and strengths

Our study has a number of limitations. First, the purpose of this study was not the potential generalizability of the CSQF, but a description of the implications of use of the prototype CSQF questionnaire

as an approach for an alcohol survey, linked to drinking context. Nevertheless, this localized study has provided information with important implications for alcohol-related policy at the survey site. Second, alcohol consumption was based on self-report of the participants and laboratory data were not used to validate these findings. Self-reported alcohol behaviours may be prone to underestimation and recall error. Third, we employed a cross-sectional study design which meant we were not able to analyze causal associations. Lastly, each participant is allowed to choose only one unique combination of drinking partner(s), beverage, frequency, and quantity of alcohol consumed in each specified situation and location, to minimize participant's burden in answering the questionnaire. In fact, the participant may be having more than one unique combination in each specified situation and location.

The strength of this study is that much of the currently available literature has focused on predictors of episodic heavy drinking, which are seen in high-intensity drinking events for both sexes and some of the medium-intensity events in males in our study. We also examined low-, medium- and high-intensity drinking events and examined dose-response relationships to clearly reflect the effect of predictors (i.e., education level and special situation drinking activity).

Implications and future research

The CSQF will be useful to identify alcohol drinking environments in a general population survey or clinical practice. It can potentially be employed to screen patients for risky drinking at outpatient clinics, health care professional visits, ambulatory visits, or in a general population survey. Interventions targeting drinking associated with known high-risk events are starting to be developed and evaluated with some success. For example, the Good Sports program in a community sports club in Australia delivered lower rates of risky drinking within club settings. Not only did responsible drinking patterns increase but also a range of other benefits were observed (i.e., financial, memberships increased) ([Crundall, 2012](#)). A web-based personalized feedback intervention for 21st birthday drinking found reduced drinking at such events ([Neighbors, Lee, Lewis, Fossos, & Walter, 2009](#)). It is feasible to use a contextual approach in any countries where the purpose is to explore alcohol drinking behaviours.

It would be worthwhile in the future to explore other applications of the CSQF, its acceptability in multiple cultures and languages, and methodological issues such as inter-interviewer reliability and test-retest reliability. The response categories in each drinking context can change to conform to different drinking cultures. For

instance, local beverages for different countries (e.g., sake in Japan, grappa in Italy, and schnapps in Germany) and the special public holidays which influence drinking behaviours can be selected.

Conclusion

The CSQF possesses several advantages over existing instruments for assessing alcohol consumption. Comprehensive assessment of the drinking context (i.e., drinking situation, location, drinking partner(s), beverage, and sharing of beverages in a group) provides valuable information for clinical practice and for alcohol policies and helps to more clearly understand drinking behaviour. For our analysis, the special situation drinking, such as during a holiday, party or cultural events, and non-beer beverages were more likely to be a feature of medium- or high-intensity drinking events. Hence, the alcohol preventive interventions or policies can be framed specifically for the holiday and cultural events in Thailand. The improved drinking behaviour instrument has various benefits for the health system, from the individual to public health levels.

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CONFLICT OF INTEREST STATEMENT

None declared

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Table 1. Participant characteristics by drinking status (n=804)

Characteristics	Lifetime abstainers (n=456), n (%)	Former drinkers ₁ (n=165), n (%)	Current drinkers by risk of chronic harm ₂ (n=183), n (%)		
			Low-risk (n=154)	Medium/high-risk (n=29)	Total
Gender					
Male	64 (14.0)	105 (63.6)	128 (83.1)	28 (96.6)	156 (85.2)
Female	392 (86.0)	60 (36.4)	26 (16.9)	1 (3.4)	27 (14.8)
Age (year)					
Median (IQR)	52.0 (41.0, 63.0)	50.0 (39.0, 63.0)	46.5 (34.2, 60.0)	49.0 (40.0, 57.0)	47 (35.0, 60.0)
15 to 29	41 (9.0)	18 (10.9)	24 (15.6)	2 (6.9)	26 (14.2)
30 to 44	110 (24.1)	47 (28.5)	44 (28.6)	10 (34.5)	54 (29.5)
45 to 59	151 (33.1)	46 (27.9)	45 (29.2)	11 (37.9)	56 (30.6)
≥60	154 (33.8)	54 (32.7)	41 (26.6)	6 (20.7)	47 (25.7)
Marital status					
Married	371 (81.4)	126 (76.4)	124 (80.5)	25 (86.2)	149 (81.4)
Single	48 (10.5)	26 (15.8)	26 (16.9)	3 (10.3)	29 (15.8)
Widowed/divorced/separated	37 (8.1)	13 (7.9)	4 (2.6)	1 (3.4)	5 (2.7)
Education level					
Primary school or less	302 (66.2)	87 (52.7)	74 (48.1)	12 (41.4)	86 (47.0)
High school	88 (19.3)	44 (26.7)	45 (29.2)	13 (44.8)	58 (31.7)
Bachelor and above	66 (14.5)	34 (20.6)	35 (22.7)	4 (13.8)	39 (21.3)
Occupation					
Unemployed	147 (32.2)	45 (27.3)	33 (21.4)	0	33 (18.0)
Laborer	57 (12.5)	28 (17.0)	25 (16.2)	9 (31.0)	34 (18.6)
Agriculture	170 (37.3)	55 (33.3)	69 (44.8)	14 (48.3)	83 (45.4)
Commercial	82 (18.0)	37 (22.4)	27 (17.5)	6 (20.7)	33 (18.0)
Household income level (Baht/month)					
Median (IQR)	10,000 (6,000, 20,000)	12,000 (6,000, 24,000)	15,000 (10,000, 25,000)	15,000 (10,000, 30,000)	15,000 (10,000, 26,500)
<10,000	181 (39.7)	63 (38.2)	37 (24.0)	7 (24.1)	44 (24.0)
10,000 to 29,999	206 (45.2)	71 (43.0)	84 (54.5)	12 (41.4)	96 (52.5)

Characteristics	Lifetime abstainers (n=456), n (%)	Former drinkers ₁ (n=165), n (%)	Current drinkers by risk of chronic harm ₂ (n=183), n (%)		
			Low-risk (n=154)	Medium/high-risk (n=29)	Total
≥30,000	69 (15.1)	31 (18.8)	33 (21.4)	10 (34.5)	43 (23.5)
Smoking status					
Non-smoker	431 (94.5)	108 (65.5)	86 (55.8)	11 (37.9)	97 (53.0)
Current smoker	25 (5.5)	57 (34.5)	68 (44.2)	18 (62.1)	86 (47.0)
Average daily intake (g/day)					
Median (IQR)	-	-	3.0 (1.0, 14.5)	67.5 (54.7, 90.3)	5.88 (1.33, 23.93)

IQR, interquartile range

₁ Former drinkers: who drank but had not consumed anything for three months

₂ Criteria for risk of chronic harm on average daily consumption level;

Low-risk: >0-40 g/day in male, >0-20 g/day in female,

Medium to high-risk: >40 g/day in male, >20 g/day in female

Table 2. Drinking context by drinking intensity (n=412 drinking events from 183 current drinkers)

Drinking context	Drinking intensity ₁ (n, %)			Total
	Low-intensity (n=215)	Medium-intensity (n=79)	High-intensity (n=118)	
Drinking situation				
Usual life activity	95 (44.2)	25 (31.6)	31 (26.3)	151 (36.7)
Special situation activity	120 (55.8)	54 (69.4)	87 (73.7)	261 (63.3)
Holidays	49	25	49	123
Party	43	20	25	88
Cultural event	28	9	13	50
Drinking location				
Drinker's owned house	110 (51.2)	36 (45.6)	44 (37.3)	190 (46.1)
Outside owned house	105 (48.8)	43 (54.4)	74 (62.7)	222 (53.9)
Other people's house	71	29	52	152
Workplace	14	8	4	26
Restaurant	7	3	11	21
Local shop/religious place	13	3	7	23
Drinking partner(s)				
Alone	33 (15.3)	2 (2.5)	5 (4.2)	40 (9.7)
Family	37 (17.2)	18 (22.8)	16 (13.6)	71 (17.2)
Friend	122 (56.7)	49 (62.0)	83 (70.3)	254 (61.7)
Colleagues	23 (10.7)	10 (12.7)	14 (11.9)	47 (11.4)
Drinking beverage				
Beer	114 (53.0)	24 (30.4)	14 (11.9)	152 (36.9)
Whisky	39 (18.1)	27 (34.2)	86 (72.9)	152 (36.9)
White spirit	29 (13.5)	12 (15.2)	11 (9.3)	52 (12.6)
Others ₂	33 (15.3)	16 (20.3)	7 (5.9)	56 (13.6)
Sharing of beverages in a group (no. of drinkers/sharing group)				
No sharing	89 (41.4)	22 (27.8)	33 (28.0)	144 (35.0)
Sharing	126 (58.6)	57 (72.2)	85 (72.0)	268 (65.0)
2 to 4	64	32	30	126
≥5	62	25	55	142

₁ Low-intensity: >0-40 g/drinking day in male, >0-20 g/drinking day in female,

Medium-intensity: 41-60 g/drinking day in male, 21-40 g/drinking day in female,

High-intensity: >60 g/drinking day in male, >40 g/drinking day in female

₂ Others: local beverage, wine, wine cooler, and vodka

Table 3. Relationship between drinking status and general characteristics

Variables ₁	Low-risk drinkers versus Lifetime abstainers/former drinkers (ref.)		Medium/high-risk drinkers versus Lifetime abstainers/former drinkers (ref.)	
	RRR (95% CI)	P	RRR (95% CI)	P
Education level				
Primary school or less	1	-	1	-
Higher than primary school	1.97 (1.33, 2.92)	<0.001*	2.84 (1.27, 6.36)	0.01*
Occupation				
Non-agriculture	1	-	1	-
Agriculture	1.78 (1.20, 2.63)	0.004*	2.17 (0.99, 4.78)	0.05
Household income level (Baht/month)				
<10,000	1	-	1	-
≥10,000	1.92 (1.24, 2.97)	0.004*	1.86 (0.75, 4.66)	0.18
Smoking status				
Non-smoker	1	-	1	-
Current smoker	5.70 (3.78, 8.58)	<0.001*	12.24 (5.49, 27.29)	<0.001*

RRR, relative risk ratio; CI, confidence interval, * $P < 0.05$

₁ Variables in the table remained after model adjustment

Table 4. Relationship between predictors and drinking-intensity events (n=412 drinking events from 183 current drinkers)

Variables ₁	Low- (ref.) versus Medium-intensity		Low- (ref.) versus High-intensity	
	Adjusted OR (95% CI)	P	Adjusted OR (95% CI)	P
Age group (year)				
15-29	-	-	1	-
30-44	-	-	2.89 (0.61, 13.75)	0.18
45-59	-	-	2.87 (0.49, 16.86)	0.24
60+	-	-	0.31 (0.04, 2.59)	0.28
Education level				
Primary school or less	1	-	1	-
Higher than primary school	4.74 (4.73, 4.75)	<0.001*	5.23 (1.38, 19.77)	0.01*
Drinking situation				
Usual life activity	1	-	1	-
Special situation activity	2.46 (2.46, 2.47)	<0.001*	2.78 (1.23, 6.28)	0.01*
Drinking partner(s)				
Alone/family	-	-	1	-
Friends/colleagues	-	-	2.58 (0.96, 6.92)	0.06
Beverage				
Beer	1	-	-	-
White spirit/whisky/others ₂	7.27 (7.25, 7.29)	<0.001*	-	-

Adjusted OR, adjusted odds ratio; CI, confidence interval, * $P < 0.05$

₁ Variables in the table remained after model adjustment

₂ Others: local beverage, wine, wine cooler, and vodka