Factors affecting alcohol drinking behaviour among secondary school students in Vientiane Province, Lao People's Democratic Republic: a cross-sectional study

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Background: This study investigated alcohol consumption prevalence among adolescents in school settings in Lao People's Democratic Republic and identified factors associated with alcohol consumption to establish better school-based interventions.

Methods: Self-administered questionnaires containing items assessing alcohol drinking behaviour and underlying factors were administered to 393 secondary school students ages 10–19 y. Multivariate logistic regression was used to predict factors associated with drinking behaviour.

Results: Fifty-eight percent of respondents reported ever drinking alcohol. Among the drinkers, 52.6% were light drinkers, 16.8% were moderate drinkers, 27.0% were heavy drinkers and 3.5% were very heavy drinkers. Older age group (adjusted odds ratio [AOR] 5.2 [95% confidence interval {CI} 2.6 to 10.1]); peer pressure, particularly when more than two-thirds of friends drank alcohol (AOR 8.0 [95% CI 2.2 to 29.5]); and siblings' drinking behaviour (AOR 2.8 [95% CI 1.4 to 5.5]) were positively associated with alcohol use, while no permission to drink at home (AOR 0.2 [95% CI 0.1 to 0.6]), uncertain of permission to drink at home (AOR 0.06 [95% CI 0.02 to 0.1]) and never attempting to buy alcohol (AOR 0.2 [95% CI 0.1 to 0.4]) were negatively associated with respondents' alcohol use.

Conclusions: By the age of 19 y, most participating students had started drinking alcohol. One-third of them were permitted to drink by family members and drinking was strongly accelerated by peer pressure. Educational programmes are needed for adolescents attending school and their families that employ peer learning to raise awareness of the ill effects of alcohol use.

Keywords: adolescents, alcohol, drinking behaviours, Laos, risk factors, students.

Introduction

Alcohol consumption directly caused 3.3 million deaths, or 5.9% of all global deaths, in 2016.[1] Harmful use of alcohol is known to be a risk factor for non-communicable diseases (NCDs).[1,2] Common NCDs, including cardiovascular diseases, diabetes, chronic respiratory diseases and cancer, contributed to >38 million deaths in 2012; among these, 16 million were premature deaths. This disease burden falls mainly in developing countries, where 82% of premature deaths occur.[2] In Lao People's Democratic Re-public (PDR), approximately 55% of all deaths are related to NCDs and 26% have the risk of premature death from target NCDs. Like other developing countries, Lao PDR faces an increasing burden of NCDs; the premature death rate is higher for NCDs than for maternal and child health and communicable diseases combined.[3]

In adolescents, alcohol consumption can lead to short- and long-term negative health outcomes. In the short term, alcohol consumption affects memory, learning capacity, problem-solving abilities, flexibility in thinking and ability to inhibit impulses, which might continue into adulthood.[4] In the long term,

alcohol consumption increases the risk of liver cirrhosis, diabetes, cardiovascular diseases and liver cancer.[5] Adolescence is a critical period for cognitive, physical, social and emotional development, when puberty and rapid brain development lead to a new set of behaviours, including health-related behaviours, thus it is a key time for establishment of those behaviours.[6] It is estimated that 70% of premature deaths in adults include contributory factors that began in adolescence.[7] In Lao PDR, most of the population is young, with 50% of the country's >7 million inhabitants estimated to be <25 y of age, while 20.9% of the population are 10–19 y of age. More than half of adolescents (59.4%) attend lower secondary school and 37.6% attend upper secondary school.[8]

Schools play an important role in promoting healthy lifestyles among adolescents by encouraging and helping them to establish lifelong healthy behaviours. By focusing on reducing problem behaviours and replacing them with healthy behaviours, mortality and morbidity in adolescence and adulthood can be reduced.[9] Previous studies have considered alcohol consumption behaviours among adults and adolescents in Lao PDR. For instance, Sychareun et al.[10] determined the relationship between demographic factors and concurrent health risk behaviours, including alcohol abuse, among adolescents in Luangnumtha Province of Lao PDR. Pengpid et al.[11] examined the sociodemographic and health correlates of binge drinking in the adult population of Lao PDR. However, few studies have explored knowledge and attitudes regarding alcohol consumption behaviours; peer, family and commercial influences on alcohol use; and factors associated with alcohol consumption other than demographic factors, particularly in secondary school students. Therefore this study investigated alcohol drinking behaviours of adolescents in school settings and determined factors that are associated with alcohol consumption among secondary school students in Vientiane Province, Lao PDR.

Methods

Study area and population

This was a cross-sectional study conducted among adolescents ages 10–19 y (n=393) in eight schools in Phonhong District, Vientiane Province, Lao PDR, from February to March 2020. Vientiane Province is situated in the northwest region of Lao PDR. It is comprised of 11 districts, with a total land area of 15 927 km^2. Phonhong District, the main research site, is the capital district of Vientiane Province and is located 60 km to the north of Vientiane, the national capital. The total population is 65 200, the total number of secondary schools is 37 and the total number of students in academic year 2018–2019 was 9293.[12] The required sample size was calculated by assuming the proportion of students who drink alcohol to be 40%.[1] Given a 5% significance level and 5% precision, the required sample size was 368. With a non-response rate of 8%, the required sample size was expected to be 400. This study was conducted as part of another project by the Lao Tropical and Public Health Institute. The method of school selection is indicated in another publication.[12] The target participants of this study were randomly selected from lists of all students attending eight schools. The distribution of sample sizes was proportionate to the number of students in each selected school. The K-value

was calculated by dividing the total number of students attending each school by the sample size distributed among the schools. The first participant was selected randomly between 1 and K, using the lottery method, then the next participant was selected in accordance with K-values until the sample size allocated to each school was reached.

Participation in the study was voluntary. The procedures of this study did not include invasive action and the protocol fulfilled the requirements of the ethical review boards. Ethical approval was obtained from the ethical committee of the School of Tropical Medicine and Global Health, Nagasaki University, Japan and the National Ethical Committee of Health Research of Lao PDR. Written consent was obtained from participants' guardians and from all participants >18 y of age, while assent forms were obtained from participants <18 y of age before data collection began.

Data collection

Data were collected using anthropometric measurements and self-administered questionnaires. The questionnaire consisted of three components: sociodemographic characteristics; knowledge, attitude and behaviour regarding alcohol; and factors related to alcohol consumption. The questionnaires were prepared in English and translated to the Lao language. The back translation was performed by a different translator to ensure its accuracy. The Lao questionnaires were then pretested in a school that was not part of the study. Modification of the final questionnaires was performed in accordance with feedback from participants in the pretest.

One of the authors provided training to three data collectors from the Lao Tropical and Public Health Institute on how to explain the data collection process to the prospective participants, how to obtain written consent from their guardians and assent from participants and how to conduct anthropometric measurements.

In each school, students from different grades were gathered in one room to answer the self-report questionnaires. After completing the questionnaires, the participants' heights and weights were measured individually by the data collectors in a separate room. Of 400 participants, 393 completed the questionnaires, thus the response rate was 98%.

Measurement of variables

To assess knowledge of alcohol, five multiple-choice questionnaires were used. Attitude toward alcohol drinking behaviour was measured using a 5-point Likert-type scale (totally disagree, disagree, neutral, agree and totally agree). Adolescents' alcohol consumption behaviour was measured by asking whether they had recently drunk alcohol or not regardless of its frequency and amount per each occasion. Drinking frequency and drinking amount were measured by asking how many times they drank alcohol in the past 30 d and how many glasses of alcohol they drank per occasion. The accessibility of alcohol was assessed by two questions: the first asked if it was easy for respondents to buy alcohol and the second asked if they had been refused by a seller in the past 30 d because of their age. Advertisement exposure was measured by asking about the frequency of seeing or hearing any advertisement about alcohol during the 30 d prior to the survey. Peer influence was measured by asking about

the drinking behaviours of their friends, parents and siblings. Regarding their friends, the question asked was if none of their friends, some of their friends or a majority of their friends drank alcohol. Regarding their parents and siblings, the question asked was whether they currently drank alcohol. Cigarette smoking was measured by asking if they had smoked in the past 30 d. To assess body mass index (BMI), height and weight were measured using the World Health Organization (WHO) standardised height and weight measurement tools, following standard anthropometric measurement techniques.[13] Weight was measured to the nearest 0.1 kg via a battery-powered digital scale (SECA, Hamburg, Germany) and height was measured to the nearest 0.1 cm using a SECA stable stadiometer for mobile height measurement.

Data processing and data analysis

Data entry was performed using the Census and Survey Processing System. Data were processed and analysed using Stata, version 14.1 (StataCorp, College Station, TX, USA). A dependent variable, alcohol consumption behaviour, was dichotomously coded as 0 for non-drinker and 1 for drinker. Next, drinkers were classified into four levels—very heavy, heavy, moderate and light—based on the classification developed by Baker et al.,[14] to understand the degree of exposure to alcohol. The independent variables included categorical and continuous variables. Some categorical variables were categorised dichotomously, including advertisement exposure (never seen/rarely and sometimes/often), the ease of buying alcohol (difficult and easy) and cigarette smoking (non-smoker and smoker). Some categorical variables were categorised into three groups, including have been refused by seller because of age (no, yes and never attempt to buy), if parents drink alcohol (no, yes and do not know), if friends drink alcohol (none drink, some drink and the majority drink), if siblings drink alcohol (no, yes and do not know/no sibling) and permission to drink at home (yes, no and uncertain). The BMI-for-age was calculated for each student using his/her weight and height measurement. The cut-off values for BMI-for-age were based on WHO reference values for adolescents.[15] The BMI values were then categorised into two groups: overweight (Z-score >1 standard deviation [SD]) and not overweight (Z-score ≤1 SD). Sociodemographic characteristics were categorised dichotomously, including gender (male, female), age (10–14 y, 15–19 y), religion (Buddhism, Animism), living conditions (house, dormitory), parents' occupation status (unemployed, employed) and parents' education level (up to primary, higher than primary).

Continuous variables included knowledge and attitude. Each item that measured knowledge was scored as 1 if correct and 0 if incorrect. The scores were then summed; the higher the score, the better the knowledge. A 5-point Likert-type scale was used to assess attitude, with options as follows: 1, totally disagree; 2, disagree; 3, neutral; 4, agree; 5, totally agree. The score was then reversed for the negative items and the scores for all items summed; the higher the score, the more desirable the attitude toward alcohol drinking.[16] Cronbach's α was obtained to assess the consistency of all attitude items and to determine if the data were suitable to be treated as continuous. An item with low consistency in the model was removed, after which the final model had an acceptable Cronbach's α of 0.7.[17]

Alcohol consumption behaviour, sociodemographic status, BMI-for-age Z-score, knowledge score, attitude score and other independent variables were summarised as means and 95% confidence intervals (CIs) for continuous variables and frequencies for categorical variables. The Pearson chi-squared test and Student's t-test were used to compare categorical variables between groups. Logistic regression was used to examine the association between drinking behaviours and individual and family demographic characteristics, knowledge score and attitude score regarding alcohol and other dependent variables mentioned above. A multivariate logistic regression model was used to identify factors associated with drinking behaviour. *A priori* variables (gender, age, religion) and associated variables that were statistically significant in univariate analyses were included in a multivariate logistic regression model. The final model was performed using backward elimination to arrive at a final logistic model that best predicted alcohol consumption. The backward elimination was performed in two stages: in the first stage, variables with p-values >0.2 were eliminated, while for the final model, p-values <0.05 were considered statistically significant.

Results

A total of 393 secondary school students completed the questionnaires. Of these, 51.7% were female and 53.4% were 10–14 y of age. Most were from the Lao-Tai ethnic group (77.9%) and were Buddhist (77.6%). Most lived with their family or relatives (88.3%; Table 1). Regarding knowledge of alcohol, while most knew what alcohol is and could identify types of alcohol, only 6.4% could answer correctly the disadvantages of alcohol (Table 2). Attitudes towards alcohol consumption are shown in Figure 1. Figure 1a shows attitudes toward perceived norms of alcohol use between non-drinkers and drinkers. Drinkers showed a higher mean attitude score for all items, with a statistically significant difference. Figure 1b shows the attitudes toward expectations of drinking alcohol. The difference in attitudes toward expectations of drinking alcohol between non-drinkers and drinkers was not statistically significant.

Details on drinking behaviour are presented in Table 3. Among the drinkers, the most preferred alcohol type was beer (78.3%) for both girls and boys. Places where they reported drinking often included someone else's house (41.6%), followed by their own home (38.9%), while a small number reported drinking at bars/pubs and restaurants. Most of them reported that they started drinking because they were asked by their friends (53.5%) or started by themselves (38.5%), while some of them reported that they started drinking because their family offered (6.2%) or older people in the community offered (1.8%). When drinking behaviour was classified by frequency of drinking and amount of drinking, half of them were light drinkers (52.6%), followed by heavy drinkers (27.0%), moderate drinkers (16.8%) and very heavy drinkers (3.5%).

The results suggested that older age, having some or most friends who drink alcohol and having siblings who drink alcohol were positively associated with alcohol consumption after adjusting for other variables. The results showed that the older age group (15–19 y) was five times (adjusted odds ratio [AOR] 5.2 [95% CI 2.6 to 10.1]) more likely to drink alcohol than the younger

Table 1. Sociodemographic characteristics, behaviours, and environmental exposure related to alcohol consumption of respondents

Variables	Sub-category	Frequency (%)	Alcohol consumption			
			Drinker Frequency	Percentage (95% CI)	Odds ratio	p-value
Sociodemographic characteristic						
All respondents		393 (100.0)	226	57.5 (52.4 to 62.4)	NA	NA
Gender	Male	190 (48.3)	113	59.5 (52.1 to 66.5)	1.0	Ref
	Female	203 (51.7)	113	55.7 (48.5 to 62.6)	0.8	0.44
Age group	10–14	210 (53.4)	75	35.7 (29.2 to 42.6)	1.0	Ref
	15–19	183 (46.6)	151	82.5 (76.2 to 87.8)	8.5	<0.01
School	1 (Public)	40 (10.2)	15	37.5 (22.3 to 54.2)	1.0	Ref
	2 (Public)	39 (9.9)	18	46.1 (30.1 to 62.8)	1.4	0.43
	3 (Private)	39 (9.9)	25	64.1 (47.1 to 78.7)	2.9	0.02
	4 (Public)	80 (20.3)	40	50.0 (38.6 to 61.4)	1.6	0.19
	5 (Public)	55 (14.0)	41	74.5 (61.0 to 85.3)	4.8	<0.01
	6 (Public)	40 (10.2)	35	87.5 (73.2 to 95.8)	11.6	<0.01
	7 (Public)	60 (15.3)	32	53.3 (40.0 to 66.3)	1.9	0.12
	8 (Public)	40 (10.2)	20	50.0 (33.8 to 66.2)	1.6	0.26
Living condition	House[a]	347 (88.3)	197	56.8 (51.4 to 62.0)	1.0	Ref
	Dormitory	46 (11.7)	29	63.0 (47.5 to 76.8)	1.2	0.42
Nutritional status	BAZ≤+1SD	346 (88.0)	28	59.5 (54.4 to 65.0)	1.0	Ref
	BAZ>+1SD	47 (12.0)	19	40.4 (26.3 to 55.7)	0.4	0.01
Father's occupation	Unemployed	96 (24.4)	59	61.5 (51.0 to 71.2)	1.0	Ref
	Employed[b]	297 (75.6)	167	56.2 (50.4 to 61.9)	0.8	0.36
Mother's occupation	Unemployed	134 (34.1)	76	56.7 (47.9 to 65.2)	1.0	Ref
	Employed[b]	259 (65.9)	150	57.9 (51.6 to 64.0)	1.0	0.82
Father's education	Up to primary	210 (53.4)	119	56.7 (49.7 to 63.5)	1.0	Ref
	Higher than primary	183 (46.6)	107	58.5 (51.0 to 66.0)	1.1	0.71
Mother's education	Up to primary	225 (57.2)	128	56.9 (50.1 to 63.2)	1.0	Ref
	Higher than primary	168 (42.7)	98	58.3 (50.5 to 65.9)	1.1	0.77
Family size	≤5	223 (57.9)	132	59.2 (52.4 to 65.7)	1.0	Ref
	>5	162 (42.1)	92	56.8 (48.8 to 64.5)	0.9	0.63
Ethnicity	Lao-Tai	306 (77.9)	185	60.5 (54.7 to 66.0)	1.0	Ref
	Minority	87 (22.1)	41	47.1 (36.3 to 58.1)	0.5	0.02
Religion	Buddhism	305 (77.6)	186	61.0 (55.2 to 66.5)	1.0	Ref
	Animism	88 (22.4)	40	45.5 (34.8 to 56.4)	0.5	<0.01
Environmental exposure related to alcohol drinking behaviour						
Advertisement exposure	Never/rarely	202 (51.4)	111	54.9 (47.8 to 61.9)	1.0	Ref
	Sometimes/often	191 (48.6)	115	60.2 (52.8 to 67.2)	1.1	0.29
Ease of buying	Difficult	111 (28.2)	48	43.2 (33.9 to 53.0)	1.0	Ref
	Easy	282 (71.8)	178	63.1 (57.2 to 68.8)	2.2	<0.01
Have been refused by seller because of age	No	185 (47.1)	151	81.6 (75.3 to 86.9)	1.0	Ref
	Yes	58 (14.7)	40	69.0 (55.5 to 80.5)	0.5	0.04
	Never attempt to buy	150 (38.2)	35	23.3 (16.8 to 30.9)	0.1	<0.01
Parents drink[c]	No	226 (57.5)	131	58.0 (51.2 to 64.5)	1.0	Ref
	Yes	137 (34.9)	82	59.8 (51.1 to 68.1)	1.1	0.72
	Do not know	30 (7.6)	13	43.3 (25.5 to 62.6)	0.5	0.13
Siblings drink	No	117 (29.8)	49	41.9 (32.8 to 51.3)	1.0	Ref
	Yes	141 (35.9)	106	75.2 (67.2 to 82.1)	4.2	<0.01
	Do not know/no sibling	135 (34.3)	71	52.6 (43.8 to 61.2)	1.5	0.09
Friends drink	None	63 (16.0)	4	6.3 (1.7 to 15.5)	1.0	Ref
	Some	206 (52.4)	117	56.8 (49.7 to 63.6)	19.0	<0.01
	Majority	124 (31.5)	105	84.7 (77.1 to 90.5)	80.1	<0.01
Permission to drink at home	Permit	130 (33.1)	116	89.2 (82.6 to 94.0)	1.0	Ref
	Not permit	125 (31.8)	83	66.4 (57.4 to 74.6)	0.2	<0.01
	Uncertain	138 (35.1)	27	19.6 (13.3 to 27.2)	0.02	<0.01

Table 1. Sociodemographic characteristics, behaviours and environmental exposure related to alcohol consumption of respondents

Variables	Sub-category	Frequency (%)	Alcohol consumption			
			Drinker Frequency	Percentage (95% CI)	Odds ratio	p-value
Cigarette smoking	No	367 (93.4)	202	55.0 (49.8 to 60.2)	1.0	Ref
	Yes	26 (6.6)	24	92.3 (74.9 to 99.0)	9.8	<0.01
Attitude score[d]		Mean 14.8 (95% CI 14.4 to 15.1)	Mean 15.3 (95% CI 14.9 to 15.8)		1.1	<0.01

[a]House includes parents' house and relatives' house.
[b]Employed includes office workers, retail workers and self-employed.
[c]At least one of the parents drink alcohol.
[d]Attitude assessment is comprised of six items that are rated using a 5-point Likert scale.
BAZ: body mass index for age Z-scores; OR: Odds ratio; Ref: reference group.

Table 2. Knowledge on alcoholic drinks by gender, age and alcohol consumption (N=393)

Variables	Subcategory	Answered correctly, n (%)					Mean score (95% CI)	p-Value[a]
		Q1	Q2	Q3	Q4	Q5		
All respondents		324 (82.4)	252 (64.3)	249 (63.4)	25 (6.4)	40 (10.2)	2.3 (2.2 to 2.4)	NA
Gender	Male	151 (79.5)	129 (67.9)	116 (61.0)	15 (7.9)	22 (11.6)	2.3 (2.1 to 2.4)	0.90
	Female	173 (85.2)	123 (60.9)	133 (65.5)	10 (4.9)	18 (9.0)	2.3 (2.1 to 2.4)	
Age group (years)	10–14	158 (75.2)	125 (59.5)	122 (58.1)	9 (4.3)	23 (11.0)	2.1 (1.9 to 2.2)	<0.01
	15–19	166 (90.7)	127 (69.8)	127 (69.4)	16 (8.7)	17 (9.3)	2.5 (2.3 to 2.6)	
Drink alcohol	Yes	201 (88.9)	156 (69.3)	160 (70.8)	13 (5.7)	23 (10.2)	2.4 (2.3 to 2.6)	<0.01
	No	123 (73.6)	69 (30.7)	160 (70.8)	12 (7.2)	17 (10.2)	2.0 (1.8 to 2.2)	

[a]Student's t-test was used to calculate the p-value (normal distribution).
Q1: Which of the following are alcoholic drinks?
Q2: Which of the following has the highest alcohol percentage?
Q3: Alcoholic drinks are the main cause of which of the following diseases?
Q4: Which of the following is the disadvantage of drinking alcoholic drinks?
Q5: Which of the following increase alcohol concentration in the blood when you are drinking alcohol?

(10–14 y) age group. Adolescents whose siblings drank alcohol had a three times increased chance (AOR 2.8 [95% CI 1.4 to 5.5]) of drinking alcohol compared with those whose siblings did not drink. When some of their friends drank alcohol, their own chance of drinking alcohol was increased five times (AOR 4.5 [95% CI 1.4 to 14.5]) compared with when none of their friends drank alcohol. When the majority of their friends drank, this multiplier was eight times (AOR 8.0 [95% CI 2.2 to 29.5]). In contrast, never attempted to buy alcohol, not being allowed to drink at home and uncertain if parents allow drinking at home were negatively associated with alcohol consumption. The adolescents who reported never attempting to buy alcohol had 80% less chance of drinking alcohol compared with adolescents who could purchase alcohol without refusal by sellers (AOR 0.2 [95% CI 0.1 to 0.4]). Adolescents who were not allowed to drink at home or were uncertain if their parents would allow drinking at home had an 80% (AOR 0.2 [95% CI 0.1–0.6]) and 94% (AOR 0.06 [95% CI 0.02 to 0.1]) lower probability of drinking alcohol, respectively, compared with adolescents who were allowed to drink at home (Table 4).

Discussion

The results of this study provide key information on alcohol consumption prevalence among secondary school students in Lao PDR, particularly Vientiane Province. This province is situated not far from the capital, but it has more variation in background characteristics of the population and different ethnicities are represented, such as Hmong (highland Lao) and Laoloum (lowland Lao). The overall drinking prevalence was 57.5%. Among the drinkers, about half of them were light drinkers based on the frequency–amount classification, while the other half were moderate, heavy or very heavy drinkers. Those who were categorised as more than light drinkers drank more than four or five glasses per occasion and/or drank several times per week. Conegundes et al.[18] categorised drinking four to five glasses per occasion as binge drinking and associated binge drinking and heavy drinking with drug use, lower school grades and school violence. Although there was no evidence of such undesirable behaviours in this study, these respondents' current and future possibility of

(a)

(b)
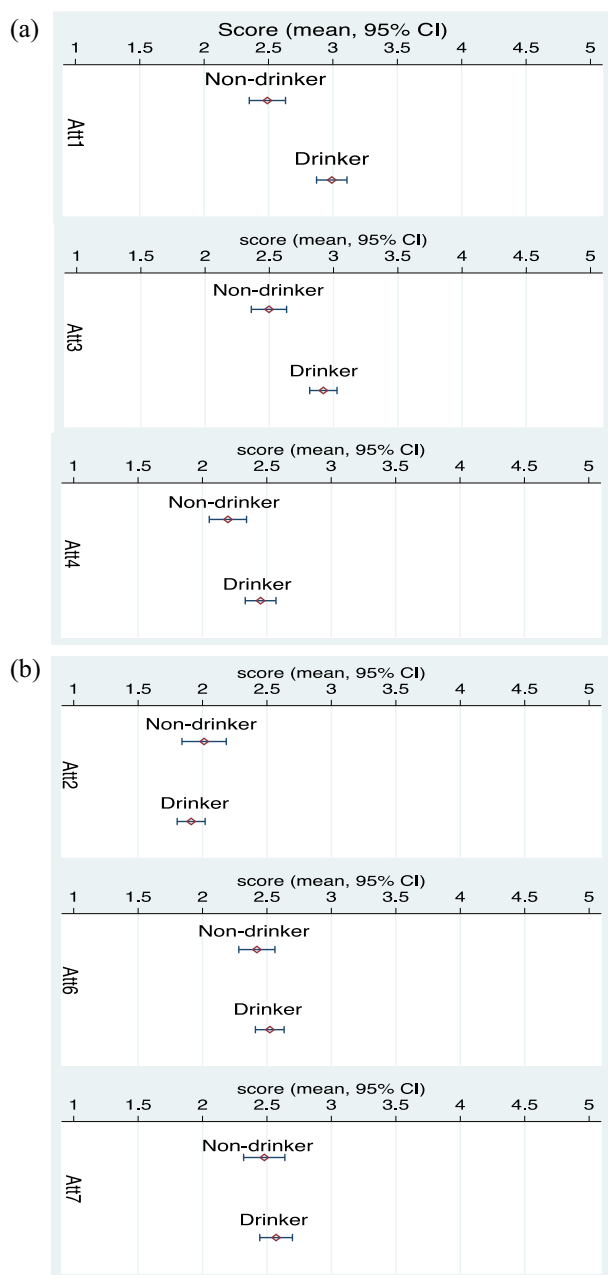
Figure 1. Attitude toward alcoholic drinks comparing non-drinkers and drinkers

(Score: 1, totally disagree; 2, disagree; 3, neutral; 4, agree; 5, totally agree)
Attitude 1: People can drink whenever they want to
Attitude 2: Alcohol drinks are pleasant and offer well-being
Attitude 3: Using alcoholic beverages is something normal in adolescents
Attitude 4: Drinking alcoholic drinks is a good way to get along with other people
Attitude 6: Drinking alcoholic drinks helps decrease daily stress and tension
Attitude 7: Drinking alcoholic drinks makes you have more courage

developing such negative behaviours may be higher for moderate- or heavier-drinking adolescents.

This study suggests that age is one of the potential factors promoting alcohol consumption. Late adolescents (15–19 y of age) have a greater chance of drinking alcohol than early adolescents (10–14 y of age). According to Sawyer et al.,[7] the early–late division is appropriate to explore the extent of change in the health of adolescents. A study of age pattern and risk-taking conducted in 11 Western and non-Western countries showed that the prevalence of alcohol consumption is highest among late adolescents in both Western and non-Western countries.[19] A study in the eastern part of Thailand showed that 31% of school-attending adolescents in the study had experienced drinking, and the number of drinkers and rate of drinking increased with age.[20] This suggests that prevention of harmful use of alcohol should be implemented at a very young age to prevent those in early adolescence from initiating alcohol consumption and to encourage early and late adolescents to reduce or stop alcohol consumption.

The results of this study show that more than half of the school-attending adolescents had started drinking because of persuasion from their friends, and adolescents who reported that some or most of their friends drank alcohol were five to eight times more likely to drink alcohol compared with those whose friends did not drink. Previous studies also indicate that friends' alcohol usage increases the risk of initiation and use of alcohol in school-attending adolescents.[6,21,22] Similarly, several studies have demonstrated that siblings' drinking behaviour is strongly related to school-attending adolescents' drinking behaviour. In this study, school-attending adolescents whose siblings drank alcohol were almost three times more likely to drink alcohol compared with those whose siblings did not drink. Another study exploring the pathway of siblings' influence on drinking behaviour showed that in families where older siblings drank, younger siblings were more likely to drink.[23] A randomised controlled trial found that peers' and siblings' alcohol use were strong predictors of adolescents' drinking.[24] These results indicate that peer influence is an important factor that should be considered when designing prevention campaigns for alcohol consumption among school-attending adolescents. Although friends' drinking behaviour increases the risk of alcohol intake among school-attending adolescents, peer connection could possibly be a protective factor against alcohol consumption. A study investigated the influence of friendship networks and peer selection on alcohol consumption among school-attending adolescents and found that while, on an individual level, peers' drinking behaviour related to adolescents' drinking behaviour, a stronger connection with peers also reduced the level of drinking among school-attending adolescents.[25]

In the current study, parents' drinking behaviours were not associated with alcohol consumption in school-attending adolescents; however, those who were not allowed to drink and who were not certain if they were allowed to drink at home were less likely to drink alcohol compared with those who were allowed. In this study, one-third of adolescents were allowed to drink at home. A previous cohort study in Australia showed that adolescents whose parents supplied them with alcohol engaged in binge drinking or alcohol use as a consequence.[26]

Table 3. Details on alcohol consumption (N=226)

Variables	n (%)	Gender, n (%)		p-Value	Age group (years), n (%)		p-Value
		Male (n=113)	Female (n = 113)		10–14 (n=75)	15–19 (n=151)	
Degree of alcohol consumption							
Light	119 (52.6)	55 (48.7)	64 (56.6)	0.62	56 (74.7)	63 (41.7)	<0.01
Moderate	38 (16.8)	22 (19.5)	16 (14.2)		11 (14.7)	27 (17.9)	
Heavy	61 (27.0)	32 (28.3)	29 (25.7)		7 (9.3)	54 (35.8)	
Very heavy	8 (3.5)	4 (3.5)	4 (3.5)		1 (1.3)	7 (4.6)	
Preferred alcohol type							
Beer	177 (78.3)	92 (81.4)	85 (75.2)	0.01	42 (56.0)	135 (89.4)	<0.01
Wine	19 (8.4)	7 (6.2)	12 (10.6)		17 (22.7)	2 (1.3)	
Cider	24 (10.6)	8 (7.1)	16 (14.2)		13 (17.3)	3 (7.3)	
Lao khao (local spirits)	6 (2.6)	6 (5.3)	0 (0.0)		3 (4.0)	3 (2.0)	
Places where drinking often							
Home	88 (38.9)	40 (35.4)	48 (42.5)	0.38	28 (37.3)	60 (39.8)	0.14
Someone else's home	94 (41.6)	51 (45.1)	43 (38.0)		37 (49.3)	57 (37.7)	
School	6 (2.6)	1 (0.9)	5 (4.4)		3 (4.0)	3 (2.0)	
Bar or pub	18 (8.0)	11 (9.7)	7 (6.2)		4 (5.3)	14 (9.3)	
Restaurant	15 (6.6)	7 (6.2)	8 (7.1)		1 (1.3)	14 (9.3)	
Other	5 (2.2)	3 (2.6)	2 (1.8)		2 (2.7)	3 (2.0)	
How started drinking							
By myself	87 (38.5)	43 (38.0)	44 (38.9)	0.22	27 (36.0)	60 (39.7)	0.11
Asked by friends	121 (53.5)	60 (53.1)	61 (54.0)		40 (53.3)	81 (53.6)	
Asked by family	14 (6.2)	6 (5.3)	8 (7.1)		8 (10.7)	6 (4.0)	
Asked by adults in community	4 (1.8)	4 (3.5)	0 (0.0)		0 (0.0)	4 (2.6)	

Therefore parental awareness of alcohol consumption and its effects should also be considered. Even parents who do not actively supply alcohol, as in this study, may influence alcohol use indirectly by supporting alcohol use and by a lack of monitoring and supervision to limit consumption.[27]

The findings from this study do not show that commercial inaccessibility deters alcohol use in adolescents. Friese et al.[28] explained that adolescents' alcohol access does not solely rely on commercial sources, but rather on social sources, whereby provision occurs with or without exchange, avoiding existing legislation that limits underage alcohol purchases. This may explain why the results did not show reduced alcohol use in adolescents who perceived difficulty in buying alcohol when compared with those who perceived ease of buying alcohol. Similarly, the adolescents who attempted to purchase but were refused by the sellers in comparison with adolescents who were not refused did not show a decreased risk of drinking alcohol. Rather, the results suggest that adolescents who have never purchased alcohol have a low probability of alcohol use. Adolescents who have never purchased alcohol may have less desire to use alcohol because they may be exposed to alcohol in more positive familial and social environments or have a greater understanding of alcohol misuse.[29]

The results of this study also did not indicate a significant association between alcohol consumption and being overweight. Olatona et al.[30] found a positive association between alcohol consumption and obesity in a university undergraduate population in low- and middle-income countries. In contrast, the current study revealed a negative association between the variables in univariate analysis. Although we could not confirm any particular reason for this relationship, we suggest that financial constraints might have led to food purchases being replaced by alcoholic beverage purchases. However, after adjusting for other variables, the association between these two variables was not significant.

The results of this study revealed that factors other than knowledge and attitude influence alcohol use; nonetheless, knowledge provided at school should not be neglected. As shown by the results, school-attending adolescents have poor knowledge of the disadvantages of alcohol, thus improving their knowledge on this topic might show a significant association with a later decrease in their alcohol consumption. When designing health education programmes to provide knowledge of alcohol, other factors that promote alcohol use should also be considered. Apart from educating young people on the ill effects of substance use, focus should be directed toward equipping them with skills such as how to refuse persuasion to use alcohol from friends, seniors or family members and how to reduce and quit alcohol use. In addition, prevention programmes to address alcohol use should not focus solely on the individual level, but should involve family and peers. Peer education programmes could be facilitated to reduce alcohol consumption among adolescents attending school. Peer learning has been widely used in health education and has been effective at reducing

Table 4. Univariate and multivariate analyses of factors associated with alcohol use (N=393)

Characteristics	Subcategory	Univariate analysis		Multivariate analysis[a] (R^2=0.51)	
		OR (95% CI)	p-Value	AOR (95% CI)	p-Value
Gender	Male	1.0	Ref	1.0	Ref
	Female	0.8 (0.6 to 1.3)	0.44	–	>0.20
Age group (years)	10–14	1.0	Ref	1.0	Ref
	15–19	8.5 (5.2 to 13.6)	<0.01	5.2 (2.6 to 10.1)	<0.01
Religion	Buddhist	1.0	Ref	1.0	Ref
	Animism	0.5 (0.4 to 0.9)	<0.01	0.4 (0.2 to 1.1)	0.08
Have been refused by alcohol seller	No	1.0	Ref	1.0	Ref
	Yes	0.5 (0.3 to 0.9)	0.04	–	>0.20
	Never attempt to buy	0.1 (0.04 to 0.1)	<0.01	0.2 (0.1 to 0.4)	<0.01
Ease of buying	Difficult	1.0	Ref	1.0	Ref
	Easy	2.2 (1.4 to 3.5)	<0.001	–	>0.20
Siblings drink alcohol	No	1.0	Ref	1.0	Ref
	Yes	4.2 (2.4 to 7.4)	<0.01	2.8 (1.4 to 5.5)	<0.01
	Do not know/no sibling	1.5 (0.9 to 2.5)	0.09	–	>0.2
Friends drink alcohol	None	1.0	Ref	1.0	Ref
	Some	19.1 (5.9 to 61.0)	<0.01	4.5 (1.4 to 14.5)	0.01
	Majority	80.1 (14.6 to 439.3)	<0.01	8.0 (2.2 to 29.5)	<0.01
Permission to drink at home	Yes	1.0	Ref	1.0	Ref
	No	0.2 (0.1 to 0.4)	<0.01	0.2 (0.1 to 0.6)	<0.01
	Uncertain	0.02 (0.01 to 0.05)	<0.01	0.06 (0.02 to 0.1)	<0.01
Cigarette smoking	No	1.0	Ref	1.0	Ref
	Yes	9.8 (2.2 to 43.3)	<0.01	–	>0.20
Nutritional status	BAZ ≤1 SD	1.0	Ref	1.0	Ref
	BAZ >1 SD	0.4 (0.2 to 0.8)	<0.01	0.4 (0.2 to 1.1)	0.09
Knowledge, mean (95% CI)	Score	1.5 (1.2 to 1.8)	0.01	–	>0.20
Attitude, mean (95% CI)	Score	1.1 (1.0 to 1.2)	<0.01	–	>0.20

[a]Total number of respondents in the final model was 385 due to missing data for the variables of knowledge and attitude.
Ref: reference.

health-risk behaviours. School students could learn more effectively from their peers. Peer educators could provide information and counselling to individuals via creative games, role play etc.[31]

To the best of our knowledge, this is the first study to explore alcohol use and its associated factors among secondary school students in Vientiane Province, Lao PDR. The assessment of alcohol consumption measured not merely raw alcohol use, but also alcohol consumption patterns (frequency–amount categorisation). However, some limitations should be noted. This research was conducted in a school setting, thus it might not represent adolescents who do not attend school. Although secondary school enrolment in Lao PDR is increasing, there is still a large number of adolescents who do not attend school,[8] and they are probably at higher risk of engaging in drinking and problem drinking behaviours. Second, this study did not include psychological factors such as anxiety, depression or loneliness, which could possibly contribute to substance use.[32] Third, some items in the questionnaire requested participants to recall their behaviours, thus recall bias may have occurred. Last, the socio-economic status of households was not measured; this is another important factor that could influence alcohol use.[33]

Conclusions

This study was conducted to investigate behaviours regarding alcohol use and risk factors among secondary school students in Lao PDR. The prevalence of alcohol use was 57.5%. The factors positively associated with alcohol use were older age, friends' drinking behaviour and siblings' drinking behaviour. The factors negatively associated with alcohol consumption were no permission to drink at home, uncertainty of permission to drink at home and never attempting to buy alcohol. These results emphasise the importance of peer and household influences in alcohol use. Prevention of alcohol use should be tackled from a young age to prevent the harmful use of alcohol by young people. Raising awareness of adverse health outcomes of alcohol use in households, particularly among parents and siblings, is necessary, as they are important factors that influence substance use. Establishing a peer education programme, in which adolescents learn how peer pressure influences alcohol consumption through simulated experiences, could also be an effective way to foster awareness of the adverse effects of alcohol use and could help encourage adolescents to avoid and reduce alcohol use.

Further research needs to explore effective methods of delivering peer-learning programmes to reduce alcohol consumption in the school setting of Lao PDR.

Authors' contributions: TK conceived the study, trained the data collectors and drafted the manuscript. TK and JO designed the study. TK and MV conducted the study. TK, JO and KM carried out the analysis and interpretation data and critically revised the manuscript for intellectual content. All authors read and approved the final manuscript. TK and JO are guarantors of the paper.

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