

Prevalence and Correlates of Current Alcohol Use among Bhutanese Adults: A Nationally Representative Survey Data Analysis

Kinley Wangdi^{1,2}, Tshering Jamtsho³

ABSTRACT


Background: Alcohol-related ailments are among the 10 leading causes of morbidity and mortality in Bhutan. The objectives of this article were to determine the prevalence and explore the correlates of current alcohol use among Bhutanese adults. **Materials and Methods:** This is a retrospective study of secondary data from the National Health Survey 2012 of Bhutan. The outcome variable of interest was current alcohol use. The questionnaire was developed following the World Health Organization (WHO) STEPwise approach to Surveillance (STEPS) of noncommunicable diseases. Univariate and multivariate logistic regression was performed to identify the correlates of current alcohol use. The prevalence of current alcohol use was 30.9%. The correlates of current alcohol use were male sex [adjusted odds ratio (AOR) = 1.85; 95% confidence interval (CI) 1.47–2.36], widowhood (AOR = 2.92, 95% CI, 1.22–6.99), and chewing betel quid >20 times per week (AOR = 2.07, 95% CI, 1.08–4.03). Primary (AOR = 0.67, 95% CI, 0.50–0.91), high (AOR = 0.52, 95% CI, 0.38–0.71), and university (AOR = 0.46, 95% CI, 0.29–0.73) educated participants were less likely to be current alcohol users when compared with those who had no education. Compared with unskilled workers, services and sales workers were less likely to use alcohol regularly (AOR = 0.64, 95% CI, 0.49–0.82). Homemade alcohol *Ara* was the most common drink. **Conclusion:** The national prevalence of current alcohol use in Bhutan is higher than the national average in the WHO South-East Asia Region. Prevention should target the correlates and limit the availability of locally home-brewed *Ara*.

Key words: Alcohol, Bhutan, correlates, modeling, National Health Survey

INTRODUCTION

Alcohol is a psychoactive substance with dependence-producing properties. The consumption of alcohol and problems related to alcohol vary widely

around the world, but the burden of alcohol-related disease and death remains significant in most countries.^[1,2] Harmful use of alcohol ranks among

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Website: www.ijpm.info	Quick Response Code 
DOI: 10.4103/IJPSYM.IJPSYM_412_18	

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How to cite this article: Wangdi K, Jamtsho T. Prevalence and correlates of current alcohol use among bhutanese adults: A nationally representative survey data analysis. *Indian J Psychol Med* 2019;41:38-45.

¹Research School of Population Health, College of Medicine, Environment and Biology, The Australian National University, Canberra, ²Phuensholing General Hospital, Phuentsholing, Bhutan, ³School of Demography, ANU College of Arts and Social Sciences, The Australian National University, Canberra, Australia

Address for correspondence: Dr. Kinley Wangdi
62 Mills Road, New Acton, Canberra, ACT 2601, Australia. E-mail: kinley.wangdi@anu.edu.au

the top five risk factors for disease, disability, and death throughout the world.^[3] In 2012, about 3.3 million deaths were attributed to the harmful use of alcohol. This accounts for 5.9% of all deaths worldwide, which surpasses the proportion of deaths from HIV/AIDS (2.8%), violence (0.9%), or tuberculosis (1.7%).^[1] Alcohol was responsible for 2.8% of all deaths from cancer, liver cirrhosis, and injury: 1.3% for women and 4.1% for men globally.^[4]

Harmful use of alcohol causes direct harm to the liver. It is also an important risk factor for many chronic diseases, notably high blood pressure and other cardiovascular diseases,^[5-7] poor mental health,^[8,9] unsafe driving, and traffic accidents.^[10-14] Around 4.9% of the world's adult population is believed to suffer from alcohol use disorder.^[15] Harmful alcohol use stems from regular, heavier drinking, defined as drinking more than 40 g of pure alcohol per day for men and 20 g of pure alcohol per day for women.^[16,17] In addition to the average volume of alcohol consumption, patterns of drinking – especially, irregular heavy-drinking occasions or binge drinking (defined as drinking at least 60 g of pure alcohol or five standard drinks in one sitting) – also result in harmful health impacts.^[18]

The negative impact of alcohol use transcends the health burden. Alcohol imposes serious social and economic costs on individuals and society at large. The economic costs on an individual are the direct costs of alcohol consumption and healthcare costs. The second major category of social costs is indirect cost. This results, for example, from lost productivity due to absenteeism, unemployment, decreased output, reduced earning potential, and lost working years due to premature pension or death.^[19,20] Third, intangible costs are the costs assigned to pain and suffering, and more generally to a diminished quality of life. Such intangible costs are borne by the drinkers as well as their families and potentially by other individuals linked to the drinker.^[20]

Consumption of alcoholic beverages is a common practice among adults globally. A number of proposed factors affect the magnitude and pattern of alcohol use and predisposition to the risk of alcohol use disorders. Male sex,^[21-23] young age,^[21] older age,^[24] no education or primary education,^[22,24,25] lower socioeconomic status,^[25] mental disorder,^[26] medicinal benefits,^[27] smoking,^[28,29] betel nut chewing,^[29] having a spouse who drinks alcohol,^[25] manual laborer status,^[26] and living in urban areas^[23] have been identified in other studies as factors associated with alcohol use.

The World Health Organization (WHO) South-East Asia Region (SEAR), which comprises 25.0% of the

world's population, is estimated to consume 26.4% of the worldwide unrecorded alcohol.^[1] Socially and culturally, alcohol use is acceptable in Bhutan, and alcohol is often served as part of celebrations and special occasions.^[30,31] Although the sale of homemade alcohol is prohibited, many homes, especially in rural areas, produce it. Common homemade alcohol varieties are spirits (Ara) and wines (Changkey, Singchang, and Bangchang). Most of the homemade beverages are made from cereals such as maize, rice, wheat, and millet. Some alcoholic products are also made from fruits. Bhutan is believed to have the highest per capita drinking prevalence among member countries of the WHO SEAR.^[32] In 2015 and 2016, alcohol-related ailments were among the 10 leading causes of morbidity and mortality,^[33,34] and prevalence of deaths caused by alcoholic liver disease has increased in recent years.^[35] On average, the cost for medical and healthcare service for a person with alcohol dependence was estimated to be as high as USD 1,688 (Nu. 1,20,000), whereas the cost of rehabilitation for alcohol dependence was USD 675.31 (Nu. 48,000) per patient.^[36] There are a total of 5,407 alcohol outlets (wholesale, retail, and functioning bars) in the country, and from those, 944 are in Thimphu, accounting for up to 17.5% of alcohol outlets in Bhutan.^[37] However, there is a dearth of nationally representative prevalence studies on alcohol use and its correlates in Bhutan. The aim of this study was to explore the prevalence and correlates of current alcohol use at the national level.

MATERIALS AND METHODS

Study site

The study was undertaken in the small Himalayan Kingdom of Bhutan. Bhutan covers an area of approximately 38,394 km², and the population was 7,35,553 in 2017.^[38] Bhutan is divided into 20 administrative districts and 205 subdistricts [Figure 1].^[39] Around 62.2% (452,178) of the population live in rural areas^[38] and practice subsistence farming. The altitude ranges from 75 m on the southern border with India to more than 7000 m in the Himalayas.

Data source

This study used secondary, nationally representative data from the National Health Survey (NHS) conducted nationwide in all 20 districts of Bhutan in 2012. The survey samples were estimated using the census sample frame adopted for the first Population and Housing Census of Bhutan (PHCB) in 2005. The survey sample was appropriately derived and designed to produce statistically reliable estimates of most indicators at the national and district levels, further aggregated by rural and urban categorization. The variables were all self-reported and followed the

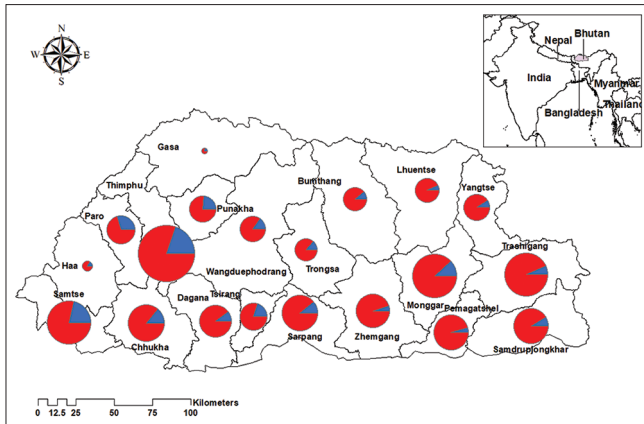


Figure 1: The proportion of current alcohol use by districts in Bhutan. The size of the circles indicates the proportion of participants who used alcohol in the past 12 months. Red shows the proportion of current alcohol user and blue noncurrent alcohol user.

WHO STEPwise approach to Surveillance (STEPS) of noncommunicable diseases survey guidelines. The required sample size for each dzongkhag was estimated using the sample size as follows:

$$n = \frac{z^2 p(1-p)(f)(k)}{e^2}$$

Where n is the number of households required in the sample; z is the value of the statistic in a normal distribution for a 95% confidence interval (CI; this value is 1.96, and for purposes of calculation it is rounded to 2); p is the proportion of households with access to any health facility within 1 h; e is the acceptable margin of error in estimating p , set at 0.05; f is the sample design effect, assumed to be 2.0; k is the adjustment factor for an anticipated nonresponse of 5%.

The study participants were the adult population (>18 years), and the outcome variable of interest was self-reported current alcohol use. “Current alcohol use” was defined as consumption of alcohol in the past 30 days. Independent variables were sex; age categorized as 18–24, 25–34, 35–44, 45–54, 55–64, and over 65 years; marital status; education level; occupation; urban–rural residence; ever smoked; feeling worried; and chewing betel quid.

Statistical analysis

All statistical analyses were weighted and carried out using the appended sample weights of the respective survey dataset (individual module) so as to provide nationally representative estimates. The analysis was performed using the survey (SVY) module for complex samples of the statistical package STATA version 15 (Stata Corporation; College Station, TX, USA). Bivariate and multivariate logistic regression models for correlates for alcohol use were built using backward elimination to identify significant covariates.

Any variable with a P value <0.2 in the univariate analysis, along with the variable of main interest, was considered a candidate for a multivariate model. All potential dependent variables were put in the full model, and odds ratios with 95% CIs were used to demonstrate the association of each independent variable. Any variables which were of ordinal scale in nature were tested for linear trend in the final regression model. A value of $P \leq 0.05$ was considered significant.

Ethical approval

The approval by the ethics committee for this study was given by Research Ethics Board of Health (REBH), Ministry of Health Bhutan, via REBH/Approval/2018/041.

RESULTS

Sociodemographic characteristics of the study population

There were 31,066 study participants with a mean age of 39.3 ± 15.0 years and an age range of 18–75 years, and 16,731 (53.9%) of the study population were women. The majority of the study population were in the age group of 25–34 years at 8,060 (26%). Nearly half (15,666, 51%) did not have formal education, and 275 (1%) had completed a diploma or certificate level education. Two-thirds (23,420) of the participants were from rural areas. Farmers, unskilled and clerical workers, and service and sales workers made up 10,061 (66.1%) and 3,155 (20.7%) of the participants, respectively. Most of the participants were married (22,985, 74.1%). Current smokers and ever smoked made up 1,322 (4.2%) and 4,999 (16.1%) of the participants, respectively. Around 1% of the participants reported always feeling worried or lonely. More than 16,334 (52%) did not engage in exercise, and chewing of betel nut was quite common, with 1,545 (9.9%) having never chewed betel quid [Table 1].

Sociodemographic characteristics of current alcohol users

The national drinking (current alcohol user) prevalence was 30.6% (9,507). Drinking prevalence in men and women was 18.2% (12.5%, Those who had ever used alcohol and those who used alcohol in the past 12 months were 14,681 (48.0%) and 11,022 (35.5%), respectively. Among the current alcohol users, there were 5,636 (59.3%) men, 5,170 (54.5%) did not have formal education, 7,618 (80.2%) were married, 2114 (22.2%) lived in urban areas, the most common occupation group was farmers 3,573 (66.8%), 629 (6.6%) were current smokers, 2,165 (22.8%) ever smoked, 5,180 (54.5%) engaged in regular vigorous exercise, and 5,815 (71.5%) chewed up to 10 quid of betel nut per week [Table 2].

Table 1: Sociodemographic characteristics of the study population and current alcohol users

Characteristic	Total (%)	Current alcohol user (%)
Sex		
Men	14,335 (46.1)	5,636 (59.3)
Women	16,731 (53.9)	3,870 (40.7)
Age group (years)		
18-24	6,083 (19.6)	1,048 (11.0)
25-34	8,060 (26.0)	2,566 (27.0)
35-44	6,172 (19.9)	2,154 (22.7)
45-54	5,100 (16.4)	1,766 (18.6)
55-64	3,543 (11.4)	1,273 (13.4)
>65	2,106 (7.8)	698 (7.3)
Education		
No formal education	15,666 (50.6)	5,170 (54.5)
Nonformal education	2,560 (8.3)	794 (8.4)
Primary school	3,820 (12.3)	1,142 (12.0)
High school	6,260 (20.2)	1,385 (14.6)
Diploma/certificate	275 (0.9)	109 (1.2)
University	1,501 (4.8)	567 (6.0)
Monastic education	899 (2.9)	318 (3.3)
Marital status		
Single	5,223 (16.8)	1,037 (10.9)
Married	22,985 (74.1)	7,618 (80.2)
Divorced/separate	1,299 (4.2)	315 (3.3)
Widow	1,532 (4.9)	530 (5.6)
Occupation		
Clerical/farmer/unskilled	10,061 (66.1)	3,573 (66.8)
Army	540 (3.5)	218 (4.0)
Manager and professionals	1,339 (8.8)	537 (10.0)
Service and sales worker	3,155 (20.7)	959 (17.9)
Monks	134 (0.9)	64 (1.2)
Current smoker		
No	29,741 (95.8)	8,877 (93.4)
Yes	1,322 (4.2)	629 (6.6)
Ever smoker		
No	26,067 (83.9)	7,341 (77.2)
Yes	4,999 (16.1)	2,165 (22.8)
Urban		
No	23,420 (75.4)	7,392 (77.8)
Yes	7,645 (24.6)	2,114 (22.2)
Lonely		
Never	19,935 (64.2)	5,931 (62.4)
Rarely	4,039 (13.0)	1,312 (13.8)
Sometimes	6,694 (21.6)	2,136 (22.5)
Always	380 (1.2)	122 (1.3)
Worried		
Never	18,062 (58.2)	5,257 (55.3)
Rarely	4,353 (14.0)	1,443 (15.2)
Sometimes	8,312 (26.8)	2,684 (28.3)
Always	318 (1.0)	118 (1.2)
Vigorous exercise		
No	16,334 (52.6)	4,323 (45.5)
Yes	14,725 (47.4)	5,180 (54.5)
Betel chewing per week		
No quid	1,545 (9.9)	1,017 (12.5)
Up to 10 quid	11,461 (73.2)	5,815 (71.7)
11-20 quid	1,790 (11.4)	900 (11.1)
>20 quid	852 (5.4)	375 (4.6)

Thimphu district reported the highest proportion of current alcohol users, with 1,318 (13.9%), followed by Trashigang 898 (9.5%) and Mongar 880 (9.3%) [Figure 2]. There was a wide range of alcohol use with some using daily (2,598, 27.3%), while others used 1–3 days a week (1,846, 19.4%) and 1–4 days a week (2,670, 28.1%) [Figure 3a]. Most of the alcohol brewed at home (5,343, 56.0%) [Figure 3b]. The probability of alcohol use increased with age [Figure 4].

Factors associated with being a current alcohol user

In the multivariate analysis, men were nearly twice as likely to be current alcohol users than women [adjusted odds ratio (AOR) = 1.85; 95% CI, 1.41–2.29]. Widowed people were approximately three times (AOR = 2.92; 95% CI, 1.22–6.99) more likely to be current alcohol users when compared with singles. When compared with those having no education, those with primary, high, university, or nonformal education were less likely to be current alcohol users: AOR = 0.67 (95% CI, 0.50–0.91), AOR = 0.52 (95% CI, 0.38–0.71), and AOR = 0.46 (95% CI, 0.29–0.73), respectively. Service and sales workers were less likely to be current alcohol users when compared with farmers and unskilled workers, AOR = 0.64 (95% CI, 0.49–0.82). Chewing betel quid with a frequency of >20 times per week was another significant correlate of current alcohol use (AOR = 2.07, 95% CI, 1.07–3.99) [Table 3].

DISCUSSION

Using nationally representative data, this study showed that the national prevalence of current alcohol use in Bhutan is 30.6%. The correlates of current alcohol users were being men, widowed, and chewing betel quid >20 times a week. Primary, high, and university education levels were protective against alcohol use when compared with no education, as were being

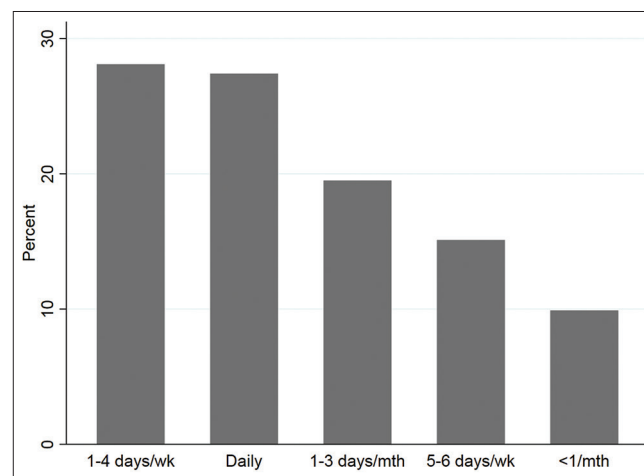


Figure 2: The frequency of alcohol use among the current alcohol user in the past 12 months. (mth: month; wk: week)

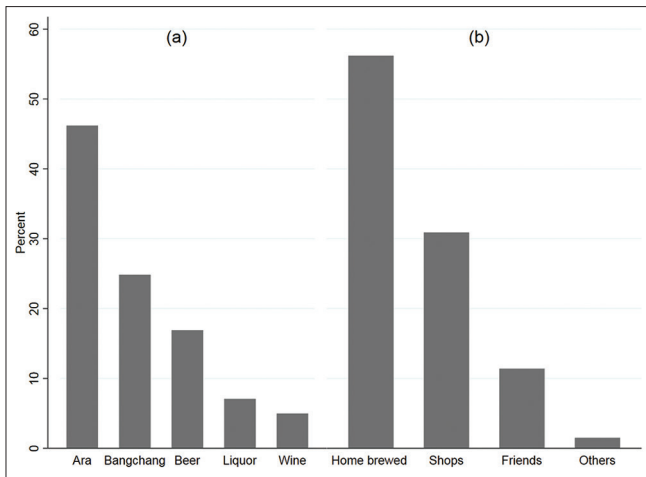


Figure 3: Different (a) types of alcohol and (b) sources of alcohol

Table 2: Smoking and betel chewing among current alcohol users stratified by gender

Characteristics	Sex			
	Male (n, %)	Mean age (years)	Female (n, %)	Mean age (years)
Current smoker				
No	5,104 (90.6)	42.0	3,773 (97.5)	41.7
Yes	531.9 (9.4)	32.9	97 (2.5)	42.2
Ever smoked				
No	3,960 (70.3)	41.6	3,380 (87.4)	41.2
Yes	1,677 (29.7)	39.9	488.8 (12.6)	45.0
Betel chewing per week				
No quid	534 (15.9)	40.1	200 (8.9)	42.5
Up to 10 quid	2,253 (67.2)	39.5	1,773 (78.5)	40.4
11-20 quid	410 (12.2)	39.4	194 (8.6)	40.7
>20 quid	157 (4.7)	39.4	91 (4.0)	43.4

service or sales workers when compared with being farmers or unskilled workers. Current alcohol user was highest in Thimphu district (the capital city), followed by Tashigang and Mongar. The most common type of alcohol consumed was *Ara* brewed at home.^[38]

The national prevalence of current drinkers was 30.6%, which is consistent with the published literature.^[27] This prevalence is much higher than the average of 13.5% found for WHO SEAR countries in 2010.^[40] Alcohol has a strong social and cultural context in Bhutan.^[30,31] Alcohol is offered in Buddhist religious ritual to deities as one of the five precious elements (*duetsi*).^[30] In addition, alcohol is usually served during celebrations including marriage, birthdays, and local festivals (*Tshechu*). In rural Bhutan, alcohol is served to welcome and see off guests. As a result, families have been making traditional Bhutanese liquor *Ara* from cereals and grains for many generations – and continue to do so today. This is reflected in this analysis, with more than half of the alcohol users using alcohol brewed at home and *Ara* being the most common alcoholic beverage.

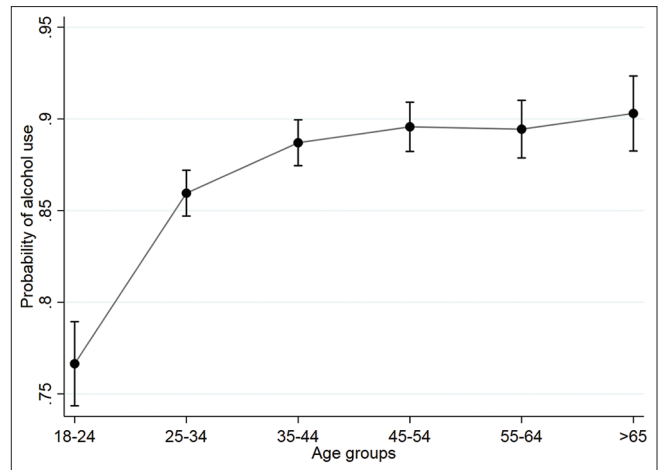


Figure 4: The probability of alcohol use by age groups

Male gender was a strong correlate of current alcohol use. This finding is consistent with the published literature.^[21-23,41-44] This could be due to a more tolerant attitude toward drinking by men than women in Bhutan. Other studies have identified one reason for a higher proportion of men engaging in alcohol drinking; that drinking could serve as a marker of masculinity or male camaraderie.^[45-47] This may encourage male drinkers to deny or minimize problems resulting from their drinking or to regard drunken behavior as normal or permissible.

In terms of educational background, there was a strong inverse association between the education level completed and the likelihood of being a current drinker. Those who had completed higher levels of school were less likely to misuse alcohol. Education offering a protective effect has been observed in other studies.^[22,24,25,48] This reflects the view that education plays an important protective role and gives a direction for designing possible intervention programs.^[49]

Similarly, blue-collar occupations offered protection against alcohol use. Other studies have found that blue-collar occupation is associated with alcohol consumption^[50] and that the increased risk of alcohol use with occupation is linked to job stress.^[51]

Similar to another published study, chewing betel quid >20 times a week was a strong correlate of current alcohol use.^[29,52] Like alcohol use, betel chewing was perceived as manly, trendy, stylish and sexually attractive.^[53]

Thimphu district reported nearly 14% of all the current alcohol users in Bhutan. This can be attributed to a number of factors, including easy access to alcohol. In 2017, there were 944 alcohol outlets in Thimphu, accounting for up to 17.5% of alcohol outlets in

Table 3: Multinomial logistic regression analysis of correlates for current alcohol users

Variable	Unadjusted correlates			Adjusted correlates		
	OR	95% CI	P	AOR	95% CI*	P
Sex						
Women	Ref			Ref		
Men	1.34	1.25-1.55	<0.0001	1.86	1.47-2.36	<0.0001
Age group (years)						
18-24	Ref			Ref		
25-34	1.85	1.57-2.18	<0.0001	1.06	0.72-1.57	0.761
35-44	1.96	1.65-2.33	<0.0001	0.88	0.58-1.33	0.538
45-54	2.42	2.0-2.92	<0.0001	0.92	0.58-1.44	0.702
55-64	2.54	2.06-3.14	<0.0001	0.73	0.44-1.19	0.204
65+	2.70	2.07-3.52	<0.0001	1.05	0.49-2.24	0.904
Marital status						
Single	Ref			Ref		
Married	2.01	1.74-2.32	<0.0001	1.23	0.88-1.72	0.218
Divorce/separated	1.69	1.23-2.32	0.001	1.39	0.74-2.59	0.313
Widow	2.24	1.69-2.96	<0.0001	2.92	1.22-7.00	0.016
Education						
No education	Ref			Ref		
Primary	0.72	0.61-0.86	<0.0001	0.67	0.50-0.90	0.009
High	0.47	0.41-0.55	<0.0001	0.52	0.38-0.71	<0.0001
University or equivalent	0.35	0.29-0.43	<0.0001	0.46	0.29-0.73	0.001
Diploma/certificate	0.41	0.28-0.62	<0.0001	0.93	0.34-2.51	0.881
Monastic	1.01	0.71-1.43	0.963	1.07	0.55-2.07	0.851
NFE	0.81	0.66-1.00	0.053	0.66	0.44-1.00	0.05
Occupation						
Clerical/farmer/unskilled	Ref			Ref		
Army	1.13	0.74-1.74	0.568	0.89	0.54-1.48	0.652
manager and professionals	0.59	0.47-0.74	<0.0001	1.09	0.72-1.65	0.676
Service and sales worker	0.54	0.45-0.64	<0.0001	0.64	0.49-0.82	<0.0001
Monks	1.69	0.67-4.31	0.27	1.00		
Urban-rural						
Rural	Ref			Ref		
Urban	0.59	0.53-0.66	<0.0001	0.98	0.76-1.25	0.842
Ever smoked						
No	Ref			Ref		
Yes	0.95	0.84-1.08	0.468	1.16	0.92-1.47	0.208
Worried						
Never	Ref			Ref		
Rarely	0.96	0.82-1.12	0.597	0.98	0.73-1.31	0.874
Sometimes	1.06	0.93-1.20	0.402	0.83	0.66-0.04	0.109
Always	1.46	0.82-2.60	0.198	3.47	0.46-26.42	0.229
Betel chewing						
No	Ref			Ref		
Up to 10 quid	0.76	0.60-0.96	0.021	0.85	0.62-1.16	0.3
11-20 quid	0.75	0.55-1.02	0.063	0.78	0.53-1.16	0.22
>20 quid	1.15	0.73-1.82	0.547	2.07	1.07-3.99	0.031

OR – Odds ratio; AOR – Adjusted odds ratio; CI – Confidence interval

*Significant

Bhutan.^[37] There is a lack of a national figure on the injuries due to alcohol. However, a study from the Jigme Dorji Wangchuck National Referral Hospital emergency department had reported that 37% of

all injury victims were alcohol-positive.^[54] Alcoholic liver disease continues to be in the top five causes of morbidity and mortality in Bhutan.^[34,35,55] This has led to significant medical and health costs in terms of care and rehabilitation for those with alcohol dependence.^[36]

In recent years, there have been attempts by the government to stop the import of alcohol. However, this study suggests that the main source of alcohol was home-brewed *Ara*. This calls for a different approach to the prevention of alcohol abuse in Bhutan. In addition to price-related policies like taxation on alcohol beverages, intervention targeting reduction in production of the local alcohol *Ara* should be undertaken urgently.

The main strength of this analysis is that it is the first study in Bhutan on national alcohol prevalence and the correlates of current alcohol use. However, there are a few limitations worth mentioning. First, the cross-sectional design limits the assessment of causality and that aspect demands further longitudinal studies. Second, self-reported data are susceptible to recall and social desirability biases. Third, there was a lack of information on alcohol use disorders and alcohol-related consequences in the Bhutanese population. Finally, though the use of alcohol has been documented in adolescents, it was not included in this study.

Bhutan's national alcohol prevalence is the highest in the WHO SEAR countries, and this calls for the health policymakers to initiate national preventive strategies to reduce alcohol use. The correlates outlined in this study can be used for developing national preventive strategies. In addition, community awareness can be increased through education to reduce brewing of home-made *Ara*. This study can provide a baseline for any future studies on the prevalence of alcohol use. Furthermore, it can be used for assessing the effectiveness of any interventions directed at primary prevention by the epidemiologists and health policymakers.

CONCLUSION

The national prevalence of current alcohol use in Bhutan is higher than the national average of the countries in the WHO SEAR. Prevention should target the correlates of current alcohol use, including being men or widowed and chewing of betel quid. Strategies to reduce locally home brewed *Ara* should be prioritized.

Acknowledgments

The authors would like to acknowledge the Ministry of Health, for allowing us to use the data of NHS 2012 for this study. They would also like to thank all the study participants. They are grateful to Dr. Matthew Kelly, Department of Global Health, Research School

of Population Health, for proof reading and proving valuable feedback.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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