Patterns of alcohol consumption in diverse rural populations in the Asian region

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Background: Alcohol abuse, together with tobacco use, is a major determinant of health and social well-being, and is one of the most important of 26 risk factors comparatively assessed in low and middle income countries, surpassed only by high blood pressure and tobacco.

Objectives: The alcohol consumption patterns and the associations between consumption of alcohol and socio-demographic and cultural factors have been investigated in nine rural Health and Demographic Surveillance System (HDSS) located in five Asian countries.

Methods: The information was collected from multiple study sites, with sample sizes of sufficient size to measure trends in age and sex groups over time. Adopting the WHO STEPwise approach to Surveillance (WHO STEPS), stratified random sampling (in each 10-year interval) from the HDSS sampling frame was undertaken. Information regarding alcohol consumption and demographic indicators were collected using the WHO STEPwise standard surveillance form. The data from the nine HDSS sites were merged and analysed using STATA software version 10.

Results: Alcohol was rarely consumed in five of the HDSS (four in Bangladesh, and one in Indonesia). In the two HDSS in Vietnam (Chililab, Filabavi) and one in Thailand (Kanchanaburi), alcohol consumption was common in men. The mean number of drinks per day during the last seven days, and prevalence of at-risk drinker were found to be highest in Filabavi. The prevalence of female alcohol consumption was much smaller in comparison with men. In Chililab, people who did not go to school or did not complete primary education were more likely to drink in comparison to people who graduated from high school or university.

Conclusions: Although uncommon in some countries because of religious and cultural practices, alcohol consumption patterns in some sites were cause for concern. In addition, qualitative studies may be necessary to understand the factors influencing alcohol consumption levels between the two sites in Vietnam and the site in Thailand in order to design appropriate interventions.

Keywords: *alcohol consumption; risk factor surveillance; INDEPTH; Asia; WHO STEPS*

The level of alcohol consumption in a population is an important determinant of health and social well-being (1). Widespread and increasing use of alcohol is drawing attention to the health consequences of alcohol consumption. Alcohol abuse ranks fifth among the 10 leading causes of death globally (2). It is causally related to more than 60 International Classification of Diseases codes (3). Worldwide, alcohol abuse is estimated to account for 1.8 million deaths and 4% of the burden of disease, slightly less than the damage caused to society by tobacco use (4.1%) and high blood pressure (4.4%) (4, 5). Excessive consumption of alcohol was

considered to be a cause of many liver diseases including cirrhosis, and mortality from alcoholic liver disease closely follows the per capita alcohol consumption (6).

According to a World Health Organization (WHO) report, about one half of the total adult population worldwide used alcohol. The proportion of users varied across countries, from 18 to 90% among males, and from 1 to 81% among adult females (7).

Recent WHO literature indicates that while the percentage of alcohol consumption per capita in the population is declining in wealthy countries, it is rising in low and middle-income countries (8). A study from India showed that the highest prevalence of individuals ever to use alcohol was among Christians (61.2%) and the lowest prevalence was among Muslims (9.4%). When considering the educational level, the prevalence of individuals ever to use alcohol was 26% and 27.1% among illiterates and those with primary education, respectively (9).

In a recent study on alcohol consumption in Vietnam, about one-third of respondents had had at least one drink of alcohol per week and about 18% were classified as drinking alcohol to excess (10–12). However, limited data on drinking patterns and socio-demographic factors are a challenge in raising awareness in communities and for policy makers.

A chronic disease risk factor study carried out in nine Health and Demographic Surveillance System (HDSS) sites within the INDEPTH Network offered an opportunity to investigate the patterns of alcohol use as part of the broader risk factor study. The largely rural sites were not only diverse in terms of economic development, but also in terms of religious and cultural characteristics.

Materials and methods

The cross-sectional survey was conducted in nine HDSS – all part of the INDEPTH Network – located in five Asian countries in 2005. These HDSS included Matlab, Mirsarai, Abhoynagar, and WATCH (Bangladesh), Kanchanaburi (Thailand), Filabavi and Chililab (Vietnam), Vadu (India), and Purworejo (Indonesia).

Methodology and data source

The methodology followed the WHO STEPwise approach to Surveillance (WHO STEPS) (13). Briefly, in each HDSS, a representative sample of 2,000 men and women aged 25–64 years (approximately 250 individuals in each sex and 10-year age group) were selected using the sampling frame developed from the surveillance system. Data were collected through face-to-face interviews at a household level, and were conducted by trained field workers. Data quality were controlled in the field by supervisors as well as by the investigators of this study.

Survey instrument and measurement

A structured questionnaire 'STEPS Instrument for NCD risk factors' was adapted to collect information on major NCD risk factors as well as socio-demographic information (13). All interviewers were trained on how to ask the respondents about their alcohol consumption. Showcards were developed and used as a reference for respondents to visualise a standard drink size and standard drinks were also estimated for locally derived forms of alcohol.

Alcohol use was defined as consumption of any alcoholic drink, including beer, wine, spirits, as well as other local drinks such as *arak* or *tuak* in Indonesia, *ruou gao* in Vietnam, *sonti* in India, and *Satoh, Ou*, and *Krauche* in Thailand; many of these drinks could be classified as a form of rice vodka. Alcohol consumption was categorised into two groups: *Non-drinkers* were defined as those who had never drunk a single glass of beer or wine in the past; *Drinkers* were identified according to the answers to the question asked about number of standard drinks of beer, wine and or spirit, fermented cider, and other alcoholic drinks drunk during the week before interview. Drinkers were further categorised into two groups (11): *Moderate drinkers* included those who drank less than or equal to four standard drinks per day for women and five for men, and *at-risk drinkers* were defined as those who consumed, during the week preceding the time of interview, a large amount of alcohol (five or more standard drinks per day among men and four or more standard drinks per day among women) (11).

Information on socio-demographic status of study subjects included educational level, gender, and age. Educational level was classified into four levels: Level I: No schooling and not graduated from primary school; Level II: graduated from primary school; Level III: graduated from secondary school; and Level IV: graduated from high school or university.

Statistical methods

A standardised data entry programme using EPIDATA software was used in each site for data entry to ensure uniform database structure across sites. STATA software version 10 was used to perform descriptive statistics on variables of interest, including socio-demographic variables and alcohol consumption. Due to the differences of sample populations among the sites, sampling weights were applied in data analysis.

Logistic regression modelling was performed to examine the association between alcohol consumption and sex, age groups, and education levels. A conventional significance level of $p < 0.05$ was used.

Results

A great variation in the pattern of alcohol consumption was observed among the six sites in Bangladesh (Matlab,

Mirsarai, Abhoynagar, and WATCH), India (Vadu), and Indonesia (Purworejo) in comparison to the other three sites in Vietnam (Filabavi, Chililab) and Thailand (Kanchanaburi).

As shown in Table 1, in the four sites in Bangladesh, alcohol consumption was very rare. The highest prevalence found in these sites was 4.0% in men; no women were identified as drinkers in these sites. In Vadu and Purworejo, male drinker prevalence was 17.3% and 11.5%, respectively.

When stratified by sex, the highest proportion of men who consumed alcohol was found in both sites in Vietnam, Chililab and Filabavi (85.8% and 84.7%, respectively). The proportion of women who consume alcohol was less than men; it was highest in Chililab (29.4%), second in Kanchanaburi (28.4%); in Vadu – India, Matlab and Mirsarai – Bangladesh no women were reported as alcohol drinkers.

As shown in Table 1 and Fig. 1, among men, the proportion of at-risk drinkers was highest in Filabavi (31.4%), second in Chililab (17.3%), and the moderate drinker prevalence was highest in Chililab and in Kanchanaburi (68.5% and 63.2%, respectively). Among women, proportion of at-risk drinkers was highest in Kanchanaburi, then in Filabavi (3.5% and 0.4%, respectively); while for moderate drinker category, its prevalence was highest in Chililab and in Kanchanaburi (29.1% and 24.9%, respectively).

The patterns of alcohol consumption stratified by sex and education in four selected HDSS are shown in Table 2. Among men, the highest proportion of men who consume alcohol were found in the group who completed secondary education in both sites in Vietnam (87.3% in Filabavi and 87.2% in Chililab) and the lowest proportion was found in the group who graduated from high school or university in Vadu (13%). Among women, the highest proportion of women who consume alcohol was found at the Kanchanaburi site in the group who did not go to school and did not complete primary school (34.9%).

The mean level of alcohol consumption in the four sites in which drinkers were found to be more prevalent (Chililab, Filabavi, Kanchanaburi, and Vadu) are presented in Table 3. As shown in Table 3, among men who were identified as drinkers, the average number of standard drinks consumed per day were highest in Filabavi (5.3 standard drinks) and lowest in Vadu (1.6 standard drinks). Among women, average number of drinks consumed per day was highest in Kanchanaburi (2.5 standard drinks) and lowest in Chililab (1.4 standard drinks). The mean number of standard drinks consumed per day did not differ significantly with educational level. Among men, the highest mean number of standard drinks consumed per day (6.0 standard drinks) was found in the group who graduated from high school or university in Filabavi. The lowest mean number of standard drinks

Table 1. Prevalence (% and 95%CI) of alcohol use adjusted by age in nine Asian HDSS, stratified by sex

Alcohol use category	Bangladesh				India	Vietnam		Indonesia	Thailand
	Matlab	Mirsarai	Abhoynagar	WATCH	Vadu	Chililab	Filabavi	Purworejo	Kanchanaburi
Men									
Non-drinker	96 (94.4–97.1)	96.3 (94.9–97.3)	98.3 (97.1–99.0)	97.1 (95.6–98.1)	82.7 (80.2–85.0)	14.2 (12.2–16.5)	15.3 (13.2–17.8)	88.5 (86.3–90.4)	25.1 (22.5–27.9)
Moderate drinker	4 (2.9–5.6)	3.3 (2.4–4.7)	1.7 (1.0–2.9)	2.8 (1.8–4.3)	17.2 (14.9–19.7)	68.5 (65.5–71.3)	53.2 (50.0–56.5)	11.3 (9.5–13.5)	63.2 (60.1–66.1)
At-risk drinker	0	0.4 (0.1–1.1)	0	0.1 (0.01–0.6)	0.1 (0.01–0.6)	17.3 (15.1–19.8)	31.4 (28.5–34.6)	0.2 (0.01–0.9)	11.7 (9.8–14.0)
Women									
Non-drinker	100	100	99.9 (99.0–99.9)	100	100	70.7 (67.8–73.3)	85.6 (83.3–87.7)	98.0 (96.9–98.8)	71.7 (68.8–74.4)
Moderate drinker	0	0	0.2 (0.01–1.03)	0	0	29.1 (26.4–31.9)	14.0 (11.9–16.3)	1.9 (0.1–3.0)	24.9 (22.3–27.6)
At-risk drinker	0	0	0	0	0	0.3 (0.01–0.8)	0.4 (0.2–1.1)	0.1 (0.01–0.6)	3.5 (2.5–4.8')

Note: Moderate drinker = less than four standard drinks in a day when consumed alcohol; at-risk drinker = four standard drinks or more in a day when consumed alcohol.
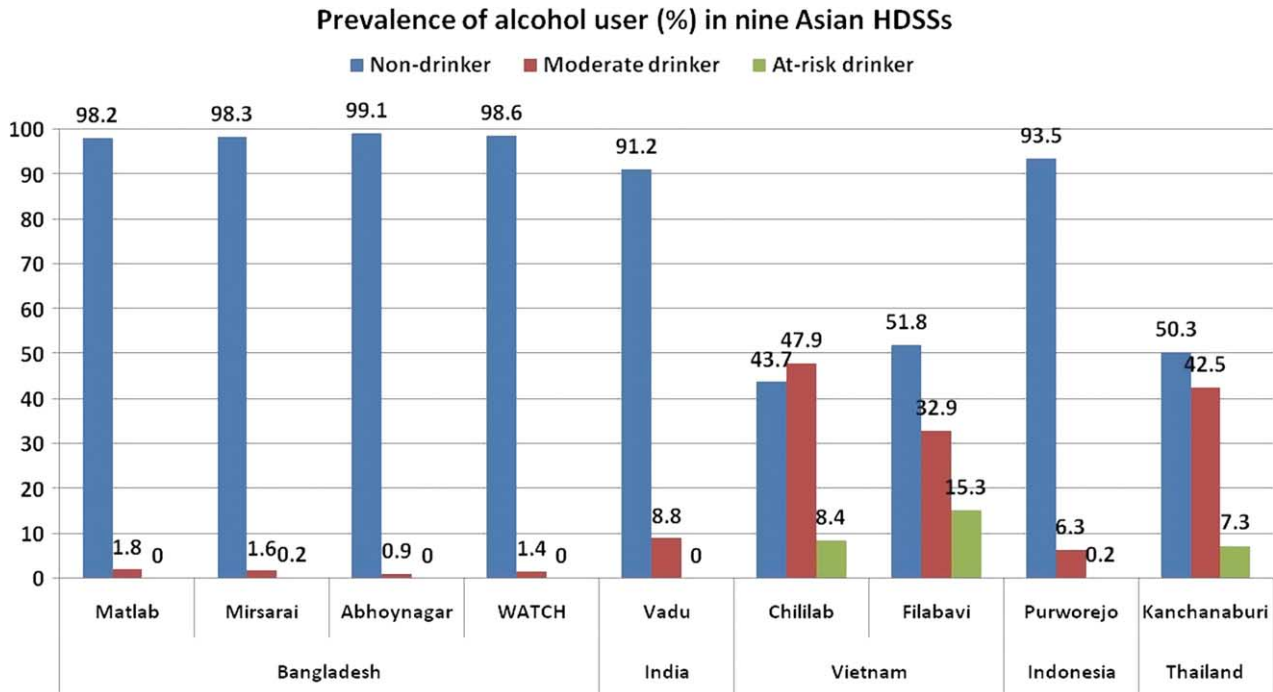
Prevalence of alcohol user (%) in nine Asian HDSSs

Fig. 1. Prevalence of alcohol user (sex and age-adjusted) in nine Asian HDSS.

consumed per day was also found in the group who graduated from high school or university in Vadu (1.3 standard drinks). Among women, the highest mean number of standard drinks consumed was also found in the group who graduated from high school or university at the Kanchanaburi site (3.1 standard drinks).

Results from the logistic regression analyses, measuring associations between at-risk drinking and sex, age and

education levels in the three sites having highest proportions of alcohol drinkers are presented in Table 4. Overall, men were more likely to drink than women in all three selected sites. There appears to be strong association between the highest level of alcohol consumption (at-risk drinker) and sex; men in Filabavi were 100 times (95%CI: 39.9–313.5) more likely to be at-risk drinkers than women, and were about 90 times (95%

Table 2. Prevalence of alcohol user adjusted by age in four Asian HDSS, stratified by sex and education group

Percentage consuming any alcohol in the last 12 months (95%CI)	India	Vietnam		Thailand
	Vadu	Chililab	Filabavi	Kanchanaburi
Men				
No schooling and not graduated from primary school	24.4 (19.3–29.4)	77.7 (66.5–88.9)	84.5 (76.1–93)	75.4 (70.4–80.3)
Primary education	20 (12.7–27.2)	85.2 (79.1–91.3)	81.4 (75.2–87.7)	72.4 (68.4–76.4)
Secondary education	15.7 (10.5–20.8)	87.2 (84–90.3)	87.3 (84.6–90.1)	79.8 (72–87.6)
Graduated from high school or university	13 (9.6–16.5)	85.6 (82.2–89)	79.5 (73.2–85.8)	77.7 (71–84.4)
Total	17.3 (14.9–19.7)	85.8 (83.7–87.9)	84.7 (82.4–87)	74.9 (72.2–77.6)
Women				
No schooling and not graduated from primary school	0 (0–0)	26.9 (19.7–34.1)	17.8 (11.6–23.9)	34.9 (30.2–39.6)
Primary education	0 (0–0)	25.4 (19.4–31.3)	13.1 (8.4–17.7)	24.3 (20.3–28.2)
Secondary education	0 (0–0)	30.2 (25.8–34.6)	13.2 (10.2–16.2)	23.1 (12–34.1)
Graduated from high school or university	0 (0–0)	31.7 (26.3–37.1)	18 (11.4–24.7)	23.9 (15–32.7)
Total	0 (0–0)	29.4 (26.6–32.1)	14.4 (12.2–16.6)	28.3 (25.5–31.1)

Table 3. Mean level of alcohol consumption (average number standard drinks consumed per day on the last seven days) by sex and education group

Average number of standard drink consumed in the last seven days (95%CI)	India	Vietnam		Thailand	
	Vadu	Chililab	Filabavi	Kanchanaburi	Total
Men					
No schooling and not graduated from primary school	1.7 (1.4–2)	4.9 (3.3–6.4)	4.6 (3.7–5.6)	3.8 (3.3–4.2)	4 (3.6–4.4)
Primary education	1.5 (1–2)	4.5 (3.7–5.3)	5 (4.4–5.6)	3.9 (3.4–4.5)	4.3 (3.9–4.7)
Secondary education	1.7 (1.3–2.1)	3.3 (3–3.7)	5.3 (4.7–5.8)	5.2 (4.1–6.3)	4.4 (4.1–4.7)
Graduated from high school or university	1.3 (1–1.5)	2.9 (2.6–3.1)	6 (4.9–7.2)	3.9 (3.3–4.5)	3.6 (3.3–3.9)
Total	1.6 (1.4–1.7)	3.4 (3.2–3.6)	5.3 (4.9–5.7)	4 (3.7–4.4)	4.1 (3.9–4.3)
Women					
No schooling and not graduated from primary school	–	1.4 (0.9–1.9)	1.2 (0.9–1.4)	2.8 (2.2–3.4)	2.4 (2–2.9)
Primary education	–	1.1 (0.9–1.2)	1.1 (0.9–1.2)	2.1 (1.6–2.7)	1.7 (1.4–2.1)
Secondary education	–	1.5 (0.7–2.3)	2 (1.4–2.6)	2.2 (1.2–3.3)	1.7 (1.1–2.2)
Graduated from high school or university	–	1.3 (0.8–1.9)	1.9 (1–2.8)	3.1 (0.7–5.6)	1.8 (1.1–2.5)
Total	–	1.4 (0.9–1.8)	1.7 (1.4–2.1)	2.5 (2.1–2.9)	1.9 (1.6–2.2)

Note: Respondents were asked about number of standard drinks they consumed on each day (Monday–Sunday) during the last seven days, and we calculated an average number of standard drinks consumed per day by taking arithmetic average of number of drinks on available days. For respondents who drank only on two days during the last week, an average of number of standard drink during these two days was calculated. This average number was used and presented in Table 3.

CI: 26.9–298.5) in Chililab and 3.7 times (95%CI: 2.5–5.5) in Kanchanaburi. A weaker association between at-risk drinker and education levels taking into account the difference in gender and age was found only in Chililab. In this site, people who were less educated (did not go to school or who had not completed primary school) were 2.4 times more likely to drink than people who graduated from high school or university (OR: 2.4, 95% CI: 1.2–4.6).

Discussions

This multi-site study illustrates that the prevalence of people who reported drinking was very low in five HDSS sites including Matlab, Mirsarai, and Abhoynagar in

Table 4. Strength of association between demographic variables and at-risk alcohol user (and its 95%CI) in four HDSS sites

Variables	Vietnam		Thailand
	Chililab	Filabavi	Kanchanaburi
Sex			
Men	89.6 (26.9–298.5)	111.8 (39.9–313.5)	3.7 (2.5–5.5)
Women	1	1	1
Age groups (years)			
25–34	1	1	1
35–44	0.9 (0.6–1.5)	1.1 (0.7–1.6)	0.7 (0.5–1.1)
45–54	0.8 (0.5–1.3)	0.9 (0.6–1.3)	0.6 (0.3–0.9)
55–64	0.5 (0.3–0.9)	0.7 (0.4–1)	0.3 (0.2–0.6)
Highest education levels			
No schooling and not graduated from primary school	2.4 (1.2–4.6)	1 (0.5–1.8)	1 (0.6–1.8)
Graduated from primary school	1.6 (1–2.7)	1.4 (0.9–2.4)	0.8 (0.5–1.3)
Graduated from secondary school	1.3 (0.9–1.8)	1.4 (0.9–2.1)	1.6 (0.9–2.9)
Graduated from high school or university	1	1	1

Bangladesh, Vadu in India and, Purworejo in Indonesia. Almost no women in these sites reported drinking alcohol. In the three selected sites (two in Vietnam, one in Thailand), the prevalence of alcohol consumption in men was higher in comparison with the findings from another study in South East Asia where 45% adult men were identified as alcohol drinkers (14). The prevalence of at-risk drinking was higher in the two sites in Vietnam, especially in Filabavi where prevalence of at-risk drinking was 31.4% and mean level of alcohol consumption was 5.3 standard drinks per day, in comparison with other seven sites in the study. This finding appears to be larger than the results of summary alcohol use from the data base at the WHO; in Russia, South Africa, and Bolivia, it was 3.6, 3.2, and 3.1 standard drinks, respectively (15).

The huge differences in drinking patterns among nine sites in the study may be due to the differences in the degree of religious beliefs and cultural practices in the studied populations or the data collection time may, by chance alone, for example in the case of Vietnam sites, have overlapped with special events in the communities where alcohol drinking is used as a means for strengthening friendship and sharing (16).

Even though the prevalence of women who consume alcohol was not high in this study in comparison to men, it should be noted that in Kachanaburi, the prevalence of women who may be at risk to the adverse effects of alcohol was higher in comparison with women in other sites in the study. This could be of concern, as women are more vulnerable to the effects of alcohol because of their smaller physical build (17).

A moderate and significant association between heavy drinking status and education levels among study subjects, taking into account the differences in age and gender was observed only in Chililab. People having lower education levels were more likely to be at risk of heavy drinking in comparison with people having high school and university education. The same pattern of association was observed in other studies conducted in Rotterdam and in China (18, 19).

Since our study utilised a cross-sectional design, a temporal relationship between the independent and dependent variables cannot be established. It is possible that the very act of participating in the study may colour the participants' answers to the interview questions. We were concerned about the possible effects of social desirability bias, in which the interviewee responds with an answer which is considered to be more socially acceptable. Because we did not directly measure the possible existence of these potential biases, we cannot discount their potential effect on our results and we therefore recommend caution in interpreting the study findings.

Due to cultural differences related to the means of containing alcohol used for drinking (different serving sizes), as well as difficulties in estimating the alcohol concentration of different types of alcoholic beverages among sites in the study, there would be a limitation on how to pose and measure the 'standard drinks' consistently across sites.

Health promotion and information on alcohol harm should address the whole population with an emphasis on men and groups of individuals with a lower level of education in Vietnam and Thailand sites. There is a need for follow up of trends in alcohol use in these HDSS. In addition, qualitative studies may help shed light on factors influencing alcohol consumption level in order to design appropriate interventions on alcohol consumption, particularly the HDSS in Vietnam.

Conflict of interest

The authors have declared no conflict of interest.

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