Magnitude and predictors of excessive alcohol use in Ethiopia: Findings from the 2015 national non-communicable diseases STEPS survey

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Abstract

Background: The burden of disease, injury and death associated with excessive alcohol consumption remains high in most countries. Although there were studies done in different parts of Ethiopia that looked at hazardous use and dependence, no national survey was done on excessive alcohol consumption which is an important risk factor for many health and social problems. This study assessed the magnitude and predictors of excessive alcohol use and associated factors in Ethiopia.

Methods: A community based cross-sectional survey was conducted using the WHO STEPwise approach to explore risk factors for NCDs including excessive alcohol consumption. A mix of stratified, three-stage cluster and simple random sampling were used to the study setting or clusters and households. The sampling frame was based on the population and housing census conducted in Ethiopia in 2007. A total of 10,260 households were selected from the 513 enumeration areas. Data were collected using WHO STEPS questionnaire. For this report, Heavy Episodic Drinking was taken as a dependent variable. Descriptive statistics including frequency table, mean, median, interquartile range and standard deviations were computed. Logistic regression was used to analyze the predictors of Heavy Episodic Drinking.

Results: A total of 9,800 participants were interviewed in the study. The majority59.4% of the study subjects were female, 40.4% were aged 15-29 years. The overall prevalence of lifetime alcohol consumption was 49.3%, and 40.7% of the study participants reported consumption of alcohol in the past 30 days, defined as current drinkers. Heavy episodic drinking was reported by 12.4% of the participants (20.5% males and 2.7% females). In multivariate logistic regression, factors independently associated with heavy episodic drinking, after adjusting for other characteristics, were male sex, rural residence, married, and current tobacco smoking.

Conclusion: More than one in five males reported heavy episodic drinking which will predispose them to non-communicable diseases and other risks. Concurrent tobacco smoking is also a major concern. The findings will be helpful to initiate effective public health interventions to reduce heavy episodic drinking and consequently reduce the risks associated with it. It will also serve as a baseline to conduct further studies on this issue in Ethiopia. [*Ethiop.J. Health Dev.* 2017;31(Special Issue):312-319]

Key words: Alcohol, Heavy Episodic Drinking, NCD, Ethiopia, WHO STEPS

Background

Consumption of alcohol is a common behavior seen in humans around the world, with more than 16% of the population 15 years and above reportedly engaged in heavy episodic drinking (1). Excessive alcohol consumption is among the top causes of injury, disease and premature death- in 2012 alone, 3.2 million deaths and 5.1% of global burden of disease and injury were attributed to alcohol consumption (1). Besides the direct damage to the liver, it is an important contributing factor for more than 200 diseases and injuries including alcohol dependence, high blood

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pressure, diseases of the heart, various types of cancers, injuries and violence (1, 2).

Existing literature, though limited, show excessive consumption of alcohol is common in sub-Saharan Africa, and it is one of the important risk factors for diseases, injury and death including high risk of contracting HIV by affecting the behavior of the individual (3).

According to WHO estimates for the WHO Africa region, the average per capita consumption of alcohol in the age group 15 and above in 2010 was 6 liters of pure alcohol, which is close to the global average of 6.2 liters 100% alcohol (1). Per capita annual consumption rates vary from country to country even in the sub-Saharan Africa region, for instance, consumption in Ethiopia was estimated at 4.2 liters almost similar with neighboring Kenya which has an estimated consumption at 4.3 liters; some countries reportedly had very high consumption patterns such as 11 liters in South Africa, 10.9 liters in Gabon, 10.1 liters in Nigeria, 9.8 liters in Rwanda, 9.8 liters in Uganda and 9.3 liters in Burundi (1).

High rates of hazardous drinking were reported from South Africa (SA): a study involving more than 1,500 adults visiting outpatient facilities of different hospitals found that 41.2 % of men and 18.3 % of women had hazardous drinking (4). In SA, 7% of disability adjusted life years (DALYs) was attributed to alcohol, injury and cardiovascular accidents being the two most important complications of excessive alcohol consumption (5).

The Ethiopian Demographic and Health Survey (DHS) involving national representative samples from the age group 15–49 year reported 53% of men and 45 % of women had lifetime history of alcohol consumption, among whom 53% of men and 48 % of women consumed alcohol six or more days in the past month; increasing age and urban residence were associated with high levels of consumption (6). Both manufactured and homemade alcoholic drinks are consumed in Ethiopia, the later being more frequented in rural areas; the estimated alcohol content for different homemade alcoholic drinks was estimated at 2-4% for *tella* (traditional beer), 7-11% for tej (honey wine) and up to 45% for *araqe* (strong colorless liquor distilled from grain) (7).

A recent community based survey of adults in rural Ethiopia involving 1,500 adults, age 18 and above, reported overall prevalence of hazardous alcohol use of 21 %, 31 % in males and 10.4 % in females; being male, increasing age, having experienced one or more stressful life events and severe psychological distress were associated with hazardous alcohol use (8).

A STEPwise surveillance conducted in Addis Ababa in 2006 showed 10.4% of men had heavy episodic drinking; the prevalence in women was 1% (9). Another STEPwise survey conducted in Northwestern Ethiopia involving 2,200 adults showed alcohol consumption was associated with hypertension, with odds ratio of 1.71 (CI= 1.24-2.36) (10). A similar study done in Gondar town involving 3,227 individuals aged 18 years and above showed drinking alcohol daily to be associated with high blood pressure (11).

Besides chronic diseases such as hypertension, heavy consumption of alcohol was reported to be a risk factor for HIV infections by affecting decision making capacity of individuals: a systematic review of published literature from Africa that looked at association of heavy alcohol drinking with the risk of HIV reported doubled risk of acquiring HIV (12). Reports from Ethiopia also showed increased risk of HIV associated with heavy alcohol consumption, increasing the risk up to five times among heavy drinkers (13-16). High school students in Addis Ababa who reported having sexual intercourse admitted consuming alcohol before engaging in the behavior; the majority had sex without using condom exposing them to sexually transmitted infections including HIV and unwanted pregnancy (16).

Thus, there are clear reasons for concern about alcohol consumption in Ethiopia since a large segment of the population consumes alcoholic drinks, a significant proportion engage in heavy consumption. No national survey had been conducted thus far specifically looking at heavy episodic alcohol consumption, although the EDHS reported the national prevalence of alcohol consumption. The main aim of this STEPS survey was to determine the risk factors for NCDs, one of which is heavy alcohol consumption. This report specifically focuses on magnitude and predictors of alcohol use in Ethiopia in general and heavy episodic drinking and associated factors in particular. The findings from this nationally representative sample are expected to inform policy for designing public health interventions to address heavy episodic drinking and thereby mitigate the adverse consequences.

Methods

Study design and target population: A community-based cross-sectional study was carried out using the WHO STEPwise approach to surveillance (17). The target population for this survey included all men and women aged 15-69 years who have been living at their claimed primary place of residence for at least six months. This definition included those individuals residing in Ethiopia regardless of their citizenship status. Individuals who were institutionalized in hospitals, prisons, nursing homes, and other similar institutions, or residents whose primary residences are military camps or dormitories were excluded. Moreover critically ill, severely mentally disabled and those with some type of physical disability who were not suitable for physical measurement were also excluded from this study.

Sample size and sampling technique: A single population proportion formula was used to determine the sample size. To adjust for the design effect, a

complex sampling design effect coefficient of 1.5 was used to compute the sample size. In order to have an adequate level of precision for each age-sex estimate and place of residence, the sample was multiplied by the number of age-sex and place of residence groups for which the estimates were reported. The sampling frame was based on the population and housing census conducted for Ethiopia in 2007 (CSA, 2008). According to the 2007 population and housing census, there were a total of 15,837 Kebeles in Ethiopia i.e. 14,364 in rural and 1,473 in urban kebeles. Taking into account the cost of the study and the level of precision, 20 households per EA, and one eligible individual from each household, with a total of 513 EAs were covered nationwide. Stratifying the sampling design by place of residence we allocated about 404 EAs for rural and the remaining 109 to urban areas. In this study, a mix of sampling approach, namely, stratified, three-stage cluster sampling and simple random sampling was used. The total sample size calculated was 10,260; Kish method (18) was employed to select the households and the study participant from a selected household. Kish method is commonly used method for selecting a participant to a survey from a household using a table of random numbers (grid).

Survey instrument: The STEPwise approach has 3 steps, but we will describe here only step-1 as it is relevant for this report.

Step-1 involves collecting information on demographics and behavioral risk factors such as tobacco use, alcohol consumption, dietary behaviors such as fruit and vegetable intake and salt and sodium intake, and physical inactivity, as well as history of NCDs and related conditions such as raised blood pressure, diabetes, raised cholesterol, cardiovascular diseases; cervical cancer screening coverage in women; and provision of general lifestyle advice to tackle NCDs was collected through interview. The focus here is on alcohol only; other variables are reported in separate manuscripts. Alcohol consumption was measured using standard drinks. A standard drink is any drink containing about 10g of alcohol (17). Data collectors used show cards depicting most commonly consumed alcoholic beverages as standard drinks. Respondents who reported consuming alcohol within one month preceding the survey were classified as current drinkers.

Operational definitions

- "Lifetime alcohol use" was defined as respondents who admitted to having ever used alcohol.
- "Past twelve month alcohol users" was defined as people who took alcoholic drinks in the 12 months prior to the date of data collection.
- "Current prevalence of alcohol users" was defined as the proportion who took alcoholic drinks within 30 days preceding the study.
- Heavy Episodic Drinking (HED) or Excessive Alcohol Consumption in this study is defined as consumption of ≥6 drinks and ≥4 drinks on a single occasion in men and women respectively.

Data management and analysis IB: Data was collected using Personal Digital Assistant (PDA) and transferred to EPHI server using Internet File Streaming System (IFSS) through internet. Data cleaning was done to check any inconsistency. Analysis was done in STATA v13 (19).

Ethical approval: Data was collected anonymously without any personal identifiers. Informed consent was obtained from the study participants before administering the questions/collecting blood sample, and objectives of the study was explained to the participants by the data collectors. For participants who were below 18 years of age, assent and consent from their parents or guardians was obtained. Ethical clearance was obtained first from the EPHI Institutional review board (IRB) then from National Research and Ethics Review Committee (NRERC). Furthermore, an official letter was produced and delivered to the respective regional health bureaus by EPHI during fieldwork.

Results

Socio-demographic characteristics of the study participants: A total of 9,800 participants were interviewed in this study, obtaining a response rate of 95.5%. The majority of the study participants were females 59.4%, and 40.4% were 15-29 years of age. The mean age and (SD) was 34.5(13.1) years, 28.3% were Oromo by ethnicity, followed by Amhara 27.2%. Details of socio-demographic characteristics are presented in Table 1.

Table1: **Socio-demographic characteristics of the study participants, Ethiopia, 2015**

Characteristics (N=9,800)	Number	Percentage (95% CI)
Age		
15-29	3,959	40.40 (39.4- 41.4)
30-44	3,499	35.70 (34.8-36.7)
45-59	1,690	17.24 (16.5-18.0)
60-69	652	6.65 (6.2-7.2)
Mean±SD		34.5 (13.1)
Gender		
Male	3,977	40.58 (39.6-41.6)
Female	5,823	59.42 (58.4-60.4)
Residence		
Urban	2,687	27.42 (26.5-28.3)
Rural	7,113	72.58 (71.7-73.5)
Ethnicity		
Oromo	2773	28.3 (27.4-29.2)
Amhara	2666	27.2 (26.3-28.1)
Tigray	1059	10.8 (10.2-11.4)
Somali	597	6.1 (5.6-6.6)
Wolayita	222	2.3 (2.0-2.6)
Sidama	339	3.5 (3.1-3.8)
Gurage	316	3.2 (2.9-3.6)
Hadiya	156	1.6 (1.4-1.8)
Afar	334	3.4 (3.1-3.8)
Gamo	159	1.6 (1.4-1.9)
Marital status		
Single	1,705	17.40 (16.7-18.1)
Married	6,634	67.72 (66.8-68.6)
Separated/divorced	788	8.04 (7.5-8.6)
Widowed	669	6.83 (6.3-7.3)
Education		
No formal Schooling	4,843	49.42 (48.4-.50.4)
Less than primary school	2,818	28.76 (27.9-29.7)
Primary school completed	975	9.95 (9.4-10.6)
Secondary school completed	653	6.66 (6.2-7.2)
College/University completed	499	5.09 (4.7-5.5)
Post graduate degree	12	0.12 (0.07-0.2)
Monthly income		
1st Quintile	4597	46.9 (52.6-54.7)
2nd Quintile	1364	13.9 (15.2-16.7)
3rd Quintile	1220	12.4 (13.5-14.9)
4h Quintile	1373	14.0 (15.3-16.8)
5th Quintile	18	0.2 (0.1-0.3)
Occupation		
Employed	956	9.89 (9.3-10.5)
Self employed	5,087	52.63 (51.6-53.6)
Unpaid	3,323	34.38 (33.4-35.3)
Unemployed	300	3.10 (2.8-3.5)

Magnitude and frequency of alcohol use: The overall lifetime prevalence of alcohol use was 49.3% and among them 89.6% drank alcohol in 12-months preceding the survey. Among ever drinkers, 40.7% of reported consumption of alcohol in the past 30 days, defined as current drinkers. Heavy episodic drinking was reported by 12.4% of the participants, 20.5% of males and 2.7% of females. Around twenty-nine percent (28.6%) of life time alcohol users stopped drinking due to health reasons. During the past 30 days before the date of the survey, 81.2% of them reported consuming an alcoholic drink usually with meals. In the 12 months preceding the survey, 6.8% of them reported to have at least one standard alcoholic drink daily. Details are presented in Table 2.

Table 2: **Magnitude and patterns of alcohol use among participants aged 15-69 years in Ethiopia, 2015**

Characteristics	Men N (%)	Women N (%)	Both sexes N (%)
Ever drink alcohol	2012 (54.9)	2318 (42.7)	4330 (49.3)
Alcohol drinking in the past 12 months among ever drinkers	1818 (90.4)	2045 (88.2)	3863 (89.6)
Stopped drinking due to health reasons	54 (30.3)	75 (26.5)	129 (28.5)
Having at least one standard alcoholic drink During the past 12 months			
Daily	154 (8.7)	55 (3.5)	209 (6.7)
5-6 days per week	103 (6.0)	28 (1.5)	131 (4.3)
3-4 days per week	287 (14.7)	102 (6.2)	389 (11.4)
1-2 days per week	687 (36.9)	540 (27.9)	1227 (33.4)
1-3 days per month	315 (19.5)	557 (28.6)	872 (23.0)
Less than once per month	269 (14.1)	748 (31.5)	1017 (20.9)
Alcohol consumption in the last 30 days	1709 (93.6)	1793 (89.4)	3502 (92.0)
Any home brewed alcohol consumption, like Tella, Tej, Araqe, Bordie in the last 7 days	938 (51.1)	907 (46.0)	1845 (49.2)
Modalities of alcohol consumption with meals during the past 30 days			
Usually with meals	1319 (78.6)	1520 (85.5)	2839 (81.2)
Sometimes with meals	270 (15.5)	183 (11.3)	453 (13.9)
Rarely with meals	47 (3.0)	25 (1.1)	72 (2.3)
Never with meals	73 (3.0)	65 (2.1)	138 (2.6)
Heavy Episodic Drinking Above end level*	465 (20.5)	247 (2.7)	712 (12.4)

***men drinks ≥6 standard drink at a single occasion or women drinks ≥ 4 standard drink at a single occasion**

In the multivariable logistic regression, factors independently associated with heavy episodic alcohol use, after adjusting for other characteristics, were sex, residence type, marital status, and current smoking status. The odds of heavy episodic drinking was more than double in men compared with women [AOR=2.17; 95% CI, 1.67 - 2.5]. Study participants from rural residence were 1.44 times more likely to engage in heavy episodic alcohol drinking compared to people who lived in urban area [AOR=1.44; 95% CI, 1.1 to 1.8], being married [AOR=1.58; 95% CI, 1.2 to 2.1], and people who were current tobacco smokers [AOR=2.87; 95% CI, 2.1 to 3.9] also had shown statistically significant association.

Table 3: **Factors associated with heavy episodic drinking among participants aged 15-69 years in Ethiopia, 2015**

Characteristics	Bivariate		Multivariate	
	COR (95%CI)	p-value	AOR (95%CI)	p-value
Sex				
Male	2.38 (2.0-2.5)	<0.000	2.17(1.67-2.5)	**<0.001**
Female	1		1	
Age Group				
15 - 29	1		1	
30 - 44	1.42 (1.2-1.7)	<0.000	1.20 (0.9-1.5)	0.106
45 - 59	1.39 (1.1-1.8)	0.005	1.06 (0.8-1.4)	0.635
60 - 69	1.28 (0.9-1.8)	0.137	1.02 (0.7-1.5)	0.887
Locality				
Urban	1		1	
Rural	1.44 (1.3-1.9)	<0.000	1.44 (1.1-1.8)	**0.002**
Occupational status				
Employed	1		1	
Self employed	0.98 (0.8-1.2)	0.904	0.79(0.6-1.1)	0.132
Unpaid	(0.56(0.4-0.8)	<0.000	0.83(0.6-1.2)	0.303
Unemployed	(0.65(0.3-1.4)	0.264	0.91(0.4-1.9)	0.819
Marital status				
Single	1		1	
Married	1.59(1.2-2.1)	<0.000	1.58(1.2-2.1)	**0.003**
Separated/divorced	1.19 (0.8-1.7)	0.349	1.51(0.9-2.3)	0.055
Widowed	1.25 (0.8-1.9)	0.270	1.90(1.2-3.1)	0.012
Currently chew Khat				
No	1			
Yes	1.39(0.8-2.3)	0.196		
Currently smoke any tobacco products				
No	1		1	
Yes	3.84 (2.8-5.2)	<0.000	2.87(2.1-3.9)	**<0.001**
Quintiles of income				
1st Quintile	1			
2nd Quintile	0.91 (0.7-1.2)	0.502		
3rd Quintile	0.76(0.6-1.0)	0.058		
4th Quintile	0.85(0.7-1.1)	0.217		
5th Quintile	0.50(0.1-4.1)	0.518		

Discussion

This report was part of the national STEPS survey conducted to explore the prevalence of tobacco use, alcohol consumption, dietary behaviors such as fruit and vegetable intake and salt and sodium intake, and physical inactivity, as well as history of NCDs, specifically looked at the national prevalence of alcohol drinking including heavy episodic drinking. This is the first national report on heavy episodic drinking from Ethiopia. Ethiopia is one of the ancient civilizations in the world, inhabited by pre-humans and humans as confirmed by the discovery of skeletal evidence (20). It is believed to be one of the countries in the world to plant trees for the production of alcoholic drinks; the central and northern highlands, as well as the southern and western regions of Ethiopia produce and consume traditional alcoholic drinks for festivities and holidays, some people also consume these drinks on regular basis leading to problematic use (7,8). Following the recent economic development and the emergence of middle class who can afford to spend money on industrial alcoholic beverages, Ethiopia has seen massive investment in the alcohol industry, considered 'a lucrative market', annual production of beer, wine and liquor has increased dramatically, according to reports (24).

Although there were several studies on alcohol conducted at different parts of the country involving diverse groups, there was no national survey on the prevalence of excessive alcohol use. Prior studies focused on either patterns of use as in the case of EDHS (6), or hazardous use, abuse and dependence (8, 21-23).

In this study, respondents who reported alcohol drinking at some point in their lives were around 43%, and 55% among women and men respectively, which is comparable to the 2011 EDHS report of 45% and 53% in women and men respectively (6). High levels of heavy episodic drinking was identified in this study, men had nearly 10 times higher rates than women. The finding in men is almost twice higher than the report from Addis Ababa by Tesfaye et al in 2006 (9). This could be due the economic transition with the emergence of middle class society, the expansion of alcohol industry, and massive alcohol advertisement (10, 24). The harms associated with alcohol depends on the volume and frequency of alcohol consumed, significant personal and social harm results from consumption of large volume of alcohol per episode (25).

In this study, heavy episodic drinking was found to be associated with being male, married and tobacco smoking. Males are known to engage in risky behaviors including heavy alcohol consumption. This is consistent with several studies from Ethiopia and elsewhere, heavy episodic drinking was associated with masculinity and is considered a male norm (9, 26, 27). This behavior is often associated with significant harm to the individual as well as society including homicide (28, 29, 30, 31). A report from Uganda by Zablotska et al showed men who engaged in heavy drinking were reported to commit intimate partner violence, sexual coercion, and the victims had increased risk of HIV infection because disinhibiting and impulsivity due to alcohol (32).

The finding of positive association of tobacco smoking with alcohol drinking is consistent with other reports from Ethiopia; a report from Addis Ababa University showed alcohol consumption was significantly associated with tobacco smoking (33). The concurrent use of alcohol and tobacco were reported to have synergetic effect on individuals, enhancing the pleasures they get from using these substances, confirming the observation that people smoke more cigarettes while drinking (34).These two form 50% of the behavioral risk factors for NCDs as described by the WHO: excessive alcohol drinking, tobacco smoking, inadequate physical exercise and unhealthy diet. Hence, the presence of tobacco smoking and heavy alcohol drinking will put the individual to a much greater risk of NCDs such as cardiovascular diseases, diabetes mellitus, respiratory diseases and cancer (35). For instance, the combination of heavy alcohol consumption doubled the risk of hepatocellular carcinoma, when combined with tobacco smoking the risk increased to nine fold (36).

Regarding place of residence, heavy episodic drinking was significantly higher in rural areas. A review of alcohol consumption patterns in 20 African countries reported heavy alcohol consumption ranging from 7-77%, as Africa is predominantly rural it affects a large segment of the society that could pose challenges for intervention due to limitations in access to information communication and service delivery (37).

The study has some limitations. First, as the study is cross-sectional, it is not possible to establish causal relationship between the independent and outcome variables. Second, the study had looked at the pattern of use including heavy episodic drinking, but it didn't look at clinical aspects such as presence of dependence in greater detail. Moreover, personal health and psychosocial consequences as well as social harms associated with alcohol consumption have not been explored.

Conclusion and recommendation:

Nearly half of the Ethiopian population reported drinking alcohol at some point in their life, one in five men reported heavy episodic drinking. Being a male, living in rural area, being married, and current smoking of tobacco products were found to be the factors significantly associated heavy episodic drinking.

The findings warrant the initiation of effective alcohol prevention and control programs focusing mainly on heavy episodic drinking in rural areas and males. The increased health risk of concurrent use of alcohol and tobacco has to be a major public health concern. Future studies looking at adverse health and psychosocial

consequences, both at the level of individual and society, are recommended.

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Competing interests
The authors declare no financial or non-financial conflict of interest.

Authors' contributions
TG, AD, HT, GG, AB, AB, TG, KA, TT, FC, KM, MG, YF, FS, YT, DY, MG, YT, TT, ST participated in the conception and design of the study, acquisition of data and manuscript writing; GG, GT and MT participated in manuscript writing.

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