

Prevalence, drinking patterns, and risk factors of alcohol use and early onset among Ghanaian senior high school students

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ABSTRACT

Objectives: Alcohol use among young people (mostly late adolescents) contributes to a range of behavioral, social, economic, and health consequences. This study assessed the prevalence, drinking patterns, and risk factors of alcohol use and early onset among senior high school students in Ghana.

Methods: A school-based cross-sectional study adapted from the Youth Risk Behaviour Survey was conducted. Using a cluster sampling technique at four randomly selected senior high schools, 803 participants (59.42% females; mean age = 17 years, SD = 1.72 years, min/max age = 12/25 years) were sampled for the study. Statistical analysis was conducted to assess prevalence, drinking patterns, and associated risk factors to alcohol use and early onset.

Results: With a reported prevalence of 38.2% (CI: 37.1–44.1) alcohol use, no statistically significant differences were observed in the prevalence of drinking patterns among males and females. The average age of alcohol onset was 14.97 (SD = 2.84). A simple linear regression indicated that statistically significant independent variables associated with alcohol onset were age, grade, ethnicity, parental status, age of first sex, smoking parents, number of sex partners, age of first purchase, and occasional drunkenness. A multivariable logistic regression analysis indicated that living with a single parent, having smoking friends, number of sex partners, having a single-sex partner, and ever purchasing alcohol were significantly associated with ever drinking.

Conclusion: With higher rates of alcohol use and decreasing age of alcohol onset in this study, school health programs, and policy development should focus on addressing associated modifiable risk factors to reduce underage drinking.

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Introduction

Alcohol use comprises 5.1% of the global burden of disease as measured in disability-adjusted life years and 3.3 million deaths every year [1]. The consumption of alcoholic drinks is a behavior common to different cultures and countries. However, early initiation and misuse of alcohol can affect people in diverse ways, especially youth. Alcohol misuse can lead to behavioral, social, economic, and health consequences. These consequences affect individuals, families, friends, and the larger society. Improper alcohol use has contributed to a high burden of

injuries, morbidity, and mortality, hence making this an issue of immense public health concern [2].

Approximately three-fourths of adolescents have tried alcohol by the end of high school [3], thus before the legal age limit of alcohol use. Studies report alcohol onset for most youth to be below 14 years [4] and 15.33 years for first alcohol consumption [5–8]. Early onset of alcohol use among young people has been found to be associated with alcohol abuse and addiction in adulthood [3,9] as well as half of the deaths and three-fourths of the economic costs due to excessive drinking [10].

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With these consequences widely known among policy and decision-makers, numerous health policies exist to monitor adolescent alcohol use, especially in developed countries. Furthermore, numerous data on alcohol use and its related outcomes exist. However, few population-based studies from low- and middle-income countries have addressed early drinking onset and its association with adult alcohol-related adverse outcomes [7,9,11]. There is a “paucity of data” in alcohol research in lower- and middle-income countries as [12, p. 1] described in the case of Ethiopia. A report by the World Health Organisation shows that only 34% of WHO Member States have a national alcohol policy of which most of them are in developed countries [13]. In Ghana, young people are highly exposed to alcohol use as no such policy exists even for the legal age limit for on-premise service and off-premise sales of alcoholic beverages [14,15]. Thus, one in five Ghanaians (youth) is at risk of alcohol abuse [16].

The Sustainable Development Goal 3 of the United Nations aims to ensure healthy lives and promote well-being for all at all ages. In so doing it seeks to, as part of its objectives “strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol” [17]. In the Lower Manya Krobo Municipality, there are reported cases of deviance with alcohol and other illicit drugs among youth in the area, which has called for anti-drug and alcohol campaigns in recent times by traditional stakeholders [18]. But there exists no published studies on alcohol misuse within the study area. This research, therefore, aims to fill this gap by assessing the drinking patterns, risk factors of alcohol use, and early alcohol onset among young people in the municipality. The findings in this research will also inform policy and decision making about alcohol use thereby strengthening the prevention of substance abuse among young people.

Methods

Setting and recruitment

The study was conducted in the Lower Manya Krobo Municipality of the Eastern Region of Ghana – an area with an estimated 99,000 people [19]. Senior high school students were recruited for the study. The municipality has 11 senior high schools with an estimated population of 15,000 students. A minimum sample size of 375 was determined with the Raosoft sample size calculator using a 95%

confidence interval, 5% margin of error, and a 50% dichotomous response distribution. Eight hundred and three students participated in the study from four randomly selected senior high schools. These schools include Manya Krobo SHS (390), Akro Senior High School (248), King David Senior High School (80), and Kpong Community Development and Vocational Training Institute (85). At each school, cluster sampling of classrooms was conducted. All students in sampled clusters were invited to participate in February 2018. Using a 46.2% known prevalence [20] and a 0.05 alpha level, a post hoc power analysis indicated a 78.4% power [21]. Students from the schools represented various ethnicities, religions, locations, and other characteristics of Ghana as all the schools are boarding schools that attract students from all regions of Ghana.

Materials and methods

A cross-sectional study design was used for this school-based study. A well-structured questionnaire was self-administered to study participants.

The questionnaire was developed based on the “Alcohol and other Drug Use” section and other sections of the 2017 State and Local Youth Risk Behaviour Survey (YRBS) survey, particularly sections on demographics, alcohol consumption, and other selected risk factors [22]. Novel questions were also developed as appropriate for the Ghanaian context. These novel questions included perceived risk factors to alcohol use such as sexual practices, parental status, and perception of alcohol use. The survey was administered to students in four Ghanaian senior high schools using a paper and pencil self-administered questionnaire in English language.

The (YRBS) is a standard school-based survey instrument that measures a variety of youth risk behaviors including substance abuse. It has been adapted for use in other countries such as Brazil, Mexico, India, and South Africa with adequate validity [23–29].

Approval for the study was obtained from The Ensign College of Public Health Institutional Review Board in December 2017. Permission was also sought from various heads of the sampled high schools to conduct the study. In Ghana, most senior high schools are boarding schools; hence, school heads act as custodians over boarders. Hence, written permission to participate in the study among students below the age of 18 was given by the headteachers of the school as well as the Municipal Educational service. Students ages 18 and above

consented into the study by reading and signing an informed consent document.

Statistical measures and analysis

Data entry and analysis were conducted using Microsoft Excel 2013 and Stata/IC 14.0 (StataCorp LP, College Station, TX, USA), respectively. Descriptive analysis was conducted to assess the demographic characteristics, prevalence, and pattern of alcohol consumption. Bivariate (chi-square and simple linear regression) and multivariate regression analysis (logistic regression models) were conducted to determine the association between outcomes and explanatory variables. An alpha level of 0.05 was used in this study.

Outcome variables investigated in this study were the age of alcohol onset and ever drinking. Ever drinking was assessed by respondent's response to the dichotomous question "Have you ever had alcoholic beverages like beer, wine, gin, bitters, or liquor?". A "yes" response (coded as 1) was categorized "ever drinking", whereas a "no" response (coded as 0) was categorized "abstainers". Furthermore, with regards to the age of alcohol onset: respondents who have ever used alcohol were asked to recall their age of first alcohol consumption to the follow-up question "about how old were you the first time you drank alcohol?"

Exposure variables used in the study included demographic variables, youth risk behaviors (sexual and smoking habits), perception of underage alcohol use, parental alcohol, smoking practices, and self-description of academic performance. Respondents indicated the "number of sexual partners" by responding to the question "during your life, with how many people have you had sexual intercourse?" Responses were categorized into "No sex partners (0), Single Sex Partner (1) and multiple sex partners (2 or more)".

Drinking patterns were assessed using these drinking pattern standards [8,30]: low-risk drinkers constituted respondents who drink on average one alcoholic drink within 2 days or less in a month. Moderate drinkers constitute respondents who drink on average one alcoholic drink within 3–19 days within a month. Binge drinkers constitute respondents who in the past one month have drunk 5 or more drinks in a row (for males) and 4 or more drinks in a row (for females). Heavy drinkers constitute respondents who in the past one month have drunk 4 or more alcoholic drinks in a row for 3 days or more.

Results

Background characteristics of the study participants

Table 1 summarizes socio-demographic characteristics of the study participants. All the students who were administered questionnaires returned the questionnaires. Males represented 40.58% of 41

Table 1. Background characteristics of study participants, *N* = 803.

Variable	Frequency (<i>n</i>)	Percent (%)
Gender		
Male	323	40.58
Female	473	59.42
Age group		
Below 17 years	628	81.88
18 years and above	139	18.12
Grade		
1st year	504	63.56
2nd year	128	16.14
3rd year	150	18.92
4th year	11	1.39
School program		
Science	11	1.38
General art	644	80.9
Business	33	4.15
Home economics	49	6.16
Visual arts	2	0.25
Technical	56	7.04
School residential status		
Day student	311	38.83
Boarding student	490	61.17
Religion		
Christianity	757	95.22
Islam	32	4.03
Traditional	6	0.75
Ethnicity		
Akan	153	19.17
Ewe	150	18.8
Krobo	404	50.63
Ga	64	8.02
Adangbe	17	2.13
Northerners	10	1.26
Residential status		
Rural	158	21.76
Suburban	251	34.57
Urban	317	43.66

(Continued)

Variable	Frequency (n)	Percent (%)
Parent's education		
No formal education	26	3.32
Primary	33	4.21
JHS	253	32.31
SHS/VOC/TECH	265	33.84
Tertiary	206	26.31
Parental status		
Live with both parents	467	58.67
Live with adopted parents	41	5.15
Live with single parent	182	22.86
Live with other relatives	78	9.8
Live alone	28	3.52
Socioeconomic status		
Low	251	35.7
Medium	268	38.12
High	184	26.17

the study sample. The majority of the respondents were below the age of 18 with most of the respondents in their first year of school. With a minimum age of 12 years with a range of 13, the average of respondents was 17 years (SD = 1.7 years). About half of the respondents lived with both parents.

Drinking pattern among respondents

We assessed the prevalence rates of the various drinking patterns among respondents who have ever drunk alcohol (Table 2). The prevalence of alcohol use among respondents was 38.2% (CI 37.1–44.1) – thus respondents who have ever drunk alcohol in their lifetime. The reported pattern of alcohol drinking included low-risk drinking, moderate risk drinking, ever binge drinking, recent binge drinking, and heavy drinking. The highest drinking pattern exhibited by respondents was low-risk drinking (88.93%). In general, males reported a higher prevalence in all drinking patterns than females, except for moderate drinking patterns. However, these differences were not statistically significant.

Age of alcohol onset

We assessed the age of initiation of alcohol use among respondents as well as factors predicting the age of onset. The average age of alcohol onset among respondents was 14.97 years (SD = 2.84). The youngest reported age of alcohol onset was 6 years. Figure 1 shows a boxplot of the age of alcohol

onset by gender. Females recorded an early age of alcohol onset (6 years) compared to males (8 years).

We assessed the predictive and associated factors to the age of alcohol onset. Table 3 shows a simple linear regression output of the age of alcohol onset and associated factors. Compared to their respective categories, grade in school (second and third years), living with other relatives, having smoking parents, and occasional drunkenness was associated with an increased average of age of alcohol onset ($p < 0.05$).

Compared to Akans, we found that northerners were on average 5.97 younger in age of alcohol onset ($p = 0.038$). A one year increase in age of first sexual intercourse results in a mean of 0.53 increase in age of alcohol onset ($p < 0.001$). There was also a 0.26 increase in age of alcohol onset with an increasing number of sexual partners ($p = 0.037$). An increase in the age of the first purchase of alcohol increases the age of alcohol onset ($p < 0.001$). Furthermore, the age of alcohol onset was 1.18 higher among respondents living with other relatives compared to those living with both parents.

Risk factors of alcohol use

A logistic regression analysis was conducted to assess the association between the outcome variable (ever drinking) and explanatory variables.

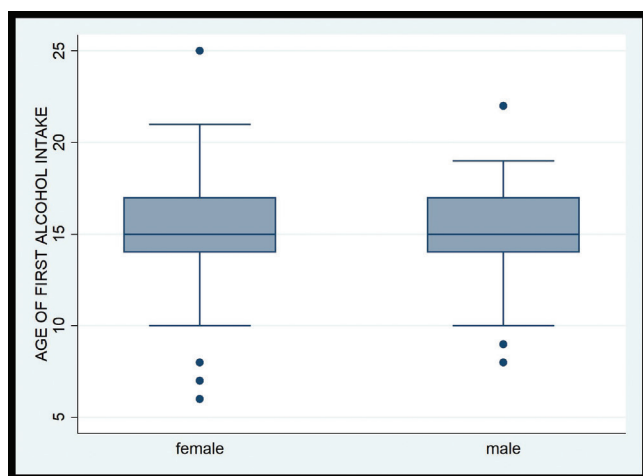
A bivariate logistic regression showed that having the perception that underage alcohol use is a “serious problem” was found to be the only protective factor to lifetime alcohol use compared to the reference category. Respondents who perceive alcohol use as a “serious problem” were less likely to ever drink alcohol (OR = 0.55, 0.4–0.76). However, adjusting for other significant variables in a multivariable analysis, this difference was not statistically significant.

Furthermore, compared to respective reference groups, the bivariate analysis indicated that grade (second and third years) in school and living with single parents were the background characteristics that increase the odds of lifetime alcohol use. Furthermore, ever smoking, having smoking friends, having smoking parents, ever having sex, number of sex partners, having single and/or multiple partners, low academic performance (grade C and D/F), ever purchasing alcohol, and occasional parental permission to drink were significantly associated with an increased odds of alcohol use (Table 4).

However, when adjusted for other variables, living with single parents, having smoking friends,

Table 2. Gender distribution of drinking pattern among respondents, *N* = 803.

Drinking pattern	Total		Male		Female		<i>p</i> -Value
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Abstainers	455	56.66	186	60	269	59.51	0.550
Ever drinkers	307	38.23	124	40	183	40.49	
Among ever drinkers, <i>N</i> = 307							
Low risk drinking	273	88.93	121	97.58	152	83.06	0.418
Moderate drinking(1 or 2 drinks)	18	5.86	5	4.03	13	7.10	0.418
Ever had 5 or more drinks (ever binge)	24	7.82	11	8.87	13	7.10	0.667
5+ drinks in past 1 month(recent Binge)	15	4.89	7	5.65	8	4.37	0.450
Heavy drinking(binge drinking for 5+days)	20	6.51	7	5.65	13	7.10	0.162

**Figure 1.** Reported age of alcohol onset by gender boxplot.

number of sex partners, having a single partner, and ever purchasing alcohol were significantly associated with ever drinking in a multivariable logistic regression model.

Discussion

Several studies report increasing sources of alcohol exposure to young people [3,31]. Yet little is being done by policymakers and agencies, especially in developing countries, to curb this public health concern of its associated threats to the health and wellbeing of young people now and in the future. This study assessed the prevalence, risk, and protective factors to adolescent alcohol use and onset as well as drinking patterns.

The prevalence of alcohol use among students in this study was 38.2%. This reported rate was lower compared to higher-income countries particularly the WHO European Region (69.5%) and the United States (52.7%) in 2010 [1,29,32,33]. Studies that reported lower rates compared to this work as in

[12,34–36]. This may be due to time differences as increasing modernization exposes younger people to alcohol, unlike the past. Compared to similar studies conducted in Ghana with a reported prevalence of 35% [15], this study reported a higher level of alcohol prevalence among high school students. On the other hand, there have also been reports of a higher prevalence of 46.2% and 43% in the Volta and Greater Accra Regions of Ghana [20,37]. Even though no studies on adolescents' alcohol use exist in the Lower Manya Krobo Municipality to make a comparison on the trend of consumption, the high prevalence rate reported in this study should draw the attention of key stakeholders. This report could be attributed to the early exposure of young people to alcohol use in Ghana. The reported age of alcohol onset was 6 years old at the minimum, which is way below studies reporting 14 years and above [4–8]. Decreasing age of alcohol onset comes with the associated risk of binge drinking in future, alcohol abuse [3,9], early death [3,38], psychological distress [7], early sexual activity onset early, especially in girls [24,39], etc. Early onset of alcohol use, in this case, could be explained by the increasing level of alcohol advertisements in Ghana, especially on TV and Radio. This may have likely aroused the curiosity of young people and children [40], hence the early reported age of alcohol onset.

A greater proportion of lifetime alcohol users was low-risk drinkers. Furthermore, about 7.82% of them had at some point been victims of binge drinking. Unlike the developed world, binge drinking by adolescents and high school students is not common in developing countries. This may be due to the low standard of living due to low financial capabilities [7,36,41,42] of most Ghanaian children compared to the developed world. Males exhibiting high levels of drinking patterns as found in this study being

Table 3. Simple linear regression of age of alcohol onset on associated variables.

Variable	β	p-Value	CI 95%
Grade			
1st year			
2nd year	1.66	<0.001	0.8–2.52
3rd year	1.32	0.001	0.51–2.13
4th year	3.64	0.063	–0.21 to 7.48
Ethnicity			
Akan			
Ewe	–0.26	0.624	–1.3 to 0.78
Krobo	0.14	0.76	–0.74 to 1.01
Ga	–0.05	0.94	–1.43 to 1.32
Adangbe	–1.22	0.408	–4.10 to 1.67
Ningo	2.03	0.478	–3.60 to 7.67
Northerners	–5.97	0.038	–11.60 to 0.33
Parental status outside school			
Live with both parents			
Live with adopted parents	–1.42	0.06	–2.90 to 0.06
Live with single parent	0.28	0.48	–0.5 to 1.05
Live with other relatives	1.18	0.046	0.02–2.34
Live alone	1.55	0.076	–0.16 to 3.25
Age of sex debut	0.53	<0.001	0.30–0.75
Smoking parents			
No			
Yes	1.79	<0.001	1.15–2.43
Number of sex partners	0.26	0.037	0.02–0.50
Age of first purchase	0.30	0.001	0.13–0.47
Occasional drunkenness			
No			
Yes	0.90	0.023	0.12–1.67

consistent with that of other studies [14,43–45]. Despite the differences observed in absolute figures, differences in drinking patterns were not statistically supported as opposed to studies that find increased use of alcohol use and drinking patterns among males than females [28,36,41]. Thus, these findings call for attention to female alcohol use and early onset in this study area and in Ghana.

As supported by numerous studies, several factors have been found to be significantly associated with early alcohol onset and lifetime alcohol use. Among these include age and grade in school [5,43], the parental status of young people, having smoking parents [46], age of first sex, increasing number of sex partners [35,47,48], age of first alcohol purchase, and occasional drunkenness.

Multivariable analysis to determine the risk factor of lifetime alcohol use showed an increased

risk among students with smoking friends, single parents, and ever purchasing of alcohol. However, having a single-sex partner was the only protective risk factor observed in the model. Safe sex practices have been found to be associated with a reduced risk of alcohol use [48]. Furthermore, the study results support similar studies conducted to assess numerous risk factors for alcohol use. In this study, the second-highest proportion of respondents lives with single parents. Hence, parental supervision may not be at the optimum thereby exposing young adults to early alcohol use and abuse. Having smoking friends increased the risk of ever drinking as reported in this study. In Ghana, adolescents who smoke are normally seen drinking as well. Thus, smoking peer may influence their colleagues to at least drink if they are reluctant to smoke. With the absence of alcohol policies in Ghana, there are no

Table 4. Logistic regression showing the risk factors of ever drinking.

Variable	OR	95% CI	p-Value	AOR	95% CI	p-Value
Grade						
1st year	R					
2nd year	1.73	1.15–2.59	0.008			
3rd year	1.52	1.04–2.21	0.03			
4th year	0.42	0.089–2.02	0.282			
Parental status outside school						
Live with both parents	R	R				
Live with adopted parents	1.34	0.69–2.62	0.386	2.15	0.59–7.87	0.246
Live with single parent	1.48	1.04–2.11	0.031	2.25	1.19–4.25	0.012
Live with other relatives	1.11	0.67–1.82	0.693	0.97	0.40–2.36	0.947
Live alone	1.42	0.64–3.15	0.385	0.99	0.11–8.95	0.994
Ever smoked						
No		R			R	
Yes	2.28	1.08–4.80	0.031	5.75	0.55–60.25	0.145
Smoking friends						
No		R			R	
Yes	2.73	1.56–4.79	<0.001	2.16	1.07–4.34	0.032
Unsure	1.48	0.83–2.64	0.184	0.97	0.46–2.04	0.939
Smoking parents						
No		R			R	
Yes	1.74	1.30–2.33	<0.001	0.49	0.16–1.50	0.209
Ever had sex						
No		R			R	
Yes	2.21	1.63–2.98	<0.001	5.75	0.55–60.25	0.145
Number of sex partners						
	1.52	1.31–1.75	<0.001	0.42	0.20–0.87	0.02
Type of sex partners						
No sex partner		R			R	
Single sex partner	1.89	1.25–2.88	0.003	0.09	0.02–0.50	0.006
Multiple sex partners	2.45	1.71–3.51	<0.001	Collinearity		
Academic performance						
Mostly A		R			R	
Mostly B	1.64	0.96–2.80	0.069	1.27	0.53–3.05	0.59
Mostly C	2.07	1.22–3.52	0.007	1.28	0.52–3.13	0.586
Mostly D/F	2.63	1.39–4.94	0.003	0.89	0.17–4.29	0.888
Unsure	1.58	0.74–3.33	0.235	1.04	0.26–4.23	0.952
Ever purchased alcohol						
No					R	
Yes	1.76	1.28–2.41	<0.001	1.87	1.04–3.38	0.037
Parental permission						
Never		R			R	
On special occasions only	1.90	1.14–3.16	0.014	2.19	0.71–6.79	0.174
Under parental supervision	1.11	0.42–2.95	0.838	1.50	0.20–11.25	0.691
Anytime I want	1.58	0.1–25.41	0.746	1.30	0.05–33.73	0.875

(Continued)

Variable	OR	95% CI	p-Value	AOR	95% CI	p-Value
Is alcohol a problem?						
Not at all a problem		R			R	
Minor problem	1.47	0.84–2.57	0.181	1.24	0.28–5.56	0.775
Serious problem	0.55	0.4–0.76	<0.001	0.71	0.25–2.06	0.532
Cons				0.28	0.08–0.97	0.044

laws controlling the age of alcohol purchase. Most adults, parents, and elderly people usually send children and adolescents on errands to purchase alcohol for them. This practice exposes younger people to alcohol use as they may be tempted to drink out of curiosity [15,40]

Just as it is the case in all research studies, this study also comes with its limitations. As a cross-sectional study, where respondents were asked to recall incidents in the past such as the age of first-time alcohol use, there is a tendency of a recall bias. This may not reflect the accurate outcome of variables that required recall of long-time incidents. Furthermore, this study is not a national study as the schools were just selected randomly in one municipality. Therefore, the results reported in this study do not reflect the scenario of the whole of Ghana.

Conclusion and Recommendations

This study sought to assess the prevalence, risk factors of alcohol use, and age of alcohol onset among senior high school students. The findings revealed an absolute high rate of alcohol use compared to studies in the African regions and Ghana. Furthermore, early age of onset among respondents particularly among females was observed. Males reported slightly high levels of riskier drinking patterns than females even though these differences were not statistically significant.

We, therefore, recommend that stakeholders within the district and Ghana focus attention on providing remedies to reducing the early alcohol initiation among young people. School health education programs should also focus on addressing the prospective dangers and risks alcohol abuse has on young people. Furthermore, unlike the past where alcohol abuse was rampant among males, stakeholders should realize the increasing use among females as reported in this study. Female reproductive school health programs should address issues of alcohol use among females.

Government policies should address risk factors that push young people to early access and initiation

of alcohol. This can be achieved by enforcing punitive measures to adults, alcohol stores, and other sources that provide alcohol to underage people.

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Conflict of Interest

The authors declare that they have no competing interests.

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Authors Contribution

Authors Emmanuel Kofi Bondah and Sharon L Talboys developed the proposal and the data collection tool. Authors Emmanuel Kofi Bondah and Lisa H Gren collected data. All authors contributed to the analysis of the data, drafting, and reviewing of the manuscript.

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