







BMJ Open Alcohol use among in-school adolescents in Sierra Leone

Augustus Osborne ¹, Richard Gyan Aboagye ^{2,3}, Comfort Z Olorunsaiye ⁴, Peter Bai James ^{5,6}, Camilla Bangura,¹ Abdul-Aziz Seidu ⁷, Jia B Kangbai,¹ Bright Opoku Ahinkorah ⁸

To cite: Osborne A, Aboagye RG, Olorunsaiye CZ, *et al.* Alcohol use among in-school adolescents in Sierra Leone. *BMJ Open* 2024;**14**:e080222. doi:10.1136/bmjopen-2023-080222

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<https://doi.org/10.1136/bmjopen-2023-080222>).

Received 24 September 2023
Accepted 08 March 2024

ABSTRACT

Objective To examine the prevalence of alcohol use and its associated factors among in-school adolescents in Sierra Leone.

Design Data for the study was sourced from the 2017 Sierra Leone Global School-Based Student Health Survey, a nationally representative survey conducted among in-school adolescents aged 10–19 years using a multistage sampling methodology. Percentages were used to present the prevalence of alcohol use among in-school adolescents. Multivariable binary logistic regression analysis was performed to examine the factors associated with alcohol use among in-school adolescents. The results were presented using adjusted odds ratios (aOR) with their respective 95% confidence interval (CI).

Setting Sierra Leone.

Participants A weighted sample of 1730 in-school adolescents in Sierra Leone.

Outcome measure Current alcohol use.

Results The prevalence of alcohol use among in-school adolescents was 10.7% (7.3, 15.3). In-school adolescents in senior secondary schools were more likely to use alcohol compared with those in junior secondary school (aOR=2.13; 95% CI 1.37, 3.30). The odds of alcohol use was higher among in-school adolescents who were truant at school relative to those who were not (aOR=2.24; 95% CI 1.54, 3.26). Also, in-school adolescents who were bullied (aOR=1.85; 95% CI 1.24, 2.76), ever engaged in sexual intercourse (aOR=2.06; 95% CI 1.39, 3.06), and used marijuana (aOR=3.36; 95% CI 1.72, 6.53) were more likely to use alcohol compared with those who were not. However, in-school adolescents who reported that their parents understood their problems (aOR=0.52; 95% CI 0.33, 0.82) had a lower likelihood of consuming alcohol.

Conclusion Our study has shown that alcohol use is prevalent among in-school adolescents in Sierra Leone. Grade level, experiences of being bullied, history of sexual intercourse, truancy at school, and previous use of marijuana were the factors influencing alcohol use among in-school adolescents. The findings emphasise the necessity of creating school-based health interventions in Sierra Leone that can effectively identify in-school adolescents potentially vulnerable to alcohol-related issues. Also, existing policies and programmes aimed at reducing alcohol use among in-school adolescents need to be strengthened.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The study used a nationally representative sample of in-school adolescents, providing a comprehensive analysis of alcohol use prevalence and determinants among this population.
- ⇒ Our study provides results on alcohol use among in-school adolescents in Sierra Leone, which can be used to inform policy and programme development.
- ⇒ Information on the risk factors associated with alcohol use can be used to develop targeted interventions to prevent alcohol use among in-school adolescents.
- ⇒ The 2017 Sierra Leone Global School-Based Student Health Survey used a cross-sectional design, which limits the study's ability to establish causality between the determinants and alcohol use.
- ⇒ The study is limited to in-school adolescents, which may not be representative of out-of-school adolescents.

INTRODUCTION

Alcohol use is the leading risk factor for death and disease among young people aged 15–24 years.¹ The consumption of alcohol during adolescence is a significant public health issue, with detrimental consequences for both physical and social well-being.^{2–3} Globally, in 2016, alcohol consumption was linked to an estimated 2.8 million deaths, accounting for 6.8% among males and 2.2% among females.³ Alcohol consumption is classified as the seventh most prominent risk factor for premature deaths and disabilities,⁴ contributing to approximately 5.1% of the global disease burden.⁵ In Sierra Leone, based on data from the World Health Organization (WHO) in 2018, the prevalence of heavy episodic drinking among current drinkers aged 15–19 was 18.7%, with a higher prevalence among males (27.0%) compared with females (10.6%).³ For this study, alcohol use was defined as consuming at least one alcoholic drink within the 30 days prior to the survey.



© Author(s) (or their employer(s)) 2024. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

For numbered affiliations see end of article.

Correspondence to

Dr Augustus Osborne;
augustusosborne2@gmail.com



The prevalence of risky behaviour during adolescence is largely influenced by the developmental nature of this age group.^{6–8} Existing evidence has extensively linked alcohol consumption to mental health disorders later in adulthood.^{3 9 10} The harmful impacts of alcohol use and abuse among in-school adolescents are universal, although prevalence rates may vary across different settings.³

The prevalence of heavy episodic drinking, defined as consuming 60 or more grams of pure alcohol on at least one occasion per month, has declined from 22.6% in 2000 to 18.2% in 2016 among adolescents globally. However, it remains significantly high among individuals who consume alcohol, particularly in certain regions of Eastern Europe and some sub-Saharan African nations, where it exceeds 60% among current adolescent drinkers.³ A study conducted in Nigeria found that 13% of secondary school students engage in alcohol consumption, while 26% reported having consumed alcohol at some point in their lives.¹¹ Similar trend has been observed in Mozambique, with a reported rate of 13.8%,¹² and in Uganda, with a rate of 18%.¹³ In Ghana, the prevalence ranges from 12.7% to 25% among adolescents,^{14 15} while in Rwanda it stands at 34%.¹⁶ In Tanzania, the prevalence is reported as 35.5%,¹⁷ and in South Africa it is documented as 39.4%.¹⁸ The substantial proportion of alcohol use among in-school adolescents in these countries in sub-Saharan Africa is a significant public health concern, as it is associated with an increased risk of acute and chronic harm and it may also indicate a potential alcohol use problems in adulthood that requires immediate attention from researchers, health professionals and policymakers.³

Research indicates that gender plays a significant role in adolescents' alcohol use, with boys exhibiting a higher rate of alcohol-related behaviours.^{19–22} Additionally, adolescents aged 18 and older are more likely to consume alcohol and get intoxicated.^{19–21} Parental factors, such as disapproval, participation, monitoring, support and strained relationships also influence alcohol consumption patterns in adolescents.^{23–25} Socioeconomic determinants are also influential in the development of alcohol issues among in-school adolescents.^{15 26 27} Mental health characteristics, such as anxiety, loneliness and smoking, also significantly impact alcohol consumption and misuse in adolescents.^{18 28–32} Adolescents with suicidal tendencies and those who are truant are more likely to abuse alcohol.^{19 33–37} Interpersonal risk factors within the school setting, including bullying, physical fights, and attacks, are associated with alcohol use.^{19 38–40} By understanding these factors, programmes and interventions can be developed and implemented towards reducing alcohol misuse and promoting healthier lifestyles for adolescents.

Limited research has been conducted in Sierra Leone to examine the prevalence and factors influencing alcohol use among in-school adolescents. Therefore, due to the dearth of data in Sierra Leone, our study aimed to

examine the prevalence of alcohol use and its associated factors among in-school adolescents in Sierra Leone.

MATERIALS AND METHODS

Data source and design

The study used a publicly accessible cross-sectional data from the 2017 Sierra Leone Global School-Based Student Health Survey (GSHS),⁴¹ which was nationally representative. The dataset can be accessed via <https://extranet.who.int/ncdsmicrodata/index.php/catalog/772/get-microdata> after registration. The GSHS employed a two-stage cluster sampling methodology to obtain a representative dataset encompassing all students aged 10–19 years in junior secondary school 2 and 3 and in senior secondary school 1 to 3 in Sierra Leone. During the initial phase, schools were chosen based on a probability that was proportional to their enrolment size. Next, a random selection process was employed to choose classes, and all students within the selected classes who were aged 10–19 years and present on the day of the data collection were included in the survey. The response rates for the school, student, and overall populations were 94%, 87%, and 82%, respectively. The Sierra Leone GSHS included a total of 2798 adolescents.

The detailed GSHS description can be retrieved via <https://extranet.who.int/ncdsmicrodata/index.php/catalog/772/study-description> (accessed 20 August 2023). A weighted sample of 1730 in-school adolescents aged 10–19 years were included in our final analysis. The present study aligns with the Strengthening the Reporting of Observational Studies in Epidemiology standards for observational studies, as outlined in online supplemental file 1.

Measures

The 2017 Sierra Leone GSHS was used in this study.⁴¹ The dependent variable was 'current use of alcohol' among in-school adolescents, which was operationally defined as whether the respondents consume alcohol or not. The respondents were provided with the option of selecting either 'yes' or 'no'. Respondents who consumed alcohol were categorised as 'yes' and received a numerical value code of '1'. Furthermore, in-school adolescents who had never consumed alcohol were categorised as 'no' and assigned a value code of '0'.

Based on the findings from similar studies,^{42 43} we selected eighteen explanatory variables for this study. The variables consisted of sex of the adolescents, age, grade, truancy, marijuana use, suicide behaviours (suicidal ideation, plan, and attempts), bullying, history of sexual intercourse, close friends, peer support, loneliness, and anxiety. Others were parental checks on adolescent's homework, parental understanding of adolescent's problems, parental knowledge of adolescent's free time, and parental monitoring of adolescent's items or belongings. The explanatory variables used in the study were designated and coded in the following manner: age (1= \leq 14, 0= \geq 15), sex (1=male, 0=female), grade (1=1–3, 0=4–5),

truancy (1=yes, 0=no), marijuana use (1=yes, 0=no), suicidal ideation (1=yes, 0=no), planned suicide (1=yes, 0=no), attempted suicide (1=yes, 0=no), felt lonely (1=yes, 0=no), close friends (1=yes, 0=no), peer support (1=yes, 0=no), ever had sexual intercourse (1=yes, 0=no), experience of bullying (1=yes, 0=no), peer support (1=yes, 0=no), parental awareness of the respondents' free time (1=yes, 0=no), parents checking the respondents' homework (1=yes, 0=no), parents going through the respondents' personal belongings (1=yes, 0=no), and parents understanding the respondents' problems (1=yes, 0=no) (see [table 1](#)).

Statistical analyses

The data analysis was conducted using Stata V.17.0 software. Frequencies and percentages were first used to present the background characteristics of the in-school adolescents. We employed percentages and confidence interval (CIs) to present the prevalence and distribution of alcohol use among in-school adolescents. Prior to the regression analysis, we conducted a multicollinearity test using the variance inflation factor (VIF) and the results showed that the minimum, maximum and mean VIFs were 1.03, 1.57 and 1.22, respectively. Hence, there was no evidence of high collinearity among the variables studied. Later, a multivariable binary logistic regression analysis was adopted to examine the factors associated with alcohol use among in-school adolescents. The first model (model 1) examined the independent association between the explanatory variables and alcohol use and the results were presented using crude odds ratios (cORs) with their respective 95% CIs. All variables that showed a statistically significant association with alcohol use were placed in model 2, the complete model. Model 2 results were presented using adjusted odds ratios (aOR) with 95% CI. Statistical significance was set at $p < 0.05$ in the regression analyses. All analyses were weighted to cater for undersampling and oversampling, as well as to adjust for the complex sampling methodology. All missing observations on variables of interest were dropped.

Ethical consideration

Both child consent and parental or guardian consent forms were obtained from adolescents below 18 years before their inclusion in the survey. Additionally, the WHO ensured that respondents who were 18 years old and above provided informed consent, which was obtained using both written and verbal methods.

Patient and public involvement

Patients and the public were not included in the design and conduct of this research.

RESULTS

Background characteristics of the in-school adolescents

Of the 1730 in-school adolescents included in the study, 65.7% were aged 15 years and older and 34.3% were aged 14 years and below. Slightly more than half (51.1%) of

the adolescents were female and 48.9% were male. More than half of the in-school adolescents were in junior secondary school (69.2%), were not anxious (82.7%), had no suicidal ideation (87.7%), had not planned suicide (84.5%) and had not attempted suicide (85.7%). Most of the in-school adolescents did not feel lonely (83.1%), had close friends (92.3%), experienced bullying (53.2%), had not ever had sexual intercourse (64.2%), had no peer support (69.5%), were not truant at school (67.7%) and had not used marijuana (96.1%). Approximately half had their parents not check their homework (50.3%), understand their problems (53.3%) and know their free time (51.4%). Also, 70.0% of the in-school adolescents had their parents go through their things ([table 2](#)).

Prevalence of alcohol use and its distribution across the explanatory variables

[Table 3](#) presents the prevalence of alcohol use and its distribution across the explanatory variables. The prevalence of alcohol use was 10.7% (7.3, 15.3). The prevalence of alcohol use was higher among in-school adolescents who were aged 15 years and above (12.5%), those in senior secondary school (17.1%) and male in-school adolescents (12.7%). Also, anxious in-school adolescents, those who had suicidal ideations, those who planned suicide, those who attempted suicide, those who felt lonely and those who had close friends reported 13.8%, 18.1%, 15.5%, 23.3%, 15.4% and 10.9%, respectively. Alcohol use was prevalent among in-school adolescents who were bullied (14.5%), those who had ever had sexual intercourse (19.1%), those with no peer support (11.7%), those who were truant at school (18.7%) and those who ever used marijuana (47.7%). Additionally, alcohol use prevalence was high among in-school adolescents whose parents did not check their homework (11.7%), understand their problems (14.6%) and know about their free time (14.5%). Except for anxiety, suicidal ideation, suicidal plan, feeling lonely, close friends, peer support, parents checking for homework and parents going through their things, the remaining variables were statistically associated with alcohol use at $p < 0.05$.

Factors associated with alcohol use among in-school adolescents in Sierra Leone

[Table 4](#) shows the results of the factors associated with alcohol use among in-school adolescents in Sierra Leone. In-school adolescents in senior secondary schools were more likely to use alcohol compared with those in junior secondary school (aOR=2.13; 95% CI = 1.37, 3.30). The odds of alcohol use was higher among in-school adolescents who were truant at school relative to those who were not (aOR=2.24; 95% CI = 1.54, 3.26). Also, adolescents who were bullied (aOR=1.85; 95% CI = 1.24, 2.76), ever engaged in sexual intercourse (aOR=2.06; 95% CI = 1.39, 3.06), felt lonely (aOR = 1.52; 95% CI = 1.01, 2.30), and those who used marijuana (aOR=3.36; 95% CI = 1.72, 6.53) were more likely to use alcohol compared with those who were not bullied, never engaged in sexual

**Table 1** Study variables

Variable	Survey question	Original response options	Recoded
Age	How old are you?	11–18 years (coded categorically)	1= \leq 14 years; 2= \geq 15 years
Sex	What is your sex?	1=male; 2=female	1=male; 0=female
Grade	In what grade are you?	1-2= Junior Secondary School (JSS) to 3-5 Senior Secondary School (SSS)	1=SSS0 = JSS
Current alcohol use	During the past 30 days, how many days did you have at least one drink containing alcohol?	1=0 days to 7=all 30 days	1=0 and 2-7=1
Ever used marijuana	During your life, how many times have you used marijuana?	1=0 times to 5=20 or more times	1=0 and 2-5=1
Suicidal ideation	During the past 12 months, did you ever seriously consider attempting suicide?	Yes=1; no=2	Yes=1; no=0
Planned suicide	During the past 12 months, did you make a plan about how you would attempt suicide?	Yes=1; no=2	Yes=1; no=0
Attempted suicide	During the past 12 months, how many times did you actually attempt suicide?	1=0 times to 5=6 times or more	1=0 and 2-5=1
Close friends	How many close friends do you have?	1=0 to 4=3 or more	1=0 and 2-4=1
Felt lonely	During the past 12 months, how often have you felt lonely?	1=never to 5=always	1-3=0 and 4-5=1
Anxiety	During the past 12 months, how often have you been so worried about something that you could not sleep at night?	1=never to 5=always	1-3=0 and 4-5=1
Ever had sexual intercourse	Have you ever had sexual intercourse?	Yes=1; no=2	Yes=1; no=0
Bullied	During the past 30 days, how many days were you bullied?	1=0 days to 7=all 30 days	1=0 and 2-7=1
Truant at school	During the past 30 days, how many days did you miss classes or school without permission?	1=0 days to 5=10 or more days	1=0 and 2-5=1
Peer support	During the past 30 days, how often were most of the students in your school kind and helpful?	1=never to 5=always	1-3=0 and 4-5=1
Parents check homework	During the past 30 days, how often did your parents or guardians check to see if your homework was done?	1=never to 5=always	1-3=0 and 4-5=1
Parents understand problems	During the past 30 days, how often did your parents or guardians understand your problems and worries?	1=never to 5=always	1-3=0 and 4-5=1
Parents know about free time	During the past 30 days, how often did your parents or guardians really know what were you doing with your free time?	1=never to 5=always	1-3=0 and 4-5=1
Parents go through their things	During the past 30 days, how often did your parents or guardians go through your things without your approval?	1=never to 5=always	1-3=0 and 4-5=1

JSS, junior secondary school; SSS, senior secondary school.

Table 2 Background characteristics of the in-school adolescents in Sierra Leone

Variables	Weighted frequency (n)	Weighted percentage (%)
Age (years)		
≤14	593	34.3
≥15	1137	65.7
Grade		
Junior secondary school	1197	69.2
Senior secondary school	533	30.8
Sex		
Female	885	51.1
Male	845	48.9
Anxiety		
No	1431	82.7
Yes	299	17.3
Suicidal ideation		
No	1518	87.7
Yes	212	12.3
Planned suicide		
No	1463	84.5
Yes	267	15.5
Attempted suicide		
No	1482	85.7
Yes	248	14.3
Felt lonely		
No	1438	83.1
Yes	292	16.9
Close friends		
No	134	7.7
Yes	1596	92.3
Bullied		
No	810	46.8
Yes	920	53.2
Ever had sexual intercourse		
No	1110	64.2
Yes	620	35.8
Peer support		
No	1202	69.5
Yes	528	30.5
Truant at school		
No	1171	67.7
Yes	559	32.3
Ever used marijuana		
No	1663	96.1
Yes	67	3.9

Continued

Table 2 Continued

Variables	Weighted frequency (n)	Weighted percentage (%)
Parents check homework		
No	871	50.3
Yes	859	49.7
Parents understand problems		
No	923	53.3
Yes	807	46.7
Parents know about free time		
No	889	51.4
Yes	841	48.6
Parents go through their things		
No	1211	70.0
Yes	519	30.0

intercourse, never felt lonely, and did not use marijuana, respectively. Also, in-school adolescents who attempted suicide were more likely to use alcohol compared with those who did not attempt suicide (aOR=1.80; 95% CI = 1.10, 2.93). However, in-school adolescents whose parents comprehensively understand their problems had a decreased likelihood of alcohol use (aOR=0.52; 95% CI = 0.33, 0.82) relative to those whose parents did not understand their problems.

DISCUSSION

This study examined the prevalence of alcohol use and its associated factors among in-school adolescents in Sierra Leone. The finding revealed that 10.7% of the surveyed in-school adolescents reported using alcohol in the past 30 days prior to the survey. Many in-school adolescents in Sierra Leone face challenges such as poverty, hunger, malnutrition and limited access to essential services and opportunities.⁴⁴ These challenges may limit their ability and desire to purchase and consume alcohol, as they have more pressing needs and priorities. Moreover, alcohol use may come with negative social consequences such as stigma, discrimination, violence, and legal issues, which may deter adolescents from engaging in this behaviour.⁴⁴ However, with this proportion of alcohol use, the government of Sierra Leone should continue to involve and empower local communities, particularly parents, teachers, religious leaders and civil society groups, to raise awareness and take action against harmful use of alcohol among in-school adolescents.

The study found that age and gender were not statistically significant predictors of alcohol use among in-school adolescents in Sierra Leone. This observation may be attributed to the relatively low prevalence of alcohol use in Sierra Leone, which could be influenced by the dominant religious practices in the country. Islam and Christianity, the prevailing religions in Sierra Leone, generally

Table 3 Prevalence and distribution of alcohol use among in-school adolescents

Variables	Alcohol use	
	No, % (CI)	Yes, % (CI)
Prevalence	89.3 (84.7, 92.7)	10.7 (7.3, 15.3)
Age (years)		
≤14	92.9 (88.2, 95.8)	7.1 (4.2, 11.8)
≥15	87.5 (82.0, 91.5)	12.5 (8.5, 18.0)
Grade		
Junior secondary school	92.2 (87.1, 95.4)	7.8 (4.6, 12.9)
Senior secondary school	82.9 (73.4, 89.5)	17.1 (10.5, 26.6)
Sex		
Female	91.2 (87.5, 93.9)	8.8 (6.1, 12.5)
Male	87.3 (81.2, 91.7)	12.7 (8.3, 18.8)
Anxiety		
No	90.0 (85.0, 93.4)	10.0 (6.6, 15.0)
Yes	86.2 (75.4, 92.7)	13.8 (7.3, 24.6)
Suicidal ideation		
No	90.4 (85.3, 93.8)	9.6 (6.2, 14.7)
Yes	81.9 (68.0, 90.6)	18.1 (9.4, 32.0)
Planned suicide		
No	90.2 (85.0, 93.7)	9.8 (6.3, 15.0)
Yes	84.5 (73.3, 91.6)	15.5 (8.4, 26.7)
Attempted suicide		
No	91.4 (86.7, 94.6)	8.6 (5.4, 13.3)
Yes	76.7 (66.2, 84.7)	23.3 (15.3, 33.8)
Felt lonely		
No	90.3 (85.7, 93.5)	9.7 (6.5, 14.3)
Yes	84.6 (73.0, 91.8)	15.4 (8.2, 27.0)
Close friends		
No	91.3 (83.5, 95.6)	8.7 (4.4, 16.5)
Yes	89.1 (84.3, 92.6)	10.9 (7.4, 15.7)
Bullied		
No	93.6 (89.9, 96.0)	6.4 (4.0, 10.1)
Yes	85.5 (78.9, 90.3)	14.5 (9.7, 21.1)
Ever had sexual intercourse		
No	94.0 (91.0, 96.1)	6.0 (3.9, 9.0)
Yes	80.9 (74.0, 86.3)	19.1 (13.7, 26.0)
Peer support		
No	88.3 (81.9, 92.6)	11.7 (7.4, 18.1)
Yes	91.7 (88.7, 94.0)	8.3 (6.0, 11.3)
Truant at school		
No	93.1 (89.3, 95.6)	6.9 (4.4, 10.7)
Yes	81.3 (75.5, 86.0)	18.7 (14.0, 24.5)
Ever used marijuana		
No	90.8 (86.0, 94.1)	9.2 (5.9, 14.0)
Yes	52.3 (22.8, 80.2)	47.7 (19.8, 77.2)

Continued

Table 3 Continued

Variables	Alcohol use	
	No, % (CI)	Yes, % (CI)
Parents check homework		
No	88.3 (83.0, 92.1)	11.7 (7.9, 17.0)
Yes	90.3 (84.2, 94.3)	9.7 (5.7, 15.8)
Parents understand problems		
No	85.4 (78.8, 90.1)	14.6 (9.9, 21.2)
Yes	93.8 (89.4, 96.5)	6.2 (3.5, 10.6)
Parents know about free time		
No	85.5 (78.7, 90.3)	14.5 (9.7, 21.3)
Yes	93.4 (90.4, 95.5)	6.6 (4.5, 9.6)
Parents go through their things		
No	89.3 (84.5, 92.8)	10.7 (7.2, 15.5)
Yes	89.3 (83.1, 93.4)	10.7 (6.6, 16.9)

discourage or prohibit the use of alcohol.⁴⁵ Additionally, it is worth noting that sociocultural norms in Sierra Leone may discourage alcohol use among in-school adolescents, especially girls, due to the increased likelihood of facing social stigma and prejudice.⁴⁵

Regarding gender differences, our study showed that males had a higher proportion of alcohol intake compared with females, with the regression results showing similar pattern, although not statistically significant. Males may experience social pressure to conform, make a favourable impression on others or cope with stress by consuming alcohol. On the other hand, females may encounter increased social shame, discrimination or violence if they consume alcohol, particularly in conservative or religious groups.⁴⁶ Males may have a higher likelihood of associating with those individuals who consume alcohol or being exposed to alcohol in their social environments. They may also have easier access to alcohol, whether obtained legally or illegally, compared with females.⁴⁶ Additionally, males may be more susceptible to psychological distress and trauma as a result of poverty, violence, warfare and displacement. These factors can impact their mental health and overall well-being, potentially leading to conditions such as depression, anxiety, post-traumatic stress disorder or suicidal thoughts.⁴⁷ Alcohol may serve as a means for self-medication, seeking relief or coping with these adverse emotions and experiences.⁴⁸ Similar prevalence of alcohol consumption among boys has been observed in countries such as Cambodia,¹⁹ Thailand,²⁰ the Philippines,²¹ sub-Saharan Africa,²² Morocco,⁴⁵ Kenya,⁴⁹ Ethiopia⁵⁰ and Mexico.⁵¹ These findings suggest that when implementing intervention programmes in schools to address alcohol use among adolescents, it is important to consider mental health and socioenvironmental factors that contribute to their engagement in substance use behaviours.

The study's results indicate that late adolescence (15–18 years) is a noteworthy contributing factor to

Table 4 Factors associated with alcohol use among in-school adolescents in Sierra Leone

Variables	Current alcohol use	
	Model 1 cOR (95% CI)	Model 2 aOR (95% CI)
Age (years)		
≤14	1.00	1.00
≥15	1.86** (1.28, 2.71)	1.05 (0.66, 1.69)
Grade		
Junior secondary school	1.00	1.00
Senior secondary school	2.43*** (1.76, 3.35)	2.13** (1.37, 3.30)
Sex		
Female	1.00	1.00
Male	1.50* (1.09, 2.07)	1.13 (0.78, 1.63)
Anxiety		
No	1.00	–
Yes	1.44 (0.97, 2.12)	–
Suicidal ideation		
No	1.00	1.00
Yes	2.08*** (1.40, 3.08)	1.63 (0.95, 2.79)
Planned suicide		
No	1.00	1.00
Yes	1.69** (1.15, 2.49)	0.97 (0.57, 1.64)
Attempted suicide		
No	1.00	1.00
Yes	3.23*** (2.25, 4.64)	1.80* (1.10, 2.93)
Felt lonely		
No	1.00	1.00
Yes	1.69** (1.18, 2.43)	1.52* (1.01, 2.30)
Close friends		
No	1.00	–
Yes	1.28 (0.61, 2.66)	–
Bullied		
No	1.00	1.00
Yes	2.48*** (1.74, 3.54)	1.85** (1.24, 2.76)
Ever sexual intercourse		
No	1.00	1.00
Yes	3.71*** (2.67, 5.18)	2.06*** (1.39, 3.06)
Peer support		
No	1.00	1.00
Yes	0.68* (0.47, 0.97)	0.83 (0.55, 1.23)
Truant at school		
No	1.00	1.00
Yes	3.10*** (2.23, 4.32)	2.24*** (1.54, 3.26)
Ever used marijuana		
No	1.00	1.00

Continued

Table 4 Continued

Variables	Current alcohol use	
	Model 1 cOR (95% CI)	Model 2 aOR (95% CI)
Yes	9.02*** (5.41, 15.04)	3.36*** (1.72, 6.53)
Parents check homework		
No	1.00	–
Yes	0.81 (0.58, 1.11)	–
Parents understand problems		
No	1.00	1.00
Yes	0.38*** (0.26, 0.55)	0.52** (0.33, 0.82)
Parents know about free time		
No	1.00	1.00
Yes	0.42*** (0.30, 0.58)	0.71 (0.47, 1.07)
Parents go through their things		
No	1.00	–
Yes	1.00 (0.71, 1.40)	–

*P<0.05, **P<0.01, ***P<0.001.
aOR, adjusted odds ratio; CI, confidence interval; cOR, crude odds ratio.

alcohol consumption, a trend that has also been observed in other countries and subregions such as Cambodia,¹⁹ Thailand,²⁰ the Philippines²¹ and sub-Saharan Africa.⁵² Late adolescence, which spans from ages 15 to 18, is a period characterised by the escalation of drinking and alcohol use problems for many and by the onset of increased autonomy, reduced parental monitoring and greater involvement with peers, all of which create opportunities for psychological growth as well as a context for the emergence of problem drinking.

Furthermore, our study has identified bullying, attempted suicide, feelings of loneliness, truancy at school, engagement in sexual intercourse, and marijuana usage as factors associated with alcohol use among the in-school adolescents. In-school adolescents who experience bullying, attempt suicide, feel lonely and absenteeism from school may turn to alcohol to cope with their stress and emotional pain. Also, adolescents who engage in sexual activity may be more likely to drink alcohol to cope with the stress and anxiety associated with sexual activity. Marijuana use is often associated with conduct problems, and adolescents who use marijuana may be more likely to drink alcohol as well. Several studies conducted in various countries have shown an association between the aforementioned factors and alcohol use among in-school adolescents.^{19–22 33–37 42 52} Adolescents who encounter mental health problems and unfavourable socioenvironmental conditions are more likely to engage in alcohol and substance use as a means of coping with their issues.^{43 53}

In our study, we found that parental comprehension of the challenges faced by adolescents serves as a protective factor against alcohol use. Previous research



has extensively documented the significance of parental participation in in-school adolescents' engagement in risky behaviours.^{7 43} The reason for this phenomenon is that when in-school adolescents receive adequate supervision and appropriate advice to navigate the numerous problems that accompany the adolescent stage, their likelihood of engaging in alcohol-related activities decreases. Hence, it is imperative to acknowledge the significance of parental involvement in intervention strategies designed to tackle alcohol use.

Policy and practice implications

The study revealed an association between alcohol use and grade level, bullying, history of sexual intercourse, truancy at school, and marijuana use among in-school adolescents in Sierra Leone. Hence, it is imperative to develop all-encompassing and empirically supported initiatives that can effectively prevent and mitigate alcohol intake and its adverse outcomes within this susceptible population. Furthermore, it is imperative to implement more stringent measures and ensure rigorous enforcement of the minimum legal drinking age, taxation policies, licensing requirements and advertising regulations pertaining to alcohol products. It is also essential to have collaboration and coordination across multiple sectors, including government, civil society, health, education and media, to effectively address the underlying factors that contribute to alcohol consumption among in-school adolescents.

Study limitations

The 2017 GSHS conducted in Sierra Leone used a cross-sectional study design, which limits our ability to establish causal association between alcohol use and the explanatory variables. Additionally, it is important to note that the scope of our findings is limited to in-school adolescents in Sierra Leone. Other limitations include the binary separation of age and school grade and unavailability of data on socioeconomic status. Recall bias may be present in the data due to reliance on self-reported responses. Also, missing observations on variables of interest were dropped and this could have an influence on the results of the study. Hence, the results should be interpreted with caution.

CONCLUSIONS

Our study has shown that a substantial proportion of in-school adolescents in Sierra Leone use alcohol. Several factors have been found to relate to alcohol use, including grade level, experiences of being bullied, loneliness, history of sexual intercourse, truancy at school, and marijuana use. Our study highlight the importance of enhancing mental health education throughout educational institutions and local communities in Sierra Leone. Educational programmes of this nature should incorporate mental health promotion initiatives that specifically address the unique health requirements of adolescents especially those aged 15 and older, including enhancing their opportunities for counselling

and educational resources. Additionally, the implementation of peer support and increased parental involvement in the everyday activities of adolescents have been shown to have a positive impact on mitigating adolescent alcohol use behaviour.

Author affiliations

¹Njala University, Freetown, Sierra Leone

²School of Population Health, University of New South Wales, Sydney, NSW 2052, Australia

³Department of Family and Community Health, Fred N. Binka School of Public Health, University of Health and Allied Sciences, Hohoe, Ghana

⁴Arcadia University, Glenside, Pennsylvania, USA

⁵Faculty of Pharmaceutical Sciences, University of Sierra Leone College of Medicine and Allied Health Sciences, Freetown, Sierra Leone

⁶Faculty of Health, Southern Cross University, Lismore, New South Wales, Australia

⁷Public Health & Tropical Medicine, College of Public Health, Medical and Veterinary Sciences, James Cook University, Townsville, Queensland, Australia

⁸School of Clinical Medicine, University of New South Wales Sydney, Sydney, New South Wales, Australia

Twitter Peter Bai James @peb007

Acknowledgements The authors express their gratitude to the WHO, Centers for Disease Control and Prevention (CDC), Sierra Leone Ministry of Health and Sanitation, and Ministry of Education for their contribution in providing the data. This study uses data obtained from the Global School-Based Student Health Survey (GSHS). The GSHS receives support from both the WHO and the US CDC.

Contributors RGA, CZO, PBJ: conception and design of the work, conducted data analysis, drafting of the article, critical revision and final approval of the version to be published. CB, A-AS, JBK, BOA: conception and design of the work, drafting of the article and final approval of the version to be published. AO: guarantor of the review, conception and design of the work, drafting of the article, critical revision and final approval of the version to be published.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not required.

Ethics approval This study involves human participants. Given that our study is based on the examination of a publicly available de-identified secondary data set, there was no need for formal ethical approval to conduct this study. However, it is important to note that the WHO, before conducting the survey in Sierra Leone, received ethical approval from the Ministry of Health and Sanitation. Furthermore, the WHO secured child assent from respondents who were below the age of 18 in conjunction with parental approval from their guardians. Additionally, the WHO ensured that respondents who were 18 years old and above provided informed consent, which was obtained using both written and verbal methods. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available in a public, open access repository. The data set used for analysis in this study was obtained from the GSHS Sierra Leone, 2017. Access to the data can be obtained at the WHO website: <https://extranet.who.int/ncdsmicrodata/index.php/catalog/879>.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which

permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iDs

Augustus Osborne <http://orcid.org/0000-0002-0226-841X>
 Richard Gyan Aboagye <http://orcid.org/0000-0002-3498-2909>
 Comfort Z Olorunsaiye <http://orcid.org/0000-0003-4725-0448>
 Peter Bai James <http://orcid.org/0000-0002-6373-5704>
 Abdul-Aziz Seidu <http://orcid.org/0000-0001-9734-9054>
 Bright Opoku Ahinkorah <http://orcid.org/0000-0001-7415-895X>

REFERENCES

- Mokdad AH, Forouzanfar MH, Daoud F, *et al*. Global burden of diseases, injuries, and risk factors for young people's health during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2016;387:2383–401.
- Kim HS. Alcohol use and delinquent behavior among Korean adolescents. *J Addict Nurs* 2010;21:225–34.
- World Health Organization. *Global status report on alcohol and health 2018*. World Health Organization, 2019.
- GBD 2016 Alcohol Collaborators. Alcohol use and burden for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 2018;392:1015–35.
- Inchley J, Currie D, Vieno A, *et al*. *Adolescent alcohol-related behaviours: trends and inequalities in the WHO European Region, 2002–2014: observations from the Health Behaviour in School-aged Children (HBSC) WHO collaborative cross-national study*. World Health Organization. Regional Office for Europe, 2018.
- Kaess M, Parzer P, Mattern M, *et al*. Adverse childhood experiences and their impact on frequency, severity, and the individual function of nonsuicidal self-injury in youth. *Psychiatry Res* 2013;206:265–72.
- Kugbey N, Ayanore MA, Amu H, *et al*. International NOTE: analysis of risk and protective factors for risky sexual behaviours among school-aged adolescents. *J Adolesc* 2018;68:66–9.
- Oshodi OY, Aina OF, Onajole AT. Substance use among secondary school students in an urban setting in Nigeria: prevalence and associated factors. *Afr J Psychiatry (Johannesburg)* 2010;13:52–7.
- Jensen LA, Arnett JJ, McKenzie J. *Globalization and cultural identity*. Springer New York, 2011.
- Moss HB, Chen CM, Yi HY. Early adolescent patterns of alcohol, cigarettes, and marijuana polysubstance use and young adult substance use outcomes in a nationally representative sample. *Drug Alcohol Depend* 2014;136:51–62.
- Osonuga AA, Ogunmoroti BD, Osonuga A, *et al*. Alcohol use among secondary school students in Nigeria: a worrisome trend. *N Niger J Clin Res* 2019;8:54.
- Darteh EKM. Alcohol use among school-going adolescents in Mozambique: prevalence and correlates. *Journal of Substance Use* 2022;27:156–61.
- Rudatsikira E, Muula AS, Siziya S, *et al*. Suicidal Ideation, and associated factors among school-going adolescents in rural Uganda. *BMC Psychiatry* 2007;7:67.
- Adu-Mireku S. The prevalence of alcohol, cigarette, and marijuana use among Ghanaian senior secondary students in an urban setting. *J Ethn Subst Abuse* 2003;2:53–65.
- Doku D. Substance use and risky sexual Behaviours among sexually experienced Ghanaian youth. *BMC Public Health* 2012;12:571.
- Kanyoni M, Gishoma D, Ndahindwa V. Prevalence of psychoactive substance use among youth in Rwanda. *BMC Res Notes* 2015;8:190.
- Francis JM, Weiss HA, Mshana G, *et al*. The epidemiology of alcohol use and alcohol use disorders among young people in northern Tanzania. *PLoS One* 2015;10:e0140041.
- James S, Reddy SP, Ellahebokus A, *et al*. The association between adolescent risk behaviours and feelings of sadness or hopelessness: a cross-sectional survey of South African secondary school learners. *Psychol Health Med* 2017;22:778–89.
- Peltzer K, Pengpid S, Tepriru C. Associations of alcohol use with mental health and alcohol exposure among school-going students in Cambodia. *Nagoya J Med Sci* 2016;78:415–22.
- Pengpid S, Peltzer K. Alcohol use and associated factors among adolescent students in Thailand. *West Indian Med J* 2012;61:890–6.
- Swahn MH, Palmier JB, Benegas-Segarra A, *et al*. Alcohol marketing and drunkenness among students in the Philippines: findings from the nationally representative global school-based student health survey. *BMC Public Health* 2013;13:1159.
- Woolf-King SE, Maisto SA. Alcohol use and high-risk sexual behavior in sub-Saharan Africa: a narrative review. *Arch Sex Behav* 2011;40:17–42.
- Ryan C, Russell ST, Huebner D, *et al*. Family acceptance in adolescence and the health of LGBT young adults. *J Child Adolesc Psychiatr Nurs* 2010;23:205–13.
- Strunin L, Díaz-Martínez A, Díaz-Martínez LR, *et al*. Alcohol use among Mexican youths: is Familismo protective for moderate drinking? *J Child Fam Stud* 2015;24:309–16.
- Nash SG, McQueen A, Bray JH. Pathways to adolescent alcohol use: family environment, peer influence, and parental expectations. *J Adolesc Health* 2005;37:19–28.
- Sun K, Ren M, Liu D, *et al*. Alcohol consumption and risk of metabolic syndrome: a meta-analysis of prospective studies. *Clin Nutr* 2014;33:596–602.
- Glass JE, Mowbray OP, Link BG, *et al*. Alcohol stigma and persistence of alcohol and other psychiatric disorders: a modified labeling theory approach. *Drug Alcohol Depend* 2013;133:685–92.
- Buckner JD, Schmidt NB, Lang AR, *et al*. Specificity of social anxiety disorder as a risk factor for alcohol and Cannabis dependence. *J Psychiatr Res* 2008;42:230–9.
- Dube SR, Miller JW, Brown DW, *et al*. Adverse childhood experiences and the association with ever using alcohol and initiating alcohol use during adolescence. *J Adolesc Health* 2006;38:444.
- Savage JE, Kaprio J, Korhonen T, *et al*. The effects of social anxiety on alcohol and cigarette use across adolescence: results from a longitudinal twin study in Finland. *Psychol Addict Behav* 2016;30:462–74.
- Qualter P, Brown SL, Rotenberg KJ, *et al*. Trajectories of loneliness during childhood and adolescence: predictors and health outcomes. *J Adolesc* 2013;36:1283–93.
- Balogun O, Koyanagi A, Stickley A, *et al*. Alcohol consumption and psychological distress in adolescents: a multi-country study. *J Adolesc Health* 2014;54:228–34.
- Carney T, Myers BJ, Louw J, *et al*. The relationship between substance use and delinquency among high-school students in Cape town, South Africa. *J Adolesc* 2013;36:447–55.
- Page RM, West JH. Suicide Ideation and psychosocial distress in sub-Saharan African youth. *Am J Health Behav* 2011;35:129–41.
- Gass JT, Glen WB, McGonigal JT, *et al*. Adolescent alcohol exposure reduces behavioral flexibility, promotes disinhibition, and increases resistance to extinction of ethanol self-administration in adulthood. *Neuropsychopharmacology* 2014;39:2570–83.
- Goldberg-Looney LD, Sánchez-SanSegundo M, Ferrer-Cascales R, *et al*. Adolescent alcohol use in Spain: connections with friends, school, and other delinquent behaviors. *Front Psychol* 2016;7:269.
- Mounteney J, Haugland S, Skutle A. Truancy, alcohol use and alcohol-related problems in secondary school pupils in Norway. *Health Educ Res* 2010;25:945–54.
- Kelly AB, Chan GCK, Mason WA, *et al*. The relationship between psychological distress and adolescent polydrug use. *Psychol Addict Behav* 2015;29:787–93.
- Peleg-Oren N, Cardenas GA, Comerford M, *et al*. An association between bullying behaviors and alcohol use among middle school students. *J Early Adolesc* 2012;32:761–75.
- Salas-Wright CP, Hernandez L, Maynard BR, *et al*. Alcohol use among Hispanic early adolescents in the United States: an examination of behavioral risk and protective profiles. *Subst Use Misuse* 2014;49:864–77.
- WHO. NCD Microdata repository. global school-based student health survey. 2021. Available: <https://extranet.who.int/ncdsmicrodata/index.php/catalog/> [Accessed 20 Aug 2023].
- Obeng P, Sambah F, Sarfo JO, *et al*. Prevalence and predictors of alcohol use among school-going adolescents in Panama: a population-based cross-sectional study. *Children (Basel)* 2023;10:891.
- Opong Asante K, Kugbey N. Alcohol use by school-going adolescents in Ghana: prevalence and correlates. *Mental Health & Prevention* 2019;13:75–81.
- Independent Observer. Poverty, drugs, alcohol, and substance abuse in Sierra Leone. 2022. Available: <https://independentobserver-sl.com/2022/10/06/poverty-drugs-alcohol-and-substance-abuse-in-sierra-leone/> [Accessed 27 Nov 2023].
- El Omari F, Toufiq J, Mohammed Vth University, *et al*. The Mediterranean school survey project on alcohol and other drugs in Morocco. *Addicta* 2015;2:30–9.
- James PB, Osborne A, Bah AJ, *et al*. Sexual risk behaviour among school-going adolescents in Sierra Leone and Liberia: a secondary analysis of the 2017 global school-based student health surveys. *Contracept Repr Med* 2022;7:27.



- 47 Politico SL. Youth and drugs in Sierra Leonn. 2015. Available: <https://politicosl.com/articles/youth-and-drugs-sierra-leone> [Accessed 27 Nov 2023].
- 48 Osborne LA, James PB, Olorunsaiye CZ, *et al.* Cannabis use and its psychosocial correlates among school-going adolescents in sierra leone. *In Review* [Preprint] 2023.
- 49 Atwoli L, Mungla PA, Ndung'u MN, *et al.* Prevalence of substance use among college students in Eldoret, Western Kenya. *BMC Psychiatry* 2011;11:34.
- 50 Reda AA, Moges A, Wondmagegn BY, *et al.* Alcohol drinking patterns among high school students in Ethiopia: a cross-sectional study. *BMC Public Health* 2012;12:213.
- 51 Ozer EJ, Fernald LCH. Alcohol and tobacco use among rural Mexican adolescents: individual, familial, and community level factors. *J Adolesc Health* 2008;43:498–505.
- 52 Kugbey N. Prevalence and correlates of substance use among school-going adolescents (11-18Years) in eight sub-Saharan Africa countries. substance abuse treatment, prevention, and policy. *Subst Abuse Treat Prev Policy* 2023;18:44.
- 53 Pengpid S, Peltzer K. High alcohol use and misuse among a national sample of school adolescents in Benin in 2016. *Drugs: Education, Prevention and Policy* 2020;27:328–33.