

RESEARCH NOTE

Open Access



# Psychosocial factors driving common substances used among Ghanaian senior high school students

Rachael Asantewaa Darko<sup>1,2</sup> and Franklin N. Glozah<sup>1\*</sup>

## Abstract

**Objective** Substance use among adolescents poses a significant public health challenge, particularly in low- and middle-income countries like Ghana. This study investigates the prevalence of substance use and its psychosocial correlates among in-school adolescents in Ghana, with the goal of identifying key risk and protective factors to inform culturally appropriate prevention and intervention strategies.

**Results** The findings revealed distinct patterns of substance use linked to social and familial influences. Male students, those living with relatives, and those with peers who drank alcohol had a higher likelihood of alcohol use. Students who engaged in part-time work or had family members who smoked were more likely to use cigarettes. Older adolescents and those with friends who used shisha showed increased shisha consumption. Notably, limited social media exposure and living with parents or siblings were associated with reduced marijuana use. Furthermore, students who reported substance use exhibited signs of potential substance use disorder. The study underscores the strong influence of peer and family substance use behaviours on adolescent substance uptake. These findings highlight the need for targeted, context-specific interventions that address psychosocial risk factors while reinforcing protective family and social dynamics to promote adolescent well-being in Ghana and similar settings.

**Keywords** Substance use, Psychosocial factors, Adolescents, Ghana, Risk factors, Protective factors

## Introduction

Adolescent substance use is a critical global public health challenge, with rising prevalence in developing countries [1]. Alcohol, tobacco, and illicit drugs—psychoactive substances altering cognition and mood [2], are now widespread across socioeconomic groups, including students [3–5], contradicting earlier urban-focused assumptions [6].

Adolescents are particularly vulnerable due to ongoing brain development [7–9], with African youth facing disproportionate risks: substance-related DALY rates are 2.5× higher than in high-income countries [10]. The World Drug Report projects an 11% global increase in drug use by 2030, driven largely by Africa's youth demographic [10].

The global prevalence of substance use continues to rise at an alarming rate, with the World Drug Report projecting an 11% increase in users worldwide by 2030. This trend is expected to be particularly pronounced in Africa, where estimates suggest a potential 40% surge due to demographic factors [11]. Recent data reveals that approximately 275 million people currently use psychoactive substances, representing a 22% increase since 2010, with these substances contributing to nearly half

\*Correspondence:

Franklin N. Glozah  
fglozah@ug.edu.gh

<sup>1</sup> Department of Social and Behavioural Sciences, School of Public Health, University of Ghana, Legon, P.O. Box LG13, Accra, Ghana

<sup>2</sup> Tobacco and Substances of Abuse Directorate, Food and Drugs Authority, Accra, Ghana



© The Author(s) 2025. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

a million deaths and the loss of 18 million healthy life years annually [11]. In the Sub-Saharan African context, studies show that 41.6% of adolescents engage in substance use, predominantly tobacco and alcohol [12], with tobacco alone responsible for about 8 million preventable deaths each year globally [13]. The COVID-19 pandemic has further exacerbated these concerning trends, as increased stress, social isolation, and disruptions to daily routines have led many young people to turn to substances as coping mechanisms [14, 15].

Ghana's unique sociocultural landscape presents distinct patterns of adolescent substance use. The country's rapid urbanization and economic development, coupled with traditional cultural norms, create a complex environment that influences substance use behaviours [16–18]. Senior High Schools have emerged as particularly significant settings for substance use, with studies documenting high prevalence rates in these educational institutions [19, 20]. Recent years have witnessed the emergence of new trends, including the growing popularity of shisha (waterpipe tobacco smoking) among female students, who often perceive it as less harmful than cigarettes [21, 22], as well as increasing instances of polydrug use involving multiple substances [17]. These developments present new challenges for public health interventions targeting adolescent populations.

A complex interplay of factors contributes to substance use initiation and continuation among adolescents. Peer influence and family dynamics play particularly crucial roles, with studies showing strong correlations between adolescent alcohol use and their peers' drinking patterns [23–27]. Parental substance use has been identified as a significant risk factor that increases the likelihood of adolescent substance use by two to three times [23–27]. Other important social determinants include community norms, academic pressures, and involvement with peer groups that normalize substance use [24]. On the protective side, research has consistently demonstrated that strong parent–child relationships and high levels of self-esteem serve as important buffers against substance use initiation and escalation [25–27]. These findings highlight the need for comprehensive interventions that address multiple levels of influence.

This study seeks to examine the key drivers of substance use among Senior High School students in Ghana, with particular attention to both risk and protective factors, with the aim of providing evidence that can inform targeted prevention and intervention strategies.

## Methods

### Study design

This quantitative cross-sectional study surveyed Senior High School students in Accra, Ghana's capital. Accra's

rapid urbanization, socioeconomic diversity, and educational challenges create a complex environment for adolescent substance use research. The city's schools face issues like overcrowding and resource limitations, which—combined with academic pressures and social influences—may increase substance use risks among students.

### Population and sample

The study population consisted of students attending public Senior High Schools within the Accra Metropolitan Area. Eligible participants were Form 1 and 2 students present on data collection day who voluntarily agreed to participate, while excluding unwell students. The sampling frame used the official list of public senior high schools from the Accra Metropolitan Education Office of the Ghana Education Service. From this list, the Director of Education identified three available schools (two others were occupied with ongoing studies). Researchers then used simple random sampling (lottery method) to select two study schools, ensuring both practical feasibility and methodological rigor in site selection.

Sample size was calculated using Cochran's formula for categorical data:  $n = [Z^2 \times p(1-p)]/d^2$ , where  $p$  represents the proportion of substance abuse (45.6%, based on Jumbe et al., 2021),  $Z^2$  corresponds to the 95% confidence interval (1.96), and  $d^2$  is the tolerated sampling error (0.05). This calculation yielded a base sample size of 381.19. To account for potential non-responses, we added a 10% buffer (38.2), resulting in a final required sample size of 421 participants. The 0.05 margin of error was selected to enhance the study's precision in estimating substance use prevalence among the target population. A total of 425 students eventually participated in the study.

The study employed a multi-stage sampling approach. First, two schools were randomly selected from five eligible institutions. Next, random classes were chosen within each school. Finally, systematic sampling was used to select individual students from these classes. Data collection focused exclusively on Senior High School year 1 and 2 students, as year 3 students had already completed their academic year when the study was conducted.

### Measures

The questionnaire's (supplementary file) first section examined both socio-demographic factors (age, sex, class, living situation, employment, income source) and substance availability/accessibility (alcohol, cigarettes, shisha, marijuana). Usage frequency was self-reported, ranging from "never used" to "daily," then categorized clinically: "never"/"monthly" as non-regular use versus biweekly or more frequent as regular use. Participants

also identified substance sources: school, peers, online platforms, markets, or dealers.

#### ***Intrapersonal factors and exposure to substances***

Intrapersonal factors and exposure to substances was assessed with the following items: exposed to substance through friends (Yes/No), exposed to substance through family (Yes/No), exposed to substance through social media (Yes/No). Also access to substances was assessed by asking “How easy is it to obtain these substances”. The response options were very easy—4, easy—3, slightly easy—2, difficult—1, very difficult—0). This was then dichotomised as easy access (4+3+2) and difficult (1+0).

#### ***CAGE-AID substance abuse screening tool***

The CAGE-AID Substance Abuse Screening Tool [27] was used to assess potential substance use disorders. This validated screening instrument evaluates alcohol and drug use through four yes/no questions, with each “yes” scored as 1. A cumulative score  $\geq 2$  suggests possible substance use disorder requiring further evaluation. While simple and effective for initial screening [28], with demonstrated high sensitivity (95.8%) and specificity (100%) at a cutoff  $\geq 3$ , it's important to note the CAGE-AID serves as a screening rather than diagnostic tool [29]. A positive result indicates need for additional assessment; not definitive diagnosis of substance use disorder.

#### ***The Rosenberg Self-Esteem Scale***

The Rosenberg Self-Esteem Scale (RSES) [29] was employed to measure global self-esteem. This 10-item tool uses a 4-point Likert scale, with positive items [1, 2, 4, 6, 7] scored directly and negative items [3, 5, 8–10] reverse-scored. Total scores range from 0 to 30, where scores  $> 15$  indicate high self-esteem and  $< 15$  suggest low self-esteem. The scale demonstrates strong reliability (Cronbach's  $\alpha > 0.80$ ) across diverse populations [30] and has been widely validated cross-culturally [31]. While the RSES is a well-established measure, researchers should consider potential limitations including self-report biases and contextual influences [32].

#### ***Statistical analysis***

Data were analysed using Stata version 16.1. A two-pronged analytical approach was employed, incorporating both difference-in-proportions and inferential analyses. To assess differences in proportions, Pearson's Chi-square ( $\chi^2$ ) test was utilized, with Fisher's exact test substituted in cases where any  $2 \times 2$  table cell frequency was less than 5%. Binary logistic regression analysis, employing both univariate and multivariate approaches were used and regression models were

estimated using a 95% confidence interval. This sequential approach allowed for initial identification of significant proportional differences, followed by quantification of the association strength through logistic regression. A  $p$ -value  $< 0.05$  indicated statistical significance.

#### ***Ethics approval and consent to participate***

Ethical clearance for this study was obtained from the Ghana Health Service Ethics Review Committee (GHS-ERC: 025/09/22). Furthermore, permission was granted by the Accra Metro Education Office of the Ghana Education Service and the respective heads of the Senior High Schools involved in participant recruitment. Written informed consent to participate was obtained from all participants aged 16 years and above. For participants under the age of 16, written informed consent was obtained from their parents or legal guardians, and assent was obtained from the participants themselves. All participants received thorough information regarding the study's objectives, procedures, and potential risks and benefits, enabling informed decision-making about their participation. The study adhered to strict anonymity, confidentiality, and privacy protocols. Written informed consent for publication was not obtained in written form, as no identifying images or personal or clinical details of participants are published in the manuscript.

## **Results**

### ***Socio-demographic characteristics of participants***

A total of 425 students participated in the study. Participants were primarily female, with a slight majority in SHS 1. Living arrangements were diverse, with participants living with their mothers, both parents, both parents and siblings, relatives, or alone. A notable proportion of participants reported working while still attending school. Demographic details of the sample are presented in Table 1.

### ***Factors significantly associated with alcohol use***

The prevalence of alcohol use among participants was 19% ( $n = 79$ ). Univariate analysis identified several factors potentially associated with alcohol use. However, multivariate logistic regression (Table 2) revealed that only sex, living situation, and peer influence remained significantly associated with alcohol use.

Specifically, males were 1.88 times more likely to use alcohol than females. Living with relatives was associated with a decreased likelihood of alcohol use, while having friends who use alcohol increased the likelihood of use by 2.34 times.

**Table 1** Socio-demographic characteristics of participants (N = 425)

Variables	Item	N	(%)
Age Group	14–16 ( $\leq 16$ )	126	29.65
	17–22 (17 +)	294	69.18
	Missing	5	1.18
Sex	Male	182	42.82
	Female	242	56.94
	Missing	1	0.24
Form	SHS 1	238	56
	SHS 2	186	43.76
	Missing	1	0.24
Living with	Only father	38	8.94
	Only mother	119	28
	Both parents	114	26.82
	Both parents and siblings	95	22.35
	Relatives	46	10.82
	Live alone	5	1.18
	Missing	8	1.88
Working	No	303	71.29
	Yes	118	27.76
	Missing	4	0.94
Source of pocket money	Parents	315	74.12
	Guardians	58	13.65
	From working	39	9.18
	Gift	5	1.18
	Missing	8	1.88

**Factors significantly associated with cigarette smoking**

The prevalence of cigarette smoking among students was 3.8% ( $n=15$ ). Neither age group nor sex were significantly associated with smoking status (Table 3). Univariate analysis indicated that participants who worked while attending school were more likely to smoke. However, this association was not statistically significant in the adjusted model. Exposure to cigarette use by a family member was significantly associated with smoking.

**Factors significantly associated with shisha use**

Shisha use prevalence was 12.6% ( $n=51$ ), with significant links to age (17+), employment during school, pocket money source, and family/friends' use. Univariate analyses showed employed participants were three times likelier to use shisha than those funded by parents. Those with shisha-using family members were twice as likely, and having friends who smoked shisha tripled the risk. Age  $\geq 17$  also increased likelihood compared to  $\leq 16$  (Table 4).

**Factors significantly associated with marijuana use**

The prevalence of the use of marijuana among participants was 7.5% ( $n=30$ ). From the multivariate analysis, factors associated with marijuana use include family exposure and non-exposure to social media. Respondents who live with parents and siblings were less likely to use marijuana as opposed to those who live with only their father (Table 5).

**Substance use disorder**

Substance use disorder (SUD) was scored from 0 (none) to 4 (severe), with  $\geq 2$  indicating high-risk use. Among users, 62% of alcohol users ( $n=49$ ), 66.7% of marijuana users ( $n=20$ ), and 80.4% of shisha users ( $n=41$ ) met SUD criteria, compared to 46.7% of cigarette smokers. Considering prevalence rates—alcohol (19%), shisha (12.6%), marijuana (7.5%), and cigarettes (3.8%)—the overall substance use prevalence was 11.7% (Table 6).

**Discussion**

This study examined factors driving common substances used among Ghanaian students in senior high schools. Our study confirm the association between various personal characteristics, social, and intrapersonal factors, and substance use. Alcohol use was more prevalent among males, aligning with previous studies in Morocco and Ethiopia [33, 34]. Furthermore, living with relatives and having friends who consume alcohol were significant predictors, emphasizing the importance of peer influence and social networks in adolescent substance use [34–38].

While sex was not significantly associated with cigarette use in our study, it was in a Nigerian study [17]. Although peer use is often a reliable indicator, we found no association, contrasting a study in Ethiopia that found a significant association with having smoker friends and parents [39]. However, our finding of a significant association with family exposure to cigarette use aligns with their results.

Age was associated with shisha smoking, consistent with a Lebanese study [40], but not with studies in Sudan and the UK [41, 42]. We found more boys smoked shisha, though not significantly, contrasting a Lebanese study finding more girls [43]. This discrepancy reflects differing social contexts and gendered expectations [44].

Our study is consistent with a study that found that family and friend shisha use are predictors [45]. While initially significant, low perception of consequences became insignificant after controlling for other factors, contrasting a Canadian study where low perception increased the odds of shisha use [46]. This could be due to misconceptions about shisha's harmfulness [11].

**Table 2** Factors associated with alcohol use (listwise deletion used for missingness)

Socio-demographic	Alcohol use		$\chi^2$	aOR [95%CI]
	No = 336 (80.96)	Yes = 79 (19)		
	n (%)	n (%)		
Age group				
≤ 16	102 (82.26)	22 (17.74)	0.25	<b>Ref</b>
17 +	230 (80.14)	57 (19.86)		1.10 [0.60–2.01]
Sex				
Female	203 (85.65)	34 (14.35)	8.05**	<b>Ref</b>
Male	132 (74.58)	45 (25.42)		1.88 [1.04–3.40] *
Form				
SHS 2	156 (86.67)	24 (13.33)	6.32*	<b>Ref</b>
SHS 1	180 (76.92)	54 (23.08)		1.75 [0.97–3.14]
Whom do you live with				
Only father	29 (76.32)	9 (23.68)	11.61*	<b>Ref</b>
Only mother	85 (74.56)	29 (25.44)		0.92 [0.38–2.25]
Both parents	98 (85.96)	16 (14.04)		0.53 [0.20–1.37]
Both parents and siblings	72 (79.12)	19 (20.88)		0.82 [0.31–2.14]
Relatives	43 (93.48)	3 (6.52)		0.22 [0.05–0.95] *
Live alone	5 (100)	0 (0.0)		–
Working apart from school				
No	246 (82.83)	51 (17.17)	2.75	<b>Ref</b>
Yes	87 (75.65)	28 (24.35)		1.00 [0.49–2.06]
Where participant get pocket money from?				
Parents	253 (82.14)	55 (17.86)	8.28*	<b>Ref</b>
Guardians	49 (85.96)	8 (14.04)		1.00 [0.41–2.47]
From working	25 (65.79)	13 (34.21)		2.06 [0.78–5.41]
Gift	3 (60)	2 (40)		4.57 [0.37–56.13]
Exposed to substance through friends				
Yes	101 (90.99)	10 (9.01)	9.88**	<b>Ref</b>
No	235 (77.3)	69 (22.7)		2.34 [1.03–5.32] *
Exposed to substance through family				
Yes	147 (88.02)	20 (11.98)	9.04**	<b>Ref</b>
No	189 (76.21)	59 (23.79)		1.78 [0.95–3.35]
Exposed to substance through social media				
Yes	139 (81.29)	32 (18.71)	0.02	<b>Ref</b>
No	197 (80.74)	47 (19.26)		1.13 [0.64–2.01]
Access to substances				
Easy	189 (81.12)	44 (18.88)	0.008	<b>Ref</b>
Difficult	147 (80.77)	35 (19.23)		1.07 [0.60–1.91]
Self-esteem				
High self-esteem	149 (81.87)	33 (18.13)	1.20	<b>Ref</b>
Low self-esteem	183 (79.91)	46 (20.09)		0.90 [0.51–1.60]

aOR=adjusted odds ratio; CI=confidence interval; \*p&lt;0.05; \*\*p&lt;0.01

Finally, our study revealed significant associations between marijuana use and family exposure, non-exposure to social media, and living with both parents and siblings, echoing the importance of family influence found in Moroccan and Northern Irish studies [47, 48].

While initially significant, being male, peer exposure, and working alongside schooling became insignificant after adjustment, contrasting studies linking these factors to marijuana use [19, 49]. This could be due to our study's smaller sample size compared to larger studies

**Table 3** Factors associated with cigarette smoking (listwise deletion used for missingness)

Socio-demographic variables	Cigarette use		$\chi^2$	aOR [95%CI]
	No = 383 (96.23)	Yes = 15 (3.8)		
	n (%)	n (%)		
Age group				
≤ 16	116 (96.67)	4 (3.33)	0.11	<b>Ref</b>
17 +	263 (95.99)	11 (4.01)		0.70 [0.19–2.61]
Sex				
Female	224 (96.97)	7 (3.03)	0.85	<b>Ref</b>
Male	158 (95.18)	8 (4.82)		1.14 [0.30–4.41]
Form				
SHS 2	170 (96.59)	6 (3.41)	0.12	<b>Ref</b>
SHS 1	212 (95.93)	9 (4.07)		1.19 [0.33–4.25]
Whom do you live with				
Only father	35 (94.59)	2 (5.41)	6.22	<b>Ref</b>
Only mother	103 (94.5)	6 (5.5)		0.62 [0.12–3.19]
Both parents	99 (94.29)	6 (5.71)		0.81 [0.15–4.32]
Both parents and siblings	90 (100)	0 (0.0)		–
Relatives	45 (97.83)	1 (2.17)		0.37 [0.01–15.60]
Live alone	5 (100)	0 (0.0)		–
Working in addition to school				
No	278 (97.54)	7 (2.46)	5.04*	<b>Ref</b>
Yes	102 (92.73)	8 (7.27)		3.36 [0.72–15.68]
Where participant get pocket money from?				
Parents	282 (96.25)	11 (3.75)	2.85	<b>Ref</b>
Guardians	56 (98.25)	1 (1.75)		0.29 [0.04–2.06]
From working	33 (91.67)	3 (8.33)		0.93 [0.21–4.03]
Gift	5 (100)	0 (0.0)		–
Exposed to substance through friends				
No	105 (97.22)	3 (2.78)	0.40	<b>Ref</b>
Yes	278 (95.86)	12 (4.14)		1.33 [0.23–7.62]
Exposed to substance through family				
No	158 (98.75)	2 (1.25)	4.68*	<b>Ref</b>
Yes	225 (94.54)	13 (5.46)		13.23 [107.35]*
Exposed to substance through social media				
Yes	160 (96.97)	5 (3.03)	0.42	<b>Ref</b>
No	223 (95.71)	10 (4.29)		1.49 [0.40–5.50]
Access to substances				
Easy	219 (97.77)	5 (2.23)	3.34	<b>Ref</b>
Difficult	164 (94.25)	10 (5.75)		2.23 [0.67–7.47]
Self-esteem (n = 398)				
High esteem	171 (97.16)	5 (2.84)	0.98	<b>Ref</b>
Low esteem	208 (95.41)	10 (4.59)		0.83 [0.21–3.32]

aOR = adjusted odds ratio; CI = confidence interval; \*p &lt; 0.05

finding age, low self-esteem, and substance availability as significant predictors [5, 50].

The current study revealed a notable prevalence of substance use disorder among students who reported

using various substances. Specifically, we observed high rates of high-risk substance use on alcohol (62.03%), shisha (80.36%), and marijuana (66.67%), while substance use risk was comparatively lower with cigarettes (46.67%). This lower rate of cigarette substance



**Table 4** Factors associated with shisha use (listwise deletion used for missingness)

Socio-demographic variables	Shisha use		$\chi^2$	aOR [95%CI] p-value
	No = 354 (87.41)	Yes = 51 (12.6)		
	n (%)	n (%)		
Age group				
≤ 16	115 (93.5)	8 (6.5)	6.23*	Ref
17 +	234 (84.48)	43 (15.52)		2.42 [1.10–5.31]*
Sex				
Female	211 (89.79)	24 (10.21)	2.96	Ref
Male	142 (84.02)	27 (15.98)		0.99 [0.48–2.01]
Form				
SHS 2	157 (89.2)	19 (10.8)	0.95	Ref
SHS 1	196 (85.96)	32 (14.04)		1.65 [0.79–3.42]
Whom do you live with				
Only father	28 (75.68)	9 (24.32)	8.72	Ref
Only mother	95 (84.82)	17 (15.18)		0.54 [0.18–1.65]
Both parents	99 (91.67)	9 (8.33)		0.31 [0.09–1.08]
Both parents and siblings	82 (90.11)	9 (9.89)		0.37 [0.11–1.24]
Relatives	42 (91.3)	4 (8.7)		0.31 [0.08–1.24]
Live alone	4 (80)	1 (20)		0.81 [0.08–8.64]
Working apart from school				
No	263 (90.38)	28 (9.62)	8.93**	Ref
Yes	88 (79.28)	23 (20.72)		1.64 [0.74–3.64]
Where participant get pocket money from?				
Parents	269 (89.97)	30 (10.03)	12.52**	Ref
Guardians	48 (84.21)	9 (15.79)		1.52 [0.60–3.90]
From working	27 (72.97)	10 (27.03)		1.73 [0.59–5.07]
Gift	3 (60)	2 (40)		3.41 [0.43–27.31]
Exposed to substance through friends				
No	104 (95.41)	5 (4.59)	8.68**	Ref
Yes	250 (84.46)	46 (15.54)		3.35 [1.20–9.34]*
Exposed to substance through family				
No	150 (92.59)	12 (7.41)	6.59**	Ref
Yes	204 (83.95)	39 (16.05)		1.89 [0.87–4.18]
Exposed to substance through social media				
Yes	151 (89.88)	17 (10.12)	1.59	Ref
No	203 (85.65)	34 (14.35)		1.84 [0.90–3.74]
Access to substances				
Easy	202 (88.6)	26 (11.4)	0.67	Ref
Difficult	152 (85.88)	25 (14.12)		1.21 [0.63–2.33]
Self-esteem (n = 405)				
High esteem	161 (90.45)	17 (9.55)	3.50	Ref
Low esteem	189 (84.75)	34 (15.25)		1.26 [0.63–2.51]

aOR = adjusted odds ratio; CI = confidence interval; \*p &lt; 0.05; \*\*p &lt; 0.01

use disorder aligns with reports of decreased cigarette smoking in Ghana [51].

Our findings echo previous research indicating substance use disorder among students. Similar patterns

of marijuana and alcohol use disorder in 12th-grade students have been found in a previous study [52]. Furthermore, studies conducted in diverse geographical contexts, such as Egypt [53, 54] Jordan [55], and Romania [56], have consistently demonstrated substance

**Table 5** Factors associated with marijuana use (listwise deletion used for missingness)

Socio-demographic	Marijuana use		$\chi^2$	aOR [95%CI]
	No = 370 (92.50)	Yes = 30 (7.50)		
	n (%)	n (%)		
Age group				
≤ 16	115 (94.26)	7 (5.74)	0.85	Ref
17+	251 (91.61)	23 (8.39)		1.21 [0.44–3.36]
Sex				
Female	222 (95.69)	10 (4.31)	8.21**	Ref
Male	147 (88.02)	20 (11.98)		2.60 [0.97–6.99]
Form				
SHS 2	161 (92)	14 (8)	0.10	Ref
SHS 1	208 (92.86)	16 (7.14)		0.89 [0.36–2.22]
Whom do you live with				
Only father	31 (83.78)	6 (16.22)	15.82**	Ref
Only mother	99 (90)	11 (10)		0.35 [0.09–1.35]
Both parents	101 (94.39)	6 (5.61)		0.21 [0.04–1.09]
Both parents and siblings	86 (96.63)	3 (3.37)		0.14 [0.03–0.60]**
Relatives	44 (95.65)	2 (4.35)		0.25 [0.04–1.55]
Live alone	3 (60)	2 (40)		3.19 [0.39–26.01]
Working apart from school				
No	272 (94.44)	16 (5.56)	6.01*	Ref
Yes	95 (87.16)	14 (12.84)		2.45 [0.75–7.99]
Where participant get pocket money from?				
Parents	275 (93.22)	20 (6.78)	3.42	Ref
Guardians	53 (92.98)	4 (7.02)		0.60 [0.17–2.17]
From working	31 (86.11)	5 (13.89)		0.29 [0.04–2.02]
Gift	4 (80)	1 (20)		2.98 [0.10–86.56]
Exposed to substance through friends				
No	106 (98.15)	2 (1.85)	6.80**	Ref
Yes	264 (90.41)	28 (9.59)		4.38 [0.48–39.95]
Exposed to substance through family				
No	155 (96.27)	6 (3.73)	5.53*	Ref
Yes	215 (89.96)	24 (10.04)		3.66 [1.21–11.03]*
Exposed to substance through social media				
Yes	161 (96.99)	5 (3.01)	8.24**	Ref
No	209 (89.32)	25 (10.68)		5.80 [1.84–18.28]**
Access to substances				
Easy	205 (91.11)	20 (8.89)	1.43	Ref
Difficult	165 (94.29)	10 (5.71)		0.51 [0.19–1.31]
Self-esteem (n = 400)				
High esteem	167 (94.89)	9 (5.11)	3.09	Ref
Low esteem	199 (90.45)	21 (9.55)		1.84 [0.73–4.59]

aOR = adjusted odds ratio; CI = confidence interval; \*p &lt; 0.05; \*\*p &lt; 0.01

use disorder among student populations, particularly regarding tobacco.

Collectively, these findings underscore the global nature of substance use disorder among students and highlight the need for targeted interventions and

prevention strategies aimed at reducing substance use and associated harms in this population.

The high substance use rates among Ghanaian youth highlight the need for urgent, multi-level interventions. School-based programs promoting healthy lifestyles and



**Table 6** Substance use disorder (listwise deletion used for missingness)

Variable	Type of substance											
	Alcohol			Cigarette			Shisha			Marijuana		
	Yes (2–4)	No ( $\leq 1$ )	Total	Yes (2–4)	No ( $\leq 1$ )	Total	Yes (2–4)	No ( $\leq 1$ )	Total	Yes (2–4)	No ( $\leq 1$ )	Total
	n (%)	n (%)		n (%)	n (%)		n (%)	n (%)		n (%)	n (%)	
Overall	49 (62.03)	30 (37.97)	79	7 (46.67)	8 (53.33)	15	41 (80.36)	10 (19.61)	51	20 (66.67)	10 (33.33)	30
Age group												
$\leq 16$	13 (59.09)	9 (40.91)	22	2 (50.00)	2 (50.00)	4	7 (87.50)	1 (12.50)	8	4 (57.14)	3 (42.86)	7
17+	36 (63.16)	21 (36.84)	57	5 (45.45)	6 (54.55)	11	34 (79.07)	9 (20.93)	43	16 (69.57)	7 (30.43)	23
Total	49 (62.03)	30 (37.97)	79	7 (46.67)	8 (53.33)	15	41 (80.39)	10 (19.61)	51	20 (66.67)	10 (33.33)	30
Sex												
Male	28 (62.22)	17 (37.78)	45	4 (50.00)	4 (50.00)	8	24 (88.89)	3 (11.11)	27	14 (70.00)	6 (30.00)	20
Female	21 (61.76)	13 (38.24)	34	3 (42.86)	4 (57.14)	7	17 (70.83)	7 (29.17)	24	6 (60.00)	4 (40.00)	10
Total	49 (62.03)	30 (37.97)	79	7 (46.67)	8 (53.33)	15	41 (80.39)	10 (19.61)	51	20 (66.67)	10 (33.33)	30
Form												
SHS 1	35 (64.81)	19 (35.19)	54	3 (33.33)	6 (66.67)	9	26 (81.25)	6 (18.75)	32	12 (75.00)	4 (25.00)	16
SHS 2	14 (58.33)	10 (41.67)	24	4 (66.67)	2 (33.33)	6	15 (78.95)	4 (21.05)	19	8 (57.14)	6 (42.86)	14
Total	49 (62.82)	29 (37.18)	78	7 (46.67)	8 (53.33)	15	41 (80.39)	10 (19.61)	51	20 (66.67)	10 (33.33)	30

substance risks, alongside community support initiatives, could help. Targeted measures, like brief interventions and referrals for high-risk students, should also be prioritized.

### Limitations of the study

First, as SHS 3 students could not participate due to the fact that they had completed school, this may have underestimated the prevalence and associated factors of substance use given that they are much older and more likely to use substances. Secondly, reliance on self-reporting could lead to underreporting due to social desirability bias. Finally, the use of a cross-sectional design does not make it possible to infer causality. Future research should include a wider age range, use a longitudinal design, and incorporate objective measures of substance use to address these limitations.

### Conclusion

This study found moderate substance use—mainly cigarettes, marijuana, shisha, and alcohol, among Ghanaian high school students, primarily sourced from peers. Key risk factors included peer/family influence and male gender, with many students, especially younger males, showing signs of substance use disorder. Urgent targeted interventions and further research are needed to address motivations, impacts, and prevention.

### Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s13104-025-07307-y>.

Additional file1 (PDF 166 KB)

### Acknowledgements

Our sincere appreciation goes to the school authorities who permitted this study to be conducted in their schools and the students who participated in the study. Without them, this study would not have been possible.

### Author contributions

RAD was responsible for conceptualization, methodology, formal analysis, investigation, writing—original draft FNG provided supervision and writing—review & editing.

### Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

### Availability of data and materials

The datasets generated and/or analysed during the current study are available in the Harvard Dataverse repository, <https://doi.org/https://doi.org/10.7910/DVN/MDDYTI>.

### Declarations

#### Ethics approval and consent to participate

Ethical clearance for this study was obtained from the Ghana Health Service Ethics Review Committee (GHS-ERC: 025/09/22). Informed consent to participate was obtained from all participants aged 16 years and above. For participants under the age of 16, written informed consent was obtained from their parents or legal guardians, and assent was obtained from the participants themselves. This study was conducted in accordance with the ethical principles outlined in the Helsinki Declaration.

#### Consent for publication

Not applicable.

#### Competing interests

The authors declare no competing interests.

Received: 30 January 2025 Accepted: 21 May 2025

Published online: 29 May 2025

## References

- Hamidullah S, Thorpe HHA, Frie JA, Mccurdy RD, Khokhar JY. Adolescent substance use and the brain: behavioral, cognitive and neuroimaging correlates. *Front Hum Neurosci*. 2020;14: 517606.
- Shafi A, Berry AJ, Sumnall H, Wood DM, Tracy DK. New psychoactive substances: a review and updates. *Ther Adv Psychopharmacol*. 2020;10:2045125320967197.
- Ogundipe O, Amoo EO, Adeoye D, Olawole-Isaac A. Substance use among adolescents in sub-Saharan Africa: a systematic review and meta-analysis. *S Afr J Child Health*. 2018;2018(1):s79-84.
- Dhawan A, Mishra AK, Ambekar A, Chatterjee B, Agrawal A, Bhargava R. Estimating the size of substance using street children in Delhi using Respondent-Driven Sampling (RDS). *Asian J Psychiatr*. 2020;48: 101890.
- Glozah FN. Exploring the role of self-esteem and parenting patterns on alcohol use and abuse among adolescents. *Health Psych Res*. 2014.
- Earnshaw VA. Stigma and substance use disorders: a clinical, research, and advocacy agenda. *Am Psychol*. 2020;75(9):1300.
- Jumbe S, Kamninga TM, Mwalwimba I, Kalu UG. Determinants of adolescent substance use in Africa: a systematic review and meta-analysis protocol. *Syst Rev*. 2021;10(1):125.
- Lees B, Meredith LR, Kirkland AE, Bryant BE, Squeglia LM. Effect of alcohol use on the adolescent brain and behavior. *Pharmacol Biochem Behav*. 2020;192: 172906.
- Glozah FN, Komesuor J. University students' alcohol use behaviour and self-efficacy to abstain from alcohol use: data from Ghana. *BMC Res Notes*. 2019;12(1).
- Castelpietra G, Knudsen AKS, Agardh EE, Armocida B, Beghi M, Iburg KM, et al. The burden of mental disorders, substance use disorders and self-harm among young people in Europe, 1990–2019: Findings from the Global Burden of Disease Study 2019. *The Lancet Regional Health–Europe*. 2022;16.
- United Nations Office on Drugs and Crime. World drug report 2021. 2021.
- Jumbe C, Darko F, Chilongo T. Centre for Agricultural Research and Development (CARD) TRAINING MANUAL 1. 2014;1.
- World Health Organization. Global status report on alcohol and health and treatment of substance use disorders. 2024.
- World Health Organization. The impact of COVID-19 on mental, neurological and substance use services: results of a rapid assessment. 2020.
- Jamatia B. Prevalence of alcohol intake and illegal drugs among the students at English medium private schools of Tripura, India (North Eastern States of India). *Indian J Commun Med*. 2022;47(4):618–21.
- Kabore A, Afriyie-Gyawu E, Awuah J, Hansen A, Walker A, Hester M, et al. Social ecological factors affecting substance abuse in Ghana (West Africa) using photovoice. *Pan Afr Med J*. 2019;34.
- Fagbule OF, Kanmodi KK, Samuel VO, Isola TO, Aliemeke EO, Ogbiede ME, et al. Prevalence and predictors of cigarette smoking and alcohol use among secondary school students in Nigeria. *Ann Ib Postgrad Med*. 2021;19(2):112–23.
- Kyei-Gyamfi S, Kyei-Arthur F, Alhassan N, Agyekum MW, Abrah PB, Kugbey N. Prevalence, correlates, and reasons for substance use among adolescents aged 10–17 in Ghana: a cross-sectional convergent parallel mixed-method study. *Subst Abuse Treat Prev Policy*. 2024;19(1).
- Oppong AK. Cannabis and amphetamine use and its psychosocial correlates among school-going adolescents in Ghana. *Child Adolesc Psychiatry Ment Health*. 2019;13:1–9.
- Glozah FN, Komesuor J, Adu NAT, Aggrey FK. The role of alcohol abstinence self-efficacy in alcohol use: a cross-sectional survey of Ghanaian undergraduate students. *Afr J Drug Alcohol Stud*. 2017;16(1).
- Logo DD, Kyei-Faried S, Oppong FB, Ansong J, Amenyaglo S, Ankrah ST, et al. Waterpipe use among the youth in Ghana: Lessons from the Global Youth Tobacco Survey (GYTS) 2017. *Tob Induc Dis*. 2020;18.
- Ghana Food and Drugs Authority. FDA launches “Daabi-Say no to drug abuse” campaign in Achimota School [Internet]. 2022 [cited 2022 Jul 13]. Available from: <http://www.fdaghana.gov.gh/news-media.php?page=135>.
- Trucco EM. A review of psychosocial factors linked to adolescent substance use. *Pharmacol Biochem Behav*. 2020;196: 172969.
- Nawi AM, Ismail R, Ibrahim F, Hassan MR, Manaf MRA, Amit N, et al. Risk and protective factors of drug abuse among adolescents: a systematic review. *BMC Public Health*. 2021;21:1–15.
- Carver H, Elliott L, Kennedy C, Hanley J. Parent–child connectedness and communication in relation to alcohol, tobacco and drug use in adolescence: an integrative review of the literature. *Drugs Educ Prev Policy*. 2017;24(2):119–33.
- Zimmerman GM, Farrell C. Parents, peers, perceived risk of harm, and the neighborhood: contextualizing key influences on adolescent substance use. *J Youth Adolesc*. 2017;46:228–47.
- Rusby JC, Light JM, Crowley R, Westling E. Influence of parent–youth relationship, parental monitoring, and parent substance use on adolescent substance use onset. *J Fam Psychol*. 2018;32(3):310.
- Kugbey N. Prevalence and correlates of substance use among school-going adolescents (11–18years) in eight Sub-Saharan Africa countries. *Subst Abuse Treat Prev Policy*. 2023;18(1):44.
- Christianne Couwenbergh Rutger J, Van Der Gaag MKCDR, den Brink WV. Screening for substance abuse among adolescents validity of the CAGE-AID in youth mental health care. *Subst Use Misuse*. 2009;44(6):823–34. <https://doi.org/10.1080/10826080802484264>.
- Debasish Basu DB, Abhishek Ghosh AG, Nandita Hazari NH, Preeti Parakh PP. Use of family CAGE-AID questionnaire to screen the family members for diagnosis of substance dependence. 2016;143(6):722–30.
- Francis E. Implementing a screening tool and referral process for substance use disorders in the emergency department: a quality improvement project. *J Emerg Nurs*. 2024;50(4):567–72.
- Robins RW, Hendin HM, Trzesniewski KH. Measuring global self-esteem: construct validation of a single-item measure and the Rosenberg self-esteem scale. *Measuring Global Self-Esteem*. 2001.
- Ben El Jilali L, Benazzouz B, El Hessni A, Ouichou A, Mesfioui A. Prevalence of alcohol consumption and alcohol use disorders among middle and high school students in the province of Khemisset, Morocco: a cross-sectional study. *Int J Adolesc Youth*. 2020;25(1):638–48.
- Reda AA, Moges A, Wondmagegn BY, Biadgilign S. Alcohol drinking patterns among high school students in Ethiopia: a cross-sectional study. *BMC Public Health*. 2012;12:1–6.
- Bondah E, Gren L, Talboys S. Prevalence, drinking patterns, and risk factors of alcohol use and early onset among Ghanaian senior high school students. *Am J Prev Med*. 2020;6(1):16–25.
- Henneberger AK, Mushonga DR, Preston AM. Peer influence and adolescent substance use: a systematic review of dynamic social network research. *Adolesc Res Rev*. 2021;6(1):57–73.
- Osaki H, Mshana G, Mbata D, Kapiga S, Changalucha J. Social space and alcohol use initiation among youth in northern Tanzania. *PLoS ONE*. 2018;13(9): e0202200.
- Quiroga E, Pinto-Carral A, García I, Molina AJ, Fernández-Villa T, Martín V. The influence of adolescents' social networks on alcohol consumption: a descriptive study of Spanish adolescents using social network analysis. *Int J Environ Res Public Health*. 2018;15(9):1795.
- Roble AK, Osman MO, Lathwal OP, Aden AA. Prevalence of cigarette smoking and associated factors among adolescents in eastern Ethiopia. *Subst Abuse Rehabil*. 2020;2021:73–80.
- Jawad M, Charide R, Waziry R, Darzi A, Ballout RA, Akl EA. The prevalence and trends of waterpipe tobacco smoking: a systematic review. *PLoS ONE*. 2018;13(2): e0192191.
- Jawad M, Power G. Prevalence, correlates and patterns of waterpipe smoking among secondary school students in southeast London: a cross-sectional study. *BMC Public Health*. 2015;16:1–6.
- Othman M, Aghamohammadi N, Nik Farid ND. Determinants of shisha use among secondary school students in Sudan. *BMC Public Health*. 2019;19(1).
- Akel M, Sakr F, Fahs I, Dimassi A, Dabbous M, Ehlinger V, et al. Smoking behavior among adolescents: the Lebanese experience with cigarette smoking and Waterpipe use. *Int J Environ Res Public Health*. 2022;19(9):5679.
- Cheng HG, Anthony JC. A new era for drinking? Epidemiological evidence on adolescent male–female differences in drinking incidence in the United States and Europe. *Soc Psychiatry Psychiatr Epidemiol*. 2017;52:117–26.

45. Jallow IK, Britton J, Langley T. Prevalence and determinants of tobacco use among young people in The Gambia. *BMJ Glob Health*. 2017;2(4): e000482.
46. Minaker LM, Shuh A, Burkhalter RJ, Manske SR. Hookah use prevalence, predictors, and perceptions among Canadian youth: findings from the 2012/2013 Youth Smoking Survey. *Cancer Causes Control*. 2015;26:831–8.
47. El Kazdough H, El-Ammari A, Bouftini S, El Fakir S, El Achhab Y. Adolescents, parents and teachers' perceptions of risk and protective factors of substance use in Moroccan adolescents: a qualitative study. *Subst Abuse Treat Prev Policy*. 2018;13:1–12.
48. McLaughlin A, Campbell A, McColgan M. Adolescent substance use in the context of the family: a qualitative study of young people's views on parent-child attachments, parenting style and parental substance use. *Subst Use Misuse*. 2016;51(14):1846–55.
49. Hormenu T, John Elvis HJnr, Thomas S, Dietmar P. Psychosocial determinants of marijuana utilization among selected junior high school students in the Central Region of Ghana. *J Prev Med Care*. 2018;43–57.
50. Andrade C. Sample size and its importance in research. *Indian J Psychol Med*. 2020;42(1):102–3.
51. Singh A, Owusu-Dabo E, Mdege N, McNeill A, Britton J, Bauld L. A situational analysis of tobacco control in Ghana: progress, opportunities and challenges. *J Glob Health Rep*. 2020;4.
52. Luk JW, King KM, McCarty CA, McCauley E, Vander Stoep A. Prospective effects of parenting on substance use and problems across Asian/Pacific Islander and European American youth: tests of moderated mediation. *J Stud Alcohol Drugs*. 2017;78(4):521–30.
53. Rabie M, Shaker NM, Gaber E, El-Habiby M, Ismail D, El-Gaafary M, et al. Prevalence updates of substance use among Egyptian adolescents. *Middle East Curr Psychiatry*. 2020;27:1–8.
54. Shalaby SF, Soliman MA. Knowledge, attitude, and practice of medical students regarding smoking and substance abuse, Cairo University, Egypt. *J Egypt Public Health Assoc*. 2019;94:1–9.
55. Khatatbeh MM, Alkhaldi S, Khader Y, Momani W, Al Omari O, Kheirallah K, et al. Prevalence of nicotine dependence among university students in Jordan: a cross-sectional study. *Epidemiol Biostat Public Health*. 2019;16(2).
56. Dumitrescu AL, Ibric S, Ibric-Cioranu V. Opinions of Romanian dental students toward tobacco use interventions in the dental setting. *J Cancer Educ*. 2016;31(1):172–80.

## Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.