HSI Health Sciences Investigations Journal

share

Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

ISSN Online 2704-4890 | ISSN Print 2720-7609

Online first publication

Original Research Article

HSI Journal (2024) Volume 6 (Issue 1):769-775. https://doi.org/10.46829/hsijournal. 2024.7.6.1.769-775

Open Access

Substance use among high school-going adolescents, Northern Region, Ghana

Abdul G MOHAMMED [2*], Issahaku YUSSIF [6], Yaw K ASAMOAH [2], Ruth N NUKPEZAH [4], Hilarius PAK ABIWU [5], Alhassan A MUGIS [3] Magdalene ODIKRO [2], Ernest KENU [1]

[1] Department of Epidemiology and Disease Control, School of Public Health, University of Ghana; [2] Ghana Field Epidemiology and Laboratory Training Programme, University of Ghana; [3] Faculty of Education, University for Development Studies, Tamale; [4] School of Nursing and Midwifery, University for Development Studies, Tamale; [5] Northern Regional Health Directorate, Northern Region, Tamale; [6] KM Model Girls Junior High School, Ghana Education Service

Received Februayr 2024; Revised April 2024; Accepted June 2024

Abstract

Background: Substance use among adolescents in Ghana remains underreported despite its consequences. There is limited information on the prevalence of alcohol, cigarette, and other drug use among adolescents in the northern region of Ghana.

Objective: This study assessed adolescent substance use in nine senior high schools in the Northern Region of Ghana to inform evidence-based decision-making.

Methods: We conducted a school-based cross-sectional study to assess the prevalence of substance use and the factors that influence its occurrence among randomly sampled adolescents in the Northern region of Ghana. A semi-structured questionnaire was used to collect data on their background characteristics and use of substances. Binary logistic regression was used to determine the association between substance use and adolescents' characteristics at the 5% significance level.

Results: Of the 403 adolescents studied from nine senior high schools, the average age was 17.7 years (SD = 1.01), with 52.9% (n = 213) being male. The lifetime use of any substance was 62.3% [95% CI: 57.35 - 67.03]. Smoking status, alcohol intake, and illicit drug use were 6.2% (n = 25/403), 5.0% (n = 20/403), and 62.3% (n = 251/403), respectively. Substance use by peers (aOR = 2.07, 95% CI: 1.16 - 3.68), sexual activity (aOR = 1.81, 95% CI: 1.08 - 3.03), sexual relationships (aOR = 1.66, 95% CI: 1.03-2.69), social media use (aOR = 2.13, 95% CI: 1.36 - 3.36), and smartphone use (aOR = 2.89, 95% CI: 1.65 - 5.07) were significantly associated with substance use.

Conclusion: This study revealed an alarming rate of substance use among adolescents in the Northern Region. Peer use of drugs, sexual activity, sexual relationships, and use of smartphones and social media were factors identified to influence substance use. The research team organised educational and sensitisation programmes for the selected high schools. The findings could influence the development or enhancement of school policies related to substance use prevention, detection, and disciplinary actions by the Ghana Education Service (GES).

Keywords: Illicit drugs, substance use, Northern Region, adolescents, hgh School

Cite the publication as Mohammed AG, Yussif I, Asamoah YK, Nukpezah RN, Abiwu HPAK, Mugis AA, Odikro M, Kenu E (2024) Substance use among high school-going adolescents, Northern Region, Ghana. HSI Journal 6 (1):769-775. https://doi.org/10.46829/hsijournal.2024.7.6.1.769-775

INTRODUCTION

Substance abuse refers to the harmful or hazardous use of psychoactive substances, including alcohol and illicit drugs [1]. Substance use among adolescents is a growing major issue of public health concern in both developed and developing countries worldwide [2]. Adolescents commonly use alcohol, cigarettes, marijuana, khat, and recreational drugs (cocaine, heroin, and tramadol). According to the United Nations Office on Drugs and Crime (UNODC) World Drug Report 2022, around 284 million people aged 15 – 64 years used drugs worldwide in 2020, a 26 percent increase over the previous decade [3]. Substance use is a key cause of disability-adjusted life years (DALY) among adolescents [4]. The DALY due to substance use in Africa has been estimated to be more than twice that of high-income countries [4,5]. A

* *Corresponding author*
Email: agmohammed002@st.ug.edu.gh

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

recently published systematic review found that the overall prevalence of 'any substance use' among adolescents in sub-Saharan Africa was 41.6%, with alcohol and tobacco being the highest prevailing substances (40.8% and 45.6%, respectively) across the continent compared to any other substance use [6,7]. Substance use among adolescents is influenced by various factors, including childhood trauma and adverse experiences such as physical, emotional and sexual abuse [8-11]. Other demographic and socioeconomic risk factors include male sex of younger age (10 – 19 years), lower education grades, adolescents from divorced parents, unemployed or fully employed mothers, and private school attendance [12-15]. In Ghana, substance use among adolescents remains underreported despite its reported consequences. According to the Narcotic Control Board (NACOB), about fifty thousand (50,000) people in Ghana, particularly the youth, abuse drugs, out of which 35,000 are students from junior/senior high schools and tertiary institutions. The three northern regions account for more than 50% of the reported usage [16]. Health professionals working at state-funded psychiatric hospitals estimate that about 10% of inpatients and between 20% to 30% of outpatient cases are linked to substance use and abuse in Ghana [17]. In recent studies conducted among Ghanaian adolescents, 24% - 48.8% of adolescents have ever used a substance, with alcohol and tramadol being the most commonly used substances [18,19].

Despite the major public health care crisis caused by the prevalence of alcohol, cigarette, and other drug use among adolescents, few studies have focused specifically on the problem in the northern region of Ghana. This study assessed the prevalence of substance use among adolescents in senior high schools in the Northern Region of Ghana.

MATERIALS AND METHODS

Study design and setting

The study was conducted among school-going adolescents in Ghana's Northern Region. The Northern Region is one of the 16 regions of Ghana with 16 administrative districts. The capital of this region is the Tamale metropolitan area. The region shares boundaries with the North East Region to the north, to the east by the Eastern Ghana Togo border, to the south by the Oti Region, and to the west by the Savanna Region. The region's current population is 2,310,939, with over 25% adolescents. There are more than 20 public senior high schools in the Northern Region, which are classified into categories A, B, and C according to the recently updated 2020 school register released by the Ghana Education Service. These senior high schools are designed to offer student lessons at three levels: SS1, SS2, and SS3. We conducted a school-based cross-sectional study to assess the prevalence of substance use and the factors that influence its occurrence among adolescents in the Northern Region of Ghana. A semi-structured questionnaire was used to collect data on the background characteristics and use of substances from nine selected senior high schools in the region.

Study population and Sample size estimation

The study population included all individuals aged 10 – 19 years attending senior high schools in the Northern Region of Ghana. Students in exchange programmes from other regions or countries were excluded from the study. A study conducted in Woreta High School revealed 47.9% substance use among adolescents [15]. Using P (proportion of adolescents who use substances) of 47.9%, a 95% Confidence level, and m (margin of error) of 5%, we estimated a sample size of 400. A stratified sampling approach was used to select senior high schools for the study. The schools were kept in their naturally occurring academic strata, such as Category A, Category B and Category C. Three schools were randomly sampled from a list of the schools in each category. A proportional allocation using the student population of the selected schools was used to determine the number of students selected from each school. At each school, the school list obtained from the school administration was used as the sampling frame for systematic random sampling of students.

Data collection

Data were collected using a semi-structured questionnaire adapted from the Community That Care (CTC) Youth Survey' for adolescent substance use and problem behaviours [20]. The questionnaires were prepared and administered in English. This tool was adapted and modified for the study. The questionnaires collected information on adolescents' sociodemographic characteristics, such as age, sex, grade, caregiver's age, sex, marital status, and educational level. Data were also collected on adolescents' exposure to substances, such as having either parent using substances, having friends who use substances, knowing where to get the substances, and being sent to buy the substances. Data were collected on whether participants had ever used a substance, the type of substance used, the frequency of use, and the source of the substance. Trained research assistants from the University for Development Studies collected the data. Data was collected from April to May 2023.

Statistical analysis

Data were entered into Microsoft Excel 2017, cleaned, and imported into Stata Statistical Software: Release 2017 (Version 15.1) College Station, TX:StataCorp LLC for statistical analysis. Categorical variables such as sex, grade, caregiver's sex, marital status, and educational level were summarised as frequencies and proportions. Continuous variables such as age were summarised as means and standard deviations. Logistic regression analysis was used to test the association between substance use and the various adolescent characteristics. Both crude and adjusted logistic regression analyses were performed at the 5% significance level. Robust standard errors were used to adjust for clustering in both the crude and adjusted

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

analyses, with the category of school as the main clustering variable.

RESULTS

A total of 403 adolescents from nine senior high schools participated in the study. The average age of the adolescents was 17.7 ± 1 years, and more than half, 52.9% (n = 213), were males. More than two-thirds, 82.4% (n = 332), were Muslims, with almost half, 47.4% (n = 191), in their third year. The majority, 57.3% (n = 231) of the adolescents, were from nuclear families, with almost all, 97.0% (n = 391), admitting they have a good relationship with their parents (Table 1). Out of the 403 adolescents studied, 7.9% (n = 32) of the adolescents reported their parents either smoke, take alcohol or use illicit drugs, whereas 21.8% (n = 88) stated their friends smoke, take alcohol or use illicit drugs. Most (72.0%, n = 290/403) adolescents use social media, and 81.6% (n = 329/403) use smartphones. Less than one-third, 27.8% (n = 112/403) and 46.9% (n = 189/403) of the adolescents were sexually active and had a sexual relationship, respectively (Table 2). Out of the 403 adolescents studied, 62.3% (95% CI: 57.35 - 67.03) use substances. About 6.2% (n = 25/403) and 5.0% (n = 20/403)

Table 1. Socio-demographic characteristics of studied Adolescents, Northern Region, 2023

Variables	Frequency (n = 403)	Percentages (%)
Sex		
Female	190	47.2
Male	213	52.8
Age (mean, SD) years	17.7 (1.0)	
Religion		
Christianity	69	17.1
Islam	332	82.4
Traditionalist	2	0.5
Level		
First	93	23.1
Second	119	29.5
Third	191	47.4
Educational level (Caregiver)		
No formal education	214	53.1
Elementary	48	11.9
Secondary	91	22.6
Tertiary	50	12.4
Place of residence		
Rural	199	49.4
Urban	204	50.6
Type of family		
Extended	172	42.7
Nuclear	231	57.3
Relations with parents		
Bad	12	3.0
Good	391	97.0
Living with both parents		
No	117	29.0
Yes	286	71.0

Table 2. Individual-level characteristics of adolescents studied, Northern Region, 2023

Variables	Frequency (n = 403)	Percentages (%)
Substance use (caregiver)		
Non-user	371	92.1
User	32	7.9
Peer influence		
No	315	78.2
Yes	88	21.8
Drugs without prescription		
No	36	8.9
Yes	367	91.1
Social media use		
Non-user	113	28.0
User	290	72.0
Smartphone ownership		
Does not own	74	18.4
Own	329	81.6
Sexually active		
Not active	291	72.2
Active	112	27.8
Consequences of substance use		
Not aware	218	54.1
Aware	185	45.9
Sexual relationship		
No	214	53.1
Yes	189	46.9
Education on substances		
No education	217	53.9
Educated	186	46.1
Personal room		
No	226	56.1
Yes	177	43.9

Table 3: Substance Use among studied Adolescents, Northern Region, 2023

Variables	Frequency (n = 403)	Percentages (%)
Substance use		
Non-user	152	37.7
User	251	62.3
Smoking		
Non-smoker	378	93.8
Smoker	25	6.2
Alcohol intake		
No	383	95.0
Yes	20	5.0
Illicit drug use		
Non-user	152	37.7
User	251	62.3
Drugs used		
Raphenol	24	22.2
Diazepam	13	12.0
Bernalin	15	13.9
Tramadol	56	51.9
Subtotal	108	100.0

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

Table 4. Logistic regression analysis for factors associated with substance use among studied adolescents, Northern Region, 2023

Variables	Substance Use		COR (95%CI)	P - value	AOR (95%CI)	P - value
	No n (%)	Yes n (%)				
Residence						
Rural	85 (42.71)	114 (57.29)	1.00		1.00	
Urban	67 (32.84)	137 (67.16)	1.52 (1.02 2.28)	0.041	1.45 (0.93 2.24)	0.098
Sex						
Female	76 (40.00)	114 (60.00)	1.00		1.00	
Male	76 (35.68)	137 (64.32)	1.20 (0.80 1.79)	0.372	1.49 (0.97 2.30)	0.071
Level						
First	38 (40.86)	55 (59.14)	1.00		1.00	
Second	36 (30.25)	83 (69.75)	1.59 (0.90 2.81)	0.109	1.72 (0.95 3.11)	0.073
Third	78 (40.84)	113 (59.16)	1.00 (0.60 1.65)	0.997	1.05 (0.62 1.77)	0.850
Educational level (Caregiver)						
No formal education	93 (43.46)	121 (56.54)	1.00		1.00	
Elementary/secondary	40 (28.78)	99 (71.22)	1.90 (1.21 3.00)	0.006	1.76 (1.09 2.83)	0.020
Tertiary	19 (38.00)	31 (62.00)	1.25 (0.67 2.35)	0.483	1.05 (0.54 2.05)	0.881
Substance use (Caregiver)						
No	142 (38.27)	229 (61.73)	1.00		1.00	
Yes	10 (31.25)	22 (68.75)	1.36 (0.63 2.96)	0.433	1.33 (0.57 3.16)	0.505
Peer influence						
No	132 (41.90)	183 (58.10)	1.00		1.00	
Yes	20 (22.73)	68 (77.27)	2.45 (1.42 4.23)	0.001	2.07 (1.16 3.68)	0.014**
Drugs without prescription						
No	16 (44.44)	20 (55.56)	1.00		1.00	
Yes	136 (37.06)	231 (62.94)	1.36 (0.68 2.71)	0.384	1.53 (0.76 3.10)	0.235
Social media						
No	56 (49.56)	57 (50.44)	1.00		1.00	
Yes	96 (33.10)	194 (66.90)	1.99 (1.28 3.09)	0.002	2.13 (1.36 3.36)	0.001**
Smartphone use						
No	42 (56.76)	32 (43.24)	1.00		1.00	
Yes	110 (33.43)	219 (66.57)	2.61 (1.56 4.36)	0.001	2.89 (1.65 5.07)	0.001**
Sexually active						
No	122 (41.92)	169 (58.08)	1.00		1.00	
Yes	30 (26.79)	82 (73.21)	1.97 (1.22 3.18)	0.005	1.81 (1.08 3.03)	0.024**
Consequences of substance use						
No	95 (43.58)	123 (56.42)	1.00		1.00	
Yes	57 (30.81)	128 (69.19)	1.73 (1.15 2.61)	0.009	1.47 (0.94 2.30)	0.087
Sexual relationship						
No	95 (44.39)	119 (55.61)	1.00		1.00	
Yes	57 (30.16)	132 (69.84)	1.85 (1.23 2.78)	0.003	1.66 (1.03 2.69)	0.037**
Received Education on substance use						
No	102 (47.00)	115 (53.00)	1.00		1.00	
Yes	50 (26.88)	136 (73.12)	2.41 (1.58 3.67)	0.001	2.16 (1.19 3.94)	0.012
Age			0.82 (0.67 1.00)	0.060	0.86 (0.69 1.07)	0.179

smoked and took alcohol, respectively. More than half (62.3%, n = 251/403) of the study participants use illicit drugs, with tramadol being the most used at 51.9% (n = 56/108) (Table 3). After controlling for the effect of sex, age, residence, caregiver educational level and type of family, substance use by peers (aOR = 2.1, 95% CI: 1.16 - 3.68), being sexually active (aOR = 1.8, 95% CI: 1.08 - 3.03), being in a sexual relationship (aOR = 1.7, 95% CI: 1.03 - 2.69), use of social media (aOR = 2.1, 95% CI: 1.36 - 3.36) and having a smartphone (aOR = 2.9, 95% CI: 1.65 - 5.07) were significantly associated with substance use among the adolescents (Table 4).

DISCUSSION

We assessed the prevalence of substance use and the factors that influence its occurrence among randomly sampled adolescents in the Northern Region of Ghana. The current

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

study reports that more than half of high school adolescents in the Northern Region of Ghana were involved in substance use. Our findings are comparable to the prevalence of substance use of 65.7% [21] and 69.3% [22] reported in southeastern Nigeria. However, a much lower prevalence of 17.3% [23] and 32.9% [24] of substance use in similar studies have been reported in Nigeria and 30% by Ahmadi & Hasani among Iranian high school students. The variations between the prevalence in our study and others could be explained by the differences in the cultural background of the study populations, access to, and availability/variety of abusable substances. Age differences may also account for prevalence differences, where more than 80% of the students in Iranian high schools were between 15 – 18 years compared to the 13 – 18 years in Ghana. The high substance use among adolescents implies that these adolescents stand the risk of experiencing difficulties concentrating and have memory problems, as well as a decline in overall cognitive function, leading to lower academic achievements. This will negatively impact the breed of the next generation in Ghana.

Also, these children risk mental health disorders, including anxiety, depression, and other mood disorders, which could increase the investment by the government in the health sector. The study also revealed a prevalence of smoking and alcohol intake of less than one-tenth. The reported prevalence of smoking in our study was much lower than the 11.3% reported by the Global Youth Tobacco Survey [26] and 19.3% reported in a systematic review that estimated the global prevalence of tobacco use among adolescents [27]. However, the reported smoking prevalence in this study was higher than previously reported in Ghana, which was 3.2% [28]. The prevalence of smoking estimated in the current study is in tandem with the projected decrease in smoking prevalence in the general population to 3% in Ghana by 2025 [29]. The lifetime alcohol use reported by Oppong Asante and Kugbey was 11.1%, which is higher than that reported in the current study [30]. Even though smoking and alcohol use exist among students, our findings, in comparison with past reports, suggest a decline in smoking and alcohol use [31,32]. Although Ghana's legal drinking age has long been 18 years, it is evident that young drinkers can still purchase and have access to alcohol.

In our study, tramadol was the most used substance among high school pupils who abused substances. The high use of tramadol among these adolescents is a social canker, and if not controlled, will expose the next generation of adults to mental and social health consequences. The prevalence reported is, however, inconsistent with a lower prevalence of 6.3% tramadol use, which was reported in a similar study in Nigeria [33]. The disparity in the findings could be attributed to the methods used in the assessment. Our study assessed the lifetime use of these substances, whereas the Nigerian study assessed the current use of these substances. Our findings revealed that peer influence was a major factor for substance use, as the likelihood of adolescents who are being influenced by their peers using a substance was twice that of adolescents who are not being influenced by peer pressure. This finding suggests that young people are susceptible to peer pressure and often turn to substance use to gain acceptance. This corroborates the findings of studies that reported peer influence as a significant predictor of substance use [34,35]. Adolescents who were sexually active and in sexual relationships were almost twice as likely to be involved in substance use compared to their counterparts who were not sexually active or involved in a sexual relationship. Similar to our findings, a study on substance use and risky sexual behaviours among street-connected children and youth aged 8 – 19 years in Accra, Ghana, revealed a significant association between the use of marijuana and smoking cigarettes with being sexually active [10]. Another study reported that the possible reason for substance use among sexually active adolescents may include the facilitation of a sexual encounter (i.e., to lower sexual inhibitions and increase self-esteem and confidence) [37].

Our study further revealed that high school students' social media use and smartphone ownership are significantly linked to substance use. Students who used social media were 2-fold more likely to engage in substance use while owning a smartphone was likely to cause approximately a 3-fold increase in substance use among adolescents. Similar to our finding, a study to ascertain the relationship between social media use and substance use among middle and high-school-aged youth in the United States of America reported that the number of social media sites used was significantly associated with higher odds of ever using a substance and multiple substances. Additionally, there was a strong correlation between accessing social media regularly - once an hour or more and a person's likelihood of having used marijuana, e-cigarettes, any substance, or multiple substances [38].

These findings suggest that adolescents in high school are exposed to addictive drugs, such as alcohol and smoking, through social media and other Internet platforms. This evokes the need to develop effective interventions to deal with the issue and protect adolescents and young people from the negative consequences of these social media platforms. In ensuring a reduction in the high prevalence of substance use by adolescents in senior high schools in the region, the research team organised educational and sensitisation programs for 15 selected high schools in the region. The program was organised in collaboration with Ghana Educational Service and Parent Teacher Associations. Adolescents were educated on substance use and the consequences involved in its usage. Adolescents were also presented with various avenues through which they could seek help in times of psychological need instead of resorting to substances. The importance of school-based psychologists in the Ghana Educational System was made paramount with presentations from three psychologists. Our study had some limitations that should be considered when interpreting the findings. Underreporting of sensitive

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

questions cannot be ruled out. Furthermore, because this was a cross-sectional study, causal relationships could not be established. Additionally, no further questions were asked in this study about alcohol, smoking, and sexual habits among students, as the aim was to determine the prevalence of these behaviours; however, further inquiries might have uncovered details regarding other risk factors.

Conclusion

Substance use among high school adolescents in the Northern Region of Ghana is high. Factors such as peer use of drugs, sexual activity, sexual relationships, and the use of smartphones and social media were associated with increased substance use among adolescents. The identified predictors could be targeted and modified through educational and sensitisation programmes to reduce the use of substances. This study should inform the development or enhancement of school policies related to substance use prevention, detection, and disciplinary actions by the Ghana Education Service (GES).

DECLARATIONS

Ethical consideration

The study's clearance was obtained from the Ghana Health Services Ethics Review Committee (GHS-ERC-021/02/23). Permission was obtained from the Northern Regional Education Circuit (NREC). Permission was sought from the leadership of the selected senior high schools before data collection. Written informed consent was obtained from the participants' caregivers. Signed assent was also obtained from the pupil before collecting data.

Consent to publish

All authors agreed on the content of the final paper.

Funding

None

Competing Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Author contributions

All authors participated in conceptualising and designing the study. Data was curated by AGM and IY. Data was analysed by AGM, MO and IY. The initial manuscript was drafted by AGM and YAK, but all authors made significant intellectual contributions to the final manuscript. All authors read and approved the final manuscript.

Acknowledgement

The authors wish to express their profound gratitude to the data collectors and research assistants.

Availability of data

Data for this work is available upon reasonable request from the corresponding author.

REFERENCES

1. Garofalo L, Di Giuseppe G, Angelillo IF (2015) Self-Medication Practices among Parents in Italy. Biomed Res Int 2015:1–8.
2. Kabore A, Afriyie-Gyawu E, Awuah J, Hansen A, Walker A, Hester M, Wonadé Sié MA, Johnson J, Meda N (2019) Social ecological factors affecting substance abuse in Ghana (West Africa) using photovoice. Pan African Medical Journal 34:1-9
3. UNODC. dp-drug-use-prevalence | dataUNODC [Internet]. Drug use prevalence. 2022 [cited 2023 May 25]. Available from: https://dataunodc.un.org/dp-drug-use-prevalence
4. Davidson LL, Grigorenko EL, Boivin MJ, Rapa E, Stein A (2015) A focus on adolescence to reduce neurological, mental health and substance-use disability. Nature 527:S161–S166.
5. Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, Charlson FJ, Norman RE, Flaxman AD, Johns N, Burstein R, Murray CJ, Vos T (2013) Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. The Lancet 382:1575–1586.
6. Jumbe S, Kamninga TM, Mwalwimba I, Kalu U-G (2021) Determinants of adolescent substance use in Africa: a systematic review and meta-analysis protocol. Syst Rev 10:125.
7. Olawole-Isaac A, Ogundipe O, Amoo EO, Adeloye DO (2018) Substance use among adolescents in sub-Saharan Africa: a systematic review and meta-analysis. South African Journal of Child Health 12:79.
8. Gurung A, Shrestha N, Silwal M, Gurung R, Ojha S (2017) Prevalence of Substance Use and Associated Factors Among High School Adolescents in Rithepani, Lekhnath-2, kaski, Nepal. Journal of Gandaki Medical College-Nepal 10:43–48.
9. Moodley S V, Matjila MJ, Moosa MYH (2012) Epidemiology of substance use among secondary school learners in Atteridgeville, Gauteng. South African Journal of Psychiatry 18:6.
10. Asante KO, Nefale MT (2021) Substance Use among Street-Connected Children and Adolescents in Ghana and South Africa: A Cross-Country Comparison Study. Behavioral Sciences 11:28.
11. Rudatsikira E, Maposa D, Mukandavire Z, Muula A, Siziya S (2009) Prevalence and predictors of illicit drug use among school-going adolescents in Harare, Zimbabwe. Ann Afr Med 8:215-220
12. Amoo E, Adekeye OA, Omumu F, Akinpelu OO, Ajayi MP, Olawande T, Adeusi SO (2020) Drug Use and High-risk Sexual Behavior among School-Going Adolescents in Nigeria. Open Access Maced J Med Sci 8:256–261
13. Rodzlan Hasani WS, Miaw Yn JL, Saminathan TA, Robert Lourdes TG, Ramly R, Abd Hamid HA, Ismail H, Abd Majid NL, Mat Rifin H, Awaluddin SM, Mohd Yusoff MF (2019) Risk Factors for Illicit Drug Use Among Malaysian Male Adolescents. Asia Pacific Journal of Public Health 31:48S-56S.
14. Ling MYJ, Rodzlan Hasani WS, Mohd Yusoff MF, Abd Hamid HA, Lim KH, Tee GH, Baharom N, Ab Majid NL, Robert Lourdes TG, Mat Rifin H, Saminathan TA (2019)

Cigarette Smoking Among Secondary School-Going Male Adolescents in Malaysia: Findings From the National Health and Morbidity Survey 2017. Asia Pacific Journal of Public Health 31:80S-87S.

15. Birhanu AM, Bisetegn TA, Woldeyohannes SM (2014) High prevalence of substance use and associated factors among high school adolescents in Woreta Town, Northwest Ethiopia: multi-domain factor analysis. BMC Public Health 14:1186.

16. NACOB. 50,000 People Abuse Drugs In Ghana Resulting In 70% Mad Cases | Social | Peacefmonline.com [Internet]. Peace Fm online. 2014 [cited 2022 Dec 30]. p. 1. Available from: https://www.academia.edu/37191672/50_000_People_Abuse_Drugs_In_Ghana_Resulting_In_70_Mad_Cases_Comments_0

17. Roberts M, Mogan C, Asare JB (2014) An overview of Ghana's mental health system: results from an assessment using the World Health Organization's Assessment Instrument for Mental Health Systems (WHO-AIMS). Int J Ment Health Syst 8:16.

18. Addo B, Mainoo GO, Dapaah JM, Babayara MNK (2016) Prevalence of Substance Use in a Sample of Ghanaian Adolescents Experiencing Parental Divorce. J Child Adolesc Subst Abuse 25:428–437.

19. Pilote L, Côté L, Chipenda Dansokho S, Brouillard É, Giguère AMC, Légaré F, Grad R, Witteman HO (2019) Talking about treatment benefits, harms, and what matters to patients in radiation oncology: an observational study. BMC Med Inform Decis Mak 19:84.

20. Toumbourou JW (2010) The Communities That Care Youth Survey. 2010;(March).

21. Lawoyin TO, Ajumobi OO, Abdul MM, Abdul Malik JO, Adegoke DA, Agbedeyi OA (2005) Drug use among senior secondary school students in rural Nigeria. Afr J Med Med Sci 34:355–359

22. Ogunsola OO, Fatusi AO (2017) Risk and protective factors for adolescent substance use: a comparative study of secondary school students in rural and urban areas of Osun State, Nigeria. Int J Adolesc Med Health 29:20150096

23. Obadeji A, Kumolalo BF, Oluwole LO, Ajiboye AS, Dada MU, Ebeyi RC (2020) Substance Use among Adolescent High School Students in Nigeria and Its Relationship with Psychosocial Factors. J Res Health Sci 20:e00480–e00480.

24. Anyanwu OU, Ibekwe RC, Ojinnaka NC (2016) Pattern of substance abuse among adolescent secondary school students in Abakaliki. Cogent Med 3:1272160.

25. Ahmadi J, Hasani M (2003) Prevalence of substance use among Iranian high school students. Addictive Behaviors 28:375–379.

26. Ma C, Xi B, Li Z, Wu H, Zhao M, Liang Y, Bovet P (2021) Prevalence and trends in tobacco use among adolescents aged 13–15 years in 143 countries, 1999–2018: findings from the Global Youth Tobacco Surveys. Lancet Child Adolesc Health 5:245–255.

27. Nazir MA, Al-Ansari A, Abbasi N, Almas K (2019) Global Prevalence of Tobacco Use in Adolescents and Its Adverse Oral Health Consequences. Open Access Maced J Med Sci 7:3659–3666.

28. Sasu DD (2019) Ghana: prevalence of smoking among youth by gender, Statista. 2019.

29. Global State of Tobacco Harm Reduction (2023) Smoking, vaping, HTP, NRT and snus in Ghana — Global State of Tobacco Harm Reduction. 2023.

30. Oppong Asante K, Kugbey N (2019) Alcohol use by school-going adolescents in Ghana: Prevalence and correlates. Ment Health Prev 13:75–81.

31. WHO (2018) WHO global report on trends in prevalence of tobacco smoking 2000-2025. World Health Organization; 2018

32. Strizek J, Uhl A, Schaub M, Malischnig D (2021) Alcohol and Cigarette Use among Adolescents and Young Adults in Austria from 2004–2020: Patterns of Change and Associations with Socioeconomic Variables. Int J Environ Res Public Health 18:13080.

33. Nwala GC, Ibeneme CA, Ojinnaka NC, Ugolee JC (2021) Changing trend of psychoactive drug abuse among adolescent students in South Eastern Nigeria. 2021

34. Osei-Bonsu E (2017) Prevalence of Alcohol Consumption and Factors Influencing Alcohol Use Among the Youth in Tokorni-Hohoe, Volta Region of Ghana. Science Journal of Public Health 5:205.

35. Keyzers A, Lee S-K, Dworkin J (2020) Peer Pressure and Substance Use in Emerging Adulthood: A Latent Profile Analysis. Subst Use Misuse 55:1716–1723.

36. Graves KL, Leigh BC (1995) The relationship of substance use to sexual activity among young adults in the United States. Fam Plann Perspect 27:18–22, 33

37. Sumnall HR, Beynon CM, Conchie SM, Riley SCE, Cole JC (2007) An investigation of the subjective experiences of sex after alcohol or drug intoxication. Journal of Psychopharmacology 21:525–537.

38. Liu J, Charmaraman L, Bickham D (2024) Association Between Social Media Use and Substance Use Among Middle and High School-Aged Youth. Subst Use Misuse 59:1039–1046.