

Substance use and associated factors among secondary school students in the Yaoundé III Subdivision, Cameroon

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Abstract

Introduction: Psychoactive substance (PAS) is a substance that affects mental processes such as perception, consciousness, cognition or mood and feelings once introduced into a person's system. PAS use is a global public health problem, especially among young people. More than 296 million people aged 15 to 64 years used PAS in 2021. The situation in Cameroon is marked by the poor existence of data, particularly about use in schools. The aim of the study was to assess the current situation of substance use in schools and to identify associated factors in Yaoundé.

Methods: We conducted a cross-sectional study among students in the Yaoundé III subdivision from May to June 2019 in 21 schools. Schools and students were selected using a multistage sampling approach. We collected data using a self-administered questionnaire. We grouped variables to be analysed into sociodemographic data, substance use, and associated factors of substance use. We performed multivariate logistic regression analysis to identify associated factors with PAS use. We defined lifetime PAS use as the consumption of licit and illicit PAS drugs, such as tobacco, alcohol, opioids, cannabis, and/or cocaine, ecstasy, at least once in one's lifetime.

Results: A total of 1450 students participated in the study, for a response rate of 98%. The rate of substance use was 54% (774). Alcohol was the most consumed substance, at 77.3% (598), followed by tobacco at 10% (77) and tramadol at 7% (54). The others (cocaine, cannabis, heroin and glue) were the least consumed, 5.8% (45). Factors associated with substance use were male students (aOR=1.44; CI=1.09-1.90), ages between 20 to 24 years and 15 to 19 years (aORs of 3.41; CIs of 1.03-11.26 and aORs of 3.40; CIs of 1.09-10.65, respectively), living with other people (aOR: 1.52; CI: 1.06-2.19), the grade 11 class (aOR=2.31; CI=1.60-3.35; P-value = <0.001) and consumption of drugs in the neighborhood (aOR: 1.86; CI: 1.41-2.45).

Conclusions: More than 50% of students in Yaoundé III reported using PAS, mainly alcohol, tobacco, and tramadol. Strengthening school awareness, parental supervision, and enforcement of laws restricting access to these substances among minors is essential.

Keywords: Psychoactive substance use, secondary schools, associated factors

Citation

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Introduction

Psychoactive substance (PAS) abuse is a global public health concern, particularly among young people. According to the World Health Organization (WHO), a psychoactive substance is any substance that affects mental processes such as perception, consciousness, cognition, or mood and feelings once introduced into a person's system [1]. PAS abuse refers to the harmful or dangerous use of PAS, including alcohol and illicit drugs [2]. Globally, the United Nations Office on Drugs and Crime (UNODC) reported that more than 296 million people aged 15 to 64 years used drugs in 2021, representing a 23% increase over the previous decade [3]. Not only has the number of people suffering from drug-related disorders soared to 39.5 million, a 45% increase in 10 years [3]. Moreover, drug-related deaths were estimated at 494,000 in 2019, representing a 17.5% rise since 2009 [4].

Young people are particularly vulnerable to PAS use [3]. In 2021, the annual prevalence of cannabis use among 15–16-year-olds globally was 5.34%, compared to 4.3% among adults [3]. In Africa, a systematic review on the use of PAS among young aged 10–19 years estimated a prevalence of use of 41.6%, with the highest rates observed in Central Africa at 55.5% [5]. The incidence of PAS disorders is also higher among young people; for instance, in Africa, almost 70% of individuals receiving treatment for drug addiction are under 35 years of age [4]. Studies suggested that the highest consumption rates occur among the 18–25 age group [6,7]. Adolescence is a critical period for experimenting with PAS, likely due to exploration and psychosocial challenges [8–10]. The age of initiation is typically around 14 years, ranging from 8 to 19 years [8,9,11]. Early experimentation increases the risk of dependence and mental disorders such as depression and anxiety [8,12–14], and pre-existing psychological disorders may double the risk of developing substance use or dependence [18–20].

Several studies in secondary schools across Kenya, Burkina Faso, and Ethiopia have reported high rates of alcohol and tobacco use among students, sometimes exceeding 50% [15–17]. Key risk factors identified included inconsistent parental educational support, family conflict, poor parental attachment, behavioural problems at school, and peer influence.

In Cameroon, data on PAS use among students remain limited. The Cameroonian annual report of drug epidemic (2018) indicated that over 50% of PAS users were young, aged 20–29 years [21]. Also, a study conducted in 2017 among students in Yaoundé reported a high rate of alcohol and tobacco consumption (87.14% and 25.55% respectively) [22]. Similar findings were reported in 2024 in the same city, with an overall PAS use prevalence of 42.4%. Alcohol (40.5%), shisha (8.3%), and tobacco (2.7%) were the most commonly used. [23]. Depression

and low self-esteem were identified as the main risk factors associated with PAS use [23].

The burden of PAS consumption in sub-Saharan Africa, especially in Cameroon, with scarce data to assess the magnitude of this problem, raised the need for a more comprehensive study. Furthermore, risk factors associated with PAS use were inadequately addressed in previous studies that were mainly focused on estimating prevalence, with limited exploration of the determinants. Moreover, most of them relied on small samples, hence reducing their ability to identify consistent and generalizable conclusions. This study, therefore, seeks to assess a broader range of potential risk factors in a much larger sample of students in Yaoundé III subdivision. Although data from this study were collected several years ago, the findings will provide a more robust and large-scale understanding of the patterns and determinants of PAS use among adolescents in Yaoundé.

Methods

Study design and location

We conducted an analytic cross-sectional study from May to June 2019 in 21 secondary schools in the Yaoundé III subdivision of Cameroon. Yaoundé III subdivision is the most populated subdivision among the six in Yaoundé, with a population estimated at 4,854,260 inhabitants in 2025 [24, 25] and is the country's second-largest city in Cameroon. It hosts 31 schools, including nine public, 18 secular private and four confessional schools, with both general and technical education curricula [26]. It lies at an altitude of approximately 750 metres, covers an area of 180 square kilometres and has a population of 3.1 million.

Study population and eligibility criteria

We enrolled secondary school students from grades 10–12 in Yaoundé III subdivision who gave their approval for the study or whose parents' approval and consent had been obtained. We enrolled students in grades 10–12, which correspond to the late years of secondary education in Cameroon. At this stage, students are generally between 15 and 19 years old, an age range consistently identified as highly vulnerable to PAS use. Evidence shows that experimentation and regular use of PAS are more common in this age group compared to younger adolescents [8–10].

Sample size and methods

We calculated the size of our sample using the Cochran formula, with 52.5% representing the prevalence of substance use among young people in Rwanda in 2015 [11]. The margin of error was set at 5%, the precision was set at 3%, and the nonresponse rate was set at 20%, resulting in a sample size of 1277 students. Considering a multistage sampling strategy, a design effect of 1.5, commonly used in school-based surveys, increases the

required sample size to approximately 1915 students.

We used a multistage sampling strategy to select students. Yaoundé III subdivision was purposively chosen because it is the most populated among the six subdivisions of Yaoundé and hosts the highest number of schools. All the 31 secondary schools in Yaoundé III were selected. In each of them, the number of students to be surveyed was allocated proportionally to the size of the secondary school. At least one classroom from grades 10, 11, and 12 was randomly selected, and all students in the chosen classrooms were invited to participate. If the required number of students in a given school was not reached after surveying the three classrooms, additional ones were randomly selected until the expected sample size was reached.

Data collection and analysis

We collected data using a self-administered questionnaire that was pretested in a school in another subdivision of Yaoundé. We distributed questionnaires to all eligible students at the same time.

We classified key variables for analysis into sociodemographic data (age, sex, religion, residence, school grade), substance use (type of drug used, age of onset use, rate of use, reasons for use, usual place of supply) and associated factors to substance use (social environment of the student, presence of drug users in the environment, school transfers, one performances at school and parents' educational level). Data entry and cleaning were done using Epi Info 7, statistical analyses were performed with R 4.5.1, while Microsoft Excel 2016 was used to design graphs and tables. We summarized quantitative data with means and medians, and qualitative data with proportions. We identified risk factors for PAS consumption using binary logistic regression. The dependent variable was "lifetime substance use at least once". We defined lifetime substance use at least once as the consumption of PAS, such as tobacco, alcohol, cannabis, and/or cocaine, at least once in one's lifetime.

From the bivariable analysis onward, analyses were restricted to participants with complete data for the dependent variable and all covariates included in the final model. This complete-case approach was adopted to ensure consistency between bivariable and multivariable analyses. Consequently, the analytical sample comprised 966 students.

In the bivariable analysis, associations between dependent and independent variables were measured using crude odds ratios (ORs) and 95% confidence intervals (CIs). Variables with a p-value ≤ 0.20 in bivariable analysis were entered into a multivariable binary logistic regression model to identify factors independently associated with psychoactive substance (PAS) use while controlling for potential confounding. Model adequacy was assessed

using the Hosmer–Lemeshow goodness-of-fit test, and statistical significance was set at a p-value < 0.05 .

Ethical consideration

We obtained an ethical clearance CE N° 690/CRERSHC/2019 from the Centre's Regional Ethics Committee and an administrative authorization from the Centre's Regional Delegation of Secondary Education and the Departmental Delegation of Mfoundi in the Centre Region. Written informed consent was obtained from students' parents and directly from students before they completed the questionnaire. The confidentiality of information received was ensured, and all the questionnaires collected were secured in a locked cabinet.

Results

The total number of eligible students in the selected classes was 1472, of whom 1450 completed the questionnaire (response rate 98.5%).

Sociodemographic characteristics of the study population

The sex ratio (F/M) was 1.4. The median age was 18 years (13–27), with 71.1% (n=890) between 15 and 19 years old. Most students were Christians (88.7%, n=1257), and 53.4% (n=745) lived with one of their parents. Concerning the grade, 38.1% (n=552) were in grade 10, 33.7% (n=489) in grade 11, and 28.2% (n=409) in grade 12. Regarding parental education, 84.5% of mothers (n=1125) and 92.3% of fathers (n=1184) completed at least secondary school (Table 1).

Prevalence and patterns of substance use among students

Among students, 94% (n=1363) had already heard about PAS; 54% (n=774) used PAS at least once in their lifetime, of whom 54% (n=418) were male. Among lifetime users, 53.2% (n=412) had consumed PAS during the past 12 months, 23% (n=178) within the last 30 days, and 23.8% (n=184) did not specify. Regarding the type of PAS used, alcohol was the most commonly reported substance among lifetime users (77.3%, 598/774), followed by tobacco (10%, 77/774) and tramadol (7%, 54/774). Other PAS, including cannabis, cocaine, heroin, and glue, were less frequently reported (5.8%, 45/774). median age was 16 years (interquartile range: 14–17 years). Among lifetime PAS users who reported reasons for use (n = 774), the main reasons were curiosity (48%, 371/774) and imitation (12.5%, 97/774). Regarding PAS supply sources, data were available for 541 lifetime users. Among them, 28% (149/541) reported obtaining PAS from the street and 26.8% (145/541) from friends, while 45% (243/541) did not specify their source of supply.

Environmental context and associated factors with substance use

Factors significantly associated with PAS use included sex, age, social environment, school grade, and presence of drug users in the student's environment (Table 2). Male students were more likely to use PAS compared to females (aOR=1.44; 95% CI: 1.09–1.90). Students aged 15–19 and 20–24 years were about three times more likely to use PAS than those in other age groups (aOR=3.40; 95% CI: 1.09–10.65 and aOR=3.41; 95% CI: 1.03–11.26, respectively). Students living with other people were also more likely to use PAS (aOR=1.52; 95% CI: 1.06–2.19). Grade 11 students were more than twice as likely to use PAS compared to grade 10 students (aOR=2.31; 95% CI: 1.60–3.35). Finally, students reporting drug users in their environment were almost twice as likely to consume PAS (aOR=1.86; 95% CI: 1.41–2.45).

Discussion

More than half of the students aged between 15 and 19 years had used PAS at least once in their lives. This high rate is close to that found in other studies conducted in Africa, where 40 to 80% of the cases were reported in the same approximate age group [22,24,27-29]. This lifetime consumption rate is lower in East Africa, probably because of sociocultural differences [30, 31]. Alcohol, tobacco, and tramadol are the most commonly consumed PAS. Similar studies conducted in Africa have also shown that alcohol and tobacco are the main PAS used by young people [20,23,27-29]. In Cameroon, this trend could be explained by the social acceptability of alcohol consumption among young people, as it is associated with being a sign of maturity. In addition, regulation and legislation on alcohol and tobacco access and sales to minors have not been fully implemented.

Additionally, approximately half of the students started consuming PAS before the age of 16 years. Ekwoke et al. in Cameroon and Soremekun RO et al. in Nigeria described much younger initiation ages ranging from 13 to 14 [23,28]. This age corresponds to the adolescence period, which is the crucial period of experimentation, probably because it is an exploration and conflict phase, during which they want to take risks, which makes them vulnerable to external situations such as PAS consumption, delinquency and risky sexual behaviour [16,33,34]. This may also explain why the main reasons for PAS use were curiosity and imitation, as well as the need to discover new sensations and social acceptance by peers. Gagnon et al. conducted a study in 2010 among Canadian adolescents to investigate the reasons for PAS use, and reported similar motivations, including curiosity and peer influence [18]. Kpozehouen et al. in 2015 identified imitation and the perceived effects of PAS in increasing confidence and comfort as key reasons for PAS use among young people in Benin [32]. Similarly, a study in Nigeria reported that adolescents used PAS to enhance academic performance,

Table 1. Students sociodemographic characteristics, Yaounde III subdivision, 2019

Variable	Frequency	Percent (%)
Gender (n=1450)		
Male	603	41.6
Female	847	58.4
Age in years (n=1248)		
10–14	25	2.0
15–19	890	71.5
20–24	313	25.0
25 and above	20	1.5
Religion (n=1417)		
Christianity	1257	88.7
Animist	77	5.4
Islam	60	4.2
Others	23	1.6
Students' social environment (n=1394)		
Lives alone	42	3.0
Lives with both parents	344	24.7
Lives with one parent	745	53.4
Lives with other people	263	18.9
Class attended (n=1450)		
Grade 10	409	28.2
Grade 11	552	38.1
Grade 12	489	33.2
School category (n=1450)		
Public	171	11.7
Private	1193	82.3
Confessional	86	5.9
Mother's educational level (n=1332)		
None	47	3.5
Primary school	160	15.5
Secondary school	620	46.5
University	505	37.9
Father's educational level (n=1283)		
None	30	2.3
Primary school	69	5.4
Secondary school	399	31.1
University	785	61.2

increase activity levels, and for recreational purposes [35, 36]. For instance, some students were observed to use PAS during stressful periods, such as exams, to keep focused during intense study sessions and to improve their academic performances [36].

Concerning risk factors, male students were 1.5 times more likely to use PAS than female students. Similar results have been reported in other studies [11,24]. Males are more likely to use PAS than females because of their risk-taking tendency and their need to experiment new things.

Table 2. Multivariable analysis of psychoactive substance consumption risk factors among students, Yaounde III subdivision, 2019

Variables (n=966)	PAS use n (%)	PAS non-use n (%)	Total (n)	Crude OR (95% CI)	Adjusted OR (95% CI)	P value
Gender						
Male	244 (61.0)	156 (39.0)	400	1.47 (1.13–1.91)	1.44 (1.10–1.90)	0.009
Female	292 (51.6)	274 (48.4)	566	1	1	
Age (years)						
10–14	4 (21.1)	15 (78.9)	19	1	1	
15–19	378 (53.8)	325 (46.2)	703	4.36 (1.57–15.42)	3.41 (1.18–12.29)	0.035
20–24	145 (63.0)	85 (37.0)	230	6.40 (2.24–23.00)	3.41 (1.11–12.84)	0.044
25 and above	9 (64.3)	5 (35.7)	14	6.75 (1.53–35.65)	3.57 (0.74–20.19)	0.126
Students' social environment						
Lives with both parents	254 (50.1)	253 (49.9)	507	1	1	
Lives alone	18 (72.0)	7 (28.0)	25	2.56 (1.10–6.69)	1.83 (0.75–4.98)	0.203
Lives with one parent	155 (60.5)	101 (39.5)	256	1.53 (1.13–2.08)	1.37 (0.99–1.89)	0.056
Lives with other people	109 (61.2)	69 (38.8)	178	1.57 (1.11–2.24)	1.53 (1.06–2.20)	0.023
Class attended						
Grade 10	113 (43.5)	147 (56.5)	260	1	1	
Grade 11	203 (54.4)	170 (45.6)	373	1.55 (1.13–2.14)	1.43 (1.02–2.00)	0.039
Grade 12	220 (66.1)	113 (33.9)	333	2.53 (1.82–3.54)	2.32 (1.61–3.36)	< 0.001
Class doubling						
Yes	324 (60.8)	209 (39.2)	533	1.62 (1.25–2.09)	1.33 (0.99–1.78)	0.057
No	212 (49.0)	221 (51.0)	433	1	1	
School performance						
Average	277 (52.7)	249 (47.3)	526	0.73 (0.56–0.95)	0.81 (0.61–1.07)	0.137
Good	18 (43.9)	23 (56.1)	41	0.51 (0.27–0.98)	0.65 (0.33–1.28)	0.217
Low	241 (60.4)	158 (39.6)	399	1	1	
Presence of drug users in the environment						
Yes	369 (61.7)	229 (38.3)	598	1.94 (1.49–2.53)	1.86 (1.42–2.46)	< 0.001
No	167 (45.4)	201 (54.6)	368	1	1	

Furthermore, in Cameroon, females who consume alcohol are often not viewed positively [37]. Substance use increases with student age and class attended. Students aged between 20–24 years were three times more likely to use PAS, and those in Grade 12 were 2 times more likely to consume PAS than those in Grade 10. These findings are consistent with those reported by Assad et al. among urban secondary school students in Benin, where older students (20–24 years) had substantially higher odds of substance use [27]. However, our results contrast with findings from studies conducted among school-going adolescents in Nigeria, which reported higher levels of substance use among younger age groups [18]. The higher prevalence of PAS use among older students in our study may reflect repeated experimentation over time and increased exposure to environments where substances are more accessible.

Students who lived with people other than their parents and those who had people consuming PAS around them were more at risk of consuming it. Studies in Europe and Africa reported similar results in young people [27,30, 38]. Parents, friends or neighbours are important influencers on

PAS use habits as they are considered as identification models. Moreover, the family marital status had a strong influence on adolescent behaviour, and those who were married or living in couples were less at risk for PAS consumption. [23,32,33,37]. Ljubotina et al. found that PAS use generally occurs in the context of poor family relations, where parents are unable to find a balance between their business and the care of their adolescents. This contributes to an emotional deficiency, making it more difficult for children to develop their full potential and the skills needed to adapt outside the family [34].

Limitation

The main limitations of this study were the use of a self-administered questionnaire, which may have introduced recall and social desirability bias. Although the response rate was high (98.5%), some participants still provided incomplete or inaccurate answers, particularly on sensitive questions regarding the experimentation and the type of PAS. This could lead to an underestimation of the true prevalence and affect the accuracy of analyses linking

drug use to other factors. In addition, the final sample size, which was smaller than expected, may have compromised the accuracy of the estimates and the statistical power to detect existing associations.

Future research could strengthen data validity by combining self-reported surveys with complementary sources such as school administrative records or qualitative interviews with peers and family members. Administrative data could offer objective indicators while qualitative interviews would provide more details on interpersonal and contextual factors influencing PAS use.

Conclusions

The rate of substance use was more than 50% in Yaoundé III schools, with the majority of users aged between 15 and 19 years old. Alcohol, tobacco and tramadol were the most used substances. Significant factors associated with PAS use included gender, age, social environment, class attended and consumption of PAS in the neighbourhood. Interventions should focus on raising awareness about PAS consumption in schools, establishing school committees, and encouraging parents to strengthen the monitoring and education of their children. In addition, enacting and enforcing laws to prevent the sale and consumption of PAS among minors could be a crucial policy measure to control this problem. A particular focus must be placed on sensitization to PAS consumption and the establishment of vigilance. In addition, parents should strengthen the monitoring and education of their children.

What is Already Known About this Topic

- Substance use is a major global public health problem, particularly in young people who remain the group most vulnerable to using PAS
- Studies in sub-Saharan Africa estimated the prevalence of substance use at 41.6%, with the highest rate in Central Africa at 55.5%
- Several studies have shown that these substances have severe negative effects among students and can negatively impact their family, educational and social life.

What This Study Adds

- This study provides information on substance use burden in Cameroon, a Central African country where the substance use phenomenon is ever-growing and in a context of limited data about this topic
- This study is conducted on a much larger scale than other studies carried out in Cameroon. It was conducted in one of Yaoundé's (the political capital of Cameroon) largest subdivisions and in all the schools in that Subdivision.
- Also, this study identified associated factors to substance use that will enable the Government to define targeted control strategies

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Authors' Contributions

Priscilla Amvella Anya was involved in the conception and design of the work, the data collection, analysis and interpretation of data and development of the manuscript. Patricia Mendjime participated in the conception and revision of the work and the manuscript. Athanase Ateba participated in data analysis and interpretation of the work. Paul Martin Kana was involved in the conception and revision of the work and the manuscript. Soreya Dawa participated in the follow-up and revision of the work and the manuscript. Armel Evouna participated in the revision of the work and the manuscript. Georges Alain Etoundi contributed to the final revision and validation of the work and the manuscript. Nicholas Tendongfor contributed to the follow-up of the work, the development, revision and final validation of the work and the manuscript.

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Conflict of Interest Statement

The authors of this work declare no competing interests.

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