

Factors Associated with the Use of Psychoactive Substances among Adolescents in a School Environment in Abidjan, Côte d'Ivoire

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Abstract

Introduction: Côte d'Ivoire is not immune to the phenomenon of consumption of psychoactive substances by adolescents, particularly in schools. The objective was to study the determinants of psychoactive substance use among urban schoolchildren. **Methods:** This was a cross-sectional study with an analytical focus that took place over a period of 03 months in a high school. Our target was teenagers aged 10 to 19. Probabilistic sampling without any survey according to the inclusion criteria was carried out. Logistic regression step-by-step downward was used to identify factors associated with the use of psychoactive substances at the 5% significance level. **Results:** We enrolled 421 adolescents. The prevalence of psychoactive substance use (PSA) was 40.38%. The prediction was 38.4% among the male gender subject and 33.3% for female subjects. Alcohol (67.64%) was the most consumed substance. The three main motivations mentioned were being cool/festive (48.82%), curiosity (32.35%) and imitating others (10%). The factors associated with APS consumption found were the male gender [OR = 1.58; $p < 0.04$], being more than 15 years [OR = 4.48; $p < 0.0001$] and belonging to an association [OR = 0.46; $p < 0.03$]. **Conclusion:** Prevention strategies targeted at the social school environment of adolescents would make it possible to reduce the scale of this scourge in a sustainable manner.

Keywords

Addiction, Adolescent, School, Côte d'Ivoire

1. Introduction

Adolescence represents a crucial phase of life marked by significant psychic, phys-

ical and relational transformations. According to the WHO this period is between 10 and 19 years [1].

At this stage of development, the balances are fragile concerning the relationship to the body, the construction of autonomy and subjectivity, as well as socialization. To this end, the adolescent can build his identity through integration and acceptance of his peer group, experimentation with his limits, confrontation with the norm, risk-taking, adoption of test driving or even transgression of certain prohibitions [1]. It is during this period that the initiation to the consumption of psychoactive substances such as tobacco, alcohol and other various substances often begins, exposing them to addiction with damaging consequences for their well-being and social integration [2].

West Africa is a transit point for some drugs to Europe and Asia. It suffers the psychosocial, economic and health consequences of non-medical drug use [3].

In Côte d'Ivoire, the phenomenon is expanding rapidly in the educational environment. The prevalence assessed according to the National Survey on the Use of Psychoactive Substances (ENSUSPS) results is 51.7% [4]. The response of the Ivorian State to the tobacco epidemic has consisted of several actions, including the creation of the National Tobacco Control Program (PLNTA). This program works in collaboration with the National School and University Health Program - Adolescent and Youth Health (PNSSU-SAJ). Their interventions are coordinated to ensure adequate health protection for this vulnerable age group, which is adolescence, in order to promote good physical and mental learning conditions [1].

It is in this context that we undertook this study to contribute to strengthening the fight against psychoactive substance use (PAS) in schools in Abidjan, Côte d'Ivoire. The research question formulated was: "What are the determinants of psychoactive substance use among Ivorian students?" The general objective was to study the determinants of psychoactive substance use among adolescents in schools. The results of this work will contribute to improving the holistic management of adolescents with an addiction.

2. Methods

This is a cross-sectional study with an analytical aim that was carried out in the commune of Cocody located in the Autonomous District of Abidjan. The said municipality used to be home to residential neighborhoods. It is now home to a heterogeneous population with socioeconomic levels ranging from low to high. The investigation took place in a mixed secular public secondary school. The choice was made by convenience. The public nature of this high school suggests a cosmopolitan attendance of students with different attitudes, behaviors and lifestyles. It has an infirmary whose services are provided by a doctor and two nurses. It is in this latter entity of the LMC that the school adolescents were enrolled according to the inclusion criteria of the study.

All the following conditions should be met; namely, regular registration and attendance in the school, obtaining consent signed by the adolescent and written

consent signed by the representative of the parents. However, students whose parents had expressed a refusal to enroll, those who did not complete the questionnaire (7), and those who were absent on the day of the interview (6) were not included in the study, as indicated in the flow diagram.

The minimum sample size was estimated from Schwartz's formula based on the latest estimated proportion of adolescents who use psychoactive substances/drugs in secondary schools in Côte d'Ivoire estimated at 51.7% [4].

The minimum sample size was calculated using Schwartz's formula: $n = Z_{\alpha}^2 \cdot p \cdot q / i^2$:

- $Z_{\alpha} = 1.96$ (standard normal deviate at the accepted risk level)
- $P = 51.7\%$: prevalence of overweight among adolescents in Côte d'Ivoire [4]
- $q = 1 - p$
- $i = 0.05$: desired precision

The minimum sample size was 384 adolescents to be enrolled. This number was increased by 10%, resulting in 419, to account for non-response.

School records were randomly selected without sampling interval for each grade level. The number of 62 was the same for each grade, ranging from students in grade 6 to those in the final year. For adolescents whose records had been selected, the questionnaire was self-administered and, two days later, certain variables were collected during a face-to-face interview.

The dependent variable was the consumption of psychoactive substances. Independent variables were selected based on their presumed association with psychoactive substance use and in light of the literature review. They relate to 1) the adolescent (age, gender, level and academic performance, existence of a physical disability (obesity, thinness, acne, unsightly scars) or motor, chronic disease); 2) the family and school environment (age, level of education, parents' professional activity, type of family, academic performance, quality of communication at school and in the family, consumption of APS by a family member, existence of a painful experience, harassment, mockery). The "National Guide for the Care of Adolescents and Young People" developed by the National School and University-Adolescent and Youth Health Programme (PNSSU-SAJ) was the reference document [1].

It also contributed to the development of the standardized survey form and to the establishment of adolescents' risk scores from selected collected variables. These included 1) the quality of communication within the family and at school, 2) the living environment, 3) academic performance, 4) psychoactive substance use, 5) the existence of sleep disorders, 6) signs of addiction and risky sexual behaviors. Depending on the response modality, the assigned score ranges from 0 to 3. The sum of all scores by variables determines the risk score whose maximum score is 34. The interpretation of the risk score is as follows:

- Adolescent at minimal risk = score < 10;
- Moderate-risk adolescent = score ranging from 10 to 20;
- High-risk adolescent = score > 20 or the presence of a single sign of severity including signs of addiction.

For a better understanding of the presentation of the results, an operational definition of the terms proved useful. SPA users were defined as individuals who had used SPA at least once, regardless of the level of consumption, without it necessarily being pathological. PSAs referred to all substances, whether licit or illicit, according to the classification of Bonnaire *et al.*, which categorizes them based on their effects [5].

The data were analyzed and processed using the EPI Data software. A univariate analysis was performed. Pearson's Chi-square test or Fisher's exact test was used to identify crude associations between SPA consumption and each independent variable. The multivariate analysis was based on a stepwise descending logistic regression, including variables significant at the 5% and 20% levels in the univariate analysis, as well as forced variables. Variables with statistical significance greater than 0.20 were successively removed. The significance threshold was set at 5%.

From an ethical standpoint, data confidentiality was ensured through the anonymization of questionnaires and the conduct of interviews in isolated settings, away from any external listening. No nominative information or data allowing direct identification of adolescents were collected. Paper questionnaires were distributed and retrieved in sealed envelopes, ensuring discretion. They were stored securely and were accessible only to the researchers involved in the study. We obtained approval from the National Ethics Committee for Life and Health Sciences (CNESVS).

3. Results

• Descriptive study

Out of a total of 434 adolescents selected for schooling, data were obtained from 421 adolescents. The sex ratio was 0.8. In 58% of the cases, it was a student of the first cycle of secondary education and under 15 years old. Poor academic performance was noted in 9% of them. They claimed not to have had a painful psychological experience in the school environment and to be members of an associative movement in 35.6% of cases.

The living environment was considered good for 40% of teenagers. Among educated parents, there were 94% of fathers with secondary and higher education compared to 69% of mothers. The other results of the exploration of the home environment are recorded in **Table 1**.

Table 1. Distribution of adolescents in urban schools in Abidjan in 2024 according to the characteristics of the family environment.

Variables	Headcount (n = 421)	%
Habitat type		
HLM	168	40
Common compound	126	30
Villa	110	26
Informal settlements	17	4

Continued

Family type		
Parental two	226	54
Single-parent/Recomposed	195	46
Parents' educational style		
Democratic	362	86
Autocratic	38	9
Permissive/Disengaged	21	5
Intra-family communication		
Good	382	91
Difficult	39	9
Father's schooling		
Yes	396	94
No	25	6
Mother's schooling		
Yes	366	87
No	55	13
Member of an association		
Yes	162	39
No	359	61
Difficult psychological experience		
Yes	27	6
No	394	94
Risk Score		
Minimal	419	99
Moderated	2	1

Table 2. Distribution of adolescents in urban schools in Abidjan in 2024 consuming PAS according to motivations.

Motivations	Headcount (n = 170)	%
Looking nice/Being cool	83	48.82
Curiosity	55	32.35
Imitate others	17	10
Feel a sense of well-being	13	7.64
Emotional shock*	2	1.17

*Mourning, breakup.

Adolescents had a minimal SPA consumption score in 99% of cases. Among them, 40.38% reported using substances. Initiation began at 15 years in 25% of

cases, at 14 years in 18% of cases and in an equal proportion of 8% at 10 and 11 years. The motivations and substances consumed are mentioned in **Table 2** and **Table 3** respectively.

Table 3. Distribution of adolescents in urban schools in Abidjan in 2024 according to the type of SPA consumed.

Type of SPA consumed	Headcount (n = 170)	%
Alcohol	115	67.64
Alcohol + Shisha	22	12.94
Alcohol + Tobacco	14	8.23
Alcohol + Tobacco + Shisha	9	5.29
Shisha	3	1.76
Tobacco	3	1.76
Alcohol + Tramadol	2	1.17
Shisha + Tobacco	2	11.17

• Analytical study

In univariate analysis (**Table 4**), a statistically significant association was found between APS/drug use and the following variables: age, sex, membership in an association and education level. There was a higher proportion of drug use among students over 15 years of age, males and in upper secondary school. On the other hand, academic performance, psychological experience and family type were not associated with APS consumption.

In the final model of logistic regression, age, sex and membership in an associative movement were predictive factors of SPA consumption. Compared to adolescents aged 15 years or younger, those aged 16 and older were 4 times more likely to use illicit substances. Similarly, the male gender multiplied by 1.58 times the probability of consumption. However, membership in an association reduced the risk of using ABP by almost half (**Table 4**).

Table 4. Factors associated with substance abuse among adolescents in urban schools in Abidjan in 2024.

Independent variables	Univariate analysis		Multivariate analysis	
	OR (95% CI)	p	OR (95% CI)	p
Age		0.0001		0.0001
≤15 years	1		1	
>15 years	4.91 (3.17 - 7.61)		4.48 (2.87 - 7.01)	
Gender		0.03		0.04
Female	1		1	
Male	2.16 (1.46 - 3.21)		1.58 (1.02 - 2.42)	
Living environment		0.06		-
Good	1		-	
Bad	1.90 (0.97 - 3.71)		-	

Continued

Member of an association			0.001	0.03
	No	1	1	
	Yes	0.42 (0.22 - 0.80)	0.46 (0.23 - 0.93)	
Family communication			0.06	-
	Good	1	-	
	Difficulty	1.90 (0.97 - 3.71)	-	
Academic performance			0.17	-
	Good	1	-	
	Bad	0.63 (0.32 - 1.22)	-	
School level			0.001	-
	1st cycle	1	-	
	2nd cycle	2.89 (1.92 - 4.33)	-	
Family type			0.15	-
	Biparental	1	-	
	Recomposed	0.26 (0.04 - 1.66)	-	-
Painful psychological experience			0.09	-
	No	1	-	
	Yes	6.62 (0.70 - 62.35)	-	-

4. Discussion

The consumption of psychoactive substances in Côte d'Ivoire presents significant challenges in terms of public health and safety, particularly for school populations. The general objective of this work was to study the factors associated with the consumption of psychoactive substances among adolescents in a public secondary school.

In the course of implementation, certain methodological difficulties have arisen. The main limitation of this study lies in the relatively small size of the sample, with the risk of reducing the statistical power to detect significant associations between explanatory variables and the dependent variable. Reporting bias was possible due to the fear of judgment or communication of information to parents in case of proven consumption. In order to reduce this bias, precautions were taken. The investigators received training provided by a resource person from the smoking cessation unit that operates in the hospital center where we work, as well as by a social worker. The students who were apprehensive of face-to-face interviews had the flexibility to self-administer with a paper document. Anonymity of participants was guaranteed throughout the study.

The survey made it possible to estimate the prevalence of PAS consumption at 40.38% among enrolled adolescents. The phenomenon is expanding rapidly in the Ivorian educational environment. During the same year, the National Survey on the Use of Psychoactive Substances and Health among secondary school students

in Côte d'Ivoire (ENUSPS), reported a prevalence of 51.7% [4]. This result is consistent with that of Traoré *et al.* (2024) who reported a comparable rate in Mali [6]. On the other hand, this prevalence is lower than those reported by Bio-sya *et al.* (2022) and Metuge *et al.* (2022) in their studies conducted respectively in Benin and Cameroon [7] [8]. This discrepancy would be related to the larger sample size than ours, increasing statistical sensitivity.

Initiation was early, before the age of 15 years in one adolescent in 3. This early experiment could be explained by the increase in the age at which children enter middle school. It is located at the beginning of puberty, a period during which the teenager presents risky behaviors in the quest to assert his personality [8]. Alcohol was the most commonly used licit substance. It was objectified a poly consumption with a risk of deterioration of overall and mental health [9] [10]. Early experimentation with alcohol and tobacco remains the most powerful predictive indicators of a future shift to illicit drugs and dependence in adulthood described in the literature [11]. Age has proven to be a demographic parameter significantly associated with psychoactive substance (SPA) use, as adolescents over 15 years old are more exposed. This reflects algorithms that reveal a change in age-related dynamics. Between the ages of 10 and 12, psychological deregulation and health predict risk. Between the ages of 14 and 16, the main predictive factor becomes non-normative socialization as peer-to-peer consumption and the need for integration [12]. In addition to this need, the reasons mentioned by teenagers for using SPA included curiosity, managing stress or forgetting difficulties, and seeking pleasure. These patterns are expected and described in the literature [13].

Within the sample, a slight female predominance was observed. In the Ivorian context, where the school enrollment rate for girls remained low, this observation reflects the positive impact of the policy of schooling young girls, through the implementation of the strategic plan to accelerate girls' education (PSAEF) adopted in March 2018 [14] [15]. Awareness of girls' schooling has made it possible to increase the gender parity index from 0.74 in 2011 to 0.86 in 2018 in general secondary education, where girls account for 44% of students according to data from the Ministry of National Education, Technical education and vocational training [14].

The proportion of APS use was significantly higher among the most important male subjects than among female subjects within the univariate analysis. However, in the final model, female gender appears as a minor correlating factor; boys had just over 1.5 times the risk of consuming SPA compared to girls. The gap between adolescent girls' consumption, historically considered low, and that of adolescents is narrowing over time. This situation could be linked to the social normalization of this behavior marked by a decline or even a disappearance of the moral values that stigmatized women consumers [16]. This normalization of the use of SPA consumption by girls is increasingly marked in Côte d'Ivoire where social models have been changing since the post-electoral crisis that occurred in 1990 [17]. After the analysis of the literature review, increased market availability,

innovation in online sales, and the porosity of legal texts would contribute to this standardization [18]. The hypothesis of the feminization of APS use concerns more minor adolescents [19].

The analysis of the influence of family, school and social environments indicates that adolescents with the status of members of an association had a reduced probability of half to consume a SPA. Strategies to avoid the negative impact of drugs on health, safety and student success are possible. These strategies, including, on the one hand, the creation of a watch and health club, and on the other hand, the parents' association, will promote healthy practices among adolescents according to UNESCO recommendations regarding alcohol consumption, drugs and tobacco [20] [21].

Psychological distress and living in a single-parent family were not associated with SPA use, although the literature describes these as negative family impacts [22]-[24]. Likewise, adolescents' poor perception of their living environment was not identified as a factor associated with SPA consumption, contrary to findings in other studies [25] [26].

5. Conclusions

At the end of the survey, the results reveal that the prevalence of psychoactive substance use among adolescents is significant. Initiation is early with poly consumption of licit substances, of which alcohol is the main one. The determinants were socio-demographic.

Our results highlight the need to develop a program and a primary prevention strategy. It should be based on strategies of struggle including both educational and community school programs. It would also be advisable to strengthen the capacities of school educators in identifying adolescents at risk, to increase awareness among the target population for better attendance at PNSSU-SAJ services. To ensure national representativeness and strengthen the statistical robustness of our conclusions, multicenter studies are necessary with the search for toxins in urine. Longitudinal studies would make it possible to highlight causal links.

Author Contributions

Conceptualization: Aké-Assi Marie-Hélène and Eboua Tanoh François; methodology: Aké-Assi Marie-Hélène and Béda Franck Désiré Fandin; validation: Dainguy Marie Evelyne et Amorissani-Folquet Madeleine; formal analysis: Eboua Tanoh François; investigation: Aké-Assi Marie-Hélène and Béda Franck Désiré Fandin; resources: Aké-Assi Marie-Hélène and Béda Franck Désiré Fandin; data curation: Aké-Assi Marie-Hélène and Eboua Tanoh François; writing—original draft preparation: Aké-Assi Marie-Hélène; writing—review and editing: Aké-Assi Marie-Hélène Eboua Tanoh François, Dainguy Marie Evelyne; visualization, X.X.; supervision Amorissani-Folquet Madeleine.

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors state that they have no conflict of interest in connection with this work.

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