



Nonmedical Use of Prescription Psychotropic Drugs among Secondary School Students in Parakou, northern Benin

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Abstract

Background: NMU of prescription drugs among adolescents and young adults is increasing problem worldwide. Very few studies have been conducted in this sub-group in Benin. This study aimed to investigate the prevalence and pattern of NMU of psychotropic drugs (anxiolytics, hypnotics, antipsychotics, antidepressants, and mood regulators), factors associated with their use among secondary school students in Parakou and identify abuse cases and dependence.

Methods: This cross-sectional study was conducted among students in grades 8-12th aged 10-24 years old. Data were collected using the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST), followed by urine drug test using NarcoCheck quick. Participants were selected using a three-stage cluster sampling method. A logistic regression model was used to identify factors associated with NUM of prescription drugs.

Results: 13.58% of the students reported lifetime nonmedical use of any prescription drugs, while 8.64% reported past three months' use. The pattern of use revealed that Diazepam was the most widely abused psychotropic drugs (9.47%). Only 0.8% reported using prescription drugs, as shown by urine screening. An association was found between nonmedical use of psychotropic drugs and grade level ($p=0.03$), lifetime tobacco use ($p=0.016$), alcohol ($p=0.013$), cannabis use (0.003), and stimulants use ($p=0.026$). Among nonmedical users, 21.21% had a hazardous level of use, and 03.03% had dependence.

Conclusion: This study showed a high prevalence of NMU of prescription drugs among secondary school students in Parakou. There is a need for prevention and intervention programs to minimize the nonmedical use of prescription drugs in students.

Keywords: Psychotropic drugs, secondary school, nonmedical use, Benin

Introduction

The use of psychotropic drugs has considerably increased in recent years due to the rising frequency of mental illnesses, their public health importance, and the need for their management [1]. Psychotropic drugs affect brain activity and treat common and severe mental disorders. They include neuroleptics, which are used to treat schizophrenia, antidepressants to treat different types of depression, anxiolytics for anxiety states, hypnotics for sleep disorders, and mood regulators for bipolar disorders [2]. The availability of psychotropic drugs and their accessibility encourages their use in medical or nonmedical

context [3]. Whatever the context, the use of psychotropic drugs over a prolonged period presents health risks. Which are more pronounced in case of nonmedical use (NMU) [4]. NMU can be defined as taking prescription medications, which may be obtained by prescription, but not taken in the prescribed manner, on the prescribed grounds within the prescribed time frame, or taken by a person for whom the medication was not prescribed [5,6]. It may also include use at a higher dose/frequency than prescribed, for reasons other than prescribed, without a prescription, or used solely for experimentation [7-10]. In the United States (US), NMU of psychotropic drugs

has increased two to three times over the past 20 years [11]. For example, in 2017, an estimated 2.2% of US citizens aged 12 years and older were reported to use benzodiazepines and other tranquilizers without prescription [9]. In France, NMU of psychotropic drugs concerns about 11% of 16 year old students who report having experimented with tranquilizers or sedatives [12]. In Africa, little data exists on the NMU of psychotropic drugs by adolescents and young people, as most studies focus on illicit drug use or only partially address psychotropic drugs [6]. The MedSPAD III survey conducted in Morocco among school students aged 12-23 years reported that 5% of respondents had used psychotropic drugs without medical advice or prescription in their lifetime [13].

Drugs misused may initially have been prescribed and used according to the medical recommendation. However, in recent years, several studies shown a growing nonmedical use of prescription drugs in general population, including adolescents and young adults [4-8,12]. The non-medical use of psychotropic drugs is a major public health concern in other countries. What is the current situation in Benin? This study aimed to investigate the prevalence and pattern of NMU of psychotropic drugs, associated factors, and identify abuse and dependence among secondary school students in Parakou, Benin. It is hoped that this study will lay a foundation for developing guidelines for the prevention of NMU of psychoactive drugs among adolescents and further research in the area.

Methods

Study design, setting and sample size

This cross-sectional study was conducted among secondary school students in grades 8 to 12, aged 10-24 years old, in Parakou, Benin. The sample size estimation was based on the estimated prevalence of nonmedical use of prescription drugs among adolescents in China [14]. This sample size was calculated using the Schwartz formula: $n = z^2 p q / i^2$ ($Z=1.96$ at 95% confidence interval; p =estimated prevalence = 14.20%; $q=(100-P)$ and i^2 =absolute precision or sampling error tolerated=5%). Thus a minimum sample size of 187 participants was obtained. This sample was increased by 30% to address the possible attrition and arrive at a final sample size of 243 participants.

Sampling technique

A multi-stage random sampling technique was adopted to select the desired sample of school students in Parakou. The first stage involved randomly selecting ten (10) schools out of twenty-seven (27) in Parakou. The number of students selected per school was proportional to their size in the general population. The second stage involved a random selection of one class per grade level (8 to 12) in each selected school. In the third stage, eligible respondents were selected in each class. A proportionate sample was taken from the selected classes based on their sizes and the already determined number of

respondents allocated to the school. Finally, a number was assigned to each of the consenting students and used to recruit those eligible to participate in the study randomly. Schools were not notified of the investigators' visit to avoid any bias or intervention on their part.

Instruments

Data were collected using an interviewer-administered questionnaire and urine toxicology.

ASSIST V3.0

The instrument used for this study was the adapted "Alcohol, smoking and substance involvement screening test (ASSIST V3.0) questionnaire, developed and validated by the WHO [15]. The ASSIST provides information about people who have used substances in their lifetime; the pattern of substance use in the past three months; cravings; need to cut down; the level of others' concern about substance use, and related problems to use. Individual response to each of these questions has a standardized score, and it is possible to calculate the substance involvement score by adding together the standardized scores of each of the questions. With ASSIST, three groups of people could be distinguished: those with a substance involvement score of 0-3 indicate non-problematic use (low risk), those with a substance involvement score of 4-26 indicates hazardous risk, and a substance involvement score of 27 + indicates dependence (high risk) [16].

Urine screening

Urine samples were collected from participants after the interview and analyzed using an immunoassay (300-ng/mL cut-off value) with a time window of 3 days if experimentation and 4-6 weeks if chronic use of benzodiazepines. Positive results indicate only the presence of benzodiazepines and, or their metabolites in the urine sample.

Measures

Our outcome measures include lifetime and past three months NMU of psychotropic drugs. Psychotropic drugs were defined as anxiolytics, hypnotics, antipsychotics, antidepressants, and mood regulators. Lifetime use was defined as using psychotropic drugs at least once in a lifetime. Lifetime use was determined by asking students the following question: "In your lifetime, have you ever taken the following drugs without a physician's prescription (responses were coded as 1=yes and 0=no)? In addition, the following were listed as examples of prescription drugs: anxiolytics (Lorazépam, Diazépam, Oxazépam, Alprazolam, Clonazepam), hypnotics (Zolpidem, Dynawelle, Temazepam), antipsychotics (e.g., Chlorpromazine, Halopéridol), antidepressants (e.g., Fluoxétine, Clomipramine), and mood regulators (e.g., Sodium Valproate, Lithium carbonate), and the past three months use was determined by asking the students: "In the past three months, how often have you used the drug(s) you mentioned?" The

response option was: (1) never used, (2) once or twice, (3) monthly, (4) weekly, or (5) daily/almost daily.

Ethics statement

Approval for the study was obtained from the Research Committee of the Institute of Applied Biomedical Sciences (CER-ISBA) of Cotonou, reference n°125 of February 11, 2020. Written informed consent was obtained from all participants who accepted participating in the study. For students under 18 years of age, informed consent was obtained from the parent or legal guardian in addition to their assent.

Data analysis

Data were analyzed using R software (version 3.6.1) with the RStudio environment. Descriptive findings are reported as frequencies and percentage prevalence. The chi-square tests of association were used to examine relationships between two independent variables, such as gender and the outcome variables. A binary logistic regression model was used to identify which variables from the survey influenced the NMU of psychotropic drugs. The independent variables included in the model were: gender, age groups, grade level, family structure, tobacco, alcohol, and illicit drug use. The level of statistical significance for all tests was set at $p < 0.05$.

Results

Sample characteristics

Two hundred and forty-three secondary school students participated in the survey during the study period, and all the questionnaires retrieved were analyzed. **Table 1** depicts the socio-demographics of the participants. The participants' mean age (SD) was 17(2.0) years, ranging from 13 to 23 years. The participants between the ages of 15-and 19 years old formed the largest 162 (66.7%) age group, and 58.8% of the participants were males. The majority of students, 72 (29.6%), were in the 10th-grade level (**Table 1**).

Prevalence of drugs use

Table 2 shows the prevalence and current use of psychotropic drugs among secondary school students. The overall lifetime prevalence of NMU of any psychotropic drugs was 13.58% (n=33), and it was higher in females (14%) than in males (13.28%). Students most frequently used the psychotropic drug was Diazepam (benzodiazepine), which accounted for approximately 09.47% (n=23). The other drugs cited and their respective proportions are shown in **Table 2**. Again, psychotropic drugs use was more common among females (14% vs. 13.28%).

Of the 33 students who reported lifetime nonmedical use of psychotropic drugs, 21 (08.64%) reported past three months (recent use) use. Of the 21 students who had used substances in the past three months, 17 (07%) reported sporadic use (once or twice), two (0.82%) once a month, one (0.41%) weekly, and one (0.41%) daily. The most frequent combination was

Table 1. Demographic characteristics of the respondents (N=243).

Variables	Number of participants (n=243), n (%)
Age group (years)	
10-14	47 (19.3)
15-19	162 (66.7)
20-24	34 (14.0)
Gender	
Male	143 (58.8)
Female	100 (41.2)
Grade	
8 th	28 (11.5)
9 th	70 (28.8)
10 th	72 (29.6)
11 th	29 (11.9)
12 th	44 (18.1)
Family structure	
Single-parent	58 (23.86)
Both parents	126 (50.62)
Others	59 (24.28)

Table 2. Prevalence of lifetime and current substance use.

Medications	Lifetime (% using)	Past 3 months (% using)
Haldol/Haloperidol	1(0.41)	1(0.41)
Temesta/lorazepam	0(0.00)	0
Valium/diazepam	23(9.47)	12(4.93)
Dynawelle/cyproheptadine	16(6.58)	9(3.70)

psychotropic drugs and stimulants 8.64% (n=20). There were also cases in which alcohol use was added, 7.0% (n=17). The urine screening was positive for two (02) students who had used Diazepam. The average age of students who reported nonmedical use was 17.82 years (SD=2.59) (**Table 2**).

Factors associated with psychotropic drugs use

Table 3 presents the factors associated with NMU of psychotropic drugs. Associated factors were investigated using logistic regression models. Results of univariate logistic regression predicting non-medical use was significantly associated with grade level ($p=0.03$), tobacco use ($p=0.016$), alcohol ($p=0.013$), cannabis (0.003), and stimulants ($p=0.026$). The multivariate logistic regression model had not found factors associated with the use of psychotropic drugs. However, students from the oldest age group (20-24) were more likely to report this use (**Table 3**).

Table 3. Factors associated with non-medical use of psychotropic drugs.

	Total		Univariate Analysis			Multi-variate analysis	
	N	n	%	brut OR [IC95%]	P	Ajusted OR [IC95%]	P
Age groups							0.873
[10-14]	47	4	1.65	1	--	1	--
[15-19]	162	20	8.23	0.66 [0.21-2.3]	0.47	0.53 [0.13-2.12]	0.378
[20-24]	34	9	3.70	0.25 [0.07-0.92]	0.03	0.16 [0.02-1.02]	0.052
Gender							0.873
Male	143	19	7.82	1	--	1	--
Female	100	14	5.76	0.94 [0.44-1.97]	0.873	0.64 [0.26-1.55]	0.329
Grade level							0.037
8th grade	28	1	0.41	1	--	1	--
9th grade	70	10	4.12	0.22 [0.02-1.82]	0.161	0.15 [0.01-1.33]	0.089
10th grade	72	10	4.12	0.22 [0.02-1.88]	0.171	0.24 [0.02-2.22]	0.212
11th grade	29	2	0.82	0.50 [0.04-5.84]	0.581	0.68 [0.05-9.23]	0.774
12th grade	44	10	4.12	0.12 [0.01-1.04]	0.055	0.23 [0.02-2.30]	0.213
Family structure							0.204
Single-parent	58	11	4.53	1	--	1	--
Both parents	126	15	6.17	1.73 [0.74-4.05]	0.205	2.02 [0.79-5.18]	0.141
Others	59	7	2.88	1.73 [0.62-4.85]	0.291	2.09 [0.64-6.77]	0.216
Tobacco							0.016
No	138	14	5.76	1	--	1	--
Yes	105	19	7.82	0.51 [0.24-1.07]	0.016	0.54 [0.22-1.32]	0.18
Alcohol							0.013
No	35	2	0.82	1	--	1	--
Yes	208	31	12.76	0.34 [0.07-1.51]	0.013	0.59 [0.12-2.89]	0.52
Cannabis							0.003
No	216	28	11.52	1	--	1	--
Yes	27	5	2.06	0.65 [0.22-1.87]	0.003	0.64 [0.13-3.03]	0.584
Cocaine							0.977
No	228	31	12.76	1	--	1	--
Yes	15	2	0.82	1.02 [0.22-4.75]	0.977	2.31 [0.27-19.53]	0.44
Stimulants							0.026
No	46	2	0.82	1	--	1	--
Yes	197	31	12.76	0.24 [0.05-1.05]	0.026	0.32 [0.06-1.50]	0.15
Solvents							0.591
No	231	32	13.17	1	--	1	--
Yes	12	1	0.41	1.76 [0.22-14.17]	0.591	2.79 [0.29-26.06]	0.368
Hallucinogens							
No	242	33	13.58	--	--	--	--
Yes	1	0	0.00	1		1	--
Opioids							0.739
No	209	29	11.93	1	--	1	--
Yes	34	4	1.65	1.20 [0.39-3.68]	0.739	1.78 [0.47-6.65]	0.387

95% CI=95% confidence interval

Level of risks and therapeutic intervention

Among school students who reported lifetime nonmedical use of psychotropic drugs, the frequency and severity of use (indicated by collated ASSIST scores) showed that 39.39% (n=13) of users had a hazardous level of use (needed a brief intervention), and 03.03% (n=1) had dependence (needed intensive intervention).

Discussion

Psychoactive substance use among adolescents and young adults in secondary school is a significant problem in Benin [17,18]. The use of psychotropic drugs merits examination in a context of massive diffusion of drugs and confusion about the limits between their therapeutic functions and their use in a context of misuse. Nevertheless, the use of psychotropic drugs by adolescents and young adults in a nonmedical context is rarely studied in Benin. The present study, to our knowledge, was the first to investigate the prevalence and pattern of NMU of prescription psychotropic drugs among secondary school students in Parakou. Overall, 13.58% of students reported lifetime nonmedical use of prescription drugs. This rate is lower than the prevalence reported in the study conducted in Nigeria (18%) [19] and US 20.9% [4], but higher than the rates of 5.0% and 1.0% reported among secondary school students in Morocco (13,20). The observed difference could have been due to the type of drugs included in the study, the population covered, various tools used, and different data collection methods. In the present study, the method used is an interviewer-administered questionnaire. This choice is justified by its relatively high acceptance among the individuals surveyed.

The pattern of substance use revealed that the most commonly used psychotropic drugs among students were anxiolytics/hypnotics and many of them belong to the benzodiazepine family. These results are consistent with those conducted in France, which reported a high prevalence of anxiolytic and hypnotic use among adolescents and high schools students [12,21]. The prevalence found in our study was higher than the 7.5% reported in US high school students [22]. The increase in the availability of different substances over time could be one of the major reasons for the exponential growth in psychotropic drugs use. Over explanation could be because most students practiced self-medication to relieve sleep disorders. It is important to note that most of the study participants claimed to use Diazepam for its hypnotic effect. These results show that secondary school students in Parakou may be more likely to abuse anxiolytics and hypnotics and report a low prevalence of antidepressants use.

The questionnaire used in this study records the participants' statements. It was followed by urine screening to identify the substances reported by the participants. However, in the pre-sent study, only 2 (0.8%) students were positive with the NarcoCheck® test. This low prevalence of detection compared to the self-reported prevalence of use would be

due to the delay between use and urine testing because most psychotropic drugs have a short detection window [23,24]. In addition, the window of detection depends on the frequency and quantity of drugs used. In the present study, most users were experimenters, which explains this low detection rate. Another possible reason for the poor detection of psychotropic drugs by urine screening is that, it is an immunoassay based on the principle of competitive binding. During testing, if a drug is present in the urine specimen below its cut-off concentration, it will not saturate the binding sites of its specific antibody. The antibody will then react with the drug-protein conjugate giving a negative result. It, therefore, means that drugs that have been identified by the self-report but present in the urine below its cut-off concentration will not be detected by urine screening [24].

Among the vulnerability factors associated with nonmedical use, a certain number have been identified as risk factors. These include grade level, concurrent use of other licit or illicit substances. These results align with those reported in the Brazilian study [25]. With regard to the influence of gender, we found no statistically significant differences. However, female students were more likely to use these drugs than males (14% vs. 13.28%). These results agree with other studies conducted among school adolescents, which indicated that the rate of using prescription drugs is more common in females than males [26–28]. The fact that female students have a preference for psychotropic drugs might suggest that social acceptance and accessibility of such drugs fostered this use preference among girls.

The probability of nonmedical use of psychotropic drugs use increases with age. These results are consistent with those of the study conducted in France among adolescents and young people [2]. The average age at onset of psychotropic drugs in this study was 17.82 years. This is similar to the 17 years reported in Sweden adolescents [29] and thus buttresses the earlier suggestion that young people initiate psychotropic drugs before their early twenties [1]. These findings may indicate a critical window period for drug abuse prevention programs in the population.

Nonmedical use of psychotropic drugs is an important component of substance use problems. The assessment of students with substance use disorders, including abuse and dependence, showed that seven (36.4%) students had a hazardous level of use, and one (3.03%) had a dependence. Although there are generally fewer negative consequences associated with nonmedical drug use, it is important to note that there are significant health risks for those who obtain prescription drugs from nonmedical sources. For example, people who misuse prescription drugs nonmedically do not receive clinical assessments and medical follow-ups and do not receive the important medical information that usually accompanies a prescription. In addition, they are probably unaware of the potential for the drug to interact with other drugs or of contraindications.

Findings of the present study show that prescribing psychotropic drugs to youth needs to be done more sensitively to avoid or reduce misuse. Compliance with regulatory measures relating to the prescription of psychotropic drugs should also help to reduce self-medication and thus misuse. The setting up of a national or regional observatory to monitor dependence is thus useful.

Conclusion

This study showed a high prevalence of NMU of psychotropic drugs among secondary school students in Parakou. Among students who reported using psychotropic drugs, many were abusers. Hence, effective interventions and prevention, which include minimizing the availability or access to nonmedical use of psychotropic drugs, are recommended.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

Authors' contributions	ABS	PJO	ETEK	ACA
Research concept and design	√	--	√	√
Collection and/or assembly of data	√	√	--	√
Data analysis and interpretation	√	--	--	√
Writing the article	√	√	--	√
Critical revision of the article	--	--	√	--
Final approval of article	√	√	√	√

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