

# Emerging and Conventional Psychoactive Substance Use and Its Association with Psychiatric Morbidity, Dependence Severity, and Sociodemographic Factors in Ondo State, Nigerian Drug Rehabilitation Settings

Joshua Falade<sup>1</sup>, Moses Olumide Olajide<sup>2</sup>, Abayomi Michael Oshatimi<sup>3</sup>, Micheal Olumide Gbala<sup>4</sup>, Ayodeji Majek Akande<sup>5</sup>, Kazeem Olaide Adebayo<sup>6</sup> , Olusegun Opeoluwa Shoyombo<sup>7</sup>, Abayomi Olajide<sup>8</sup>, Solape Oluwasuyi<sup>1</sup>, Olayinka Adenike Remi-Ofakunrin<sup>1</sup>, Oluwadare Ayobami Bada<sup>1</sup>, Temitope Sherifat Audu<sup>1</sup>, Benjamin Adekunle Eegunranti<sup>9\*</sup>

<sup>1</sup>Department of Mental Health, University of Medical Sciences, Ondo, Nigeria

<sup>2</sup>Independent Researcher, San Bernadino, CA, USA

<sup>3</sup>University Medical Centre, Federal University Oye-Ekiti, Oye-Ekiti, Nigeria

<sup>4</sup>Department of Obstetrics and Gynaecology, University of Medical Sciences, Ondo, Nigeria

<sup>5</sup>Independent Researcher, West Bromwich, UK

<sup>6</sup>Department of Psychiatry, Osun State University, Osogbo, Nigeria

<sup>7</sup>Department of Mental Health, National Hospital, Abuja, Nigeria

<sup>8</sup>Federal Neuropsychiatric Hospital Aro Abeokute, Abeokute, Nigeria

<sup>9</sup>Department of Psychiatry, Ladoko Akintola University of Technology, Ogbomoso, Nigeria

Email: \*beegunranti@lautech.edu.ng, \*jfalade@unimed.edu.ng

**How to cite this paper:** Falade, J., Olajide, M.O., Oshatimi, A.M., Gbala, M.O., Akande, A.M., Adebayo, K.O., Shoyombo, O.O., Olajide, A., Oluwasuyi, S., Remi-Ofakunrin, O.A., Bada, O.A., Audu, T.S. and Eegunranti, B.A. (2025) Emerging and Conventional Psychoactive Substance Use and Its Association with Psychiatric Morbidity, Dependence Severity, and Sociodemographic Factors in Ondo State, Nigerian Drug Rehabilitation Settings. *Open Journal of Psychiatry*, **15**, 433-448. <https://doi.org/10.4236/ojpsych.2025.155034>

**Received:** August 10, 2025

**Accepted:** October 20, 2025

**Published:** October 23, 2025

---

## Abstract

**Background:** Emerging Psychoactive Substances (EPS) in Nigeria pose a growing public health threat, driving earlier drug use, increased psychiatric disorders, and more severe dependence than conventional drugs. **Aim:** This study aimed to investigate the use of EPS and its association with psychiatric morbidity, dependence severity, and sociodemographic predictors among patients admitted for drug rehabilitation. **Methodology:** A descriptive cross-sectional study of 440 patients in two Nigerian rehabilitation centers (Jan–June 2025) used questionnaires, the General Health Questionnaire-12 (GHQ-12), and the Severity of Dependence Scale (SDS) to assess sociodemographics, drug use, psychiatric morbidity, and dependence. Systematic random sampling was applied, and associations were tested using Chi-square and independent t-tests, while logistic regression identified predictors of Emerging Psychoactive Substance use. A p-value of <0.05 was considered statistically significant. **Results:**

---



A total of 440 patients were admitted for drug rehabilitation, predominantly male (95.0%), single (72.5%), and Christian (85.0%), with a mean age of  $32.0 \pm 9.7$  years. Most lived with family (60.0%), and 45.0% reported a family history of substance use. Emerging Psychoactive Substances (EPS) were used by 75.0% of respondents, with synthetic cannabinoids (40.0%), methamphetamine (35.0%), and codeine syrup (30.0%) being most common. Psychiatric morbidity was detected in 57.5% of patients, and over half (55.0%) had high dependence levels. EPS users initiated substance use significantly earlier than conventional drug users ( $6.6 \pm 8.2$  vs.  $18.5 \pm 21.9$  years;  $p = 0.001$ ). EPS use was also strongly linked to psychiatric morbidity ( $p < 0.001$ ) and high dependence ( $p < 0.001$ ). Logistic regression identified male sex (OR = 7.35,  $p = 0.001$ ), family history of substance use (OR = 13.31,  $p = 0.001$ ), and earlier age of initiation (OR = 1.19,  $p = 0.001$ ) as independent predictors of EPS use. **Conclusion:** EPS use is widespread among Nigerian rehabilitation patients and is linked to severe mental health and dependence outcomes, warranting urgent prevention and tailored treatment strategies.

## Keywords

Emerging Psychoactive Substances (EPS), Conventional Psychoactive Substances, Psychiatric Morbidity, Dependence Severity, Drug Rehabilitation, Nigeria

## 1. Background of the Study

In the past two decades, drug use patterns have shifted globally, with Emerging Psychoactive Substances (EPS) becoming a major public health concern [1]. Emerging Psychoactive Substances (EPS) are novel synthetic or locally produced compounds that mimic the effects of conventional drugs but are often designed to evade legal control and detection in standard toxicology. Criteria for classifying a drug as “emerging” include novelty of synthesis, limited or absent regulation, difficulty of detection with conventional toxicology, and evolving patterns of use. Often sold under misleading names like “legal highs” or “herbal blends,” In this study, EPS are differentiated from conventional psychoactive substances such as alcohol, cannabis, and cocaine, which are well established, widely studied, and easily detectable. Substances like methamphetamine, tramadol, and synthetic cannabinoids are considered “emerging” due to their relatively recent proliferation in Nigeria, high potency, and adaptation to evade regulation, even though their chemical structures are known. EPS include synthetic and locally produced drugs such as methamphetamine, tramadol, codeine syrup, “kush,” “monkey tail,” and synthetic cannabinoids [2]. Since 2009, over 1200 new psychoactive substances have been identified worldwide, with rapid growth in low- and middle-income countries, including Nigeria [3].

Globally, the United Nations Office on Drugs and Crime (UNODC) estimates that about 5.5% of the world’s population aged 15 - 64 used drugs at least once in

2021, with over 60 million people reporting use of new or emerging psychoactive substances. The burden of EPS is particularly high in Europe and Asia, where synthetic cannabinoids and methamphetamines dominate seizures and treatment admissions. This global trend underscores the importance of examining country-specific contexts such as Nigeria. Nigeria's drug use prevalence is nearly triple the global average. The 2018 UNODC National Survey reported that 14.4% of Nigerians (about 14.3 million people aged 15 - 64) had used drugs in the preceding year [4]. EPS, such as tramadol and methamphetamine, are increasingly replacing cannabis and alcohol [5] [6], with methamphetamine use linked to aggression and risky sexual behavior among urban youth [7].

EPS are typically more potent, widely available, and often designed to evade drug control laws [8]. Their use is associated with severe psychiatric complications, including psychosis, depression, anxiety, and suicidal ideation [9] [10]. Compared to traditional drugs, EPS users tend to develop dependence faster and exhibit more intense addictive patterns [9]. Sociodemographic factors, particularly male gender, early initiation (before age 15), low education, and family history of substance use, significantly predict EPS abuse [11] [12].

Despite the rising burden, Nigerian research on EPS remains limited, particularly regarding the links between psychiatric morbidity, dependence severity, and sociodemographic predictors. Most studies focus on prevalence or single substances, leaving a gap in evidence to guide policy and clinical interventions. This gap undermines prevention efforts and contributes to high relapse rates.

This study aimed to provide context-specific evidence to inform targeted treatment strategies, strengthen rehabilitation services, and guide policy. By examining psychiatric outcomes, dependence severity, and sociodemographic risk factors, it seeks to support prevention programs for vulnerable populations, especially youth and families with a history of substance use.

## **Aim**

To investigate the use of emerging psychoactive substances (EPS) and its association with psychiatric morbidity, dependence severity, and sociodemographic factors among patients admitted for drug rehabilitation in Nigeria.

### **Specific Objectives**

- 1) To determine the pattern and prevalence of emerging psychoactive substance (EPS) use among patients admitted for drug rehabilitation in Ondo State.
- 2) To examine the association between EPS use and psychiatric morbidity among patients in rehabilitation centers Ondo State.
- 3) To assess the relationship between EPS use and level of dependence compared to conventional substances use among patients in rehabilitation centers Ondo State.
- 4) To identify sociodemographic predictors (e.g., sex, age of first use, living arrangements, family history of substance use) of EPS use among rehabilitation patients in rehabilitation centers in Ondo State.

5) To provide evidence-based recommendations for treatment approaches and preventive interventions targeting EPS users in Nigerian drug rehabilitation settings among patients in rehabilitation centers in Ondo State.

## 2. Methodology

### Study Design

This study adopted a descriptive cross-sectional design to examine the relationship between emerging psychoactive substance (EPS) use, psychiatric morbidity, dependence severity, and sociodemographic factors among patients admitted for drug rehabilitation in Ondo State, Nigeria.

### Study Setting

The study was conducted in two rehabilitation facilities in Ondo State: the State Psychiatric Hospital, Ondo, and the University of Medical Sciences Teaching Hospital, Ondo. These centers provide detoxification, counseling, and rehabilitation services for individuals with substance use disorders.

### Study Population

The study population comprised patients admitted for drug rehabilitation between January and June 2025.

### Inclusion criteria:

Patients aged 15 years and above who were admitted during the study period and provided written informed consent. For minors, assent was obtained alongside guardian consent.

### Exclusion criteria:

Patients with severe cognitive impairment or acute medical/psychiatric conditions that limited meaningful participation, as well as those unwilling to provide consent, were excluded.

### Sample size determination

The sample size was calculated using Cochran's formula for large populations ( $N > 10,000$ ):

$$n = \frac{Z^2 \cdot p}{d^2} (1 - p) \\ \approx 384$$

Minimum sample size  $\approx 384$

Using a prevalence of 50% [13] for maximum variability, a confidence level of 95% ( $Z = 1.96$ ), and a margin of error of 5% ( $d = 0.05$ ), the minimum required sample size was 384. To account for a potential 10% non-response rate, the adjusted minimum sample was approximately 422. A total of 440 respondents were ultimately recruited, which increased statistical power and compensated for possible incomplete responses.

### Sampling Technique

A multistage sampling method was employed:

- 1) Two rehabilitation centers in Ondo State were purposively selected.
- 2) Within each center, systematic random sampling was used to recruit partic-

ipants. On each clinic day, the first respondent was randomly selected among the first three patients by balloting, and thereafter, every third eligible patient was included.

3) Data collection continued daily until the required sample size was achieved. This approach ensured representativeness while minimizing selection bias.

#### **Data Collection Instruments**

Data were collected using a structured, interviewer-administered questionnaire consisting of four sections:

1) Sociodemographic variables—age, sex, marital status, education, religion, living arrangements, and family history of substance use.

2) Pattern of drug use—type of substance (EPS vs. conventional), age of initiation, frequency, and combinations.

3) Psychiatric morbidity—assessed using the General Health Questionnaire-12 (GHQ-12), a 12-item screening tool validated in Nigeria. Each item was scored using the bimodal method (0-0-1-1), with scores  $\geq 3$  indicating psychiatric morbidity.

4) Dependence severity—measured using the Severity of Dependence Scale (SDS), a five-item tool scored 0 - 3 per item, giving a total score of 0 - 15. Scores of 0 - 4 indicated low dependence, 5 - 9 moderate dependence, and 10 - 15 high dependence.

The instruments were pretested in a similar population before use.

#### **Data Collection Procedure**

Data were collected over a six-month period by trained research assistants. Questionnaires were administered on the wards, and participants were guided through completion when necessary. Completed forms were checked for accuracy and completeness before entry.

#### **Data Analysis**

Data were entered and analyzed using SPSS version 21.

Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize sociodemographic characteristics and drug use patterns.

Chi-square test was used to examine associations between categorical variables (e.g., sex, family history, psychiatric morbidity) and EPS use.

Independent-samples t-test was used to compare continuous variables such as age of first use between EPS and conventional drug users. Where assumptions for parametric testing were violated, results were confirmed using non-parametric equivalents.

Binary logistic regression analysis was performed to identify predictors of EPS use, with results presented as odds ratios (OR) and 95% confidence intervals (CI).

A p-value  $< 0.05$  was considered statistically significant.

#### **Ethical Considerations**

Ethical approval was obtained from the University of Medical Sciences Teaching Hospital Ethics and Research Committee, Ondo State (Ref: UNIMEDTH/

REC/24/035). Written informed consent was obtained from all participants, and assent was obtained from minors with guardian consent. Participation was voluntary, and respondents were informed of their right to withdraw at any stage without negative consequences. All data were anonymized, securely stored, and treated with strict confidentiality.

### 3. Results

#### Sociodemographic Variable of the Respondents

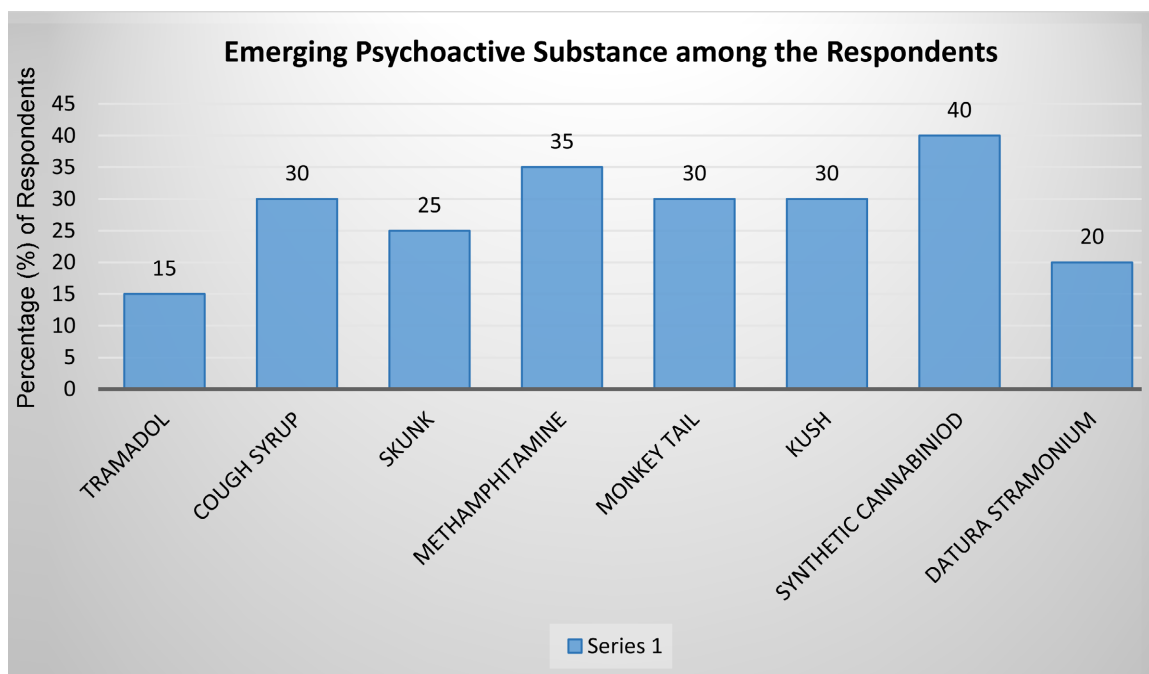
A total of 440 respondents participated in the study. The mean age was  $27.6 \pm 8.4$  years. The majority were male (82.5%), single (64.8%), and had attained at least secondary education (71.3%). Nearly half (47.7%) reported a family history of substance use (**Table 1**).

**Table 1.** Sociodemographic variable of patients admitted for drug rehabilitation.

Sn	Variable	Frequency	Percentage
1.	Sex		
	Male	418	95.0
	Female	22	5.0
2.	Religion		
	Christianity	374	85.0
	Islam	66	15.0
3.	Marital status		
	Single	319	72.5
	Married	110	25.0
	Separated	11	2.5
4.	Living arrangements		
	With parent/family	264	60.0
	Alone	176	40.0
5.	Highest academic qualification		
	Primary	146	33.2
	Secondary	147	33.4
	Tertiary	147	33.4
6.	History of substance in the family		
	Yes	198	45.0
	No	242	55.0
7.	Age	32.00 years ( $\pm 9.67$ years)	
8.	Age of drug initiation	21.05 years ( $\pm 7.92$ years)	

### Pattern of Emerging Psychoactive Substance (EPS) among the Respondents

Among respondents, 75.0% reported use of emerging psychoactive substances (EPS), while 25.0% reported use of conventional substances. Synthetic cannabinoids (40.0%) were the most prevalent EPS, followed by methamphetamine (35.0%) and tramadol (32.7%). Conventional substances used included cannabis (28.4%) and alcohol (21.1%). The mean age of first substance use was  $16.8 \pm 4.7$  years (Figure 1).



**Figure 1.** Pattern of emerging psychoactive substances (EPS) among the respondents.

### Psychiatric Morbidity and Dependence Severity

Using the GHQ-12 [14], psychiatric morbidity was identified in 61.2% of EPS users compared to 38.8% of conventional substance users. Dependence severity assessed with the SDS [15]-[17] revealed that 52.5% of EPS users had high dependence scores compared to 31.6% among conventional substance users (Table 2).

**Table 2.** Pattern of the psychoactive substance use, psychiatric morbidity and level of dependent among the respondents.

SN	Variable	Frequency	Percentage
1.	<b>Drug class</b>		
	Conventional	110	25.0
	EPS	330	75.0
2.	<b>GHQ</b>		
	Negative	187	42.5
	Positive	253	57.5

## Continued

3. Dependence category		
Low	110	25.0
Moderate	88	20.0
High	242	55.0

### Association between Sociodemographic Variables and Type of Drug Use among the Respondents using Chi-square and t-test

The Chi-square analysis examining the association between sociodemographic variables and the use of Emerging Psychoactive Substances (EPS) revealed several statistically significant relationships (Table 3). Sex was significantly associated with EPS use ( $\chi^2 = 7.719$ ,  $p = 0.005$ ), with a markedly higher proportion of males (76.3%) using EPS compared to females (50.0%). Similarly, living arrangement showed a significant association ( $\chi^2 = 6.111$ ,  $p = 0.013$ ); respondents living alone reported higher EPS use (81.3%) compared to those living with parents or family (70.8%). A family history of substance use was strongly linked to EPS use ( $\chi^2 = 37.037$ ,  $p = 0.000$ ), with 88.9% of those from such families reporting EPS use compared to 63.6% without such a history. There was a highly significant difference in the age of first use between the groups. EPS users initiated drug use much earlier, with a mean age of  $6.58 \pm 8.16$  years, compared to  $18.50 \pm 21.90$  years among users of conventional substances. This difference was statistically significant ( $t = -3.960$ ,  $p = 0.001$ ).

**Table 3.** Association between sociodemographic variable and type of drug use among the respondents using Chi-square and t-test.

sn	Variable	Conventional	eps	$\chi^2/t\text{-test}$	df	p value
1.	Sex					
	Male	99 (23.7%)	319 (76.3%)	7.719	1	0.005
	Female	11 (50.0%)	11 (50.0%)			
2.	Marital status					
	Single	77 (24.1%)	242 (75.9%)	5.260	2	0.072
	Married	33 (30.0%)	77 (70.0%)			
	Separated	0 (0.0%)	11 (100.0%)			
3.	Living arrangements					
	With parent/family	77 (29.2%)	187 (70.8%)	6.111	1	0.013
	Alone	33 (18.8%)	143 (81.3%)			
4.	Religion					
	Christianity	88 (23.5%)	286 (76.5%)	2.876	1	0.090
	Islam	22 (33.3%)	44 (66.7%)			

**Continued**

5. Highest academic qualification					
Primary	31 (21.2%)	115 (78.8%)	1.672	2	0.433
Secondary	39 (26.5%)	108 (73.5%)			
Bachelor's degree	40 (27.2%)	107 (72.8%)			
6. History of substance use in the family					
Yes	22 (11.1%)	176 (88.9%)	37.037	1	0.001
No	88 (36.4%)	154 (63.6%)			
7. Age	33.1000 ± 10.88889	31.6333 ± 9.22805	1.378	438	0.169
8. Specify age of first use	18.5000 ± 21.9000	6.57595 ± 8.16243	-3.960	438	0.001

### Association between Psychiatric Morbidity, Level of Dependence, and Type of Drug Use among the Respondents

The Chi-square analysis of the association between psychiatric morbidity, level of dependence, and type of drug use (**Table 4**). There was a highly significant association between psychiatric morbidity (GHQ status) and the type of drug used ( $\chi^2 = 84.399$ ,  $p = 0.001$ ). Among respondents who tested GHQ-positive, indicating the presence of psychiatric morbidity, an overwhelming 91.3% were EPS users, compared to only 52.9% among those who were GHQ-negative. Similarly, a strong and statistically significant association was observed between level of dependence and type of drug used ( $\chi^2 = 238.800$ ,  $p = 0.000$ ). Among respondents with high dependence, 95.5% were EPS users, while 87.5% of those with moderate dependence also reported EPS use.

**Table 4.** Association between Psychiatric morbidity, level of dependence and type of Drug use among the respondents.

sn	Variable	Pattern of drug use		$\chi^2$	df	p value
		Conventional	EPS			
1. GHQ						
	Negative	88 (47.1%)	99 (52.9%)	84.399	1	0.000
	Positive	22 (8.7%)	231 (91.3%)			
2. Dependence category						
	Low	88 (80.0%)	22 (20.0%)	238.800	2	0.000
	Moderate	11 (12.5%)	77 (87.5%)			
	High	11(4.5%)	231 (95.5%)			

### Sociodemographic Predictor of Emerging Psychoactive Substance among the Respondents

The binary logistic regression analysis identified key sociodemographic predic-

tors of Emerging Psychoactive Substance (EPS) use among the respondents (**Table 5**). Sex was a significant predictor, with males being 7.35 times more likely to use EPS compared to females (OR = 7.354, p = 0.001, 95% CI: 2.582 - 20.939). Similarly, respondents with a family history of substance use were over 13 times more likely to use EPS than those without such a history (OR = 13.310, p = 0.001, 95% CI: 6.967 - 25.426). Age at first use was also a significant predictor (OR = 1.191, p = 0.001, 95% CI: 1.130 - 1.256), indicating that for every year earlier a person initiated substance use, the likelihood of using EPS increased significantly. However, living arrangement was not a significant predictor of EPS use (OR = 0.995, p = 0.987, 95% CI: 0.534 - 1.852). Overall, these findings demonstrate that being male, having a family history of substance use, and an earlier age of initiation are strong and significant predictors of EPS use among the respondents.

**Table 5.** Sociodemographic predictor of Emerging Psychoactive Substance among the respondents.

sn	Variable	Odd ratio	p value	Confidence interval	
				Lower	Higher
1.	Sex				
	Female (Ref)				
	Male (1)	7.354	0.001	2.582	20.939
2.	History of substance use in family				
	No (Ref)				
	Yes (1)	13.310	0.001	6.967	25.426
3.	Living arrangements				
	Alone (Ref)				
	With parent/family	0.995	0.987	0.534	1.852
4.	Specify age at first use	1.191	0.001	1.130	1.256

#### 4. Discussion

This study examined the prevalence and correlates of emerging psychoactive substance (EPS) use among patients undergoing rehabilitation in Ondo State, Nigeria. The findings demonstrate a high burden of EPS use, with three out of four respondents reporting exposure. This aligns with national trends showing increasing use of synthetic and pharmaceutical substances [18]-[21], and it highlights the urgent need for more responsive prevention and treatment strategies.

##### Prevalence and Patterns of EPS Use

Synthetic cannabinoids were the most commonly reported EPS, followed by methamphetamine and tramadol. This differs from some Nigerian studies where tramadol was reported as the dominant EPS, [22] [23] reflecting regional variations in availability and market dynamics. Internationally, synthetic cannabinoids have similarly been documented as a leading EPS in Europe and North America,

consistent with their adaptability to evade legal control and detection [24]. These findings underscore the dynamic nature of EPS markets, where substances gain or lose prominence depending on accessibility, regulation, and demand.

#### **Sociodemographic Factors**

Male gender and a family history of substance use emerged as strong predictors of EPS use. These findings are in line with previous Nigerian and global studies which consistently show male predominance in substance use and highlight the role of familial exposure in shaping early initiation and normalization of drug use [25] [26]. Interestingly, educational status and marital status were not significantly associated with EPS use in this study, which contrasts with reports from other African contexts where lower education and single status were linked to higher risk. This suggests that, in Ondo State, EPS use cuts across social categories and may be more influenced by peer and market dynamics than by educational or marital status.

#### **Age of Initiation**

Respondents who initiated substance use at a younger age were significantly more likely to use EPS. This finding mirrors global evidence that early initiation predicts progression to high-risk drug categories and more severe outcomes [27]-[30]. The mean age of first use in this study was slightly lower than reported in some Nigerian surveys, raising concern about early exposure and highlighting the importance of school-based prevention strategies.

#### **Psychiatric Morbidity and Dependence Severity**

EPS use was strongly associated with psychiatric morbidity and higher dependence severity. This supports evidence from both Nigerian and international studies linking synthetic and pharmaceutical drugs with anxiety, depression, psychosis, and high dependence potential [31]. Notably, the co-occurrence of psychiatric morbidity and substance dependence represents a dual diagnosis challenge that complicates treatment outcomes. However, not all EPS users in this study reported psychiatric morbidity, suggesting that while the risk is elevated, it may be moderated by individual, environmental, or protective factors that warrant further exploration.

#### **Predictors of EPS Use**

Logistic regression confirmed that male gender, family history of substance use, and earlier age of initiation were independent predictors of EPS use [32] [33]. These factors have also been identified in previous Nigerian studies and globally, reinforcing their relevance as targets for preventive interventions. The lack of significant associations with certain sociodemographic variables (such as occupation or religion) suggests that these may play a more contextual or indirect role.

## **5. Limitations and Recommendations**

### **1) Limitations**

This study has some limitations that should be considered in interpreting the findings. First, the cross-sectional design limits the ability to establish causal rela-

tionships between emerging psychoactive substance use and psychiatric outcomes. Second, data were collected through self-report, which may be subject to recall bias and social desirability bias, potentially leading to underreporting or misclassification of substance use. Third, the study was conducted in rehabilitation centers within Ondo State, which may not fully represent patterns of substance use in other regions of Nigeria. Finally, while validated tools (GHQ-12 and SDS) were used, the absence of biochemical confirmation of substance use may have affected the precision of reported drug types.

## **2) Recommendations**

Despite these limitations, the findings provide useful insights for research, policy, and practice. Future studies should adopt longitudinal designs to better establish causal relationships and incorporate biological verification of drug use for greater accuracy. Comparative studies across multiple regions of Nigeria would also provide a more comprehensive picture of national trends.

For policymakers, there is an urgent need to strengthen regulation of synthetic and pharmaceutical substances and to improve surveillance systems that monitor emerging drug trends. Public health interventions should prioritize adolescents and young adults, with emphasis on family-based and school-based prevention programs. Rehabilitation centers should integrate mental health screening and treatment for dual diagnosis, while also tailoring interventions to the evolving patterns of EPS use.

## **6. Conclusions**

This study revealed a high prevalence of emerging psychoactive substance use among patients in rehabilitation facilities in Ondo State, Nigeria, with synthetic cannabinoids, methamphetamine, and tramadol being the most frequently reported. EPS use was strongly associated with psychiatric morbidity, greater dependence severity, and earlier age of initiation. Male gender and a family history of substance use were significant independent predictors.

These findings highlight the urgent need for prevention programs that target adolescents and young adults, particularly males and those with familial risk. Rehabilitation services should integrate routine mental health screening and dual-diagnosis management, while policymakers must strengthen control of synthetic and pharmaceutical substances.

Overall, this study underscores the complex interplay between emerging substances, psychiatric outcomes, and sociodemographic factors, and calls for coordinated public health and clinical responses to address this evolving challenge in Nigeria.

## **Declarations and Ethics Statements**

### **Ethical Approval**

Ethical approval was obtained from the Ethics and Research Ethics Committee of the University of Medical Sciences Teaching Hospital, Ondo City, Ondo State

(UNIMEDTH/REC/24/035). Written informed consent was collected from the participants.

### Informed Consent from Participants

Participation was voluntary, and informed consent was obtained from the participants.

### Share upon Reasonable Request Data Sharing Policy

The data is presently unavailable in the public domain because the authors do not have permission to share the data yet. Therefore, the data will be made available only upon request.

### Acknowledgements

We acknowledge the participants, research assistants, and the hospital authorities for the opportunity to carry out the study.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

### References

- [1] Rinaldi, R., Bersani, G., Marinelli, E. and Zaami, S. (2020) The Rise of New Psychoactive Substances and Psychiatric Implications: A Wide-Ranging, Multifaceted Challenge That Needs Far-Reaching Common Legislative Strategies. *Human Psychopharmacology: Clinical and Experimental*, **35**, e2727. <https://doi.org/10.1002/hup.2727>
- [2] Miller, B.L., Stogner, J.M., Agnich, L.E., Sanders, A., Bacot, J. and Felix, S. (2015) Marketing a Panic: Media Coverage of Novel Psychoactive Drugs (NPDS) and Its Relationship with Legal Changes. *American Journal of Criminal Justice*, **40**, 523-541. <https://doi.org/10.1007/s12103-014-9270-6>
- [3] Gust, S.W., Ahumada, G., Copeland, J., Griffiths, P., Howard, J. and Hynes, M. (2018) International Aspects of Cud. In: Budney, A.J., Ed., *Cannabis Use Disorders*, Springer International Publishing, 253-263. [https://doi.org/10.1007/978-3-319-90365-1\\_26](https://doi.org/10.1007/978-3-319-90365-1_26)
- [4] Osayomi, T., Iyanda, A.E., Adeleke, R. and Osadolor, O.J. (2021) Geographical Analysis of Illicit Drug Use in Nigeria: Evidence from the First National Drug Use Survey, 2018. *The Professional Geographer*, **73**, 377-391. <https://doi.org/10.1080/00330124.2021.1883445>
- [5] Fetuga, M.B., Ogunlesi, T.A., Adekanmbi, A.F. and Alabi, A.D. (2011) Growth Pattern of Schoolchildren in Sagamu, Nigeria Using the CDC Standards and 2007 WHO Standards. *Indian Pediatrics*, **48**, 523-528. <https://doi.org/10.1007/s13312-011-0094-x>
- [6] Alabi, K.O., Joshua, F., Akinwumi, A.I., Adje, D.U. and Awodele, O. (2023) Perception of Community Pharmacists on Abuse of Psychotropic Medications among the Consumers. *Tropical Journal of Pharmaceutical Research*, **21**, 2721-2729. <https://doi.org/10.4314/tjpr.v21i12.30>
- [7] Ukachukwu, A.K., Njeru, P.N., Ayodele, O.A., Ahmad, M.H., Onyia, C.U., Morgan, E., et al. (2024) A Geospatial Analysis of the Availability, Distribution, and Accessi-

- bility of Neurosurgical Facilities, Workforce, and Infrastructure in Nigeria; and Projection Towards 2050. *World Neurosurgery*, **185**, e16-e29. <https://doi.org/10.1016/j.wneu.2023.10.146>
- [8] Akunna, G.G. and Lucyann, C.A. (2023) Nigeria's War against Drug Abuse: Prevalence, Patterns, Ramifications, Policy and Multisectoral Response, Strategies and Solutions. *Studies in Social Science & Humanities*, **2**, 35-55. <https://doi.org/10.56397/sssh.2023.10.06>
- [9] Schifano, F., Orsolini, L., Duccio Papanti, G. and Corkery, J.M. (2015) Novel Psychoactive Substances of Interest for Psychiatry. *World Psychiatry*, **14**, 15-26. <https://doi.org/10.1002/wps.20174>
- [10] Mbanuzuru, A.V., Oriji, S.O., Udigwe, I., Onu, J.U., Ifeadike, C. and Ibeh, C.C. (2022) Dangerous Trend of Methamphetamine Use among Youths in South-Eastern Nigeria: A Mini-Review. *International Journal of Research in Psychiatry*, **2**, 32-36. <https://doi.org/10.22271/27891623.2022.v2.i1a.26>
- [11] Falade, J., Akinnuoye, A.A., Sajo, S., Ajayi, A.A., Ajayi, A.O., Ogungbemi, A.O., et al. (2024) Emerging Psychoactive Drugs and the Common Life Events among Adolescents in a Nigerian Rehabilitation Centre. *British Journal of Guidance & Counselling*, **52**, 142-156. <https://doi.org/10.1080/03069885.2024.2370525>
- [12] Neicun, J., Yang, J.C., Shih, H., Nadella, P., van Kessel, R., Negri, A., et al. (2020) Lifetime Prevalence of Novel Psychoactive Substances Use among Adults in the USA: Sociodemographic, Mental Health and Illicit Drug Use Correlates. Evidence from a Population-Based Survey 2007-2014. *PLOS ONE*, **15**, e0241056. <https://doi.org/10.1371/journal.pone.0241056>
- [13] Naing, L., Nordin, R.B., Abdul Rahman, H. and Naing, Y.T. (2022) Sample Size Calculation for Prevalence Studies Using Scalex and Scalar Calculators. *BMC Medical Research Methodology*, **22**, Article No. 209. <https://doi.org/10.1186/s12874-022-01694-7>
- [14] Falade, J., Egunranti, B.A., Tobih, J.E., Ogundiran, A.C., Ibigbami, O., Akinsulore, A., et al. (2019) Prevalence, Pattern and Correlates of Study Difficulty among Students of College of Health Sciences Ladoko Akintola University of Technology Osogbo. *Advances in Social Sciences Research Journal*, **6**, 322-338. <https://doi.org/10.14738/assrj.69.7138>
- [15] Gossop, M., Griffiths, P., Powis, B. and Strang, J. (1994) Cocaine: Patterns of Use, Route of Administration, and Severity of Dependence. *British Journal of Psychiatry*, **164**, 660-664. <https://doi.org/10.1192/bjp.164.5.660>
- [16] Cheng, S., Siddiqui, T.G., Gossop, M., Kristoffersen, E.S. and Lundqvist, C. (2019) The Severity of Dependence Scale Detects Medication Misuse and Dependence among Hospitalized Older Patients. *BMC Geriatrics*, **19**, Article No. 174. <https://doi.org/10.1186/s12877-019-1182-3>
- [17] Mercincavage, M., Smyth, J.M., Branstetter, S.A. and Catley, D. (2016) Exploring the Severity of Dependence Scale (SDS) as a Possible Measure of Nicotine Dependence. *Substance Abuse*, **37**, 323-329. <https://doi.org/10.1080/08897077.2015.1062459>
- [18] Sanni, M.M., Bolu-Steve, F.N., Durosaro, I.A. and Adigun, A.A. (2021) Prevalence of Drug Relapse among Clients in Rehabilitation Centres in North Central Nigeria: Implications for School Counsellors. *Canadian Journal of Family and Youth/Le Journal Canadien de Famille et de la Jeunesse*, **13**, 14-25. <https://doi.org/10.29173/cjfy29668>
- [19] Mulatu, M.S., Leonard, K.J., Godette, D.C. and Fulmore, D. (2008) Disparities in the Patterns and Determinants of HIV Risk Behaviors among Adolescents Entering Substance Abuse Treatment Programs. *Journal of the National Medical Association*, **100**,

- 1405-1416. [https://doi.org/10.1016/s0027-9684\(15\)31540-6](https://doi.org/10.1016/s0027-9684(15)31540-6)
- [20] Obadeji, A., Kumolalo, B.F., Oluwole, L.O., Ajiboye, A.S., Dada, M.U. and Ebeyi, R.C. (2020) Substance Use among Adolescent High School Students in Nigeria and Its Relationship with Psychosocial Factors. *Journal of Research in Health Sciences*, **20**, e00480-e00480. <https://doi.org/10.34172/jrhs.2020.15>
- [21] Obisesan, O.A. and Adejuwon, G.A. (2023) Family Dysfunction and Perceived Peer Pressure as Predictors of Substance Use among In-School Adolescents in Ibadan, Nigeria. *African Journal for the Psychological Study of Social Issues*, **26**, 155-165.
- [22] Schifano, F., Napoletano, F., Chiappini, S., Guirguis, A., Corkery, J.M., Bonaccorso, S., et al. (2019) New/Emerging Psychoactive Substances and Associated Psychopathological Consequences. *Psychological Medicine*, **51**, 30-42. <https://doi.org/10.1017/s0033291719001727>
- [23] Ajayi, O.C., Esangbedo, A.E., Lawal, A.A., Ojo, T.I., Gbadegesin, A.O., Olusegun, J.O., et al. (2025) Relapse Rates and Admission Correlates among Patients Admitted for a Substance Use Disorder to the Federal Neuropsychiatric Hospital Yaba: A Retrospective Cross-Sectional Study. *Nigerian Journal of Medicine*, **34**, 30-37. [https://doi.org/10.4103/njm.njm\\_92\\_24](https://doi.org/10.4103/njm.njm_92_24)
- [24] Shafi, A., Berry, A.J., Sumnall, H., Wood, D.M. and Tracy, D.K. (2020) New Psychoactive Substances: A Review and Updates. *Therapeutic Advances in Psychopharmacology*, **10**, 1-21. <https://doi.org/10.1177/2045125320967197>
- [25] Onaolapo, O.J., Olofinnade, A.T., Ojo, F.O., Adeleye, O., Falade, J. and Onaolapo, A.Y. (2022) Substance Use and Substance Use Disorders in Africa: An Epidemiological Approach to the Review of Existing Literature. *World Journal of Psychiatry*, **12**, 1268-1286. <https://doi.org/10.5498/wjp.v12.i10.1268>
- [26] Klantschnig, G., Carrier, N. and Rusenga, C. (2024) Beyond Africa and the War on Drugs: Reassessing Drug Markets Research and Policy. *Journal of Illicit Economies and Development*, **5**, 18-26. <https://doi.org/10.31389/jied.172>
- [27] Sevarino, K.A. and Farrell, M. (2024) Disorders Due to Substance Use: Stimulants. In: *Tasman's Psychiatry*, Springer International Publishing, 2843-2932. [https://doi.org/10.1007/978-3-030-51366-5\\_26](https://doi.org/10.1007/978-3-030-51366-5_26)
- [28] Fiorentini, A., Cantù, F., Crisanti, C., Cereda, G., Oldani, L. and Brambilla, P. (2021) Substance-Induced Psychoses: An Updated Literature Review. *Frontiers in Psychiatry*, **12**, Article ID: 694863. <https://doi.org/10.3389/fpsy.2021.694863>
- [29] Chartoff, E.H. and Connery, H.S. (2014) It's MORE Exciting than Mu: Crosstalk between Mu Opioid Receptors and Glutamatergic Transmission in the Mesolimbic Dopamine System. *Frontiers in Pharmacology*, **5**, Article ID: 116. <https://doi.org/10.3389/fphar.2014.00116>
- [30] Dias da Silva, D., Silva, J.P., Carmo, H. and Carvalho, F. (2021) Neurotoxicity of Psychoactive Substances: A Mechanistic Overview. *Current Opinion in Toxicology*, **28**, 76-83. <https://doi.org/10.1016/j.cotox.2021.10.002>
- [31] Schifano, F., Napoletano, F., Chiappini, S., Guirguis, A., Corkery, J.M., Bonaccorso, S., et al. (2021) New/Emerging Psychoactive Substances and Associated Psychopathological Consequences. *Psychological Medicine*, **51**, 30-42. <https://doi.org/10.1017/s0033291719001727>
- [32] Almarhabi, Y., Mufti, A.I., Almaymuni, A.D., Abdurahman, T., Abdulaziz, G., Alghamdi, A.A., et al. (2018) Substance Abuse at Early Age as a Potential Risk Factor for Driving under the Influence of Substance in Jeddah, Saudi Arabia: A Cross-Sectional Study. *Traffic Injury Prevention*, **19**, 687-692.

<https://doi.org/10.1080/15389588.2018.1494828>

- [33] Aguocha, C.M., Duru, C.B., Ndukuba, A.C. and Nwefoh, E.C. (2020) Gender Differences in Psychoactive Substance Use among Undergraduates in a Developing Country. *Journal of Substance Use*, **26**, 85-93.

<https://doi.org/10.1080/14659891.2020.1779363>