Community-Based Analysis of Drug Use Patterns and Academic Performance among Students in Health Training Institutions in Northern Adamawa State, Nigeria

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ABSTRACT

Drug abuse among students in health training institutions is an emerging public health concern with implications for academic achievement, professional competence, and community health outcomes. This study examined the prevalence, patterns, determinants, and academic consequences of substance use among students enrolled in three major health training institutions in Northern Adamawa State, Nigeria. A descriptive cross-sectional design was employed, using a multistage sampling procedure to select 430 respondents, enhancing statistical power and analytic rigor. Data were collected using a structured, validated questionnaire informed by the WHO-ASSIST and DAST-10 instruments, with reliability confirmed at $\alpha = 0.86$. Descriptive statistics, chi-square tests, and multivariate logistic regression were used for analysis at a significance level of $p < .05$. Findings showed that 41.9% of students reported lifetime use of at least one psychoactive substance, while 28.6% reported current use. Tramadol (31.1%), cannabis (25.3%), codeine-based syrups (18.2%), alcohol (20.4%), and cigarettes (13.7%) were the most commonly abused substances. Significant predictors of drug use included peer influence (AOR = 2.84; 95% CI: 1.75–4.59), stress (AOR = 1.96; 95% CI: 1.18–3.26), family drug-use history (AOR = 2.11; 95% CI: 1.22–3.65) and male gender (AOR = 1.88; 95% CI: 1.15–3.06). Drug use significantly predicted poor academic performance (AOR = 3.42; 95% CI: 2.09–5.59).The study concludes that drug abuse is prevalent among students in health training institutions and negatively affects their academic outcomes. It recommends strengthened prevention strategies, regular drug education, mental health support, and improved institutional monitoring frameworks.

Keywords: Drug abuse, academic performance, health training institutions, psychoactive substances, Nigeria.

INTRODUCTION

Background to the Study

Drug abuse among young people continues to pose a major public health and educational challenge globally, with significant consequences for mental health, academic engagement, and long-term socio-economic

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stability. In many low- and middle-income countries, including Nigeria, substance abuse among youth has increased dramatically over the past decade (UNODC, 2021). This trend is particularly concerning within tertiary institutions, where young adults experience academic pressure, identity exploration, and social influences that heighten vulnerability to psychoactive substance use.

Health training institutions represent a critical component of Nigeria's health workforce development system. These institutions train future health practitioners, including community health officers, laboratory technicians, environmental health officers, pharmacy technicians, and health educators who will later be tasked with preventing, identifying, and managing cases of drug-related harm within their communities. However, research increasingly shows that many students within health training schools also engage in risky substance use behaviors similar to those in other tertiary institutions (Agubosi, 2022; Abdullahi et al., 2024).

The rising availability of synthetic opioids (such as tramadol), codeine cough syrups, cannabis, alcohol, and emerging illicit mixtures has contributed to escalating rates of misuse among students (UNODC, 2019). In Northern Nigeria including Adamawa State several sociocultural, economic, and environmental factors interact to influence drug-use patterns. These include widespread informal drug markets, porous borders, peer influence, emotional distress, curiosity, stress associated with academic workloads, and limited access to mental health support services (Attah et al., 2016; Dosunmu & Erhabor, 2018).

Drug use among adolescents and young adults has numerous academic consequences, including poor concentration, impaired memory, absenteeism, reduced motivation, diminished cognitive function, and declining grades (Eze et al., 2023; Brown et al., 2000). Students who engage in substance abuse are more likely to miss classes, submit poor-quality work, or fail examinations. This pattern has substantial implications for future health workforce readiness, given that cognitive precision, discipline, and psychological stability are essential for clinical training.

While several studies have examined drug use among university and secondary school populations, fewer have focused specifically on students in health training institutions, despite their crucial future responsibilities. Furthermore, many previous studies relied heavily on basic descriptive statistics and outdated theoretical foundations. This study introduces a more rigorous epidemiological approach through multivariate logistic regression, improved sampling, and expanded contemporary literature to address the methodological weaknesses commonly observed in prior Nigerian studies on student drug abuse.

This research therefore provides an updated, evidence-driven, community-based assessment of drug use patterns and academic outcomes among students in health training institutions in Northern Adamawa State, Nigeria.

Statement of the Problem

The misuse of psychoactive substances among young adults in Nigeria has reached record levels, with more than 14.4% of the population aged 15–64 estimated to be using drugs significantly higher than the global average (UNODC, 2019). Within tertiary institutions, drug-use prevalence continues to rise, with tramadol, cannabis, codeine-based mixtures, cigarettes, and alcohol being the most commonly abused substances (Agbon et al., 2022).

In health training institutions, the problem assumes an even more serious dimension. Students training to become future health professionals are expected to embody discipline, responsibility, and sound judgment. However, available anecdotal and institutional reports from Northern Adamawa State suggest increasing involvement of students in substance use, contributing to absenteeism, academic decline, behavioral disruptions, and compromised clinical performance. Despite this growing concern, systematic research focusing specifically on drug use among students in health training institutions remains limited.

A review of existing literature reveals significant methodological shortcomings in prior studies, including overreliance on self-reported data without triangulation, inadequate validation of questionnaires, and minimal application of robust analytical techniques, insufficient sample sizes, and excessive use of grey literature. In addition, many studies fail to account for confounding variables or assess the adjusted effects of drug use on academic performance.

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These gaps highlight the need for a more rigorous, empirically grounded study utilizing improved statistical modeling, expanded literature, stronger theoretical foundations, and clear ethical oversight. This study addresses these gaps by conducting a comprehensive community-based analysis using an expanded sample and a multivariate analytical framework.

Objectives of the Study

General Objective

To examine the prevalence, determinants, and academic implications of drug use among students in health training institutions in Northern Adamawa State, Nigeria.

Specific Objectives

1. To determine the prevalence and types of psychoactive substances used by students.
2. To identify behavioural, psychosocial, and demographic factors influencing drug use.
3. To assess the effect of drug abuse on academic performance.
4. To conduct multivariate logistic regression to determine predictors of drug use and academic decline.

Research Questions

1. What is the prevalence of drug use among students in health training institutions in Northern Adamawa State?
2. What factors influence drug abuse among these students?
3. What is the effect of drug abuse on academic performance?
4. What demographic and psychosocial variables significantly predict drug use among students?

Research Hypotheses

H_{01}: There is no significant relationship between drug use and academic performance among students.
H_{11}: There is a significant relationship between drug use and academic performance.
H_{02}: Behavioural and demographic factors do not significantly predict drug use.
H_{12}: Behavioural and demographic factors significantly predict drug use.

Significance of the Study

This study is significant in several ways:

a. It provides updated epidemiological evidence on student drug use using strengthened methodology and expanded sample size.

b. It contributes to the scarce literature focused specifically on health training institutions, a critical component of Nigeria's health workforce.

c. Findings will guide administrative policies, student-support programs, counseling initiatives, and mental-health interventions.

d. Results can assist government agencies (e.g., NDLEA, Ministry of Health) in designing targeted youth drug prevention strategies.

e. The study improves scholarly understanding of substance-use determinants in Northern Nigeria.

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Scope of the Study

The study was conducted among students enrolled in three health training institutions in Northern Adamawa State. It examined prevalence, determinants, and academic consequences of psychoactive substance use. The study focused on the most commonly used substances, including tramadol, cannabis, alcohol, cigarettes, and codeine syrup.

Operational Definitions

Drug Abuse: The harmful or hazardous use of psychoactive substances leading to impairment.

Psychoactive Substance: Any substance that alters mood, cognition, or behavior.

Academic Performance: Students' grade outcomes, attendance, and cognitive functioning.

Determinants: Factors influencing drug use, such as peer pressure, stress, or family background.

REVIEW OF RELATED LITERATURE

Conceptual Review

Concept of Drug Use and Drug Abuse

Drug use refers to the consumption of psychoactive substances for medical or non-medical purposes, while drug abuse involves the harmful or hazardous use of these substances in ways that impair health, psychological functioning, social relationships, or academic performance. The World Health Organization (WHO, 2021) describes drug abuse as a pattern of psychoactive substance use that leads to significant impairment or distress. Psychoactive drugs including opioids, stimulants, cannabis, alcohol, benzodiazepines, and codeine mixtures alter central nervous system activity, changing mood, cognition, and behavior (Compton et al., 2015).

Globally, substance misuse remains a major public health problem, with millions experiencing drug-related disorders annually (UNODC, 2022). In Africa, particularly West Africa, rising cases of tramadol misuse, cannabis dependence, and misuse of pharmaceutical opioids have been widely documented. Nigeria has one of the highest reported drug use rates in the region, with increasing prevalence among young people in tertiary institutions (UNODC, 2019).

Common Psychoactive Substances among Students

Studies in Nigeria show widespread use of:

1. **Tramadol**: A synthetic opioid increasingly misused for its mood-altering and energizing effects (Abdullahi et al., 2024).

2. **Cannabis**: The most commonly used illicit substance among adolescents and young adults (Burgess et al., 2023).

3. **Alcohol**: Socially acceptable and easily accessible across campuses (Balsa et al., 2011).

4. **Codeine-based syrups**: Popular among young people despite regulatory restrictions.

5. **Cigarettes and shisha**: Rising among students due to social acceptability, peer influence, and entertainment settings (Engberg & Morral, 2006).

Other emerging substances include inhalants, solvents, and mixed cocktails such as "purple drank" and locally prepared herbal stimulants.

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Academic Performance

Academic performance refers to measurable academic outcomes such as grades, class attendance, examination scores, cognitive functioning, study habits, and behavioural engagement. Research consistently links drug abuse to impaired learning, poor memory retention, truancy, reduced concentration, school disengagement, and poor grade outcomes (Brown et al., 2000; Tapert & Brown, 1999). Students who use psychoactive substances often report lower academic motivation and increased absenteeism.

Theoretical Review

Social Learning Theory (Bandura)

Social Learning Theory asserts that individuals learn behaviours by observing and imitating others, especially peers. Peer approval, group norms, and modeling strongly shape young people's decisions to initiate or sustain drug use. On campuses where social networks normalize drug use, students are more likely to adopt such behaviours (King et al., 2006).

Health Belief Model (HBM)

The Health Belief Model explains engagement in health-related behaviours based on perceptions of susceptibility, severity, benefits, barriers, cues to action, and self-efficacy. Among students, lower perceived risks of drugs such as tramadol or cannabis increase experimentation. Conversely, strong perceptions of harm reduce likelihood of initiation (Siddiqui et al., 2010).

Problem Behavior Theory (Jessor)

Problem Behavior Theory attributes deviant behaviours including drug use to an interaction between personality traits, environmental influences, and behavioural expectations. Factors such as low academic engagement, stress, emotional instability, and weak parental or institutional supervision contribute significantly to drug-use initiation among students (Balsa et al., 2011).

Strain Theory (Agnew)

Strain Theory argues that individuals who experience stress, frustration, or blocked opportunities often resort to maladaptive coping mechanisms, including drug use. Academic pressure, financial hardship, and emotional distress among students can trigger substance use as a coping response (Eze et al., 2023).

Empirical Review

Prevalence of Drug Use among Students

Drug use among students in tertiary institutions is increasing across Nigeria. Empirical studies report varying prevalence rates:

1. Agubosi (2022) found a 34.2% lifetime drug-use prevalence among in-school adolescents in Kwara State.
2. Dosunmu and Erhabor (2018) reported a prevalence of 39% among students in South-West Nigeria.
3. Attah et al. (2016) recorded 37.8% prevalence among students in Kogi State.
4. Eze et al. (2023) reported 46% prevalence among tertiary students in North-East Nigeria.

Internationally:

1. Mwangi (2018) observed drug-use prevalence of 22–29% among East African students.
2. In the United States, 36% of college students reported illicit drug use within the past year (Wechsler et al., 1998).

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Nigeria's high youth drug consumption has been attributed to stress, peer influence, easy accessibility, weak regulatory enforcement, and environmental factors (UNODC, 2021).

Types and Patterns of Drug Use

Across Nigerian campuses, tramadol has increasingly become the drug of choice among students. Cannabis remains widely used, while polydrug use using more than one substance simultaneously is rising (Adegboyega, 2012; Agbon et al., 2022). Students often combine cannabis, alcohol, and tramadol for heightened effects, increasing the risk of dependence and adverse health consequences.

Patterns of use commonly include recreational weekend use, stress-related use before examinations, and use to enhance stamina during study or work.

Determinants of Drug Use

Peer Influence

Peer influence remains one of the strongest determinants of drug use among students. Young adults often experiment with drugs due to social belonging, curiosity, and pressure from friends (Ajala, 2012).

Stress and Academic Pressure

Academic workloads, fear of failure, and emotional exhaustion increase susceptibility. Students use substances to cope with stress, enhance alertness, or escape emotional difficulties (Attah et al., 2016).

Family and Social Background

A family history of substance use or weak parental monitoring contributes significantly to student drug initiation (Gobir et al., 2017).

Gender Differences

Male students consistently show higher rates of drug use due to cultural, social, and risk-taking behaviors (Tapert & Brown, 1999).

Environmental Factors

Campuses surrounded by informal drug markets, unregulated pharmaceutical outlets, and high-risk neighborhoods expose students to drugs more frequently (Agwogie, 2016).

Drug Abuse and Academic Performance

Evidence shows that substance use reduces academic performance due to:

1. Cognitive impairment
2. Difficulty concentrating
3. Absenteeism and poor class participation
4. Reduced study time and motivation
5. Poor memory retention

Arria et al. (2013) reported that students who engage in substance use are more likely to have lower grades and experience academic setbacks. Engberg and Morral (2006) also found that reduction in substance use significantly improves school attendance and performance.

In Nigeria, Agbon et al. (2022) found substantial academic decline among adolescents who used drugs in Ogun State.

Validated Instruments for Assessing Drug Use

To ensure reliability and validity in drug-use research, standardized self-report instruments are recommended:

1. Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) – developed by WHO
2. Drug Abuse Screening Test (DAST-10) – widely used for rapid screening
3. Adolescent Drug Involvement Scale (ADIS)

Many Nigerian studies lack validated tools, which limits comparability. This study improves rigor by adopting a structured questionnaire aligned with ASSIST and DAST-10 frameworks.

Identified Gaps in Literature

A review of previous studies reveals persistent gaps:

1. Overreliance on descriptive statistics without robust modeling.
2. Small sample sizes which limit generalizability.
3. Minimal representation of health training institutions in drug-use research.
4. Weak or absent reliability and validity testing.
5. Heavy dependence on grey literature such as UNODC and WHO reports.
6. Limited examination of the adjusted effects of drug use on academic performance.
7. Theoretical frameworks often outdated or minimally applied.

This study addresses these gaps by expanding the sample to 430 respondents, applying logistic regression, adopting validated tools, improving literature depth, and strengthening theoretical grounding.

METHODOLOGY

Research Design

This study adopted a **descriptive cross-sectional research design**, suitable for assessing the prevalence and determinants of drug use among students at a single point in time. The design is widely used in epidemiological and behavioural health studies to measure exposure-outcome relationships within defined populations (Setia, 2016). Cross-sectional studies offer cost-effectiveness, rapid data collection, and suitability for assessing multiple variables simultaneously, making them ideal for school-based public health research (Levin, 2020).

Although cross-sectional designs do not establish causality, they are appropriate for identifying associations that inform further longitudinal research. This study further strengthened the design's analytical value by including multivariate logistic regression to adjust for confounders a practice recommended in modern substance-use epidemiology (Chinneck et al., 2018).

Study Area

The study was conducted in Northern Adamawa State, Nigeria, a region comprising several local government areas with a mix of urban and semi-urban communities. The area hosts multiple health training institutions, including colleges of health technology, environmental health schools, and community health extension training institutions. These institutions attract students from diverse socio-cultural backgrounds, making the

region suitable for examining drug-use patterns. According to NDLEA and regional health reports, Northern Adamawa experiences increasing availability of psychoactive substances through informal drug markets and cross-border trade, making it a relevant study location (NDLEA, 2023).

Target Population

The target population comprised all registered students across three selected health training institutions in Northern Adamawa State during the 2023/2024 academic session. The population included students enrolled in:

1. Community Health
2. Environmental Health
3. Medical Laboratory Technician
4. Health Information Management
5. Pharmacy Technician
6. Public Health Departments

These students represent future health workers expected to engage directly with community health programs, making their behavioural patterns significant for public health planning (Okorondu, 2021).

Sample Size Determination

A sample size of 430 respondents was used to enhance statistical power and allow for reliable multivariate regression analysis.

Sample size was determined using Cochran's formula for prevalence studies:

n=z2pqd2n = \frac{z^2pq}{d^2}n=d2z2pq

Where:

1. z = 1.96 (95% confidence level)
2. p = 0.34 (estimated prevalence from previous studies such as Agubosi, 2022)
3. q = 1 − p
4. d = 0.05 (margin of error)

After adjusting for design effect (1.5) and non-response (10%), the minimum required sample size was approximately 420. To strengthen representativeness and allow for subgroup analysis, the sample was increased to 430 respondents. Larger sample sizes improve precision, reduce random error, and enhance dimensionality for logistic regression (Vittinghoff & McCulloch, 2007).

Sampling Technique

A **multistage sampling technique** was used:

Stage 1: Selection of Institutions

Three accredited health training institutions were purposively selected based on:

1. Institutional size

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2. Departmental diversity
3. Accessibility
4. Administrative consent

Purposive sampling is recommended when certain institutions possess characteristics relevant to the study objective (Etikan & Bala, 2017).

Stage 2: Stratification by Departments

Each institution was stratified into departments. Stratification enhances representativeness and reduces sampling bias by ensuring all academic programs are included proportionally (Kothari, 2012).

Stage 3: Proportionate Allocation

Student lists were obtained from departmental registries. Samples were allocated proportionally using:

nh=NhN×nn_h = \frac{N_h}{N} \times nnh=NNh×n

Stage 4: Systematic Random Sampling of Students

Within each department, sampling frames were generated, and respondents were selected systematically (e.g., every 3rd or 5th student on the list). Systematic sampling is efficient for student populations and minimizes selection bias (Acharya et al., 2013).

Instrument for Data Collection

A structured, self-administered questionnaire was used. The instrument was adapted from internationally validated tools:

1. WHO Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)
2. Drug Abuse Screening Test (DAST-10)
3. Items from previous Nigerian student drug-use studies
4. Institution-specific contextual questions

The questionnaire comprised four sections:

1. Demographic characteristics
2. Drug-use patterns (lifetime, recent, types, frequency)
3. Determinants of drug use (peer influence, stress, family factors)
4. Academic performance indicators (attendance, grades, study time, concentration)

Using validated tools improves reliability, cross-study comparability, and construct validity (Humeniuk et al., 2008).

Validity of the Instrument

Content validity was ensured through:

1. Review by *three public health experts*,
2. Comparison with validated screening tools (ASSIST, DAST),

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3. Alignment with Nigerian student drug-use literature,
4. Review by two educational measurement experts for clarity.

Experts assessed the instrument for relevance, clarity, comprehensiveness, and cultural appropriateness. All ambiguous items were revised. This process aligns with recommended practices for questionnaire validation in behavioural health research (Boateng et al., 2018).

Reliability of the Instrument

The instrument's reliability was assessed through a pilot test conducted with 40 students outside the study institutions. Reliability was measured using Cronbach's alpha, which yielded:

1. Total scale $\alpha = 0.86$
2. Drug-use items $\alpha = 0.81$
3. Academic performance scale $\alpha = 0.84$

These values exceed the minimum acceptable threshold of 0.70 (Tavakol & Dennick, 2011), indicating strong internal consistency.

Method of Data Collection

Data collection involved:

1. Institutional approval
2. Permissions from department heads
3. Classroom-based administration
4. Anonymity assurance to reduce social desirability bias
5. Use of trained research assistants to assist students
6. Sealed return envelopes to protect confidentiality

Self-administered questionnaires reduce interviewer bias and encourage truthful disclosure in sensitive topics like drug use (Tourangeau & Yan, 2007).

Method of Data Analysis

Data were analyzed using **SPSS Version 26**.

Descriptive Analysis

1. Frequencies
2. Percentages
3. Means and standard deviations

Inferential Analysis

Chi-Square Tests

Used to examine associations between categorical variables such as drug use and academic performance indicators.

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Multivariate Logistic Regression

Applied to:

1. Identify predictors of drug use, and
2. Determine adjusted effects of drug use on academic performance.

Variables included in regression:

1. Demographics: age, gender, socioeconomic status
2. Behavioral factors: peer influence, stress, curiosity
3. Family factors: parental monitoring, family drug-use history
4. Environmental factors**:** proximity to drug points, hostel type

Adjusted Odds Ratios (AOR) and 95% confidence intervals were reported to control for confounding. This analytic approach aligns with epidemiological best practices (Hosmer, Lemeshow, & Sturdivant, 2013).

Ethical Considerations

Ethical clearance for the current research work was received from the Adamawa State Ministry of Health Research Ethics Committee. Permission was also obtained from the LGA Health Authorities where these Health Institutions are found, and community heads. Key ethical principles applied included:

1. Voluntary participation
2. Informed consent
3. Confidentiality and anonymity
4. Right to withdraw at any time
5. Secure data storage
6. No identifying information collected

These procedures align with the Helsinki Declaration guidelines for research involving human participants.

Limitations of the Study

a. The study relied on **self-reported data**, which may be influenced by recall bias or underreporting.

b. Cross-sectional design limits causal inference.

c. Some respondents may have been hesitant to disclose illegal drug use.

d. Environmental verification of reported drug sources was not performed.

Despite these limitations, methodological enhancements such as validated instruments, larger sample size, and multivariate analysis strengthen the study's reliability.

RESULTS

Introduction

This chapter presents the results of the study based on data collected from 430 students across three health training institutions in Northern Adamawa State. The results are organized according to the study objectives and include descriptive statistics, chi-square tests, and multivariate logistic regression analyses.

Socio-Demographic Characteristics of Respondents

A total of 430 questionnaires were distributed and all were returned completed, giving a response rate of 100%. Table 1 shows the demographic distribution.

Table 1: Socio-Demographic Characteristics of Respondents (N = 430)

Variable	Category	Frequency	Percentage (%)
Gender	Male	248	57.7
	Female	182	42.3
Age	18–22 years	176	40.9
	23–27 years	158	36.7
	28–32 years	69	16.0
	33+ years	27	6.3
Marital Status	Single	381	88.6
	Married	49	11.4
Year of Study	ND I	149	34.7
	ND II	132	30.7
	HND I	92	21.4
	HND II	57	13.3
Department	Community Health	138	32.1
	Environmental Health	114	26.5
	Public Health	89	20.7
	Medical Lab Technician	55	12.8
	Health Information	34	7.9

Interpretation:

The majority of respondents were male (57.7%). Most were between 18–27 years (77.6%), which corresponds with typical tertiary-institution ages.

Prevalence and Patterns of Drug Use

Lifetime and Current Use

Table 2: Prevalence of Drug Use among Respondents

Drug Use Variable	Yes (%)	No (%)
Lifetime use of any psychoactive substance	41.9	58.1
Current use (past 30 days)	28.6	71.4
Polydrug use (2 or more substances)	14.9	85.1

Interpretation:

Lifetime use was reported by 41.9% of respondents, while 28.6% reported current use.

Types of Drugs Used

Table 3: Types of Psychoactive Substances Used (N = 430)

Substance	Frequency	Percentage (%)
Tramadol	134	31.1
Cannabis	109	25.3
Alcohol	88	20.4
Codeine Syrup	78	18.2
Cigarettes/Shisha	59	13.7
Others (e.g., Rohypnol, mixture drinks)	21	4.9

Interpretation:

Tramadol was the most commonly used drug.

Factors Influencing Drug Use

Table 4: Reasons for Drug Use (Multiple Responses Allowed)

Reason	Frequency	Percentage (%)
Peer influence	184	42.8
Stress/Academic pressure	139	32.3
Curiosity/Experimentation	103	24.0
Family drug-use history	78	18.1
Emotional distress	66	15.3
Environmental availability	54	12.6

Interpretation:

Peer influence ranked as the strongest predictor

Effect of Drug Use on Academic Performance

Table 5: Academic Performance Indicators among Users vs. Non-Users

Academic Indicator	Drug Users (%)	Non-Users (%)
Poor concentration	46.7	18.4
Absenteeism	39.1	14.7
Declining grades	33.0	16.2
Low study time	28.5	11.3
Missed assessments/tests	24.7	9.1

Interpretation:

Drug users exhibited significantly poorer academic outcomes.

Chi-Square Analysis

Table 6: Chi-Square Test of Drug Use and Academic Performance

Variable	χ^2	df	p-value	Decision
Drug use × Academic performance	18.64	1	< 0.001	**Significant**

Interpretation:

There is a significant relationship between drug use and academic performance.

Multivariate Logistic Regression Analysis

The logistic regression model examined determinants of drug use and the adjusted effect of drug use on academic performance.

Table 7: Predictors of Drug Use among Students

Predictor	AOR	95% CI	p-value	Interpretation
Male gender	1.88	1.31–2.69	0.001	Significant predictor
Peer influence	2.84	1.94–4.15	<0.001	Strongest predictor

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Stress/Academic pressure	1.96	1.32–2.92	0.001	Significant
Family drug-use history	2.11	1.38–3.22	<0.001	Significant
Age category	1.21	0.89–1.65	0.232	Not significant
Environmental availability	1.48	1.00–2.20	0.048	Weak but significant

Table 8: Adjusted Effect of Drug Use on Academic Performance

Variable	AOR	95% CI	p-value	Decision
Drug use (Yes vs. No)	3.42	2.09–5.59	<0.001	Significant

Interpretation:

Students who use drugs are **3.42 times more likely** to experience poor academic performance.

Summary of Key Findings

1. Drug-use prevalence was moderately high (41.9% lifetime; 28.6% current).
2. Tramadol and cannabis were the most commonly abused substances.
3. Peer influence, stress, and family history were the strongest determinants.
4. Drug use significantly worsened academic outcomes.
5. Logistic regression confirmed drug use as an independent predictor of poor performance.

DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

Discussion of Findings

This study examined drug use patterns, associated determinants, and academic consequences among students in health training institutions in Northern Adamawa State, using a significantly expanded sample (N = 430). The findings revealed a moderately high prevalence of psychoactive substance use among respondents, consistent with similar research across Nigeria and Sub-Saharan Africa. The implications of these findings are critical, considering the central role health trainees are expected to play as future healthcare personnel.

Prevalence and Patterns of Drug Use

The prevalence of lifetime drug use (41.9%) and current use within the past 30 days (28.6%) underscores the persistence of drug use as a public health concern in tertiary institutions. Earlier studies in Nigeria reported similar patterns, indicating a rising trend in tramadol, cannabis, alcohol, and codeine-based mixtures among youths in training institutions. While general student populations in urban universities often report higher prevalence, this study suggests that specialized health training colleges are not insulated from the wider national drug-use epidemic.

Tramadol emerged as the most widely used substance, aligning with growing evidence associating tramadol misuse with increased availability through unregulated pharmaceutical outlets. Cannabis and alcohol also showed significant levels of use, confirming the persistence of these substances among Nigerian youths. These findings are comparable with earlier epidemiological surveys showing rising use of opioids, stimulants, and cannabis in Northern Nigeria.

Determinants of Drug Use

Peer influence was the strongest predictor of drug use in the bivariate and multivariate analyses. This finding is consistent with the Social Learning Theory, which posits that individuals adopt behaviours modeled by peers within their social environment. Stress and academic pressure also emerged as significant factors, reflecting increased academic demands on health students, who must complete rigorous clinical and theoretical coursework.

Family history of drug use further showed a significant association with personal use, suggesting an important intergenerational pattern. Availability of substances in adolescent environments also contributed modestly, emphasizing the structural problem of drug proliferation in many Northern Nigerian communities.

Impact of Drug Use on Academic Performance

The study demonstrated a clear and statistically significant relationship between drug use and poor academic performance. Students who used psychoactive substances reported higher rates of absenteeism, concentration difficulties, reduced study time, missed assessments, and declining grades. Adjusted logistic regression showed that drug users were more than three times more likely to experience poor academic outcomes compared to non-users.

This relationship underscores the cognitive and behavioural impairments associated with psychoactive substances. Opioids and cannabis, in particular, impair working memory, judgment, motivation, and attention all critical for academic success. These findings align with global literature linking substance use with academic decline, school dropout, and impaired cognitive processing.

Potential Role of Artificial Intelligence (AI)

Although the study employed traditional quantitative methods, it highlights the emerging utility of AI in predictive analytics and behavioural-risk profiling within student populations. Machine learning models can detect subtle patterns in students' attendance, assessment performance, digital learning footprints, and self-reported wellbeing. Early-warning systems powered by AI could help institutions identify at-risk students and institute timely interventions. The integration of AI-driven monitoring tools has become increasingly relevant as Nigeria moves toward digital transformation in health and education. AI-enhanced models could support administrators, counselors, and policymakers in mitigating drug-related academic challenges.

Conclusion

This study concludes that psychoactive substance use is prevalent among students in health training institutions in Northern Adamawa State. Tramadol, cannabis, alcohol, and codeine syrup remain the most commonly misused substances. Peer influence, stress, academic pressure, family history of drug use, and substance availability constitute major determinants.

Drug use significantly and independently affects academic performance, contributing to absenteeism, concentration problems, low grades, and overall academic decline. These findings underscore the need for comprehensive prevention strategies, targeted student support services, and institution-level policy reforms.

Furthermore, while traditional epidemiological methods remain useful, the emerging utility of AI as a complementary tool in early detection and student-risk profiling is promising and should be explored in future institutional frameworks.

Recommendations

Based on the findings, the following recommendations are proposed:

Institutional-Level Interventions

1. Strengthen Guidance and Counseling Units with trained mental health counselors capable of managing drug-related behavioural challenges.

2. Implement routine drug education programs integrated into orientation sessions and semester-based sensitization workshops.

3. Introduce AI-supported monitoring tools that track academic performance indicators and identify students exhibiting early signs of risk.

4. Enforce campus-wide policies restricting drug availability and penalizing distribution networks around institutions.

5. Improve workload and academic-stress management through mentorship programs, academic advisory systems, and exam-preparation support.

Policy and Community Interventions

1. Collaborate with community leaders, law enforcement, NDLEA, and local NGOs to reduce illicit drug circulation around campuses.
2. Strengthen national control strategies targeting tramadol, codeine, and other frequently misused substances.
3. Promote community-based rehabilitation and early intervention programs for youths.

Research and Surveillance

1. Conduct larger multi-state studies to compare prevalence across health training institutions in Northern Nigeria.
2. Include AI-enhanced predictive modeling in future research for improved accuracy and early-warning systems.
3. Employ longitudinal designs to capture causal relationships between drug use and academic performance.

Implications of the Study

Public Health Implications:

Drug abuse within health training institutions raises concerns about the integrity and readiness of the future health workforce. Students impaired by substance use may struggle to uphold professional standards in patient care.

Educational Implications:

Drug-related absenteeism and cognitive impairment increase the risk of poor completion rates, examination failures, and reduced institutional output.

Policy Implications:

The results justify the need for targeted reforms in tertiary education drug-control strategies and investment in AI-powered monitoring systems.

Limitations of the Study

1. The use of a cross-sectional design limits causal interpretation between drug use and academic performance.
2. Self-reported data may be affected by recall bias or social desirability bias.
3. The study focused only on three institutions, limiting generalizability to all colleges in Nigeria.
4. AI components were conceptually discussed but not empirically applied due to institutional constraints and technological limitations.

Suggestions for Future Research

1. Apply machine learning analytics to academic and behavioural datasets to model risk profiles.

2. Conduct longitudinal cohort studies to track substance use across the academic lifecycle.
3. Compare public and private health training institutions to identify contextual differences.
4. Assess the effectiveness of AI-based early-alert systems after implementation.
5. Integrate neurocognitive testing with academic performance metrics to better quantify impairment.

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