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PATTERN AND PREDICTORS OF SUBSTANCE USE AMONG IN-SCHOOL ADOLESCENTS: A COMPARISON OF PUBLIC AND PRIVATE SECONDARY SCHOOLS IN GOMBE LGA, GOMBE STATE, NIGERIA.

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Abstract:

Background: Substance use is a Public Health problem with significant negative consequences on the physical, psychological and mental health of individuals with worse effects among adolescents. The objective of this study was to determine and compare the pattern and predictors of substance use among in-school adolescents in Public and Private secondary schools in Gombe LGA, Gombe State.

Methods: It was a comparative cross-sectional study. Multistage sampling technique was used to select participants from both comparison groups. Data was collected using a pretested self-administered questionnaire. All data generated were collated and analysed using the IBM Statistical Package for Social Sciences (SPSS) version 23.

Results: The proportion of students engaged in substance use were 17.9% and 18.9% in private and public secondary schools respectively, this was not statistically significantly different (P-value 0.830). There was a statistically significant difference in the level of health risk associated with substance use among respondent in public and private schools (P value 0.008). Furthermore, respondents in public schools who almost never participated in religious activities and those who occasionally participated in religious activities had 4.2 and 3.5 times more odds respectively of using substances compared to those who almost always participated in religious activities p value 0.007 (CI 1.497-12.008) and p value 0.008 (CI 1.398-9.183) respectively. In both schools, those who had friends that used substances were more likely to use them p value <0.001 (OR 0.99; CI 0.039-0.232) for private and p value <0.001 (OR 0.108; CI 0.048-0.245) for public schools.

Conclusion: This study has therefore implied that there is no difference in the proportion and pattern of substance use by adolescents in both private and public secondary schools, however, the level of health risk is more among those in private schools.

Keywords: substance use, health risk, adolescents.

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Introduction

Substance use has become a major problem worldwide with significant Public Health and economic consequences. It starts primarily as a social behaviour affecting individuals of all ages and socioeconomic status (1, 2). It involves the consumption of psychoactive substances which are harmful and hazardous. Substance use may result in substance abuse occurring from regular consumption of substances even when they cause physical, mental or psychological harm. It may also lead to substance dependence which refers to a cluster of physiological, behavioural and cognitive phenomenon in which the use of a substance takes on a much higher priority for a given individual than other behaviours that once had greater value (3). Psychoactive substances have affinity for the Central Nervous System (CNS) and alter the perception, behaviour, mental and cognitive functions of an individual. These substances can be classified as stimulants such as (marijuana, cocaine and caffeine), depressants (rohypnol, diazepam, barbiturates and alcohol), Opioids (Heroin, codeine, morphine), Cannabis (Marijuana leaves, Hashish), Inhalants (paint, paint thinner, gasoline, petrol, glue) and hallucinogens such as Lysergic acid Diethylamide (LSD) (4, 5).

The prevalence of substance use varies across regions globally. Eastern Europe and the United States have a prevalence of 5-6% (1 in 20 suffer from substance dependency), while across Western and Central Europe, the prevalence ranges from 2-5% (6). Africa, Middle East and Asia have a prevalence of about 1-2%. Though Africa seems to have a lower prevalence, it still contributes significantly to the burden of Non-communicable disease which is on the rise and invariably reduces the life expectancy and results in poor health indices in this region (6). Substance use among young people including adolescents is on the rise (7). The adolescence period is critical during development and requires positive health behaviours in order to secure a healthy and productive adult life. It is also a sensitive period where behaviours are formed which affects their adult life. Substance use starts predominantly during this period mostly as a result of peer group influence, inquisitive and impulsive nature of adolescents indulging in risky behaviours (1). Studies have also shown that the risk of substance use among adolescents is increased with extreme life events such as loss of a

parent, parental divorce and conflict, low parental support, physical, sexual and emotional abuse, neglect, isolation, deviant affiliation and single parenting (8-10). These could lead to mood and anxiety disorder, Post Traumatic Stress Disorder (PTSD) and behavioural conduct problems. Studies also suggest that race/ethnicity, gender, socioeconomic status, prior history of drug abuse, family history of substance abuse, mental health problems and negative school experiences increase the likelihood of using and abusing psychoactive substance (8-10).

According to United Nations Children's Fund (UNICEF), the gross enrollments of adolescents in lower and upper secondary school are 46.7% and 41.1% respectively in Nigeria. This signifies that less than half of the Nigerian adolescents are in school which may impact negatively on their productivity and social lives by increasing the likelihood of substance use (11). In addition, 32% of the enrollees who are mostly adolescents engage in substance use as shown by studies conducted in Nigeria, though some variation exists between Public and Private schools (12, 13). This practice may result in academic difficulties such as school absenteeism, declining grades and increased likelihood of drop out from school (8, 9). The overall effect of these are; increased financial hardship and impoverishment among parents and the adolescents themselves, reduction in the literacy rate, reduction in Gross Domestic Product (GDP) and increase in economic inequality and poverty (14). Other effects of substance use include physical injuries, accidents, increased risky behaviours leading to Sexually Transmitted Infections (STIs) including Human Immunodeficiency Virus (HIV). These health problems require skilled health care providers which is a major challenge in Nigeria due to inadequate Human Resource for Health (HRH) and weak health care systems (1, 10).

Information obtained from this study will provide a better understanding on the predictors of substance use among adolescents and determine if and why there are differences in public compared to private secondary schools in Gombe State. It will provide baseline information to the school authority and policy makers on the prevalence and predictors of substance use among adolescents in Gombe state. It may also lead to modification of educational interventions and development of targeted health promotive interventions to address the needs of adolescents.

Materials and Methods

Study Area

This study was conducted in Gombe State which is in the North-East geo-political zone of Nigeria. The 2020 projected population of adolescents (10-19 years) in the state is 1,089,809 (605,705 males and 484,104

females) (15). There are 25 Public and 67 Private day secondary schools with mixed sexes located in Gombe LGA of the state. The total number of adolescents in Public secondary schools is 29,841 (15).

Study Design

A comparative cross-sectional study design was used.

Study Population

All in-school adolescents in selected schools who gave assent and/or consent to participate in the study. Those who were absent from the school during the period of data collection and those who had known mental health challenges were excluded from the study.

Sample Size determination

The minimum sample size was determined using Cochran's formula for comparative study (16).

$$n = \frac{(Z_{\alpha} + Z_{\beta})^2 \times p(1-p)}{(P_1 - P_2)^2} \text{ per group}$$

It was calculated using the prevalence of substance use among students in Public and private schools from a study conducted in Jos (22.1% and 15%) (13) respectively. This gave a minimum sample size of 260 for Public and Private schools respectively after considering 10% non-response.

Sampling Technique

A multistage sampling technique was used

Stage One (Selection of Schools)

A list of the 25 Public and 67 Private day secondary schools with mixed sexes was obtained from the Ministry of Education in the State. Simple random sampling technique by the use of table of random numbers was used to select GSS Orji and GSS Ahmadu Gombe as the Public schools.

All Saints Secondary School and Gombe High School were the selected private secondary schools.

Stage Two (Selection of Study Participants)

To determine the number of participants to be studied in each selected school, probability proportionate sampling was used. This was done by dividing the number of adolescents in each school by the total number in all the selected schools and multiplying by the sample size. Subsequently, the total number of students in the two selected Private schools were 83 and 177 adolescents from All Saints and Gombe High schools respectively. While 142 and 118 students were selected from GDSS Orji estate and 915 for GDSS Ahmadu Gombe).

In each school, systematic sampling technique was used to recruit study participants. The sampling interval was calculated by dividing the sample size by the

sampling frame (list of all adolescents in each selected school). A sampling interval of 4 and 8 respectively was obtained for Private and Public schools. Simple random sampling technique by balloting was used to select the first participate in the sampling interval and thereafter every 4th and 8th adolescent respectively was selected based on the sampling interval. For adolescent who did not give consent or assent, the next person was selected and thereafter the sampling interval was used to select study participants.

Data Collection

Data was collected with the aid of a semi structured self administered questionnaire adapted from WHO ASSIST questionnaire (17). It was pretested in a selected day secondary school in Akko LGA.

Data Management

Based on the pre-set scoring criteria by the ASSIST questionnaire, the pattern and level of health risk was given scores for each substance used. An accumulation of the scoring was done and graded as follows:

1. **Mild risk** –a score of 0-10 for alcohol use and 0-3 for use of other substances
2. **Moderate risk**- A score of 11-26 for alcohol and 4-26 for use of other substances
3. **Severe risk**- A score of 27 for use of either alcohol or any other substance.

In this study the respondents were graded using the highest score they attained.

Data Analysis

All the data generated were collated and analysed using the IBM Statistical package for Social Sciences (SPSS) version 23. Quantitative variables such as age and income and qualitative variables such as sex, tribe, religion and use of illicit substances were presented using tables. Prevalence and pattern of substance use were also presented in frequency tables.

Chi square test was used to test for association between variables such as age or sex and use of illicit substances. It was also used to determine the association between peer influence, participation in religious activities and use of illicit substances.

Logistic regression was used to determine the predictors of substance use among the study population.

Ethical Consideration

Prior to the commencement of the study, ethical approval was obtained from Gombe State Ministry of Health. In addition, permission was obtained from the Director of Education and secondary school principals of the selected secondary schools. In seeking for these permissions, the aims, objectives and benefit of the study were clearly spelt out. A written informed consent

was obtained from the participants before enrolment into the study. For those below 18 years, a written informed consent was obtained from the parents/guardians of the adolescents and assent obtained from the adolescents.

Results

The response rates were 96.2 and 99.2% for Private and Public schools respectively.

Table1: More respondents in the Public schools were in late adolescent period (17-19yrs), compared to those in Private schools (138(75.4%) and (45(24.5%) for Public and Private schools respectively, this difference was statistically significant with a p-value < 0.001. In addition, respondents who had parents that were separated were more from Public schools (96(91.4%) compared to those in Private schools (22(18.6%) and this difference was also statistically significant. P- value < 0.001.

Table1: Sociodemographic characteristics of respondents private and public secondary schools

VARIABLE	Private school n=250 Frequency (%)	Public School n=258 Frequency (%)	χ^2	df	p-value
Age group (years)					
10-13	70(70.0)	30(30.0)	72.154	2	<0.001
14-16	135(60.0)	90(40.0)			
17-19	45(24.5)	138(75.4)			
Sex					
Male	138(52.5)	135(47.5)	2.315	1	0.128
Female	112(45.7)	133(54.3)			
Class (Level)					
Junior Sec School	20(50.0)	20(50.0)	2.105	1	0.147
Senior Sec School	63(37.5)	108(62.5)			
Religion					
Christianity	95(42.6)	128(57.4)	6.952	1	0.008
Islam	135(54.5)	130(45.6)			
Monthly Allowance					
≤999	193(48.0)	209(52.0)	4.302	3	0.231
1000-4,999	39(60.0)	26(40.0)			
5000-9,999	8(38.1)	13(61.9)			
≥10,000	10(50.0)	10(50.0)			
Family Setting					
Polygamous	132(48.4)	141(51.6)	0.175	1	0.676
Monogamous	118(50.2)	117(49.8)			
Respondents' parents separated					
Yes	22(18.6)	96(91.4)	57.464	1	<0.001
No	228(58.5)	162(41.5)			

Table 2: About 17.9% and 18.9% of adolescents in Private and Public schools respectively engage in subs-

tance use. Among the proportion who use substances, more than half of them were from public secondary schools (52%) compared to (48%) from private secondary schools. However, this finding was not statistically significant (P-value 0.830).

Table 2: Proportion of students using substances in public and private secondary schools

VARIABLE	Private school n-250	Public School n-258				
	Frequency (%)	Frequency (%)	χ^2	df	p-value	
Respondent uses substances						
Yes	38(48.1)	41(51.9)	0.048	1	0.830	
No	212(41.4)	217(50.6)				

Table 3: The proportion of respondents who used alcohol and cigarette in Private and Public schools were similar 22 (48.9%) and 23(51.1%) for alcohol and 15 (44.1%) and 19(55.9%) for cigarette. However, more of the respondents in private schools used codeine, marijuana and pethidine 4(80.0%), 7(70.0%) and 5(100%) respectively, while more respondents from public schools 10 (62%) used tramadol.

Table 3: Types of Substances Used by Adolescents in Public and Private Secondary Schools

VARIABLE	Private school n-69 frequency(%)	Public school n-64 frequency(%)
Substance		
Alcohol	22(48.9)	23(51.1)
Cigarette	15(44.1)	19(55.9)
Codeine	4(80.0)	1(20.0)
Tramadol	6(37.5)	10(62.5)
Marijuana	7 (70.0)	3(30.0)
Paint/petrol	8(53.3)	7(46.7)
Pethidine/diazepam	5(100)	0(0)
Lizard faeces	2(66.7)	1(33.3)

*Multiple responses allowed

Table 4: More respondents in the public schools 23 (57.5%) commenced substance use during early adolescence period (10-13) compared to 17 (42.5%) in Private schools, this was not statistically significant (p value 0.503). In both public and private schools, peers/friends introduced the respondents to substance use. In addition, almost all respondents had used substances in the past one month, 100% and 92.7% in private and public schools respectively and this finding was not statistical significant (p= 0.241). Although more of the respondents 20 (52.6%) and 27 (65.8%) in public and private schools respectively reported that they

have not had challenges with school as a result of substance use. This finding was also not statistically significant with a p value of 0.232.

Table 4: Reason and Extent of Substance Use Among Adolescents in Public and Private Secondary Schools

VARIABLE	Private school n- 38 Frequency(%)	Public school n- 41 Frequency(%)	χ^2	df	p-value
Age of commencing					
Substance use					
10-13	17 (42.5)	23 (57.5)			
14-16	18 (56.2)	14 (48.7)			
17-19	3 (27.3)	4 (72.2)			0.503*
Who introduced respondent to substance use					
Friends/peer					
Family member					
No one	25 (56.8)	19 (43.2)	6.308	2	0.043
	6 (26.1)	17 (73.9)			
	7 (58.3)	5 (41.7)			
Reason for using substances					
To perform better in school					
Because friends use substances					
To boost confidence	4 (21.1)	15 (78.9)			0.006*
Others	16 (50.0)	16 (50.0)			
	13 (56.5)	10 (46.5)			
	5 (100)	0			
Respondent has used substances in the last one month?					
Yes					
No	38 (50.0)	38 (50.0)			0.241*
	0	3 (100)			
Tried to stop using substances in the past 3 months					
Yes					
No	23 (45.1)	28 (54.9)	0.520	1	0.471

*Fischer's exact

Table 5: An assessment of level of risk which is related to the health and social development of the adolescents showed that more respondents in public schools 22(73.3%) have mild risk of developing health problems from substance use compared to those in private schools 8(26.7%). In addition, more of the respondents in private schools have high risk of harm from their current pattern of substance use compared to those in public schools 5(71.4%) and 2(28.6%) for public and private school respectively, this was statistically significant (p= 0.008).

Table 6: The respondents age, sex, religion and having friends using substances were factors that were statistically significantly associated with substance use among respondents, higher proportion of older adolescents, males and those that had friends who used substances, were

Table 5: Level of Health Risk Associated with Substance Use Among Respondents in Public and Private Secondary Schools

VARIABLE	Private school	Public School				
	n-38	n-41				
	Frequency (%)	Frequency (%)	χ^2	df	p-value	
Level of health risk with substance use						
Mid risk	8(26.7)	22(73.3)	9.659	2	0.008	
Moderate risk	26(60.5)	17(39.5)				
High risk	5(7.4)	2(28.6)				

engaged in its use 13(28.9%), 27(19.6) and 24(52.2) respectively.

Table 6: Factors Associated with Substance Use Among Respondents in Public Secondary School

PRIVATE SCHOOLS					
VARIABLE	Use substances	Do not use substances			
	n-38	n-212			
	Frequency (%)	Frequency (%)	χ^2	df	p-value
Age					
10-13	8(11.4)	62(88.6)	8.026	2	0.018
14-16	17(12.6)	118(87.4)			
17-19	13(28.9)	32(71.1)			
Sex					
Male	27(19.6)	111(80.4)	4.554	1	0.033
Female	11(9.9)	101(90.2)			
Religion					
Christianity	25(26.3)	70(73.7)	14.688	1	<0.001
Islam	13(8.4)	142(91.6)			
Class					
JSS	15(11.1)	120(88.9)			
SSS	23(20.0)	92(80.0)	3.801	1	0.051
Monthly income					
≤999	25(13.0)	168(87.0)	3.409	3	0.333
1000-4,999	9(23.1)	30(76.9)			
5000-9,999	2(25.0)	8(75.0)			
≥10,000	2(20.0)	8(80.0)			
Participation in religious activities					
Almost never					
Occasionally	7(22.6)	24(77.4)	2.139	2	0.343
Almost always	9(11.5)	69(88.5)			
Parents of respondents separated	22(15.6)	119(84.4)			
Yes					
No					

Table 7: Sex, participation in religious activities and having friends that use substances were statistically significantly associated with substance use p-value 0.03, 0.01 and <0.001 respectively.

Table 7: Factors Associated with Substance Use Among Respondents Private Secondary Schools

PUBLIC SCHOOLS					
VARIABLE	Use substances	Do not use substances			
	n-41 frequency (%)	n-217			
		frequency (%)	χ^2	df	p-value
Age group (year)					
10-13	3(10.0)	27(90.0)	1.431	2	0.489
14-16	13(14.4)	77(85.6)			
17-19	25(18.7)	113(81.9)			
Sex					
Male	26(20.9)	99(79.2)	4.371	1	0.037
Female	15(11.3)	118(88.7)			
Religion					
Christianity	19(14.8)	109(85.8)	0.209	1	0.648
Islam	22(15.9)	102(83.1)			
Class					
JSS	3(7.3)	38(92.5)	2.881	1	0.102
SSS	38(17.3)	179(82.7)			
Monthly income					
≤999	29(13.9)	180(86.1)	7.717	1	0.502
1000-4,999	9(34.6)	17(85.4)			
5000-9,999	2(15.4)	11(84.6)			
≥10,000	1(10.0)	9(90.0)			
Participation in religious activities					
Almost never					
Occasionally	19(25.0)	57(75.0)	8.983	2	0.011
Almost always	13(16.9)	64(83.1)			
Parents of respondents separated	9(8.6)	96(91.4)			
Yes					
No	23(14.2)	139(85.8)	0.010	2	0.99
Substance use by friends	18(18.7)	78(81.3)			
Friends use substances	27(38.0)	44(62.0) 173(95.2)	35.915	1	<0.00

Table 8: Logistic regression showed that the odds of male respondents using substances compared to female respondents was 1.1 and 1.9 times higher in both Private and Public schools respectively, though this was not statistically significant. Furthermore, among respondents in Public schools, those who almost never participated in religious activities and those who occasionally participated in religious activities had 4.2 and 3.5 times more odds respectively of using substances compared to those who almost always participated in religious activities p-value 0.007 (CI 1.497-12.008) and p-value 0.008 (CI 1.398-9.183) respectively. In both Private and Public schools, having a friend who uses substances was a predictor of substance use. Those who had friends that used substances were more likely to use them p-value <0.001 (OR 0.99; CI 0.039-0.232) for Private and p-value <0.001 (OR 0.108; CI 0.048-0.245) for Public schools.

Table 8: Predictors of Substance Use Among Adolescents in Public and Private Secondary Schools

PRIVATE SCHOOL				PUBLIC SCHOOL		
VARIABLE	95%		P- value	95%		p-value
	Odds	Confidence		Odds	Confidence	
	Ratio	Interval		Ratio	Interval	
Age group (years)						
10-13	0.585	0.186 -1.839	0.339	0.502	0.141 -1.787	0.287
14-16	0.484	0.184 -1.277	0.359	0.763	0.368 -1.584	0.468
17-19	1			1		
Sex						
Male	1.083	0.439 -2.672	0.862	1.922	0.893 -4.137	0.095
Female	1			1		
Religion						
Islam	1.760	0.724 -4.279	0.212	0.753	0.350 -1.620	0.468
Christianity	1			1		
Participation in religious activities						
Almost never	1.076	0.332 -3.483	0.903	4.254	1.497 -12.008	0.007
Occasionally	0.604	0.230 -1.586	0.306	3.583	1.398 -9.183	0.008
Almost always	1			1		
Friend using substances						
Yes						
No	1			1		
	0.095	0.039 -0.232	<0.001	0.108	0.048 -0.245	<0.001

DISCUSSION

Almost one-fifth of the respondents in both comparison group used substances with no statistically significant difference in prevalence between Public and Private schools, this finding was similar to a study conducted in Jos which showed that 22.1% and 15 % of students in Public and Private schools respectively used substances (13). However, findings from studies conducted in United States of America (18), India (19), Botswana (20) and Borno (21) state in Nigeria showed higher prevalence of substance use among respondents (66.6%, (18) 55%, (19) 54.9%, (20) and 54.4%(21) respectively). These findings signify the likelihood of a large proportion of adolescents at risk of developing health and social problems which could reduce their quality of life and Healthy Years Equivalent (HYE). These could also negatively affect the economy as adolescents are expected to become healthy adults who should contribute significantly to the Nations' economy (10, 20). The type of substances used by adolescents is greatly influenced by their environment, it also depends on availability and accessibility to these substances. Although the use of alcohol and cigarette was common among students in both Public and Private schools, codeine and pethidine was more among those in Private schools while tramadol was more common among those in Public secondary schools. These substances used by respondents in this study were similar to studies conducted in India, (19)

Botswana (21) and Abakaliki (23) which showed that depressants in the form of alcohol was most prevalently used compared to opioids and inhalants, other studies in more developed countries like USA and UAE showed that in addition to alcohol and cigarette, adolescents studied also had access to heroin which is likely due to easier access and availability of these substances in developed compared to developing countries (20, 24).

Furthermore, the study showed that more of the respondents in private and public secondary schools had used substances in the past three months, however, only few of them reported that substance use had negative effects on school activities and other chores. This finding may explain why many of the respondents had moderate risk for health problems as a result of substance use. The level of risk for preventable health problems resulting from substance use could impact negatively on the already weak health systems by over-burdening the low Human Resource for Mental Health. This could worsen the health indices among adolescents and adults eventually. Although some variation was observed on the predictors of substance use among students in Public and Private schools, the common and strongest predictor of substance use was having a close friend who used substances. This is in keeping with findings from studies conducted in Thailand and Botswana and Jos which revealed that substance use was about 3 and 4 times more likely respectively among students who had friends who engaged in its use. Consequently, having friends who do not engage in substance use was a protective factor to its use (13, 20, 25). The school environment plays a significant role in secondary socialization, it is a place where adolescents meet with peers and form groups based on their interest. The findings from these studies could be related to the extra time they spend with peers which could sometimes be in an uncontrolled environment. In addition, the experimental attribute of the adolescents, poor knowledge and difficulty in developing resilience may contribute to substance use (24). This is worsened by the neglect of adolescents' health needs and unavailability of adolescent health services in most developing countries despite the inclusion of adolescents in the Sustainable Development Goals (SDG). As such, more effort is required from the government, families and school authority in ensuring that they live healthy and productive lives as most of their problems are preventable. This reiterates the need for collaboration between the parents/ Guardians and the school authority in addressing issues related to substance use among in-school adolescents. More so, since peer groups have been shown to either positively or negatively influence adolescent health behaviour (13, 20, 25), the possibility of using the peer groups to positively influence behaviour of adolescents towards substance use can be fostered and applied. This can be done through strengthening school clubs where students can serve as a support system for each other. Engaging in

religious activities was also found to be protective in this study similar to a study conducted in Thailand which revealed that respondents who engaged in religious activities were 4 times less likely to use substances (13). This could be associated with the religious teachings of abstinence from harmful substances (26, 27), it could also be linked to spending more time being occupied thereby reducing the likelihood of being idle.

CONCLUSION

This study showed that there was no statistically significant difference in prevalence of substance use among those in Public and private schools, though a statistically significant difference was observed with the level of health risk associated with its use as more adolescents from Private schools had moderate risk. The predictors of substance use in this study were having a friend who uses substances and participating in religious activities. It is therefore recommended that the school authorities with the support of parents provide consistent and proper information on the dangers of substance use, this can be done through school health services, clubs in schools and sustained guidance and counselling sessions especially for in-school adolescents whose friends have been identified as substance users or abusers.

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