

Psychoactive Substance Use among Adolescents in Ado-Ekiti, Nigeria: Prevalence and Association with Anxiety and Depression

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Abstract

Psychoactive substance use among adolescents is a global public health problem and a serious concern for mental health professionals especially when co-morbid with anxiety and depression. The current study determined the prevalence of adolescents' psychoactive substance use and its association with anxiety, depression and sociodemographic correlates. Participants (n=1059) completed the Socio-demographic Data Schedule, the World Health Organization (WHO) Student Drug Use Questionnaire and the Hospital Anxiety and Depression Scale. The lifetime prevalence of adolescents' psychoactive substance use was 57.2%. Logistic regression revealed that adolescents' psychoactive substance use was increased three-fold by anxiety and it was significantly and independently predicted by older age, poor academic performance, family background, low social class and parental drug use ($p < 0.05$). This suggests that anxiety among other factors should be particularly sought among adolescents with substance use problems.

Keywords - Psychoactive substance - Adolescence - anxiety - depression - co morbid

Literature Review

There are about 1.2 billion adolescents worldwide, such that one in every five people in the world is an adolescent (Zahid, 2013). This age group, which consists of individuals between 10 and 19 years of age according to the World Health Organization (WHO, 2001), remain one of the largest groups of users and abusers of alcohol, nicotine, cannabis and opioids (Miller & Plant, 1996; Soyibo & Lee, 1995; Oshodi *et al*, 2010). A steady rise in the use of licit and illicit substances by these young people have been reported globally (McArdle, 2004; Anochie, 1999; Abdulkareem, 2005). Apart from substance use problems, adolescents also have specific health and developmental needs, and may face challenges that hinder their well being, including poverty, a lack of access to health information and services, and unsafe environments. Interventions that address their needs can save lives and foster a new generation of productive adults who can help their community's progress (WHO, 2008).

The impact of substance use problems on adolescents' mental health is enormous as alcohol dependence, along with other drugs, is associated with depression and anxiety disorders, oppositional defiant disorder, antisocial personality disorder and an increased risk for suicide (Boys *et al*, 2003; Frojd *et al*, 2010; Zinn, Stein and Swartzwelder, 2004). A study conducted in the United States of America

(USA) showed that substance use disorders and associated mood and anxiety disorders that develop independently of intoxication and withdrawal are among the most prevalent psychiatric disorders in the country (Grant *et al*, 2004). Depressive disorders, anxiety disorders and substance use problems, like any other mental health problems among adolescents, are basically unattended to because the symptoms of mental illness in this group of individuals are at times mistaken to be part of a normal developmental and behavioural change (National Youth Violence and Resource Centre, 2001).

The number of studies on the relationship between adolescents' psychoactive substance use and specific mental disorders, particularly anxiety and depression in Nigeria and indeed West Africa are few when compared to the Western World (Shrier *et al*, 2003; Rey *et al*, 2000). The episodic nature of major depressive disorders and the continuous or intermittent state of anxiety disorders usually have an insidious onset in young people and these conditions may remain unidentified until impairments in peer group relationships, withdrawal from social activities and deterioration in academic performance emerge. Although the prevalence of anxiety appears higher than that of depression among adolescents judging by the results of epidemiological surveys, most Nigerian and other African studies on adolescents' psychoactive substance use mainly focused on the association with depression and hardly any

have examined its association with anxiety (Adewuya, 2005; Igwe and Ojinnaka, 2010).

Some available epidemiological studies in Nigeria were on substance use and its correlates among adolescents and not specifically its association with anxiety and depressive symptoms. These were mainly hospital-based surveys conducted in different parts of the country (Stanley *et al*, 2002; Okwaraji, 2005). Stanley *et al* (2002) studied childhood disorders among children and adolescents in a teaching hospital in Port Harcourt while Okwaraji (2005) studied the socio-demographic and clinical features of adolescents attending an out-patient psychiatric clinic of a Nigerian university teaching hospital in Enugu. A few other studies have also looked at substance use and associated psychosocial factors among adolescents in secondary schools (Ojinnaka and Igwe, 2010; Fatoye, 2003). These studies looked at the relationship between substance use and the pattern of certain psychiatric morbidities and socio-demographic correlates among children and adolescents.

There is however a need to assess the impact of emotional problems, especially anxiety and depression in adolescents (Snaith, 2003), and to identify their association with psychoactive substances. Anxiety and depression are core symptoms of the psychological response to most stressful experiences. While some have described anxiety as the response to life threatening experiences, depression is described as the response to experiences involving loss (Finlay-Jones and Brown, 1981). Anxiety, depression and psychoactive substance use like other health problems during the period of adolescence may cause disturbances in the bodies, minds and environmental perception of affected young people which may significantly hinder the acquisition of important career, vocational and social skills needed for survival through life (Larson and Wilson, 2004). It is therefore pertinent to note that, most of the studies on psychoactive substance use among adolescents in Nigeria did not emphasize the contribution of anxiety and depression (Fatoye, 2003; Eneh and Stanley, 2004). More research on this topic will be needed in this environment since the impact of psychoactive substance use, anxiety and depressive symptoms on adolescents' physical and mental health, including academic performance cannot be overlooked.

Materials and Methods

Sampling technique

This was a cross-sectional epidemiological survey. The study was conducted among secondary school students in Ado-Ekiti, a capital city in the southwestern geographical zone of Nigeria. A multistage random sampling method was used to select the schools of the respondents from the forty-one secondary schools in the city. The schools were stratified into four groups based on the four areas where the

secondary schools are concentrated in the city namely the Iyin road zone, Opopogboro zone, Odo Ado/Ajilosun zone and Ilawe road zone. Using balloting, two schools were selected from each stratum to give a total number of eight participating schools.

An equal number of respondents were initially meant to be chosen randomly from each of the eight selected schools. However, marked disparities in the population of students in the different schools were observed. The school with the largest population was 540 while the school with the lowest number of students had a population of 127. Therefore, a proportional sampling method was used to calculate and select an appropriate number of students per school and class while same was also applied for gender distribution.

Eligibility criteria were students aged from 10-19 years and able to read and write in English while those whose parents refuse to give consent and those who were severely ill during the period of instrument administration were excluded from the exercise. Ethical clearance and approval was obtained from the Research and Ethical Committee of the Federal Medical Centre, Ido-Ekiti. Participation was made voluntary and informed written consent was obtained from the respondents and their parents. The participants were asked to complete the Socio-demographic Data Schedule, WHO Students Drug Use Questionnaire and the Hospital Anxiety and Depression Scale.

Procedure

This cross-sectional survey was carried out between the months of January and March 2012. Prior to this time, the selected students were given consent forms which were signed by both the students and their parents in December 2011. Coincidentally, this was done before the Christmas break, affording those in the boarding schools the opportunity to get consent forms signed by their parents before resumption in early January. The selected students were chosen using systematic sampling from the school registers. The Authors ensured that a hall or separate class room was provided for the completion of the questionnaires by the students in each school. Also, the different schools were asked to give convenient days and free periods for data collection based on the schools' weekly schedule. With the collaboration of the teachers and principals, the selected students were moved to the separate class room or hall where the procedure was explained and instructions given to them before they proceeded to complete the instruments. In order to ensure confidentiality and an atmosphere devoid of intimidation, the principal and the teachers were not present while the students completed the questionnaires. One of the Authors was always available during this process to provide detailed explanation to the students and clarification as the procedure continued.

The calculated sample size was 1104 students. Among these students, 38 (3.4%) did not give informed consent while 7 (0.6%) of those who agreed to participate in the study were absent during the questionnaire completion period. This

gave a final participant number of 1059 and a response rate of 96%. However, 47 incompletely filled questionnaires were excluded from analysis. This gave a final response rate of 92 percent as shown in the flow chart in figure 1.

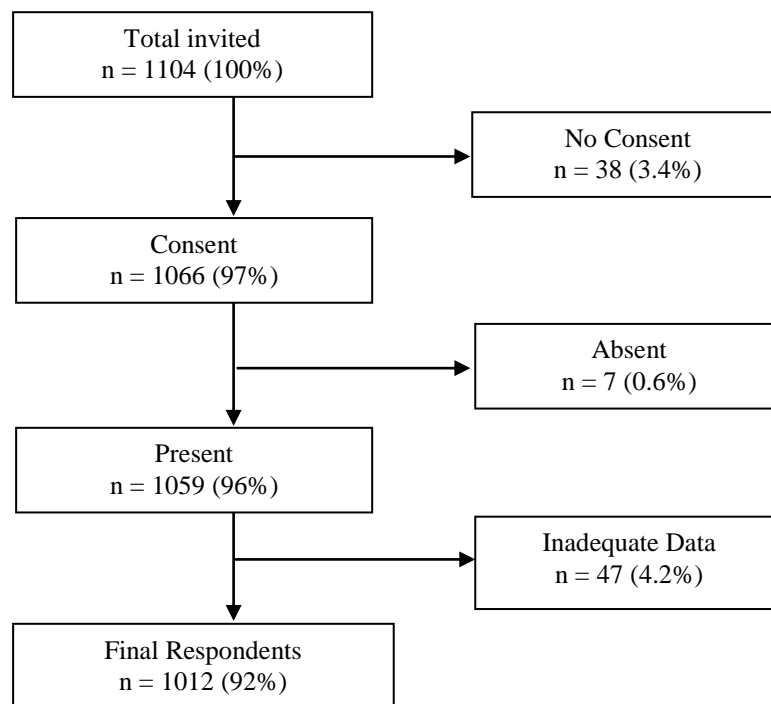


Figure 1: Flow chart showing the final sample (respondents) used for the study

Study and Statistical Analysis

A pilot study aimed at ascertaining the duration of administration and acceptability of the instruments used in the study was conducted in two non-participating secondary schools. The HADS gave an internal consistency with a cronbach's alpha of 0.81 and 0.79 for the anxiety and the depression subscales respectively. Values greater than 0.75 are deemed to be high and reflect good internal consistency

(Thompson, 1989). The HADS and the WHO Students Drug Use Questionnaires had test-retest correlation coefficients of 0.99 and 0.97 respectively while the intra class correlation of both instruments (using kappa statistics) was approximately 0.93. Data obtained in both the pilot and main studies were coded where appropriate, entered and analyzed using the Statistical Package for Social sciences (SPSS) version 17 software.

Table 1: Socio-demographic characteristic of respondents

| Variable | Frequency (n = 1012) | Percentage (%) |
|--------------------|----------------------|----------------|
| Sex | | |
| Males | 565 | 55.8 |
| Females | 447 | 44.2 |
| Age (years) | | |
| 10-13 | 414 | 40.9 |
| 14-16 | 402 | 39.7 |
| 17-19 | 196 | 19.4 |
| Religion | | |
| Islam | 271 | 26.8 |
| Christian | 741 | 73.2 |
| Religiosity | | |
| Very religious | 595 | 58.8 |
| Just religious | 252 | 24.9 |
| Not religious | 165 | 16.3 |

| | | |
|---------------------------------------------|-----|------|
| Place of Domicile | | |
| Ado-Ekiti | 691 | 68.4 |
| Outside Ado-Ekiti | 319 | 31.6 |
| Class | | |
| JSS 1 – JSS 3 | 522 | 51.6 |
| SSS 1 –SSS 3 | 490 | 48.4 |
| Number of full siblings | | |
| 0 – 3 | 418 | 41.3 |
| 4 and above | 594 | 58.7 |
| Average Position in class | | |
| 1 – 10 | 671 | 66.3 |
| 11 – 20 | 274 | 27.1 |
| 21 and above | 67 | 6.1 |
| Number of times a class was repeated | | |
| Never | 834 | 82.4 |
| Once | 135 | 13.3 |
| Twice | 15 | 1.5 |
| Twice or more | 28 | 2.8 |
| Family Type | | |
| Monogamous | 598 | 59.1 |
| Polygamous | 249 | 24.6 |
| Single Parent | 165 | 16.3 |
| Current Marital Status of Parents | | |
| Still married | 661 | 59.1 |
| Separated divorced | 140 | 16.3 |
| Never married | 84 | 16.3 |
| Widowed | 127 | 59.1 |

Results

Sociodemographic characteristics of respondents

The data from 1012 participants were analyzed; Table 1 summarizes participants' sociodemographic characteristics. The study population was made up of 565 (55.8%) males and 447 (44.2%) females giving a male: female ratio of 1.3:1. Their ages ranged from 10 to 19 years with a mean age of 14.4 years (SD \pm 2.2). More than four fifths (80.6%) were in the age range 10-16 years. Most of the students (73.2%) were Christians and more than half (58.8%) described themselves as being very religious. Majority (68.4%) resided in the area of study while a little above half (51.6%) were in junior secondary school.

Prevalence of psychoactive substance use, anxiety and depression

Table 2 shows the prevalence rates of the significant variables of the study. The overall lifetime prevalence of substance use among the respondents was 57.2% while the current users were 407 (40.2%). Alcohol ranked highest among the substances used by the subjects with a single use lifetime prevalence of 31.2% and followed by mild stimulants and tobacco while heroin and cocaine ranked lowest (Not shown on table). The prevalence of anxiety and depression was 24.7% and 20% respectively while that of mixed anxiety and depression was 11%.

Table 2: Prevalence of substance use, anxiety and depression

| Variable | Frequency (n = 1012) | Percentage (%) |
|------------------------------|----------------------|----------------|
| Substance Use | | |
| Life time | 579 | 57.2 |
| Current | 407 | 40.2 |
| Anxious | 250 | 24.7 |
| Depressed | 202 | 20.0 |
| Anxious and Depressed | 111 | 11.0 |

Association between psychoactive substance use and socio-demographic variables

The association between socio-demographic variables and the respondents' current use of psychoactive substances is depicted in Table 3. Age was significantly associated with substance use as respondents in the 14 – 16 years category reported higher use of psychoactive substances when compared to those aged 10 – 13 years ($p= 0.04$). A higher proportion of subjects from polygamous family settings (52.6%) were found to have reported substance use compared to those from monogamous homes (40.6. %) and

this was statistically significant ($p< 0.001$). Average position in class was also found to show a significant association with substance use as respondents in the greater than 20th position reported use of psychoactive substances than those in the 11th to 20th and the 1st to 10th positions ($p< 0.001$). The level of cordiality among parents, parents' marital status, paternal psychoactive substance use and socio-economic status of parents were also significantly associated with respondents' substance use. Sex, class and maternal psychoactive substance use were not significantly associated with substance use.

Table 3: Relationship between substance use and sociodemographic variables (n = 1012)

| Variable | Substance Use (%) | No Substance Use (%) | X ² Value | Df | P – Value |
|------------------------------------------|-------------------|----------------------|----------------------|----|-----------|
| Age | | | | | |
| 10 – 13 years | 155 (37.4) | 259 (62.6) | 6.5 | 2 | 0.04 |
| 14 – 16 years | 181 (45.0) | 221 (55.0) | | | |
| 17 – 19 years | 71 (36.2) | 125 (63.8) | | | |
| Sex | | | | | |
| Male | 241 (42.7) | 324 (52.3) | 3.2 | 1 | 0.24 |
| Female | 166 (37.1) | 281 (62.9) | | | |
| Religiosity | | | | | |
| Very religious | 203 (34.1) | 392 (65.9) | 29.7 | 2 | < 0.001 |
| Just religious | 110 (43.7) | 142 (56.3) | | | |
| Not religious | 94 (57.0) | 71 (43.00) | | | |
| Class of Participant | | | | | |
| JSS 1 – 3 | 195 (37.4) | 327 (62.6) | 3.7 | 1 | 0.06 |
| SSS 1 – 3 | 212 (43.3) | 278 (56.7) | | | |
| Average Position in Class | | | | | |
| 1 – 10 | 217 (32.3) | 454 (67.7) | 61.9 | 2 | < 0.001 |
| 11 – 20 | 141 (51.5) | 133 (48.5) | | | |
| > 20 | 49 (73.1) | 18 (26.9) | | | |
| Current Marital Status of Parents | | | | | |
| Still Married | 248 (37.5) | 413 (62.5) | 11.5 | 3 | 0.01 |
| Separated /divorced | 69 (49.3) | 71 (50.7) | | | |
| Never Married | 43 (51.2) | 41 (48.8) | | | |
| Widowed | 47 (37.0) | 80 (63.0) | | | |
| Family Type | | | | | |
| Monogamous | 243 (40.6) | 355 (59.4) | 44.0 | 2 | <0.001 |
| Polygamous | 131 (52.6) | 118 (47.4) | | | |
| Single Parent | 33 (20.0) | 132 (80.0) | | | |
| Level of Cordiality among Parents | | | | | |
| Very Poor/ Poor | 149 (58.4) | 106 (41.6) | 63.1 | 2 | <0.001 |
| Good | 149 (41.6) | 209 (58.4) | | | |
| Very Good | 109 (27.3) | 290 (72.7) | | | |
| Socio-economic Class | | | | | |
| Upper | 162 (31.2) | 357 (68.8) | | | |
| Middle | 76 (40.0) | (114 (60.0) | 48.0 | 2 | <0.001 |
| Lower | 169 (55.8) | 134 (44.2) | | | |
| Parental Substance Use | | | | | |
| Father | 262 (64.4) | 298 (49.3) | 22.5 | 1 | <0.001 |
| Mother | 117 (228.7) | 208 (34.4) | 3.5 | 1 | 0.6 |

Association between substance use and anxiety

The relationship between substance use and anxiety is depicted by table 4. There was a statistically significant association between current substance use and anxiety. The proportion of the current users who were anxious was found to be more than double that of the non- users ($p < 0.001$).

Association between substance use and depression

Table 4 also shows that, there was no statistically significant association between the use of psychoactive substance and depression since 23 % of the current users were depressed as compared with 18% of the non-users ($p=0.833$). There is however, a significant association between mixed anxiety and depression and substance use ($p<0.001$).

Table 4: Relationship between substance use and anxiety/depression (n=1012)

| Variable | Substance use Yes N (%) | Substance use No n (%) | X ² Value | P Value |
|----------------------------------|-------------------------|------------------------|----------------------|---------|
| Anxiety | | | | |
| Positive | 162 (40) | 88 (15) | 83.5 | < 0.001 |
| Negative | 245 (60) | 517 (85) | | |
| Depression | | | | |
| Positive | 93 (23) | 109 (18) | 3.6 | 0.59 |
| Negative | 314 (77) | 496 (82) | | |
| Mixed Anxiety/ Depression | | | | |
| Positive | 62 (15) | 49 (8) | 12.7 | <0.001 |
| Negative | 345 (85) | 556 (92) | | |

Controlling for confounders

Variables that were significant on chi square analysis were entered into a logistic regression analysis equation. These variables as shown in table 5 were age, religiosity, parent's level of cordiality, average position in class and marital status of the parents. Others were family type, parent's social class, father's substance use, anxiety and mixed anxiety and depression. Independent variables with more than 2 categories had their first category taken as reference and assigned an odd ratio of 1, while the effect of other categories was compared with this reference category. This adjusted logistic regression analysis ensures that the effect of other variables are controlled for in relation to the individual variable in the equation.

The results showed that age remained significantly associated as subjects that were older had higher odds of using psychoactive substances than the younger ones. Those in the age range 13 to 16 years were 1.7 times more likely to use psychoactive substance than those in the age range 10 to 12 (CI=1.19-2.29). Similarly, not being religious and lower social class were found to increase the odds of using psychoactive substance while good level of cordiality among parents and single parenting were found to be protective against substance use. With all other variables such as age, religiosity, family type, parent social class controlled for, anxiety was found to have a threefold increase in the risk of concurrent psychoactive substance use among the subjects (CI=2.02-4.82).

Table 5: Regression analyses for the variables significantly associated with psychoactive substance use (controlling for confounders). (n=1012)

| Variable | B | Odd ratio | 95% CI | P value |
|----------------------------|-------|-----------|-----------|---------|
| Age | | | | |
| 10 -13 (ref) | | 1 | | |
| 14 – 16 | 0.50 | 1.65 | 1.19-2.29 | 0.003 |
| 17 - 19 | 0.05 | 1.05 | 0.70-1.58 | 0.8 |
| Religiosity | | | | |
| Very religious | | 1 | | |
| Just religious | 0.31 | 1.37 | 0.96-1.96 | 0.08 |
| Not religious | 0.44 | 1.55 | 1.03-2.33 | 0.04 |
| Parent's cordiality | | | | |
| Very poor/poor (ref) | | 1 | | |
| Good | -0.49 | 0.61 | 0.39-0.93 | 0.02 |
| Very good | -1.03 | 0.36 | 0.23-0.54 | <0.001 |
| Family type | | | | |
| Monogamous | | 1 | 0.75-1.54 | 0.7 |
| Polygamous | 0.71 | 1.07 | 0.18-0.48 | <0.001 |
| Marital status | | | | |
| Married (ref) | | 1 | 1.69-1.83 | 0.6 |

| | | | | |
|----------------------------------|-------|------|-----------|--------|
| Separated/Divorced | 0.12 | 1.13 | 0.59-1.97 | 0.8 |
| Never married | 0.76 | 1.08 | 0.44-1.25 | |
| Widowed | 0.29 | 0.74 | | |
| Parent's social class | | | | |
| Upper (ref) | | 1 | | |
| Middle | -0.09 | 0.91 | 0.62-1.36 | 0.7 |
| Lower | 0.63 | 1.90 | 1.34-2.62 | <0.001 |
| Average position in class | | | | |
| 1 – 10 (ref) | | 1 | | |
| 11 – 20 | 0.48 | 1.62 | 1.18-2.24 | 0.003 |
| > 20 | 0.70 | 2.03 | 1.05-3.95 | 0.04 |
| Father's substance use | -0.27 | 0.76 | 0.56-1.03 | 0.08 |
| Anxiety | 1.14 | 3.12 | | |
| Anxiety and depression | -0.26 | 0.77 | 2.02-4.82 | <0.001 |
| | | | 0.43-1.39 | 0.386 |

Discussion

Prevalence of psychoactive substance use

This present study evaluated the relationship between substance use and some specific characteristics of adolescents and their parents with the aim of providing information about the prevalence and potential risk factors for substance use and its relationship with depression and anxiety. Current psychoactive substance use, defined as the use of drug(s) at least once during the previous 30 days (Dechenia *et al*, 2010; Soyibo & Lee, 1995) was emphasized while analyzing the data. This is because studies and clinical experience have shown that current use of psychoactive substances is more predictive of substance use related problems and psychiatric morbidity among adolescents (Igwe & Ojinnaka, 2010; Stanley *et al*, 2002; Myles & Willner, 1999).

The lifetime prevalence and current use rates in this study were 57.2% and 40.2% respectively. Dechenia *et al* (2010) using a self-administered anonymous questionnaire based on the WHO guidelines for drug use, reported a much lower lifetime prevalence rate of 12.5% among urban and rural secondary school students in India. Similarly, Kuria (1996) in a comparative study using the WHO youth survey questionnaire, reported a lifetime prevalence of 41% among urban and rural secondary school students in Kenya. The reported overall prevalence rates of substance use in both studies are significantly lower than that of the present study. This observation may be due to the fact that, urban and rural schools were used in both studies unlike the present study which involved only urban schools. Evidence has shown that the prevalence of substance use is higher among urban students (Dechenia *et al*, 2010; Soyibo & Lee, 1995).

Although, the instruments used in present study and these studies are comparable since they are all instruments designed by the WHO, other methodological differences could have accounted for the disparities observed in their

prevalence rates. The current study differed from that of Dechenia *et al* (2010) in two respects. While the current study's sample population was made up 1059 students with a broader range of age group (10 to 19 years) and recruitment was from 8 secondary schools, the study by Dechenia *et al*, only selected 416 students mainly in the 13 to 14 years age group from two secondary schools (one urban and one rural). It is possible that the larger sample size and the wider representation of the adolescent population in this study contributed to the differences in prevalence rates. In addition, the active participation of the school teachers in the study by Dechenia *et al* (2010) may have compromised the veracity of the responses by the students, leading to a lower prevalence rate. Several investigators have reported that students are more likely to be intimidated by their teachers and as such are less at ease in volunteering personal substance use information (Reddy, Panday, Swart, *et al*. 2002; Parry *et al*, 2003).

Another factor that may explain the higher prevalence in the current study compared to the one by Kuria (1996), which also studied a comparable sample size of 952 adolescents, is related to the range of the substances assessed by the different instruments employed in the two studies. The modified WHO Students' Drugs Use Questionnaire used in the current study assesses both strong and mild stimulants while the WHO Youth Survey Questionnaire used in the Kenyan study does not include the assessment of mild stimulants like kolanut and coffee, which are widely used in this part of the world.

Other studies from different parts of the world have focused more on the prevalence of specific substances of use or misuse (Moodley *et al*, 2012; Soyibo & Lee, 1995; Madrine, 2010). For example, Moodley *et al* (2012), using the CRAFFT instrument (Knight *et al*, 2002) among secondary school students in South Africa reported a lifetime prevalence of 51.4 % for alcohol use. This is similar to the finding in this study, though the rate is higher than the rate

for alcohol (31.2%) in this study. Alcohol has been widely documented as the commonest substance of use and misuse among adolescents (Madrine, 2010; Igwe and Ojinnaka, 2010). Moreover, while Moodley and colleague reported tobacco (25%), cannabis (13.2%) and glue (6.4%) as next to alcohol in terms of prevalence in their study, mild stimulants (24.3%), tobacco (16.9%) and cannabis (12.8%) were observed to be the more commonly used substances apart from alcohol in the current study. The prevalence rates of cannabis use in both studies are similar. Hence the observed differences in the substance use pattern are likely to be due to peculiarities of the different sample population and instruments used in the studies. For instance, the CRAFFT instrument, though specific for use among adolescents and for the assessment of multiple substance use (Knight *et al*, 2002), is deficient in assessing current use of psychoactive substances. This is unlike the WHO Student's Drug Use Questionnaire which assesses both current and lifetime use of psychoactive substances.

The lifetime prevalence of substance use obtained in this study is consistent with the reported prevalence rates in other studies conducted in different parts of the country. Idris and Sambo (2009) in North Western Nigeria obtained a prevalence of 56% of substance use among in-school adolescents using the same questionnaire and sampling method as the current study, although with a smaller sample size of 280 respondents. A lifetime prevalence of 29.5% was obtained in the study of Igwe and Ojinnaka (2010) among adolescents in Enugu, South East Nigeria. This study however used an unconventional reporting style in which lifetime users did not include those who are currently using the substance. This resulted in an erroneous report of a lifetime prevalence of 29.5 instead of 63%. Another study conducted among secondary school students in Rivers State (Eneh and Stanley, 2005) found that 87% of adolescents admitted that they were using at least one substance. The substances involved in the latter study were psychoactive substances, common analgesics and antibiotics as at the time of the survey. The higher rate obtained in Eneh' and Stanley's study can be explained by the inclusion of analgesics and antibiotics in the repertoire of substances, a method similar to that employed by Oshodi *et al* (2010) in Lagos, South West Nigeria. The Lagos study also reported a higher lifetime prevalence of 87.3% of substance use among adolescents in secondary schools.

Psychoactive substance use and sociodemographic factors

This study found a higher prevalence of substance use among older adolescents in secondary schools when compared to the younger ones. This finding, though consistent with the report by Roberts *et al*, (2007) and Yisa *et al*, (2009), was only true for those in the intermediate and lower age categories. Robert *et al* sampled youth aged 11 to

17 years in Houston metropolitan area of the United States of America and found that the prevalence of psychoactive substance misuse or dependence increased dramatically with age, as those 16years or older were found to have the highest rates, those 13-15 years intermediate rates, and those 12 years or younger had the lowest rates. The finding from the present study does not show such linear effect, as those in the 14-16 years age bracket had a higher rate of substance use than both those in the 10 to 13 years and 17 years or older age categories. Logistic regression further showed that those in the age range 14 to 16 years had increased odds of using substances compared to those in the other age groups.

Although the study by Yisa *et al* in Ibadan also replicated the linear pattern between substance use and age as found in the study of Robert *et al*, it was conducted only among senior secondary school students. This did not give room for direct comparison between the two studies in terms of the effect of age on substance use. The finding of a lower rate among those 17 years and older in this study, though unexpected, may be due to a tendency for them to become more focused academically by age 17 years and above as they transit into higher institutions of learning. This may help to explain the reduction in substance using behaviour. The studies of Idris & Sambo (2009) in Zaria and Onohwosafe *et al* (2008) in Delta State, however did not find any associated age difference with psychoactive substance use.

In this study, there was no statistically significant difference in substance use prevalence rates of males and females, although males recorded a higher rate than the females. While several studies report higher rates of substance use in males when compared to females (Fatoye and Morakinyo, 2002; Dechenia *et al*, 2010; Moodley *et al*, 2012), others do not show any gender difference (Shrier *et al*, 2003; Roberts *et al*, 2007; Ulbrich, 2010; Onohwosafe *et al* 2008) as observed in the present study. Several reasons may account for the finding in this study. Firstly, this may reflect an increasingly tolerant attitude towards female substance use as a result of an increased exposure to Western life style (Abiodun, Adelekan & Ogunremi *et al*, 1994). In addition, some of the substances used by the adolescents in the study such as kola nuts and coffee are widely used by both males and females.

The level of religious commitment was found to be significantly associated with substance use in this study as those that reported a lesser commitment had a higher rate compared to those that reported greater commitment. Logistic regression analysis also showed that reporting reduced religious commitment increased the odds of substance use. This has been observed in other studies conducted both in Nigeria and other parts of the world (Fatoye, 2003; Newcomb *et al*, 1986, Carlini-Cotrim and de Carvalho, 1993; Regnerus and Elder, 2003). For example,

Carlini-Cotrim and de Carvalho examined the associations between substance use and extracurricular activities among 16, 117 high school students in fifteen Brazilian cities, and found a weak but constant negative association between involvement in alcohol and drug use and attendance at religious activities. A similar result of a strong association between substance use and low level of religiosity was also reported by Fatoye (2003) in a study of 600 secondary school students in Southwestern Nigeria.

The teachings in most religious groups condemn the use of psychoactive substances. Adolescents involved in religious activities are less likely to find time for drug experimentation. In addition, they will be more likely to spend time with equally religious peers who are unlikely to be involved with drug use. Religion may be pivotal in adolescents' drug prevention programmes if effort is made to involve religious organizations in identifying and counseling substance users. The Centre for Substance Abuse Treatment reported that the screening for adolescent substance abuse should not be conducted only by health care delivery systems, but should include community organizations such as schools, vocational rehabilitation centers and religious organizations (Substance Abuse and Mental Health Services Administration [SAMHSA], 1999).

The class of participants was found not to have significant effect on the prevalence of substance use in this study. This is consistent with reports of studies conducted in different parts of the country (Onohwosafe *et al*, 2008; Idris & Sambo, 2009). Similar to the observation of this study, the reports by these authors showed higher prevalence rates of substance use among students in the senior classes when compared to those in the junior classes, even though the difference was not significant. For instance, Onohwosafe *et al* in Central Delta State investigated two cohorts of students, those in Senior Secondary School (SSS) classes and Junior Secondary School (JSS) classes. He reported that there were no significant differences in reported drug use, which was found to be 51 % and 49 % respectively. The current study found the rate to be 43.3% among senior students and 37.4% among the junior students.

Self reported poor academic performance was observed to be strongly linked with substance use. In an average class size of 32 students, the respondents who reported being ranked 20th or beyond in academic performance reported more of psychoactive substance use than those who claimed to be ranked between the first 19. This is consistent with other studies (Newcomb *et al*, 1986; Fatoye, 2003). Fatoye (2003) in a study investigating psychoactive substance use among secondary school students in Ilesa, southwest Nigeria, found a bivariate association between self reported below average academic performance and psychoactive substance use. In the current study, logistic regression analysis showed that respondents ranked 20th and beyond

had an increased odd of using psychoactive substances compared to those with better academic performance. Substance use affects cognitive functions (Tapert and Brown, 1999) and the time invested by adolescents in taking psychoactive substances and recovering from their use effectively reduces time spent to acquire knowledge, thereby leading to poor academic performance (Lynsky, 2006; Harrington, 2006). Conversely, substance use could also be a maladaptive way of coping with poor academic performance among adolescents in secondary schools.

Family background was also found to have a significant effect on respondents' substance use in this study as substance use was more prevalent among adolescents from families with separated or divorced parents than in adolescents whose parents were married. In the same vein, there was a statistically significant association between psychoactive substance use and being from a polygamous family setting. Similar findings have been reported by several studies (Idris and Sambo, 2009; Fatoye, 2003; Stoker and Swadi, 1990). The studies by Stoker & Swadi (1990) and Isohanni *et al* (1991) showed that family background and parenting styles, including parental divorce, parental discord, family disruption, negative communication, inconsistent parental discipline, and lack of closeness, have been identified as influential risk factors in adolescent drug use. Idris and Sambo, in a similar study in Zaria, observed that though the commonest push for drug use among adolescents is the zeal to experiment, family background was the only statistically significant factor associated with psychoactive substance use.

The reason for the observations above is understandable. Young people from dysfunctional and polygamous family background are more likely to find it difficult to receive desired parental attention (George, 1992). Their inability to cope with the economic demands and the inter-rivalry conflicts often found in the polygamous homes may be triggers for initiating and continued substance use. In addition, respondents who reported the level of cordiality among their parents as being 'good' or very 'good' were noted to be less likely to use substances when compared to those that reported the level of cordiality among their parents as either 'poor' or 'very poor'. Logistic regression analysis further showed that reported cordial relationship among parents was strongly and independently protective against substance use among adolescents in this study.

While several studies have reported that adolescents from single parent households are more prone to delinquent behaviour, including drug use (Venessa & William, 2009; Amey & Albrect, 1998; Barrett & Turner, 2006), some other researchers maintain that household composition has relatively little predictive utility with regards to adolescent behaviour (Ford-Gilboe, 2000; Robins & Przybeck, 1987). This study found that respondents from homes with a single

parent were protected from the use of psychoactive substances. Possible explanation for this unusual finding is that single parents are gradually becoming aware of the widely held belief that children raised by either parent alone end up with social problems such as substance use, risky sexual behaviours and criminal tendencies (Barrett & Turner, 2006). In an effort to prove their competence or capability, they put in extra effort in ensuring that such vices are averted in their children. Another plausible reason is that some children report lower levels of stress, depression and anxiety following the dissolution of high conflict or volatile marriages (Amato, 1987; Kelley, 2003). In such post divorce circumstances, the resulting single parent dynamic may be a preferable environment for children's well being and as such reduce the risk of developing dysfunctional problems like substance use.

This study also found that having parents in the lower socioeconomic class was strongly associated with substance use among adolescents. There was a two-fold increase in the odds of substance use among those in the lower social class. This observation is comparable to other studies (Fatoye, 2003; Goodman & Huang, 2002). It was observed in the study of Goodman & Huang (2002) that lower socioeconomic status measured using indices such as educational status and income of parents is associated with substance use among teenagers. However, due to the multi racial nature of the study, this association was more pronounced among black adolescents. This may be a pointer to the fact that, a higher level of poverty, unemployment and political instability in some black communities may contribute to substance taking behavior among adolescents. Fatoye (2003) also reported that current stimulant use was significantly associated with lower socio-economic status among adolescents in secondary schools in Ilesa, however, he did not state the indices used in deriving the socio-economic status.

In this study parental substance use was associated with adolescents' substance use but the association was only significant for paternal substance use. This may be since in this part of the world, substance use is more common and socially acceptable in men than in women (Gureje *et al*, 2007; Aghaji, 2000). A worrisome inference from this finding is that psychoactive substances may be present in the home environment, thereby providing a template for adolescent drug use behaviour. In many traditional settings, fathers are adolescents' role models, thus social modeling as well as inheritable biological factors might provide a plausible explanation for the association between paternal substance use and adolescent psychoactive use (Sessou, 2012). The present study's finding that parental substance use is strongly associated with adolescent substance use is consistent with other studies (Anthenelli & schukit, 1990; Hoffman & Su, 1998; Merikanges, Stolar, Steven *et al*,

1998). A Nigerian study conducted by Idris and Sambo (2009) suggested that, family substance use also play a major role in adolescent substance using behaviour.

Parental psychoactive substance use put adolescents at significant risk of becoming entrenched in a cycle of drug use, association with drug using peers and poor family relationship (Atwoli *et al*, 2010; Newcomb *et al*, 1986). The increased risk for substance use and related problems in children of substance abusing parents is attributable to both genetic and environmental factors (Anthenelli & Schukit, 1990). According to the America Council for Drug Education (1999), substance use or attitudes approving drug use in parents or other siblings appear to predispose children and adolescents to substance use, since parents serve as models for their children's behavior in so many ways. Also, genetic factors play a significant role in the determination of this evidence since children born of alcoholic parents have much higher rates of alcoholism than those of non-alcoholic parentage even when raised by foster parents (Cloninger *et al*, 1988). Twin studies and linkage/association studies have also supported the role of genetics in alcohol dependence (Ball, 2004).

Psychoactive substance use and anxiety

In this study, the prevalence of anxiety among adolescents was 24.7%. This is within the range of 8.3% to 27% reported prevalence rates for any anxiety disorder among children and adolescents world-wide (Gelder *et al*, 2006). Adewuya, Ola and Adewunmi (2007) reported that the 12-month prevalence for all anxiety disorders was 15% among Nigerian secondary school students aged 13 to 18 years. Using a modified version of WHO Composite International Diagnostic Interview Version 3.0 (CIDI), Merikangas *et al* (2010), found a lifetime prevalence of 31% among adolescents in USA. These rates are higher than the prevalence in the general population as Blazer *et al* (1999) and Bhagwanjee *et al* (2005) using DSM IIR and DSM-IV criteria respectively, reported prevalence rates of 3.8% and 3.7% respectively among the general population. A more recent study among the general population, however, showed a higher life time prevalence rate of 28.8% (Kessler *et al*, 2005) which is closer to the reported adolescents' rates.

The prevalence rate of 15% reported by Adewuya and colleagues (2007) is lower than the finding in the present study due to two possible reasons. Firstly, the Mini International Neuropsychiatry Interview for Children and Adolescents (MINI Kids) used in the study is a diagnostic instrument for major Axis I diagnosis in the DSM IV while the HADS used in this study is just a screening tool for anxiety and depression. It is possible that, if a diagnostic instrument for anxiety had been used as a second stage interview for those who screened positive on the HADS, the prevalence rate would have dropped due to this

classification. Secondly, the narrower age range of 13 to 18 years used in the study by Adewuya and colleagues may have allowed for the missing of a cohort of younger adolescents with specific phobic anxiety and possible separation anxiety disorders which could have increased the overall prevalence rate. The higher report of 31% by Merikangas *et al* (2010) using a diagnostic instrument like Adewuya *et al* (2007) was a lifetime prevalence rate which included those with past and current episodes of the disorder unlike this study which only looked at students who were currently having anxiety symptoms as at the time of the study.

Findings from this study suggest that anxiety is significantly associated with substance use. This is in line with the findings from other studies of adolescents exposed to current or past substance use (Marmorstein *et al*, 2010; Frojd *et al*, 2011). Although it is hard to infer the direction of causation, Frojd *et al*, (2011) reported in a study that, there is evidence that anxiety may contribute to substance use rather than the opposite. The current study using the HADS found a 3-fold increase in the odds of concurrent substance use with anxiety, based on logistic regression analysis. This is similar to the finding of Frojd *et al* (2011), who reported a threefold increase in the occurrence of co-morbid substance use and anxiety using a formulated instrument analogous to the 13-items of the Beck Depression Inventory. This shows that anxiety remain a significant and independent predictor of substance use among adolescents even when the effects of other significant variables in the study were controlled for.

Research coupled with clinical experience has shown that when anxiety and substance use occur together, they are functionally intertwined in both development and maintenance of the co morbidity. According to Stewart and Conrod (2008), there are three pathways involved in this co morbidity:

- A self-medication pathway indicating that an anxiety disorder leads to substance use in order to achieve relief.
- A substance-induced anxiety disorder pathway
- A third variable pathway (possibly genetic and anxiety sensitivity).

The self-medication theory appears to be more favoured as substance-induced anxiety was observed to be quite rare, occurring only in 0.2% of cases (Grant, Dawson & Stinson *et al*, 2004). Therefore, in treating adolescents who are anxious, doctors should be on the alert to the possibility of substance use which may disguise, exacerbate or be used to self-medicate anxiety symptoms (Grant *et al*, 2004). Without tailored treatment, the co- existence of anxiety and substance use disorder could interfere with the motivation to participate in addiction treatment programmes and as such,

increase the potential for relapse (Winters, 1999). It is pertinent to add that, males showed a higher prevalence rate of anxiety when compared with their female counterparts in this study and the association was statistically significant. Although with regard to substance use and gender, the findings have been highly inconsistent among studies of adolescents (Kandel *et al*, 1999; Rhode *et al*, 1996; Sung *et al*, 2004). Kandel and his colleagues (1999) found that anxiety was more strongly associated with frequent smoking among boys than among girls.

Psychoactive substance use and depression

Depression was found to have a prevalence rate of 20% in this study. Birmaher *et al* (1996) estimated the lifetime prevalence rate of adolescent depression at 15 to 20% following a meta-analysis of studies over a ten-year period. Other reports range from 0.4% to 38.2% (Anderson & McGee, 1994; Modabber-Nia *et al*, 2007; Al-Gelban, 2007). The reports of 12% by Omigbodun *et al* (2004) using the Diagnostic Interview Schedule for Children (DISC) among 484 adolescents and 9% by Adewuya & Ologun (2006) using the Beck Depression Inventory (BDI-II) among 1050 secondary school students in Nigeria are lower than the finding of this study.

Again, this difference may be explained by variation in the instruments used since the HADS is a screening instrument while the BDI-II (though originally designed as a screening tool) and the DISC are diagnostic instruments. While variations in the sampled population and the sample size used may be other reasons for this difference in the prevalence rate, higher values will be expected with a screening instrument than the diagnostic ones. It is pertinent to add that, the male gender was not statistically significant different from that females in terms of developing depression in this study, although the female respondents (21.9%) reported a higher prevalence of depression than their male counterparts (18.4%).

This study found that the presence of depression unlike anxiety was not significantly associated with substance use among adolescents as the prevalence of depression among current users (23%) was not significantly different from that of the non- users (18%). This finding, though contrary to the reports of some Nigerian studies (Adewuya, 2006; Igwe and Ojinnaka, 2011), is comparable with other studies in the western world (Roberts *et al*, 2007; Ping *et al*, 2009). Roberts and his colleagues found that there was no significant association between mood disorders like depression with substance use disorders among adolescents. In the same vein, Ping and his contemporaries observed that depression was not statistically associated with smoking among adolescents except when co-morbid with anxiety. This observation is similar to what was found in this study since there was statistically significant association between

those with mixed anxiety and depression and psychoactive substance use.

Limitations

The cross-sectional nature of the study limits the ability to determine the temporal or causal relationships between adolescent psychoactive substance use and the significantly associated variables studied. Due to the nature of this study, respondents were reluctant to reveal sensitive information concerning their substance use; however, steps were taken to improve the veracity of responses by providing a relaxed environment and adequate privacy for each participant during the interview. The study is also subject to both recall and reporting bias because all measures of substance use, anxiety, depression and socio-demographic variables were based on self reports. Lastly, this study did not determine substance use disorders like dependence and harmful use, but just identified the use of licit and illicit substances.

Conclusion

The prevalence rates of psychoactive substance use, anxiety and depression among secondary school students in this environment are comparable to those found in different parts of the world. Psychoactive substance use is significantly associated with anxiety, low socioeconomic status, low religious commitment, paternal substance use and poor academic performance among adolescents in the study. Such associations were not found with depression, academic class and gender among the students.

Adequate measures need to be put in place to address the mental health problems of adolescents especially when these problems are co-morbid in an individual. Effort targeted at curbing the menace of psychoactive substance use among secondary school students should therefore include a comprehensive evaluation, assessment and treatment of possible co morbid emotional problems like anxiety and depression. Government should ensure adequate planning and effective intervention strategies in reducing the problem of psychoactive substance use among students in secondary schools and other levels of education in our environment.

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