Academic Performance of Substance Abusing Adolescents in Abakaliki Metropolis.
Running Title:Academic Performance of Substance Abusers.

OnyinyeU Anyanwu; MD[1], Roland C Ibekwe;[2]Ngozi C Ojinnaka.MD, [2]

[1]Department Of Pediatrics, Federal Teaching Hospital Abakaliki, Ebonyi State.
[2]University Of Nigeria Teaching Hospital ItukuOzala Enugu, Enugu State

Abstract
Objective: to describe the academic performance of substance abusing students in Abakaliki.
Design: cross sectional
Setting: school based study of adolescents.
Participants: Six hundred and twenty senior secondary 2 and 3 students selected in a multi-staged sampling method were screened for substance abuse. Academic performance, school absence, psychosocial impairment of substance abusers was compared with those of their classmates matched for age, sex and socio-economic class.
Outcome: Academic performance.
Result:Poor academic performance occurred in 67.3%of substance abusers as against35.8% of control (χ^2 = 22.02;1p<0.001). Age at initiation of substance (p=0.006) as well as use of multiple substances (p=0.003), were the most important determinants of academic performance of substance abusers. However, school absenteeism (p<0.001) was the underlying determinant of academic performance of all students whether substance abusing or non-substance abusing.
Conclusion: Academic performance of substance abusers was poorer than that of control. It is therefore recommended that substance abuse and school absenteeism should be considered in students with poor academic performance in senior secondary schools in Abakaliki.
Keywords: academic performance, adolescents,school absences, substance abuse.

I. Introduction

Academic performance is the extent to which a student achieves his or her educational goal.[1] It is usually measured by performances in school examinations and continuous assessment.[1] Students substance use have been shown to be a risk factor for academic problems such as lower school grades, absenteeism and high dropout rates.[2] Alcohol interferes with a student's ability to think making learning and concentration more difficult. The more alcohol a student uses the lower his grade point average and the more likely he is to drop out of school.[2]

Cox et al[3] in a survey of academic performance and substance use among public high school students in USA, noted low academic performance in those that abused alcohol, cigarette, or marijuana. They defined poor academic performance as having a grade C or below. The authors[3] studied academic performance in mathematics and Spanish language and assessment was made using school records. Similarly, Ingles et al[4] using the same measure for assessment of academic performance in grade 8-10 students, reported poor academic performance in adolescents who abused alcohol or smoked daily probably because their interest is not positioned on school achievement or because consumption of substances interferes with their study tasks. Lukoyeet al[5] in Eldoret, Western Kenya, reported poor academic performance evidenced by a low grade point average in 4.4% of first year university students in Kenya who abuse cigarette. However, self-rating of academic performance was used by the respondents with the tendency of under assessment with this method. Substances has been shown to have varying effects on the central nervous system which can decrease cognition generally.[6-10] Those who abuse substances have been shown to manifest other delinquent behavioral attitudes such as truancy which has been shown to affect academic performance.[6,7,11]

Various factors may contribute to the academic performance of substance abusers irrespective of their natural abilities and motivation.[14] The detrimental effect of substance use has been supported by reports that maturation of the brain is not complete until after adolescence.[14] Therefore, increased use of various substances can cause injury to the immature brain thereby resulting in reduced intelligence and poor school performance.[14]Again,substance abuse may result in psychosocial impairment which may affect academic performance. Poor academic performance undermines efforts made by parents and teachers to impart knowledge on students in a bid to improve their future income capabilities.There are no study to the authors' knowledge on

the association between substance abuse and academic achievement in south eastern Nigeria. This study aims at determining the academic performance of such substance abusing students. It also hopes to determine if there is any association between substance abuse and the academic achievement of these students.

II.   Methodology

Abakaliki is the capital city of Ebonyi state in the South eastern part of Nigeria.There are a total of 13 approved secondary schools both public and privately owned with about 5,748 students in SS2-3 in 2012/2013 session.[15]Students who were in SS2 and SS3 aged 10-19 years in the 13 secondary schools in the metropolis constituted the study population for screening for substance abuse. This is because they are the ones who are more likely to have abused substances for some time and would have completed at least one session of senior secondary school. Subjects were those that abuse substance while the control group consists of non-substance abusing classmates of the subjects.

Institutional ethical approval was obtained from the medical and ethics committee of the Federal Teaching Hospital Abakaliki. Approval was also obtained from the secondary education board of the state ministry of education, Ebonyi state. Similarly, informed written consent was also obtained from the Principals, selected students and their parents/guardian before commencement of the study.

The minimum sample size determined was 288 using the formulae[16]

$$n = z^2 pq/d^2 \quad \text{and} \quad n_f = \dfrac{n}{1 + \dfrac{(n)}{(N)}}$$

However, 630 students were recruited according to WHO recommendation for substance abuse studies.[2]Six hundred and thirty senior secondary 2 and 3 students selected in a multi-staged manner were screened for substance abuse using the WHO students' drug use questionnaire.Substance abusers were identified by the researcher alone using the code which was placed on the questionnaire. Academic performance of substance abusing students was compared with those of their classmates matched for age, sex and socio-economic class.The overall score in percentage in the three terminal examinations of the school session preceding the study was documented and the average taken. This was used as an index of general academic performance. The performance was scored as high if $\geq$75% whereas 50-74% and <50% were scored as average and low, respectively.[15-17] Scores in 4 subjects, English, Mathematics, Biology, and Igbo were also compared. Socioeconomic classification was done using mothers education and fathers occupation.[18]The class attendance register was used to assess school absences in the preceding school session. High absence was taken as >12 school days absence from the school in a year as recommended by Weitzman et a,[19] while low absence is 1 – 12 school days absence. The Paediatric Symptom Checklist (PSC)- Youth Report Version[9] was used for assessing psychosocial impairment in substance abusers. A total score of 28 and above was taken as an indication of significant psychosocial impairment.[9]

Data obtained was analyzed using SPSS Version 20 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp 2011). Descriptive statistics was used to find the prevalence of substance abuse. The student's t-test was used to compare means of overall scores and scores in key subjects of substance abusers and controls while frequencies in 2 X 2 tables were compared using the Pearson's chi-square test or fishers' exact test as appropriate.   Multiple linear regressions were used to find the associations between independent variables(school absence, socioeconomic class,psychosocial impairment, and use of multiple substances) and the dependent variable, academic performance. All calculations were based on a significant level of *p*<0.05

III.   Results

The mean age of theparticipantswas 16.57$\pm$1.39 years with a male: female ratio of 1: 1.09. Two hundred and four respondents were abusers of one or more substances 202 students were selected as control. The socio-demography of subjects and control are represented in table i.

One hundred and thirty seven (67.3%) subjects had low overall scores, compared to 72 (35.8%) controls (χ^2 = 22.021; *p*=0.000). The mean score of controls was significantly higher than those of subjects in the overall score as well as in all four key subjects as shown in table ii.

The mean number of days the subjects were absent from school in the 2012/2013 session was 14.68$\pm$4.79 days while that for the control was 9.50$\pm$3.84 days (t = -8.821; *p*=0.000).There was a significant relationship between the rate of school absenteeism and overall score for both substance abusers and controls, the level of significance is as shown in table iv. Eighty-nine subjects (43.7%) and 28 controls (13.9%) had abnormal PSC scores. Students with normal pediatrics symptoms checklist (PSC)score were found to perform significantly better academically (χ^2=8.75 ; *p*=0.024). Table v shows the result of the multiple regression analysis of the factors associated with academic performance amongst substance abusers. Three factors, age at initiation of substance use, number of substances used and frequency of school absenteeism, were found to have

significant independent effects on academic performance of substance abusers. Among the control, school absences had a significant independent effect on the overall score.

IV. Discussion

The study observed lower mean scores of subjects when compared to control. School absence was also more common among substance abusing students and high school absence, associated with poor school performance. Poor academic achievement of subjects in this study may be due to the direct effect of substances on cognition or the associated increased school absence. This finding supports the assertion of Cox *et al*[3] that heavy drinking of alcohol, frequent smoking of cigarette and cannabis use resulted in low academic performance as measured by school reports of performances in mathematics and Spanish language. Ingles *et al*[4] corroborated this, having observed poor academic performance in adolescents who abused alcohol or smoked daily. The authors[4] attributed poor academic performance to lack of interest on school achievements or interference with study tasks induced by the use of substances. In addition, the "hang-over" effect of alcohol use for instance may result in poor concentration and sleep during lessons and examinations. Engberg and Moral,[7] King *et al*,[8] and Pope and Yurelun-Todd[9] reported that heavy substance use can result in problems in working memory and attention due to changes in brain activity induced by the use of substances which may culminate into school problems and eventual dropout.

The same studies,[7-9] however emphasized that the degree of substance use, as well as the use of multiple substances rather than the type of substances used was associated with poor academic performance.
School absenteeism was more amongst substance abusers than control. Similar findings were made by Godley[11] who reported more risky behaviours such as truancy among substance abusers. This finding was corroborated by Okike[17] who performed a similar study on substance abuse in adolescents in Abakaliki five years ago. He observed that school absenteeism was a consequence of the various substances he studied. It has been posited that these substances produce "hang over" effects on the abuser thereby making school attendance difficult. Other reason given is that these students prefer to "hang out" with peers rather than participate in school activities. School attendance is a critical factor in school success of students. Students who absent themselves from school lose out on the preparatory classes and tend to perform worse than their peers.[19] This is confirmed by the finding of academic underachievement among children with high school absence rate in the present study.

Substance abusers in this study had higher rate of psychosocial dysfunction. Langas *et al*[23] had reported that 46% of their substance users had personality disorders which were more or less a function of the age at which substance abusers initiated substance use. Substance abusing students with psychosocial impairment performed significantly worse than those without psychosocial impairment. Gruber *et al*[24] reported that the impaired critical skills are related to attention, memory and learning problems amongst heavy users of cannabis. Poor performance in this study may therefore be due to loss of concentration during lessons and class assessments from psychosocial dysfunctions as postulated by Gruber *et al*.[24]

The number of substances used has been shown to be significantly associated to academic performance in this study. There was a significant increase in proportion of participants with a low overall score as the number of substances used increased. This may be due to the additive pharmacologic toxicities of these substances. Igwe and Ojinnaka[25] had earlier noted multiple substance use as a risk factor for psychiatric morbidity in students that abuse substances. The resultant psychosocial impairment of multiple substance use may result in poor concentration and poor thought which could adversely affect school performance.

Multiple linear regressions showed that school absences, age at initiation of substance use and number of substances used had significant independent effects on academic performance of substance abusers. This finding agrees with the known relationship between school absenteeism and academic performance[19] as well as the effect of multiple substance use on mental health of substance abuser which in turn can affect their school performance.[24,25] However the finding of significant independent effect of school absenteeism on academic performance among control shows that the poor academic performance of substance abusers may largely be due to school absenteeism rather than substances related factors. Furthermore, the age of initiation of substance use and the use of multiple substances rather than the type of substance abused are what preclude good academic performance in substance abusers.

V. Conclusion

The academic performance of substance abusers is worse than that of students who do not abuse substances. High school absence, age at initiation of substance use and abuse of multiple substances are the most important determinants of academic performance of substance abusers in secondary schools in Abakaliki. School absenteeism is the underlying determinant of academic performance of all secondary school students in Abakaliki.

References

[1]. en.wikipedia.org/wiki/**Academic_achievement** (assessed 14th may 2012).
[2]. Dewey JD. "Reviewing the relationship between school factors and substance use for elementary, middle and high school students." J Prim Prevent 1999;**19**: 177-25.
[3]. Cox RG, Zhang L, Johnson WB, Bender DR. Academic performance and substance use: Findings from a state survey of public high school students. J Sch Health ASHA 2007; **77**: 109-15.
[4]. Ingles CJ, Torregrosa MS, Rodriguez-Marin J, Garcia del Castillo JA, Gazquez JJ, Garcia-Fernandez JM, Delgado B. Alcohol and tobacco use and cognitive-motivational variables in school settings: effects on academic performance in Spanish adolescents. Adicciones 2013; **25**: 63-70.
[5]. LukoyeA,Mungla PA, Ndung MN, Kinoti KC, Ogot EM. Prevalence of substance use among college students in Eldoret, Western Kenya. BMC Psychiatry 2011; **11**: 34-38.
[6]. Lynsky MT. Substance use and educational attainment. Addiction. 2006; **101**: 1684–85.
[7]. Engberg J, Morral AR. Reducing substance use improves adolescents' school attendance. Addiction. 2006; **101**:1741–51.
[8]. King KM, Meehan BT, Trim RS, Chassin L. Marker or mediator? The effects of adolescent substance use on young adult educational attainment. Addiction. 2006; **101**: 1730–40.
[9]. Pope HG, Yurelun-Todd D. The residual cognitive effects of heavy marijuana use in college students. J Am Med Assoc 1996; **275**: 521-27.
[10]. Wentz CT, Magavi SSP. Caffeine alters proliferation of neuronal precursors in the adults hippocampus. Neuropharmacology 2009; **56**: 994–00.
[11]. Godley SH. Substance use, academic performance and the village school. Addiction. 2006; **101**: 1685–87
[12]. Fatoye FO. Psychosocial correlates of substance use amongst secondary school students in South Western Nigeria. East Afri Med J 2003; **80**: 154-58.
[13]. Shehu AU, Idris SH. Marijuana smoking among secondary school students in Zaria, Nigeria: Factors responsible and effects on Academic Performance. Al Afri Med 2008; **7**: 175-79.
[14]. Meltem D, Serap T. Gender differences in academic performance in a large public university in Turkey. Higher Education 2007; **53**: 255-77. Springer L Science + Business Media B.V DOI10.1007/s 10734-005-2464-6. (assessed 22nd march 2013)
[15]. Ebonyi State ministry of education, Statistics and Planning Unit. 2012 school enrolment: 12-24.
[16]. Araoye MO. Research methodology with statistics for health and social sciences. Ilorin: Nathadex Publishers. 2003; 115-29.
[17]. Okike CO. Prevalence of substance abuse among secondary school adolescents in Abakaliki, Ebonyi state, South Eastern Nigeria. Dissertation: West African College of Physicians. 2009.
[18]. Olusanya O, Okpere EE, Ezimokhai M. The importance of social class in voluntary fertility control in a developing country. West Afr J Med. 1985; **4**: 252-55.
[19]. Weitzman M, Klerman LV, Lamb G, Menary J, Alpert JJ. School absence: a problem for the Paediatrician. Pediatrics 1982; **69**: 739-46.
[20]. Schatz J. Brief report: academic attainment in children with sickle cell disease. J PaediatrPsychol 2004; **29**: 627-33.
[21]. Karadel S, Kulkarni M. Poor school performance. Indian J Peditr 2005; **72**: 961-67.
[22]. Ogunfowora OB, Olanrewaju DM, Akenzua GI. A comparative study of academic achievement of children with sickle cell anemia. J Natl Med Assoc .2005; **97**: 405-08.
[23]. Langas A, Malt UF, Opjordsmoen S. In-depth study of personality disorders in first admission patients with substance use disorders. BMC Psychiatry 2012; **12**:180.
[24]. Gruber AJ, Pope HG, Hudson HI, Yurgelun-Todd D. Attributes of long-term heavy cannabis users: A case control study. Psychol Med 2003; **33**:1415-22.
[25]. Igwe WC, Ojinnaka NC. Mental health of adolescents who abuse psychoactive substances in Enugu Nigeria – A cross-sectional study. Italian J Paediatr 2010; **36**: 36-53.

Tables

Table I: Socio-demographic characteristics of subjects and controls.

Socio-demographic variable	Subjects n(%)	Control n(%)	*P*
Age range (years)			
10-14	9(4.5)	9(4.5)	0.623
15-19	195(95.5)	193(95.5)	
Gender			
Male	120(58.8)	120(59.4)	0.541
Female	84(41.2)	82(40.6)	
Socioeconomic class			
Lower	151(74.5)	147(72.7)	0.566
Middle	32(15.5)	40(20.0)	
Upper	21(10.0)	15(7.3)	

Table II: Overall academic score of subjects and control

Overall score	Subjects n(%)	Control n(%)	Total n(%)
High ($\geq$75)	4(1.8)	11(5.5)	15(3.7)
Average (50-74)	63(30.9)	119(58.7)	182(44.7)
Low(<50)	137(67.3)	72(35.8)	209(51.6)

x^2 = **22.021;** *p*=**0.000**

Table III: Mean scores of subjects and controls in selected key class subjects and their overall score.

Class subject	Scores of abusers		Scores of control			
	Mean	SD	Mean	SD	t	pvalue
Biology	42.32	15.73	54.12	15.98	5.512	0.000
English	41.25	17.98	50.01	16.98	3.714	0.000
Igbo	39.63	16.99	52.92	14.98	6.143	0.000
Mathematics	35.74	13.96	43.76	15.16	4.071	0.000
Overall	43.44	14.54	54.21	13.47	5.692	0.000

Table IV: Association between school absence and overall academic score of subjects and controls.

		School absence		
Overall score		**Low**	**High**	**Total**
Low	Abusers n(%)	17(12.2)	120(87.8)	137
	Controls n(%)	40(56.4)	32(43.6)	72
Average	Abusers n(%)	36(56.4)	27(35.3)	63
	Controls n(%)	113(95.3)	6(4.7)	119
High	Abusers n(%)	2(50.0)	2(50.0)	4
	Controls n(%)	11(100.0)	0(0.0)	11
Total	Abusers n(%)	59(29.1)	145(70.9)	204
	Controls n(%)	165(81.7)	37(18.3)	202

Statistics for subjects: fishers exact 30.85; *p*=0.000
Statistics for controls: fishers exact 23.88; *p*=0.000

Table V: Multiple regression analysis of factors associated with academic performance of substance abusers and controls.

VARIABLE	Coefficient	R^2 change	95% Interval	Partial	*P*
SUBSTANCE ABUSERS					
Age of initiation	-0.253	-0.361	-4.54 to -0.77	-0.289	0.006*
Psychosocial dysfunction	-0.029	-0.188	-0.33 to 0.25	-0.029	0.786
Degree of school absence	-0.504	-0.601	-2.049 to -1.01	-0.533	0.000*
No of substances	-0.323	-0.432	-3.23 to -0.86	-0.321	0.003*
CONTROL					
PSC score	-0.052	-0.025	-0.39 to 0.23	-0.054	0.602
Degree of school absence	-0.490	-1.075	-2.34 to -1.08	-0.49	0.000*

*=significant