

PATH ANALYSIS OF FACTORS INFLUENCING DEPRESSION AMONG FUNAAB UNIVERSITY STUDENTS

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Depression has become a prevalent mental illness that affects one out of every twenty persons at one point in their lifetime. It has been reported that depression can develop at any age and there are quite a number of factors that could lead an individual into depression. The aim of this research is to establish the effect of four selected factors influencing depression among FUNAAB students namely; Sexual Risk Behaviour- X_1 , Alcohol usage- X_2 , Bullying-Victimization- X_3 and Academic Performance - X_4 . Studies have examined the effects of each factor on depression separately, but this study improved on these by investigating the total, direct and indirect effect of each and all these factors on Depression using Path Analysis. A well-structured questionnaire was developed to source for data. The instrument reliability was checked for effectiveness using Cronbach Reliability Test. 39.6% of the respondents' showed signs of depression; Academic Performance, Alcohol usage and Bullying-victimization all contributed significantly to the presence of depression. While a unit increase in others will increase the level of depression, a good academic performance will reduce the effect and chances that a student will be depressed. Hence, efforts should be made to help cushion the effect of the independent factors on depression.

Keywords: Academic Performance, Alcohol Usage, Bullying Victimization, Depression, Path Analysis, Sexual Risk Behaviour.

2.0. INTRODUCTION

Mankind is currently battling with one of the most challenging health hazards called Depression.

Depression has become a prevalent mental illness that affects one out of every twenty persons at one point in their lifetime. Anxiety and Depression Association of America (2018) reported that depression can develop at any age and gave the median age of 32.5 years. There are quite a number of factors that could lead an individual into depression namely; family history, self-esteem, socioeconomic status, Chronic Physical or Mental Disorder, Sexual Risk Behavior, age etc.

Mental health issues have been on the increase among Nigerian students, and this is evident in the rate of increase in suicide among the Nigerian youths foremost among these are the Nigerian students. The major cause of the increase in suicide is Depression.

Depression is regarded as a serious medical condition which reduces effectiveness in studies or work, reasoning, loss of resourcefulness, and apathy (Nagaraja *et al.* 2015).

The American Psychiatry Association defines depression as a major low-spirited disorder which is a serious medical illness that negatively affects how you feel, reason and act which causes ill feeling and/or loss of interest in ones loved activities. It leads to varieties of psychological and physical difficulties and can reduced the individual's functionality.

Quite a number of literatures showed that several studies that have examined the factors contributing to Depression, studied their individual effect separately on depression as none has taken a collective look at the factors influencing depression be it directly, indirectly or the total effect on depression using different methods like logistic regression etc.

The focus of this study was on the direct and indirect effect of four (4) selected factors influencing depression among FUNAAB students namely; Sexual Risk Behavior, Alcohol Use, Bullying Victimization, and Academic Performance; and the collective effect will be captured with the use of Path Analysis.

2.0. PATH ANALYSIS

Path analysis is a method of arranging collinearity patterns between predictors and criterion variables. It is also a special case of structural equation model (SEM) which is often thought of as a form of multiple regressions directed at causality.

Path Analysis has turned out to be one of the most popular techniques in multivariate analysis as developed by Sewall Wright in 1918 according to the Department of Psychology, University of Exeter (DPUE) (1997) that path analysis as a straightforward extension of multiple regression, which provide estimates of magnitude and significance of hypothesized causal connections between the dependent variable (Depression) and the independent variables. Ye *et al.* (2014) employed the use of path analysis to identify factors influencing health skills and behaviors in adolescents. The result of their research showed that knowledge of infectious disease, health skills, health concept, general health knowledge, gender, and school performance had direct effect on health behaviors in adolescents.

Sharma *et al.* (2016) theorized the similarities between the Confirmatory Factor Analysis (CFA) and Path Analysis and reiterated the views of DPUE which stated that path analysis was a type of Structural Equation Modeling (SEM). It was apparent that path analysis has connections with several techniques for statistical analysis and decision making.

It is however germane to remark that as it was normal with several procedures, path analysis has its own sole nomenclature, assumptions and conventions (Streiner, 2005).

2.1. Data Presentation

The data used in the study was sourced primarily among the undergraduate students of the Federal University of Agriculture Abeokuta, through the use of well-structured questionnaire divided into six (6) sections which captured the socio-demographic characteristics of the respondents selected using Simple Random Sampling in the first section.

1. Beck’s Depression Inventory II (BDI-II) is a 21-item instrument used in measuring the severity of depression among the respondents with clinical depression and also to score respondents who are not clinically diagnosed with a level of perceived depression (Beck *et al.*, 1996).
2. **Sexual Risk Behavior (SRS)** is a 23-item instrument used to measure the level of risky sexual behavior including use or lack of use of protective measure during sexual behavior (Turchik and Garske, 2008).
3. **Bullying Victimization Scale** is also a 19-item instrument used to measure the degree of bullying victimization among the respondents (Nazan, 2015).
4. **Alcohol Use Disorders Identification Test (AUDIT)** is a 10-item screening tool design by the WHO to assess alcohol consumption, drinking behaviours, and alcohol-related problems (Thomas *et al.*, 2019).
5. **Academic Performance** is a self-structured questionnaire 18-item instrument used to measure the level of performance of students in their course of study.

3.0. METHODOLOGY

A simple random sampling technique was used to select respondents in the study area (FUNAAB) and the Taro Yamane (1967) formula was used to determine the sample size needed for the study

The formula was given as $n = \frac{N}{1+Ne^2} = 430$

where *N* is the population size and *e* is the α level which is given at 0.05

With the use of path analysis in examining the magnitude of the causal effects (direct, indirect and total) of the exogenous variables on the endogenous variable, a hypothesized path model was developed as given below

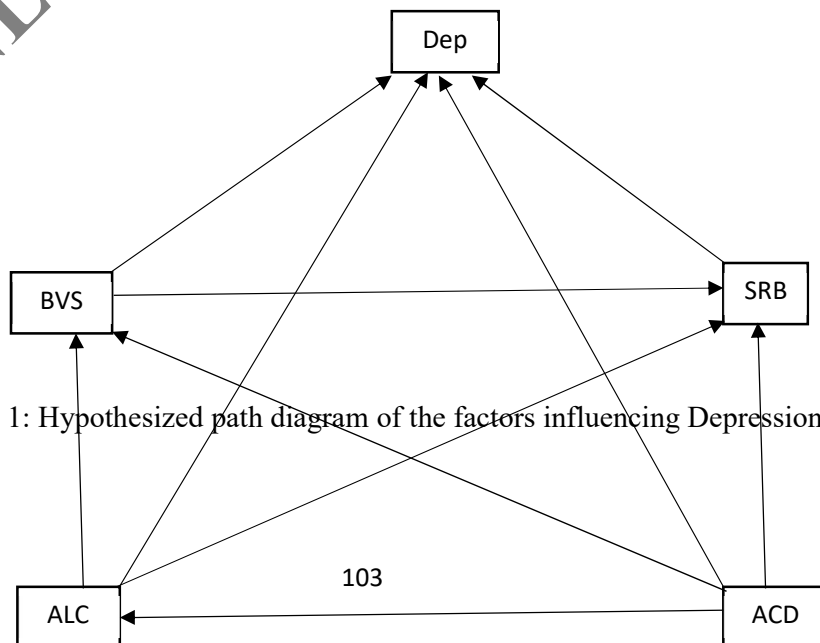


Figure 1: Hypothesized path diagram of the factors influencing Depression

The raw data were standardized before the path equations could be expressed using the transformation formula given as

$$z = \frac{x - \bar{x}}{\sigma} \tag{1}$$

where x = raw score, \bar{x} = mean of the sample, and σ = Standard deviation.

Using the z-scores, the path equations are given as

$$Z_1 = e_1 \tag{2}$$

$$Z_2 = p_{21}Z_1 + e_2 \tag{3}$$

$$Z_3 = p_{31}Z_1 + p_{32}Z_2 + e_3 \tag{4}$$

$$Z_4 = p_{41}Z_1 + p_{42}Z_2 + p_{43}Z_3 + e_4 \tag{5}$$

$$Z_5 = p_{51}Z_1 + p_{52}Z_2 + p_{53}Z_3 + p_{54}Z_4 + e_5 \tag{6}$$

In the equation given above, the Z_i – scores, $i = 1, 2, \dots, 5$ are the transformed scores for Depression, Sexual Activity, Bullying, Alcohol use and Academic Performance. The error terms are labeled e_i 's and the p_i 's are the Path coefficients leading from i to j respectively.

The relation below was used to calculate relationship with z-scores.

$$\rho_{ab} = \frac{1}{N} \sum Z_a Z_b \tag{7}$$

where, ρ_{ab} = Correlation between variables a and b ,

N = Number of items that constitute the variables.

$Z_a Z_b$ = Z – scores for variables a and b .

Therefore, the relationship between variables 1 and 2 is

$$\rho_{12} = \frac{1}{N} \sum Z_1 Z_2 \tag{8}$$

Substituting for Z_2 (i.e., replacing Z_2 with equation 3),

$$\rho_{12} = \frac{1}{N} \sum Z_1 (p_{21}Z_1 + e_2) \tag{9}$$

Expanding equation 9,

$$\rho_{12} = p_{21} \frac{\sum Z_1 Z_1}{N} + \frac{\sum Z_1 e_2}{N} \tag{10}$$

In the above equation $\frac{\sum Z_1 Z_1}{N}$ = variance of $Z_1 = 1$ and $\frac{\sum Z_1 e_2}{N}$ = correlation between Z_1 and $Z_2=0$ (One of the assumptions of path analysis)

$$\rho_{12} = p_{21}1 + 0 \tag{11}$$

which indicates that path coefficient equals the correlation when the dependent variable is a function of a single independent variable.

From the hypothesized path diagram shown above, there are two obvious paths from alcohol use and academic performance to Bullying Victimization. Hence, it is imperative that one computes the two relationships (ρ_{13} and ρ_{23}) to define the two path coefficients. The process was followed until the relationships of all the path coefficients were obtained. R statistical software was used for the analysis.

3.1. Data and Results

The summary of the data scores for both the dependent and independent variables obtained from the field were summarized in table 1 below:

	Dep_sc	SRS_sc	BulVic_sc	Alcuse_sc	AcadPerf_sc
Min.	0.00	5.916	19.00	0.000	35.00
1 st Qu	5.00	7.211	23.00	0.000	52.00
Median	13.00	7.681	33.00	1.000	59.00
Mean	15.67	7.646	34.96	5.342	58.81
3 rd Qu	26.00	8.062	44.00	9.250	65.00
Max.	48.00	9.327	80.00	32.000	87.00

Table 1: Variables Summary Table

The responses were checked for the presence of depression with the BDI-II and after scoring the respondents, respondents with scores less than 21 were categorized as having absence of depressive disorder symptoms, while those with higher scores were categorized as exhibiting depressive disorder symptoms. The scales for Sexual Risk Behavior were also obtained and categorized. Same was done for Bullying Victimization, Alcohol Use and Academic Performance as shown in table 2.

DEPRESSION					
Variables	Absent n (%)	Present n (%)	Total	X ²	p-value
Age Group					
<= 18 Years	44(68.8)	20(31.3)	64	3.81	0.149
19 – 23 Years	169(61.2)	107(38.8)	276		
>= 24 Years	56(53.8)	48(46.2)	104		
Gender					
Male	163(57.0)	123(43.0)	286	4.34	0.037*
Female	106(67.1)	52(32.9)	158		
Religion					

Christianity	198(60.2)	131(39.8)	329	0.09	0.769
Islam	71(61.7)	44(38.3)	115		
College					
Natural Sciences	81(55.9)	64(44.1)	145	8.26	0.082
COLENG	18(62.1)	11(37.9)	29		
Agric. Sciences	117(63.2)	68(36.8)	185		
Human Environmental Sciences	25(51.0)	24(49.0)	49		
Management Sciences	28(77.8)	8(22.2)	36		
Level					
100	49(60.5)	32(39.5)	81	2.40	0.663
200	82(63.1)	48(36.9)	130		
300	49(64.5)	27(35.5)	76		
400	42(60.0)	28(40.0)	70		
500	47(54.0)	40(46.0)	87		
Fathers' Education					
Primary & SSCE	65(61.9)	40(38.1)	105	10.95	0.012*
OND/NCE	15(39.5)	23(60.5)	38		
HND/B.Sc	140(66.0)	72(34.0)	212		
M.Sc/Ph.D	49(55.1)	40(44.9)	89		
Mothers' Education					
Primary & SSCE	81(54.4)	68(45.6)	149	9.97	0.019*
OND/NCE	54(70.1)	23(29.9)	77		
HND/B.Sc	112(65.1)	60(34.9)	172		
M.Sc/Ph.D	22(47.8)	24(52.2)	46		
Fathers' Profession					
Artisan	115(62.8)	68(37.2)	183	16.92	0.000*
Civil Servant	82(72.6)	31(27.4)	113		
Professional	70(47.9)	76(52.1)	146		
Mothers' Profession					
Artisan	143(62.2)	87(37.8)	230	6.46	0.040*
Civil Servant	81(65.3)	43(34.7)	124		
Professional	43(48.9)	45(51.1)	88		
Marital Status					
Single	262(61.6)	163(38.4)	425	5.44	0.064 [#]
Married	6(42.9)	8(57.1)	14		
Cohabiting	1(20.0)	4(80.0)	5		
Sponsor					
Parent	254(59.8)	171(40.2)	425	4.86	0.088 [#]
Self	8(66.7)	4(33.3)	12		
Others	7(100.0)	0(0.0)	7		
Sexual Risk Behavior					

Low	153(69.2)	68(30.8)	221	17.18	0.000*
Moderate	65(58.0)	47(42.0)	112		
High	51(45.9)	60(54.1)	111		
Bullying Victimization Level					
Low	84(75.0)	28(25.0)	112	66.29	0.000*
Moderate	95(82.6)	20(17.4)	115		
High	90(41.5)	127(58.5)	217		
Alcohol Use Level					
Low	230(72.6)	87(27.4)	317	72.89	0.000*
Moderate	26(41.9)	36(58.1)	62		
High	13(20.0)	52(80.0)	65		
Academic Performance					
Poor	41(36.6)	71(63.4)	112	45.52	0.000*
Average	70(59.3)	48(40.7)	118		
Good	79(68.7)	36(31.3)	115		
Excellent	79(79.8)	20(20.2)	99		

* *p-value* <.05, #*Likelihood Ratio*

Table 2: The relationship between the said variables and Depression Scores using Chi-square Analysis.

The table above describes the relationship between the socio demographic characteristics and the presence of Depression among the respondents of this study. Gender, Parents education and occupation, sexual risk behavior, Bullying Victimization, Use of Alcohol, and Academic Performance are found to be statistically dependent with *p-values* .037, .012, .019, .000, .040, .000, .000 .000, and .000 respectively.

All other variables are found to be independent and we fail to reject the null hypothesis and as such we conclude that there is no relationship between the variables and Presence of Depression among the respondents.

The standardized raw scores and the correlation matrix obtained was shown in the table 3 below.

	Dep_sco	SRS_sco	BulVic_sco	Alcuse_sco	AcadPerf_sco
Dep_sco	1	0.2	0.41	0.37	-0.32
SRS_sco		1	0.28	0.49	-0.22
BulVic_sco			1	0.5	-0.32
Alcuse_sco				1	-0.22
AcadPerf_sco					1

Table 3: Correlation Matrix between variables

The parameter estimates of the path coefficients were obtained and given below.

		Estimate	Std.Err	z-value	P(> z)	Std.lv	Std.all
Dep ~							
SRS	(a)	-0.016	0.048	-0.334	0.739	-0.016	-0.016
Bullying	(b)	0.245	0.049	4.967	0.000**	0.245	0.245
Alcohol	(c)	0.212	0.053	4.015	0.000**	0.212	0.212
Academic	(d)	-0.199	0.044	-4.496	0.000**	-0.199	-0.199
SRS ~							
Bullying	(e)	0.015	0.049	0.298	0.766	0.015	0.015
Alcohol	(f)	0.457	0.047	9.636	0.000**	0.457	0.457
Academic	(g)	-0.115	0.043	-2.643	0.008**	-0.115	-0.115
Bullying ~							
Alcohol	(h)	0.451	0.041	11.062	0.000**	0.451	0.451
Academic	(i)	-0.221	0.041	-5.408	0.000**	-0.221	-0.221
Alcohol ~							
Academic	(j)	-0.220	0.046	-4.752	0.000**	-0.220	-0.220
Variances:							
		Estimate	Std.Err	z-value	P(> z)	Std.lv	Std.all
.Dep		0.756	0.051	14.900	0.000**	0.756	0.758
.SRS		0.741	0.050	14.900	0.000**	0.741	0.742
.Bullying		0.703	0.047	14.900	0.000**	0.703	0.704
.Alcohol		0.949	0.064	14.900	0.000**	0.949	0.952

The path coefficients are labelled with the alphabets ‘a’ – ‘j’ and the estimate given with its significant p – values are shown above.

The measured magnitude of the indirect and total effects of the independent variables on the presence/severity of depression among the Nigerian student as seen in the case of FUNAAB, was shown in below in table 4

	Estimate	Std.Err	Z-value	P(> z)	Std.lv	Std.all
AcadEff	-0.305	0.048	-6.328	0.000**	-0.305	-0.305
AlcEff	0.315	0.044	7.221	0.000**	0.315	0.315
BulEff	0.245	0.049	4.963	0.000**	0.245	0.245
AcadEffInd	-0.106	0.030	-3.535	0.000**	-0.106	-0.106
AlcEffInd	0.103	0.033	3.146	0.002**	0.103	0.103
BulEffInd	-0.000	0.001	-0.222	0.824	-0.000	-0.000
SRS	-0.016	0.048	-0.334	0.739	-0.016	-0.016

Table 4: Magnitude of the indirect and total effects of the independent variables on depression

The Path diagram obtained from the analysis of the factors’ influencing depression was as presented in figure 2 below.

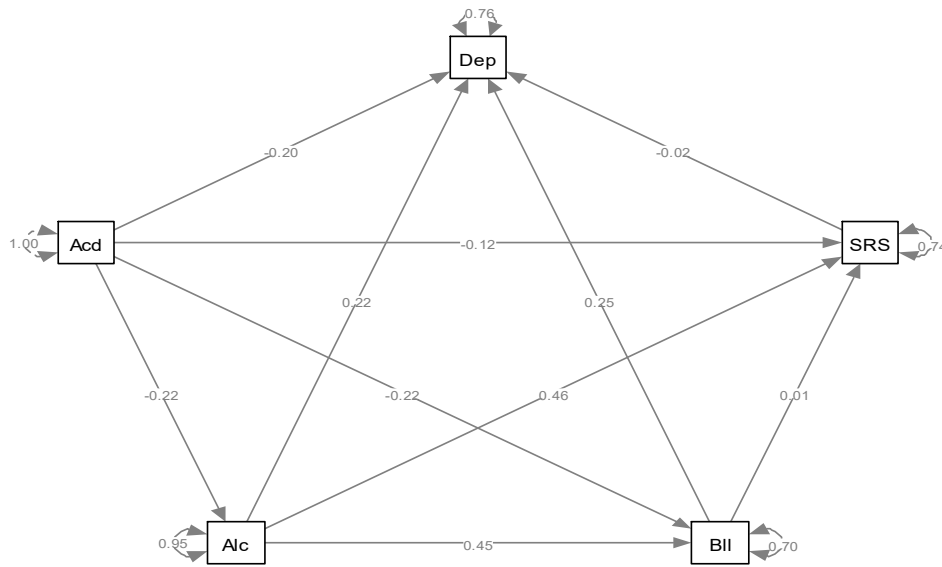


Figure 2: Obtained path diagram from the analysis of the factors influencing depression

4.0. SUMMARY OF FINDINGS

Out of all the 444 students who participated in the study, 268 students were found to be free of depression while 176 students showed signs of depression. The number of depressed students form about 39.6% of the respondents which was not negligible. The results presented above showed that Bullying Victimization, Alcohol usage and Academic Performance are the foremost contributors to depression among the students, while interestingly Sexual Risk Behavior do not have a significant contribution to the presence of Depression among the students. It was found that a unit increase in bullying victimization and use of alcohol will cause about 25% and 21% increase in the level of depression among the students likewise, a unit increase in academic performance will result in 2% decrease in the depression level among the students.

The results showed that the mediated effect (indirect effect) of academic performance and alcohol use are significant contributors to the level of depression faced by FUNAAB students.

The total effect of Academic Performance, Alcohol use and Bullying Victimization were significant contributors to the level of depression among FUNAAB student.

5.0. CONCLUSION AND RECOMMENDATION

From the above, academic performance, alcohol use and bullying victimization are all significant contributors to the presence and/or severity of depression.

While a unit increase in the other factors will increase the level of depression, a good academic performance will reduce the effect and chances that a student will be depressed, hence

concerted efforts should be made to help cushion the effect of the independent variables on depression as pointed out in this study. This study revealed that parent social status also needs further investigation due to its level of contribution to depression among the students.

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