ORIGINAL ARTICLE

Depressive Disorders Among In-School Adolescents: How Prevalent in Anambra State, Nigeria?

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ABSTRACT

Background: Depressive disorders are the leading causes of ill-health and disability globally. Depression among adolescents is usually associated with a range of adverse later outcomes which include suicidality, and general poor physical and mental health.

Objective: To determine and compare the prevalence of depressive disorders among in-school adolescents in urban and rural areas of Anambra State.

Methodology: This was a cross-sectional analytical study of urban and rural in-school adolescents in Anambra State, Nigeria. A total of 1187 secondary school adolescents in government-owned schools in Anambra State was selected using multi-stage sampling technique. Patient Health Questionnaire-9 (PHQ-9) was the study instrument.

Results: The mean age of the participants was 15±2 years. The overall prevalence of depression was 12.5%. The proportion of urban participants identified with depression was significantly higher than that of their rural counterparts (14.5% versus 9.6%). Multiple regression showed that increased odds of developing depression are associated with urban setting (p = 0.001), female gender (p=0.018), and late adolescence (p=0.025).

Conclusion: This study showed that depressive disorders are prevalent among in-school adolescents in Anambra State, with some of the associated factors being urban setting, female gender and late adolescence. There is need for multi-sectoral intervention programs to address these identified factors.

Key Words*: In-school adolescents, Depressive disorders, Nigeria, Urban-rural, Patient health questionnaire-9 (PHQ-9)*

INTRODUCTION

Depressive disorder (or simply depression) is a mood disorder that causes distressing symptoms that affect how one feels, thinks and handles daily activities.[1] It is a condition

in which a person feels discouraged, sad, hopeless, unmotivated or disinterested in life in general for more than two weeks, and the feeling also interferes with daily activities. Persons with depression may also present with the following symptoms: irritable mood, difficulty sleeping or concentrating, changes in grades (for those in school), getting into trouble at school or refusing to go to school, change in eating habits, feeling angry or irritable, mood swings, feeling worthless or restless, frequent sadness or crying, withdrawing from friends and activities, loss of energy, low self-esteem and thought of death or even suicide. It can affect people across age groups-children, adolescents as well as adults, from all walks of life, and all countries.[2] The mental anguish caused by depression and impact on people's ability to carry out everyday tasks, can sometimes have devastating consequences on relationships with family and friends.[2]

Depression has been noted as the leading cause of ill-health and disability worldwide.[2] About 300 million people worldwide are living with depression, with over 80% of the disease burden being in low- and middle-income countries(LMICs).[2] World Health Organization (WHO) led a one year global campaign against depression with the 2017 World Health Day theme being *Depression: Let's talk*.[2] Though depressive feelings are common especially after experiencing setbacks in life, the diagnosis of depressive disorder is made only when the symptoms reach a threshold and last at least two weeks.[3] This threshold is recognized by the symptoms interfering with daily activities.

Like other mental disorders, depression results from a combination of factors which include genetic, biochemical, environmental and psychological factors.[4] In adolescents, depression is usually associated with a range of adverse later outcomes which include suicidality, and general poor physical and mental health such as substance use disorder, eating disorder and anxiety disorders among other co-morbidities.[1] As part of general intervention/control measures, there was need to first know how prevalent depressive disorder is among adolescents in our environment. Adolescence (10-19 years) has been noted as period of heightened vulnerability for the onset of internalizing psychopathology.[5]

The school environment provides unique setting to access this prevalence among adolescents. This study like most other studies on adolescents in sub-Saharan Africa and Nigeria target in-school adolescents because they are easily accessible, easier to organize and monitor compared to those who are not in school.[6] Previous works conducted on depression among in-school adolescents in rural areas of the South-West region of Nigeria, using Patient Health Questionnaire (PHQ-9) and Global School Health Questionnaire (GSHQ) separately, reported prevalence of depressive disorders as 21.2% and 12.6% respectively.[7,8] The study in Singapore among school aged children (8-12 years) gave prevalence of depression as 16.9%, using Children Depression Inventory (CDI) for depression as tool for assessment.[9]

Most studies that assessed prevalence of depression among adolescents did not compare rural and urban differences. With

difference in social amenities and general life style, one should expect a difference in the prevalence. The findings of the index study will help bridging knowledge gaps as to the differences in the prevalence of depressive disorders among in-school adolescents in rural and urban areas.

This study sought to determine and compare the prevalence of depressive disorders among in-school adolescents in urban and rural areas of Anambra State. It also determined the relationship of depression with some selected socio-demographic variables.

METHODOLOGY

Study Design and Area

This was a cross-sectional analytical study involving in-school adolescents in urban and rural areas of Anambra State, Nigeria. Anambra State has its capital and seat of government at Awka, with twenty-one LGAs and three senatorial zones namely: Anambra South, Anambra Central and Anambra North.[10] The major ethnic group of the State is Igbo (98% of the population), and a small population of Igala (2% of the population) living mainly in the North-Western part of the State, with Christianity as the predominant religion.[11] This study was done in six Local Government Areas (LGAs), two from each of the three senatorial zones, between February to July 2017.

Study Population

The population studied comprised adolescents (aged 10 to 19 years) males and females, enrolled and studying for at least one year, in registered public secondary schools in the chosen LGAs in Anambra State.

Exclusion criteria: Adolescents who met the inclusion criteria, but whose informed permission could not be obtained or were absent from school during the study period.

Sample Size Determination

The minimum sample size for the study was calculated using the formula for comparative study of two population proportion with binary outcome, with 80% power and at 95% confidence level [12,13]

$$n = \frac{\left\{Z_{1-\alpha}\sqrt{\left[2P(1-P)\right]}+Z_{1-\beta}\sqrt{\left[P_1(1-P_1)+P_2(1-P_2)\right]}\right\}^2}{(P_2-P_1)^2}$$

Where $P = (P_1+P_2)/2$

n = Sample size for each group

$Z_{1-\alpha}$ = percentage point of the standard normal deviate corresponding to the two-sided significance level = 1.96 (for α = 5% or 0.05)

$Z_{1-\beta}$ = one-sided percentage point of the standard normal deviate corresponding to 100% - power (1- β) = 0.84 (for power = 80%).

P_1 = Prevalence of adolescent depression in urban area = 6.9% = 0.069.[14]

P_2 = Prevalence of adolescent depression in rural area = 12.6% = 0.126.[8]

For each sub-population, 471 respondents were calculated, after adjusting for a non-response rate of 10%, giving a total of 942 as the minimum sample size.

Sampling Technique

A multi-stage sampling technique was used in this study.

Stage 1: Selection of Local Government Areas - The 21 LGAs in Anambra State were stratified into urban, semi-urban and rural LGAs, based on the 3 senatorial zones (see Appendix A). By simple random sampling method (employing simple balloting), one urban LGA and one rural LGA were selected from each senatorial zone, totaling 6 LGAs. From *Anambra North*

senatorial zone, Onitsha South LGA and Anambra-West LGA were the urban and rural LGAs respectively; while Awka South and Awka North were used as urban and rural LGAs respectively from *Anambra Central* senatorial zone. In the *Anambra South* senatorial zone, Nnewi North and Orumba North were selected as the urban and rural LGAs respectively

Stage 2: Selection of Schools - The list of the government-owned secondary schools in each selected LGA (urban and rural) formed the sampling frame for that zone. Proportionate allocation was employed to account for the varied number of schools in each LGA within the 3 senatorial zones. In all, 19 schools from the 3 senatorial zones of Anambra State were used for this study (10 schools from the urban LGAs and 9 schools from the rural LGAs).

Stage 3: Selection of Classes – All classes, in both junior and senior secondary arms of the schools were considered. For schools with streams of same class, by simple random sampling, a class was chosen to represent the rest.

Stage 4: Selection of Participants - The participants were selected from each class using systematic random sampling method. Depending on the population of the class, an average of 8 participants per class in the rural areas, and 12 participants per class in the urban areas were selected. Sampling interval was calculated following the number of students in each class. The first sampling within the sample interval was selected using simple random sampling, while subsequent ones followed the sample interval until the required number for each class was selected.

Tools for Data Collection

The study was carried out using a pretested semi-structured modified self-administered questionnaire adopted from the Patient Health Questionnaire-9 (PHQ-9).[15] Author-designed questionnaire was used to collect information on socio-demographic profile of the participants (age, gender, number of siblings, birth order, school class, family type, marital status, tribe and religion) and the self-rating of their health status.

PHQ-9: The PHQ is a self-administered version of the Primary Care Evaluation of Mental Disorder (PRIME-MD), developed in the mid-1990s by Spitzer *et al*. for Pfizer Inc, to detect 5 disorders: depression, anxiety, somatoform, alcohol and eating disorder with many versions.[15,16,17] The PHQ-9 is the depression scale from PHQ. It was modified for teens by the Guidelines for Adolescent Depression in Primary Care (GLAD-PC) team.[16] The PHQ-9 is both screening and diagnostic tool for depression.[15] As a diagnostic tool, PHQ was found to have good validity from previous studies.[15,16,18] Major depression is diagnosed from the PHQ-9 if 5 or more of the 9 symptom criteria have been present at least "more than half the days" in the past 2 weeks. This is equivalent to PHQ-9 score of ≥ 10. The cut-off of ≥ 10 is recognized as the optimal point for detecting and monitoring depression.[19] This cut off point was used in this study.

The psychometric properties of PHQ-9 include establishment of its diagnostic validity in studies involving 8 primary care and 7 obstetric clinics; PHQ-9 scores of ≥10 having sensitivity of 88% and specificity of 88% for major depression. PHQ-9 scores of 5, 10, 15,

and 20 represent mild, moderate, moderately severe and severe depression respectively.

Scoring of PHQ-9: The four possible response categories, "*not at all*", "*several days*", "*more than half the days*" and "*nearly every day*" to each of the questions in PHQ-9 were assigned the scores of 0, 1, 2 and 3 respectively.[20] This gives the total score for the 9 items ranging between 0 and 27.[16,20] The last added question on the PHQ asks the respondent to report "*how difficult have these problems (depressive experiences) made it for you to do your work, take care of things at home, or get along with other people*?" This item is not used to calculate PHQ score or diagnosis, but rather measures the respondent's global impression of the symptom-related impairment.[15,16]

Study Procedure

Study commenced after ethical approval was obtained from the Ethics Committee of Nnamdi Azikiwe University Teaching Hospital, Nnewi, and permission granted by Government of Anambra State (Post Primary Schools Service Commission-Headquarters Awka). The various School principals also gave permission while informed consent was obtained from each participant above 18 years and assent from those less than 18 years. Informed permission was also sought from parents/guardians through the various school authorities. Study was thoroughly explained to them. The participants then responded to the study questions with guidance given where necessary to ensure quality data.

The instrument for this study was pretested among 18 adolescents from Amichi Secondary School in Nnewi South LGA, a school that was not part of the study sites. The pretesting was done to determine the clarity of the questions of the study instrument, appropriateness of the language, format and its comprehensibility. The pretesting also assessed the ability of the research assistants, the feasibility and time needed to administer the questionnaire. Then modification was done as appropriate.

Data Management and Analysis

The Statistical Package for the Social Sciences (SPSS) version 22 was used for analysis.[21] Depression was the dependent (outcome) variables in this study. The independent variables were location, age, gender, birth order, class, student type, family structure, and living condition. The socio-demographic characteristics including location (rural or urban) were summarized using frequencies (and percentages). The mean and standard deviation of the participants' age was calculated. The proportion of those with depressive disorders was calculated, and compared using location, gender, and age group. Bi-variate analysis was done, using significance level of 5%. Logistic regression was used to test the independent association between the outcome variables and the covariates like age-category, birth order, and family structure. The magnitude of the associations between each variable and depressive disorder was quantified using odd ratios (ORs) at 95% confidence interval. Significance was computed at $p<0.05$.

The correlation coefficient between total PHQ-9 score and how difficult depressive symptoms affected participants = 0.524, *p*-value < 0.001.

The self-rating of 'very poor' and 'poor' constitute the *unfavourable rating*, while the

self-rating of 'good', 'very good' and 'excellent' constitute *favourable rating*.

Table 1. Prevalence of depression by location, gender, age group, family structure and birth order

Variable	Depression			χ^2	p-value
	No	Yes	Total		
Rural	450 (90.4%)	48 (9.6%)	498 (100%)	6.295	0.013
Urban	589 (85.5%)	100 (14.5%)	689 (100%)		
Male	505 (89.5%)	59 (10.5%)	564 (100%)	3.968	0.053
Female	534 (85.7%)	89 (14.3%)	623 (100%)		
Early Adolescence	302 (89.6%)	35 (10.4%)	337 (100%)	5.894	0.052
Middle Adolescence	553 (88.1%)	75 (11.9%)	628 (100%)		
Late Adolescence	184 (82.9%)	38 (17.1%)	222 (100%)		
Both parents alive & living together	773 (87.7%)	108 (12.3%)	881 (100%)		
Parents separated or divorced	55 (80.9%)	13 (19.1%)	68 (100%)	3.066	0.214
One or both parents dead	211 (88.7%)	27 (11.3%)	238 (100%)		
1st birth	249 (86.8%)	38 (13.2%)	287 (100%)	0.360	0.985
2nd birth	193 (88.5%)	25 (11.5%)	218 (100%)		
3rd birth	170 (87.6%)	24 (12.4%)	194 (100%)		
4th birth	176 (87.6%)	25 (12.4%)	201 (100%)		
5th and above	251 (87.5%)	36 (12.5%)	287 (100%)		

Table 2. Prevalence of depression by student residency status and class

Variable	Depression			X^2	P-Value
	No (%)	Yes (%)	Total (%)		
Students residency status					
Day Students	997 (87.8)	138 (12.2)	1135(100.0)	2.279	0.134
Boarders	42 (80.8)	10 (19.2)	52 (100.0)		
Class of participants					
JSS 1	204 (90.3)	22 (9.7)	226 (100.0)		
JSS 2	205 (90.3)	22 (9.7)	227 (100.0)		
JSS 3	192 (86.9)	29 (13.1)	221 (100.0)	5.568	0.351
SSS 1	184 (84.8)	33 (15.2)	217 (100.0)		
SSS 2	215 (85.7)	36 (14.3)	251 (100.0)		
SSS 3	39 (86.7)	6 (13.3)	45 (100.0)		

JSS = Junior Secondary School SSS = Senior Secondary School

Table 3. Urban/rural comparison of prevalence of depression by gender

		Depression			
		No	**Yes**	**Total**	**p-value**
Rural	Male	221 (92.1%)	19 (7.9%)	240 (100%)	0.209
	Female	229 (88.8%)	29 (11.2%)	258 (100%)	
	Total	450 (90.4%)	48 (9.6%)	498 (100%)	
	Male	284 (87.7%)	40 (12.3%)	324 (100%)	0.128
	Female	305 (83.6%)	60 (16.4%)	365 (100%)	
	Total	**589 (85.5%)**	**100 (14.5%)**	**698 (100%)**	

Table 4. Association of location, gender, age group, ACE score, birth order and family structure on the likelihood of developing depression

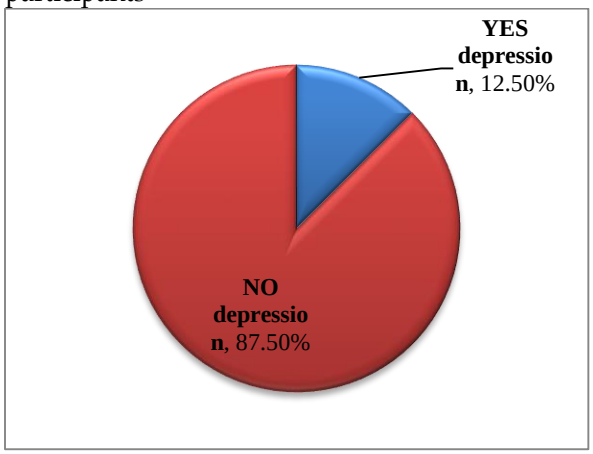
Variables	**OR (95% C.I)***	***p*-value**
Location: Rural	1.000 (Reference)	
Urban	2.015 (1.366 - 2.973)	0.001
Gender: Male	1.000 (Reference)	
Female	1.563 (1.079 - 2.263)	0.018
Age Group:		
Early Adolescence	1.000 (Reference)	
Middle Adolescence	1.118 (0.715-1.748)	0.625
Late Adolescence	1.846 (1.079-3.156)	0.025
Birth Order:		
1st	1.000 (Reference)	
2nd	0.908 (0.518-1.591)	0.736
3rd	0.889 (0.501-1.577)	0.687
4th	1.049 (0.594-1.853)	0.869
5th and above	1.011 (0.605-1.690)	0.966
Family Structure:		
Both parents live together	1.000 (Reference)	
Parents separated/divorced	1.239 (0.630-2.435)	0.535
One or both parents dead.	0.748 (0.464-1.207)	0.235

** OR = Odds Ratio C.I. = confidence interval*

Table 5. Association between depression and overall self-rating of health by participants

Variable	**Depression**			
	No (%)	**Yes (%)**	**Total (%)**	**p-value**
Very poor	5 (0.5)	1 (0.7)	6 (0.5)	<0.001
Poor	20 (1.9)	11 (7.4)	31 (2.6)	
Good	113 (10.9)	38 (25.7)	151 (12.7)	
Very good	158 (15.2)	18 (12.2)	176 (14.8)	
Excellent	743 (71.5)	80 (54.1)	823 (69.3)	
Total	**1039 (100)**	**148 (100)**	**1187 (100)**	

Figure 1. Prevalence of depression in the participants



RESULTS

Out of 1200 questionnaires administered in this survey, 1187 were adequately responded to and used for analysis giving a response rate of 98.9%. The mean age of the participants was 15±2 years. The pie chart showing the overall prevalence of depression among the participants (12.5%) was shown in Figure 1. The proportion of urban participants identified with depression (no=100, 14.5%) was significantly higher than that of their rural counterparts (no=48, 9.6%). Similarly, the depressive prevalence among the females was higher than that of the males (Table 1). By age group, late adolescent stage had the highest proportion (no=38, 17.1%) compared to that of middle and early adolescence. Based on family structure, participants from separated or divorced families had the highest prevalence of depression (no=13, 19.1%) compared to the stable families. First born participants had the highest prevalence of depression (no=32, 13.2%) among other birth orders.

Table 2 revealed that the prevalence of depression among those living in the boarding house was higher than those of the day students, as well more common in the senior classes compared to the junior classes.

The prevalence of depression among the females was higher than the males even when stratified into rural and urban (Table 3).

Multiple regression showed that increased odds of developing depression are associated with urban setting (OR 2.01, 95% CI: 1.37-2.97, p = 0.001), female gender (OR 1.56, 95% CI: 1.08-2.26, p=0.018), late adolescence (OR 1.85, 95% CI: 1.08-3.16, p=0.025), and separated/ divorced parents (OR 1.24, 95% CI: 0.63-2.44, p = 0.535) (Table 4)

There was positive correlation between PHQ-9 score and degree of difficulty perceived by the participants. Higher proportion of participants with unfavourable self-rating of health was among those identified with depression compared those without depression (Table 5).

DISCUSSION

The index study reported an overall prevalence of depression of 12.5%, among the in-school adolescents in Anambra State. In other words, out of every 10 in-school adolescents, more than one may be identified with depression. Considering the possible complications of depression especially among young people, this proportion will need intervention programmes to take care of this group. This work however, was not designed to ascertain the availability of such intervention programs designed to cater for the need of in-school adolescents identified with depression. This prevalence of 12.5% is almost same to what was reported (12.6%) in the work from South-Western Nigeria.[8] The higher prevalence of 21.2%, reported by another work from South-West Nigeria that

used similar study instrument (PHQ-9) could be accounted by the fact that PHQ-9 score of ≥ 5 was used as cut-off point for the diagnosis of depressive disorder, instead of PHQ-9 score ≥ 10 used in this study which is the acceptable cut-off internationally.[7,19]

The prevalence of depression among the urban participants was significantly higher than that of their rural counterparts in this study. Urban areas have more social amenities and most parents in the urban areas seemingly have better education than those in the rural areas. One would have assumed depression is to be identified more in the rural areas but this study shows the reverse, pointing out the contributions of other factors like urban stress to development of depressive symptoms. Urbanization has been reported to affect mental health through the influence of increased stressors and factors such as over-crowded and polluted environment, increased level of violence and inadequate social support.[22]

This study showed that the prevalence of depression among females was significantly higher than that of males, even when stratified into rural and urban. Previous studies have reported similar findings.[23,24,5,25,26] Genetic and biological make-up of females have been noted to play some roles.[3] The traditional roles of females in the society also expose them to greater stresses, which predispose them to greater chance of being identified with depressive disorders. More females are exposed to domestic and sexual violence compared to their male counterparts. The traumatic experience of rape or attempted rape could predispose more females to depression.[3]

The prevalence of depression among the various adolescent stages in this study showed a unique pattern, with the highest prevalence in late adolescents. Middle adolescent stage followed while late adolescents stage had the least prevalence of depression. Some other studies have reported similar pattern of prevalence being low before teens and rises sharply after puberty especially in the females, with highest prevalence at late stage compared to early adolescence.[27,28,29] In the same vein, the senior students (SSS1 to SSS3) had higher prevalence of depression compared to the junior students (Table 2).

The development within the late adolescent stage marks the peak of self-awareness and peer pressure. The participants in this study living in boarding house had higher prevalence of depression compared to those coming to school from outside the boarding house. It is possible that adolescents living in the boarding house were exposed to higher stress above their equals coming from homes or living outside the school.

Dysfunctional family (separated or divorced parents) was associated with the higher prevalence of depression among the participants in this study, even higher than those whose one or both parents were dead. The likely impact of disrupted family system on our in-school adolescents need be looked into and addressed. The impact of separated or divorced family on major depressive disorder was also noted from a study in Uganda.[30] Our study further showed that first-borns had the highest prevalence of depression among other birth-orders. It is possible that the first-borns were exposed to higher stressors than the rest of the births.

This study also showed that as the PHQ-9 score increases, the more difficult the participants would perceive their depressive symptoms. This was further corroborated by the finding that most people that had unfavorable self-rating of their health were identified with depression, compared to those without depression (and vice versa). This need to be further assessed possibly in longitudinal studies.

Strengths and Limitations: This study employed a standardized valid tool, patient health questionnaire (PHQ-9), and covered all the senatorial zones of Anambra State. Nevertheless, causality (and its direction) cannot be inferred from this study following its cross-sectional nature.

CONCLUSION

This cross-sectional analytic study on depression among in-school adolescents in Anambra State, Nigeria has shown that depressive disorders are prevalent with associated factors being urban setting, disrupted family system, female gender, late adolescence and first birth order. There is need for multi-sectoral intervention programs to address these identified factors.

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