

Crippled By Fear: Anxiety Disorders Among Adolescents In Nigeria

Running Title: Prevalence Anxiety Adolescent Nigeria

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Introduction

More than half of all lifetime psychiatric disorders begin by the early adolescent period, with anxiety and depressive disorders responsible for a significant part of this disease burden [1]. Collectively referred to as childhood emotional disorders, juvenile-onset anxiety and depressive syndromes are widely recognized to be the most prevalent group of mental disorders in this population, as they are in adults [2-6]. The prevalence of anxiety disorders in adolescent populations is estimated to range between 8.3% to 27.0% [7]. The National Comorbidity Replication Survey - Adolescent Supplement (NCS-A) in the United States found a lifetime rate of 31.9% for any anxiety disorder [8]. In comparison, a study in rural Uganda demonstrated a 26.6% prevalence rate of anxiety disorders amongst children and adolescents [9]. In a local study conducted among adolescents aged 13–18 years in a semi-urban Nigerian town, anxiety disorders' estimated 12-month prevalence rate was 15% [10].

Pathological anxiety states in adolescents have well-recognized associations with several risk factors such as parental psychopathology, female sex, parenting styles, behavioral inhibition, neuroticism, peer difficulties, low household income, and adverse childhood experiences (emotional abuse, physical abuse, and sexual abuse) [11-16]. In addition, anxiety disorders have also been associated with adverse psychosocial outcomes, including reduced educational attainment, impaired peer relations, substance abuse, eating problems, and other forms of psychopathology [17-20]. Juvenile-onset anxiety tends to be persistent across the lifespan. Moreover, the occurrence of any anxiety disorder early in life has been linked with the subsequent development in adulthood of not only other anxiety disorders but other psychiatric disorders includ-

ing depression and substance abuse as well as an increased risk of adolescent suicidality [21-23].

It is estimated that about 62.5% of the Nigerian population are under 25 years [24]. The relatively high prevalence rates of these adolescent emotional disorders combined with an extensive treatment gap suggest they are likely to constitute a significant portion of the burden of psychiatric morbidity in the entire population [25]. However, there have been relatively few studies that have investigated the magnitude of these disorders among adolescent population and the associated risk factors. Some authors in Nigeria examined depression and anxiety in adolescents as it relates to physical abuse in different settings [26]. Using only two measures including a teacher rating scale, some authors investigated anxiety disorders in the southern part of Nigeria. Correlates such as parental psychopathology and sibship were not examined [27]. The aim of this study is to determine the prevalence and correlates of anxiety disorders among adolescents in a major urban city in southwestern Nigeria.

Methodology

The study was carried out in Abeokuta, a major urban city in south-western Nigeria. The city is divided into two geographically contiguous local administrative councils: Abeokuta North and Abeokuta South. The Abeokuta metropolitan area has a population of 1,117,000. An estimated 24% of the population belongs to the 14- 18 age group [24]. There are 39 public secondary schools in Abeokuta, 22 in Abeokuta South, and 17 in Abeokuta North [28]. In this study, five schools were randomly selected through a 'blind draw method' to participate in the research. The study population comprised all senior secondary students (SSS) enrolled in the five selected schools.

Students were excluded from the study if they were younger than 12 years or older than 18 years at their last birthday; parents or guardians declined to give consent/students refused assent; students had a history of Intellectual disability. Sample size (n) was calculated using the formula for a cross-sectional prevalence study which gave a sample size of 196 [29]. The sample size was over-sampled by 20% to allow for non-response, giving a final sample size of 255 [30].

A systematic random sampling method with probability proportional to size for each school was employed to obtain a representative sample of 255 students. All senior students in the five schools constituted the sampling frame. Enrollment figures for each school were used to determine the number of students an individual school will contribute. The first participant in each school was randomly chosen using a table of random digits, and after that, subsequent participants were chosen using the school-specific k-interval. If a selected student was not in school on that day, the name was skipped, and the next one was chosen instead.

Study Instruments

Sociodemographic Questionnaire

This was designed to gather information about age, gender, religious affiliation, class, and tribe. It also included questions collecting information on some variables reported to be associated with anxiety and depression, such as a history of physical abuse, history of sexual abuse, exposure to adverse life events (e.g., death of a close relative), personal history of chronic medical illness, level of involvement in physical exercise, present living circumstances, family structure, parental level of education, and parental alcoholism. Information on behavioral correlates like alcohol use, smoking, and sexual activity was also collected.

Rosenberg's Self-Esteem Scale

The Rosenberg's Self-Esteem Scale is a 10-item scale that assesses adolescents' global self-worth by quantifying positive and negative feelings about the self [31]. Responses to all items were answered using a 4-point Likert scale ranging from strongly agree to strongly disagree. Higher scores on the scale reflect higher self-esteem [32]. It has been validated and used with samples of Nigerian adolescents [33].

Mini-International Neuropsychiatric-Interview for Children And Adolescents (MINI-KID)

The Mini-International Neuropsychiatric Interview (MINI) is a brief structured interview for assessing the presence of DSM IV and ICD 10 mental disorders [34]. The MINI-KID was developed explicitly for use in children and adolescents between ages 6-17 years. It was designed to provide a short but valid and reliable diagnostic instrument for current DSM-IV & ICD-10 psychiatric disorders. It is also used to diagnose suicidality in child and adolescent populations. The MINI-KID is divided into 23 modules consecutively lettered A – W, corresponding to a diagnostic category. Modules E, F, G, H, I, J, K, and U correspond to Panic Dis-

order, Agoraphobia, Separation Anxiety Disorder, Social Phobia, Specific Phobia, Obsessive-Compulsive Disorder, Post-traumatic Stress Disorder, and Generalized Anxiety Disorder respectively. Each module begins with screening question(s) corresponding to the main criteria of the disorder. At the end of each module, diagnostic boxes enable the clinician to indicate whether diagnostic criteria are met. This produced a current diagnosis for all the disorders and an additional lifetime diagnosis for Panic Disorder and Suicidality.

A study investigating the reliability and concurrent validity of the MINI-KID with the Schedule for Affective Disorders and Schizophrenia for School-Aged Children-Present and Lifetime Version (K-SADS-PL) showed that it generally has satisfactory psychometric properties. MINI-KID - K-SADS-PL concordance was substantial with an area under the curve (AUC) = 0.84 for any anxiety disorder. Sensitivity was 0.90 for any anxiety disorder with specificity rate of 0.77. Reliability estimates were excellent with kappa values of 1.00 and 0.72 for inter-rater and test-retest reliability for agoraphobia. It has been used in some local studies without significant methodological concerns [10, 35].

Family APGAR

The Family APGAR is a brief screening questionnaire designed to elicit a respondent's perception of the operational state of his or her family [36]. It consists of five questions, each assessing satisfaction with a particular dimension of family functioning, namely Adaptability, Partnership, Growth, Affection, and Resolve. Each parameter is assessed on a 3-point scale: 0 (hardly ever), 1 (some of the time), and 2 (almost always). Total scores between 0-3 suggest a highly dysfunctional family, 4-6 moderately dysfunctional families, and 7-10 Highly functional families. The Family APGAR Score is valid and reliable in assessing family functioning in several local studies [37-38]. It was completed independently by the participating students.

General Health Questionnaire (GHQ-12)

The GHQ-12 is intended to screen for general (non-psychotic) psychiatric morbidity [39]. Originally developed as a 60 - item instrument, the twelve-item version has been translated into many languages and extensively validated in general and clinical populations worldwide [40-42]. The scale asks whether respondents have experienced a particular symptom or behavior recently. Each component is rated on a 4-point scale (less than usual, no more than usual, rather more than usual, and much more than usual). The standard scoring methods are bimodal (0 - 0 - 1 - 1) and Likert scoring styles (0 - 1 - 2 - 3). When using the GHQ-12, it provides a total of 12 or 36 based on the selected scoring method. The GHQ-12 is brief, simple, and easy to complete, and its application in research settings as a screening tool locally is well documented [43-44]. A Yoruba version of the GHQ-12 with already established validity and reliability is also available [45]. The GHQ-12 was used to assess the potential presence of psychiatric morbidity (including depression and anxiety) in the respondents' parents. The

GHQ has been used to screen for parental psychopathology in several local studies of adolescent populations [46]. For this study, the GHQ score of 3 (bimodal scoring) and above indicates the potential presence of psychopathology in parents of the respondents [47].

Data Collection

This was done in two phases. In the first phase, after appropriate permission was obtained from the Ogun State Ministry of Education and the respective school authorities, the selected classes' nominal register was obtained, and all the names on it numbered serially. Students who were invited to the study were chosen using a systematic random sampling method as earlier described. A teacher in the school then went to the classes to gather the selected students in a hall. The nature and goal of the study were explained to them in detail. The students were reassured about confidentiality and anonymity throughout the study as their names or school registration numbers were not to be included in any of the questionnaires. Thereafter they were given an opportunity to opt-out of the study. Those who remained were then given an envelope containing a consent letter, English and Yoruba versions of the GHQ-12. They were asked to take the letter and questionnaire home to their parents/guardians, who were to give their consent to their child/ward participating in the study by reading and signing the consent letter. The parents were also asked to fill either the English or Yoruba version of the GHQ-12 included in the envelope. Since maternal psychopathology is more consistently linked with anxiety and depressive symptoms in offspring than paternal psychopathology, students were instructed to preferably have their mother fill the GHQ-12, although a father or other surrogate parent filled the form when the mother was unavailable [48]. Each letter and questionnaire had a code number which was maintained on all the instruments used for the participant. A schoolteacher kept a record of all the selected students and their code numbers. This record was used to obtain the English and Mathematics scores of the respondents based on the Unified statewide examinations from the first term of the academic session, which all five schools partook in. Only the code numbers and the aggregate exam score were released to the researchers.

Students who returned signed consent letters and parent-completed GHQ-12 were then gathered and administered the self-report instruments (Sociodemographic questionnaire, Rosenberg's Self-Esteem Scale & Family-APGAR). After that, they were interviewed with a structured diagnostic instrument (MINI-KID) to ascertain the presence of DSM-IV Anxiety Disorders.

Data Analysis

The study data were analyzed using the Statistical Package for Social Sciences (SPSS) for Windows 21.0. Participants' age was first entered as a continuous variable then recoded separately into two categorical variables: younger adolescents (12 – 15 years) and older adolescents (16 – 18 years). Rosenberg self-esteem scores were entered and analyzed as a continuous variable. In contrast,

the family Apgar (FAPGAR) score was first entered as a continuous variable then recoded into highly dysfunctional, moderately dysfunctional, and well-functioning categories. The respondents' academic performance as measured using the aggregate English and Mathematics scores was converted to percentages by dividing by two. The percentage score was then entered as a continuous variable. All other sociodemographic characteristics, familial and psychosocial variables, were entered as categorical variables. Anxiety disorder diagnoses were entered as categorical variables for each respective disorder.

The sociodemographic characteristics of respondents were presented using descriptive statistics reflecting frequencies and percentages. The means and standard deviations were calculated for continuous variables like age, self-esteem, exam, and FAPGAR scores. The prevalence of anxiety disorders diagnosed by the MINI-KID interview was presented categorically using frequency distribution tables and percentages.

The associations between diagnostic categories and various sociodemographic, familial, and psychosocial variables were analyzed using the analysis of variance (ANOVA) and independent t-test for continuous variables and chi-square statistics for categorical variables. When the omnibus ANOVA was significant, post-hoc contrasts between pairs of groups were conducted. Between-group differences were also analyzed based on comorbid versus single disorder status. The level of significance was set at < 0.05 . Fisher's Exact Test was used for contingency tables where the expected count was less than five in 20% or more cells.

A multiple regression analysis was then done to determine which of the identified significant sociodemographic, familial, and psychosocial variables best predicted the presence of an anxiety disorder.

Ethical Approval

Ethical approval was sought and obtained from the Ethical Committee of the Neuropsychiatric Hospital, Aro, Abeokuta. Permission for the study was also obtained from the Ogun State Ministry of Education, Science, and Technology as well as from the authorities of the selected schools. In addition, written informed consent was obtained from parents/guardians of all the participating students. The students were also informed that they could choose to opt out of the study at any point.

Results

A total of 255 senior students were sampled from the five schools and approached for the study. Five of them, representing about 1.96% of the total sample, declined to participate in the study. All five were SSS 3 students who had a crucial examination coming up the next day. Six (2.35%) of the selected students were over 18 years of age and so were excluded. The remaining 244 students were given consent letters with English and Yoruba versions of the GHQ-12 attached to take home for their parents to fill. Of this number, 31 students representing 12.16% were excluded from the

study because they did not return a signed consent form. Thus, a total of 213 students were recruited into the study. This comprised those who returned the parent-filled GHQ-12 questionnaire and the signed consent letter. In addition, all 213 of them completed the self-report instruments and had a structured diagnostic interview to give a final response rate of 83.53%. (Figure. 1)

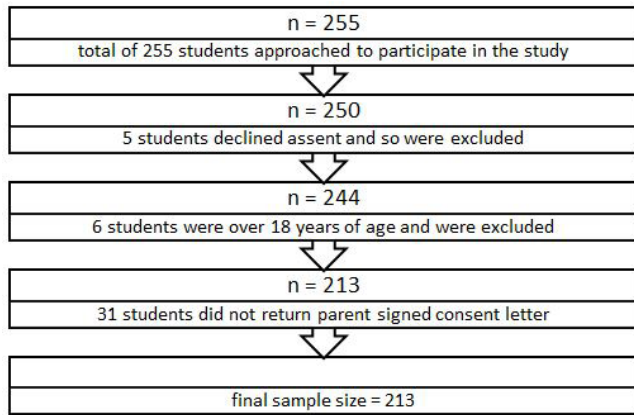


Figure 1: Flowchart Showing Respondents’ Recruitment into the Study

Table 1: Sociodemographic Characteristics of Participants

Characteristic	N (%)
Age Group	
12-15	119 (55.9)
16-18	94 (44.1)
Gender	
Female	109 (51.2)
Male	104 (48.8)
Class	
SS1	54 (25.4)
SS2	89 (41.8)
SS3	70 (32.9)
Religion	
Islam	69 (32.4)
Christian	144 (67.6)
Tribe	
Yoruba	189 (88.7)
Igbo	12 (5.6)
Hausa/Fulani	3 (1.4)
Others	9 (4.2)
Parental level of education	
Father	
No formal education	2 (0.9)
Primary Education	44 (20.7)
Secondary education	54 (25.4)
Tertiary education	95 (44.6)

Sociodemographic Characteristics

Table 1 shows the sociodemographic characteristics of the sample. The mean age of the whole sample was 15.3 years (SD= 1.27), with 55.9% between the ages of 12 – 15 years; 104 (48.8%) were males; 54 (25.4%) were in SS1, 89 (41.8%) in SS2, and 70 (32.9%) in SS3. Fathers generally had higher levels of education than mothers: 44.6% of fathers had tertiary education compared to 25.4% of mothers; there was no difference in employment status between fathers and mothers (92% vs. 93.4% respectively); 75.1% were from a monogamous family; 74.2% lived with both parents; 77% were from families with small sibship (1 – 4) siblings). Parental separation was reported by 11.3% of the students; domestic violence was reported as occurring on some days by 8% of the sample and most days by 2.3% of the sample. Regarding family functioning, 85.9% reported a high degree of satisfaction with their overall family functioning. Assessing for parental psychopathology using GHQ-12, 16% of parents screened positive to the presence of psychological distress; more mothers (17.1%) were GHQ-positive than fathers (8.3%).

Unknown	18 (8.5)
Mother	
No education	3 (1.4)
Primary education	61 (28.6)
Secondary education	67 (31.5)
Tertiary education	71 (33.3)
Unknown	11 (5.2)
Parental employment	
Father	
Not Applicable/unknown	9 (4.2)
Unemployed	8 (3.8)
Employed	196 (92.0)
Mother	
Unemployed	13 (6.1)
Employed	199 (93.4)
Not reported	
Family Type	
Monogamous	160 (75.1)
Polygamous	53 (24.9)
Caregiver	
One parent	47 (22.1)
Both Parents	158 (74.2)
Other relative or guardian	8 (3.8)
Sibship	
Only child	6 (2.8)
1-4 (small sibship)	164 (77.0)
5 or more (large sibship)	43 (20.2)
Parental Separation/Divorce	
No	189 (88.7)
Yes	24 (11.3)
Father Alive	
No	20 (9.4)
Yes	193 (90.6)
Mother Alive	
No	7 (3.3)
Yes	206 (96.7)
Domestic Violence	
Rarely/never	191 (89.7)
Some days	17 (8.0)
Most days	5 (2.3)
Family Functioning	
Highly Dysfunctional Family (FAPGAR Score: 0-3)	6 (2.8)
Moderately Dysfunctional Family (FAPGAR Score:4-6)	24 (11.3)
Highly Functional Family (FAPGAR Score:7-10)	183 (85.9)

The experience of having lost a close relative within the preceding year was reported by 28.2% of the total sample; over 90% of the student reported having one or more close friends, and 70% said they got along well with their friends. The experience of being bullied was reported by 15.5% of the sample; 6.6% reported having experienced sexual abuse in their lifetime; 3.8% have used substances; 14.6% have chronic illnesses such as asthma and sickle cell anemia.

The converted aggregate English and Mathematics scores of the respondents ranged between 44 and 72. The median score was 56.0, while the mean score was 57.0 (SD = 6.34). There were no differences in the gender scores ($p = 0.35$). Scores of the Rosenberg Self-Esteem Scale ranged between 8 and 30, with a mean score of 19.07 (SD= 3.47). Boys scored higher on the self-esteem

scale than girls. (19.55, SD = 3.6 vs 18.61, SD= 3.3, $p = 0.049$).

Prevalence and correlates of anxiety disorders

The overall twelve-month prevalence of all anxiety disorders was 23% (see Table 2). Social phobia was the most prevalent anxiety disorder diagnosed with a prevalence of 6.6%, followed by specific phobia (6.4%), agoraphobia (4.7%), generalized anxiety disorder (4.2%), panic disorder (1.4%), obsessive-compulsive disorder (1.4%), and post-traumatic stress disorder (0.9%). The disorders did not separately differ in prevalence by gender, but significant age differences were found in the prevalence of separation anxiety disorder, which was overrepresented in the 12 – 15 age ($p = 0.04$); and generalized anxiety disorder, which was more among the 16–18 age group ($p = 0.046$).

Table 2: 12-month Prevalence of Anxiety Disorders

Disorder	N (%)
Any Anxiety Disorder	49 (23.0)
Panic Disorder	3 (1.4)
Agoraphobia	10 (4.7)
Separation Anxiety	6 (2.8)
Social Phobia	14 (6.6)
Specific Phobia	12 (5.6)
OCD	3 (1.4)
PTSD	2 (0.9)
GAD	9 (4.2)
MDD: Major Depressive Disorder OCD: Obsessive-Compulsive Disorder PTSD: Post-Traumatic Stress Disorder GAD: Generalized Anxiety Disorder	

There was an association between having any anxiety disorder and female gender ($p = 0.02$); large sibship ($p = 0.01$); not having a best friend ($p < 0.0001$); lower frequency of interaction with friends ($p = 0.001$); having fewer close friends ($p = 0.01$); difficulty getting along with friends ($p = 0.01$); presence of parental psy-

chopathology ($p = 0.02$); perceived family dysfunction ($p = 0.01$) (See Table 3). No significant associations were found with recent loss, parental separation, history of sexual abuse, bullying, domestic violence, parental education, and parental employment status.

Table 3: Correlates of Anxiety disorders among adolescents

		ANXIETY DISORDER		
		Absent n (%)	Present n (%)	p value
GENDER	Female	77 (70.6)	32 (29.4)	0.024
	Male	87 (83.7)	17 (16.3)	
AGE GROUP	12 - 15	87 (73.1)	32 (26.9)	0.129
	16 - 18	77 (81.9)	17 (18.1)	
SIBSHIP	None	4 (66.7)	2 (33.3)	0.011
	1-4	134 (81.7)	30 (18.3)	
	5 or more	26 (60.5)	17 (39.5)	

PARENTAL PSYCHO-PATHOLOGY	Absent	143 (79.9)	36 (20.1)	0.021
	Present	21 (61.8)	13 (38.2)	
FAMILY FUNCTIONING	Highly dysfunctional family	2 (33.3)	4 (66.7)	0.013
	Moderately dysfunctional family	16 (66.7)	8 (33.3)	
	Highly functional family	146 (79.8)	37 (20.2)	
CLOSE FRIENDS	None	11 (52.4)	10 (47.6)	0.011
	One	24 (68.6)	11 (31.4)	
	Two	44 (80.0)	11 (20.0)	
	Three or more	85 (83.3)	17 (16.7)	
BEST FRIEND	No	25 (54.3)	21 (45.7)	0.000
	Yes	139 (83.2)	28 (16.8)	
FRIEND INTERACTION	Rarely	3 (33.3)	6 (66.7)	0.001
	Somedays	41 (70.7)	17 (29.3)	
	Everyday	120 (82.2)	26 (17.8)	
GETTING ALONG WITH FRIENDS	Often quarrel/they don't understand me	15 (65.2)	8 (34.8)	0.013
	Somewhat well	26 (63.4)	15 (36.6)	
	Very well	123 (82.6)	26 (17.4)	

Separation anxiety disorder was associated with domestic violence in the home ($p = 0.04$); social phobia was associated with not having a best friend ($p = 0.045$), lower frequency of friend interaction ($p = 0.003$) and the experience of being bullied ($p = 0.001$); generalized anxiety disorder was associated with parental separation ($p = 0.032$) and perceived family dysfunction ($p = 0.001$).

Comparing scores on the standardized tests, those with any anxiety disorder had a mean score of 48.06 (SD = 8.03), which was lower than the mean score of 50.58 (SD = 10.47) for peers without an anxiety disorder. The difference was, however, not significant ($p =$

0.122). In addition, those with any anxiety disorder reported lower mean scores on the self-esteem scale than those who did not report any anxiety disorder ($p < 0.0001$).

In the multivariate logistic regression analysis (See Table 4), large sibship (OR = 6.18; $p < 0.0001$); female gender (OR = 2.42; $p = 0.048$); not having a best friend (OR = 6.34; $p = 0.001$), infrequent interaction with friends (OR = 9.32; $p = 0.011$) and lower family functioning score (OR = 0.67; $p = 0.040$) emerged as the significant predictors of anxiety disorder.

Table 4: Multivariate Logistic Regression of Independent Correlates of Anxiety Disorders

	OR	<i>p</i> value	95% C.I.	
			Lower	Upper
GENDER				
Female	2.42	0.048	1.01	5.82
Male	Reference			
SIBSHIP				
Large sibship	6.18	<0.0001	2.38	16.03
Small sibship	Reference			
BEST FRIEND				
No	6.34	0.001	2.18	18.43
Yes	Reference			
FREQUENCY OF FRIEND INTERACTION				
Rarely	9.32	0.01	1.67	51.99
Some days	1.41	0.45	0.59	3.39
Everyday	Reference			

GETTING ALONG WITH FRIENDS				
Quarrelling/misunderstanding	1.21	0.77	0.34	4.29
Somewhat well	1.13	0.82	0.38	3.36
Very well	Reference			
NUMBER OF CLOSE FRIENDS				
None	0.96	0.96	0.23	3.94
One	1.65	0.38	0.55	4.98
Two	0.87	0.78	0.31	2.41
3 or more	Reference			
PARENTAL PSYCHOPATHOLOGY				
Present	1.87	0.22	0.69	4.99
Absent	Reference			
FAMILY FUNCTIONING				
Highly Dysfunctional Family	0.25	0.45	0.01	8.67
Moderately Dysfunctional Family	0.21	0.09	0.04	1.25
Highly Functional Family	Reference			

Discussion

This study aimed to determine the prevalence and psychosocial correlates of anxiety disorders among senior students attending secondary schools in Abeokuta. The study had an overall response rate of 83.5%, lower than the response rate in studies done by Omigbodun et al. and Adewuya et al [10, 49]. but comparable with the 82.9% response rate obtained in the United States National Comorbidity Study-Adolescent Supplement (NCS-A) [8].

This study reported the twelve-month prevalence of any anxiety disorder of 23%, higher than the prevalence reported by Adewuya et al., but still considerably less than the lifetime prevalence of 31.9% reported from the United States [8, 10]. Costello et al., in their review, estimated the prevalence of anxiety disorders in adolescent populations to range between 8.3% to 27.0% [7]. Prevalence rates of respective anxiety disorders were generally higher in this study than in the study by Adewuya et al. (2007) and Frank-Briggs and Aliko (2010) [10, 27]. Of note was the 5.6% prevalence of specific phobia in this study compared with the 2.5% reported by Adewuya et al [10]. Most studies of child and adolescent populations consistently reported specific phobia as the most prevalent type of anxiety disorder, ranging between 4.7% to 10.9% [50]. Lifetime prevalence estimates were up to 19.3% for specific phobia alone in the United States.⁸ Also, a meta-analysis by Costello et al. reported a 6.7% mean prevalence for specific phobia [50].

Prevalence rates of Panic disorder, PTSD, and OCD were relatively low in this study, and this is in keeping with observations from many other studies of adolescent populations [10, 50, 51]. Although panic attacks may occur at any stage in adolescence, the peak incidence has been reported to range from late adolescence into early adulthood, which may explain the low prevalence in this predominantly mid-adolescent sample [52, 53]. OCD with a

prevalence of 1.4% in this study is very similar to the low rate of 1.2% reported by Adewuya et al [10]. An even lower prevalence of 0.57% was reported among a Ugandan adolescent population [9]. But higher rates of up to 3% were reported in the United States, 2.3% in Israel, 3.9% in New Zealand, and 4.1% in Denmark [54, 55]. Consistently higher rates of OCD diagnosis between African and Western studies may be due to overdiagnosis or issues of transcultural semantic equivalence of diagnostic criteria [56, 57].

PTSD was the least frequent disorder in the current study, with a prevalence of 0.9%. This is in keeping with low rates reported elsewhere in Nigeria but contrasting with the relatively high rate of 6.6% from Uganda [6, 9, 10]. The Ugandan study was observed to have been done in a region of the country traumatized by multiple psychosocial stressors such as war, drought, and floods. This may explain the observed high prevalence of PTSD [9].

All the Separation anxiety disorder (SAD) cases were diagnosed in the younger adolescent age group. This finding compares with those by Adewuya et al. and Abbo et al., who reported a preponderance of SAD in younger adolescents [9, 10]. It is also consistent with the body of knowledge that shows SAD is majorly a disorder of childhood with a peak age of onset in middle childhood and lower inception rates in the adolescent period [58]. Nevertheless, it is also possible that older adolescents who are expected to be more “grown-up” were more reluctant to admit to having difficulties enduring periods of separation from important attachment figures.

Several other reasons may account for the seeming high prevalence of anxiety disorders reported in this study. Firstly, Ollendick et al. have earlier established that Nigerian adolescent tend to endorse fears higher than their western counterparts. Additionally, other reasons such as higher cultural emphasis on obedience,

self-control, emotional restraint and, compliance to social rules may possibly account for the elevated anxiety symptoms [59, 60].

Furthermore, in contrast with a study by Adewuya et al., agoraphobia was included as a separate diagnostic category of its own instead of only reporting cases where it occurred as part of a panic disorder [10]. This was done in keeping with the objectives of this study to determine the prevalence of all anxiety disorders using the MINI-KID, which is structured to allow the diagnosis of agoraphobia even when not accompanied by panic disorder.

Generalized anxiety disorder appeared to be overrepresented in older age groups in this study. Although GAD is more prevalent in older than younger adolescents, this difference appeared to be enhanced because most of the affected older adolescents were in their final year of study in school and were preparing for their O-level WAEC exams. Preparation for O-level WAEC exams is a potential stressor for which several appeared to be distressed.

Female gender was associated with anxiety disorders in this study, consistent with existing literature [4, 8, 10]. Two broad frameworks have been offered to explain the observed gender differences in anxiety disorders: The first suggests that the female preponderance in anxiety disorders is due to genetically or biologically determined differences between the sexes. The second assumes that gender differences in anxiety are linked to differences in men's and women's experiences and socio-cultural roles [61, 62]. Other factors associated with anxiety disorders in this study include large sibship, parental psychopathology, and family dysfunction. Studies in Uganda, Japan, and Spain have all reported a similar association between large sibship and anxiety disorder. Lower parental educational attainment, marital disruption, disorganized child-rearing practices, and other social disadvantages often associated with large families may mediate the observed relationship between large sibship and adolescent psychopathology [9, 63-65]. Parental psychopathology might not only confer a genetic predisposition but could also affect parenting practices and child-parent interactions [66, 67]. It has been suggested that parental negativity, or lack of warmth, may lead the child to believe that the environment is fundamentally hostile and threatening, that outcomes will be harmful, and a sense of low self-worth and competence [68].

In this study, having an anxiety disorder was associated with qualitative and quantitative impairments in peer relations. Adolescents with anxiety disorders were less likely to report having a best friend, less likely to report getting along well with their friends, more likely to report having fewer close friends, and more likely to report infrequent interaction with their friends. This is consistent with findings from elsewhere around the world. Caraveo-Anduaga et al [69]. in Mexico also reported similar generalized impairment of interpersonal relationships among children and adolescents with pathological anxiety. Social phobia, in particular, has been associated with a relative lack of mutually satisfying peer relationships [70]. Underdeveloped interpersonal skills are likely to impair the

experience of companionship and intimacy with peers and result in overall poor social adjustment. An innate temperamental disposition for behavioral inhibition provides a psychobiological underpinning for some of the inadequacy of peer relations often reported by adolescents with anxiety disorders. Such youths often avoid unfamiliar people or unaccustomed settings and so are less likely to initiate new relationships. Even when they attempt to engage others, anxiety-related micro behaviors, such as poor eye contact, short speech duration, conversational pauses, low self-disclosure, trembling, blushing, and other anxious mannerisms, tend to elicit adverse reactions in peers [71]. This serves as negative reinforcement that may cause the affected youth to withdraw further, thereby self-perpetuating the interpersonal cycle of social isolation. This is supported by Strauss et al., who showed that anxious adolescents tend to be less liked by peers and were also most likely to fall in the socially neglected category of peer status [72].

Comparison of self-esteem scores showed differences across broad diagnostic categories, which were statistically significant. This study found that boys scored significantly higher on the self-esteem scale than girls, in keeping with the small yet consistent effect size of male gender on self-esteem widely reported across cultures and confirmed in a meta-analysis by Kling et al [73]. Adolescents without any disorder had a non-significant, slightly higher mean self-esteem score than those who had anxiety disorder only. The lack of significance may be due to the heterogeneity of the diagnostic categories, as some anxiety disorders may be more strongly associated with low self-esteem than others.

In the multivariate analysis, female gender, large sibship, not having a best friend, and infrequent interaction with friends emerged as the significant predictors of anxiety disorder. These have earlier been shown to mirror findings from other studies from around the world [8, 33, 49, 74]. Traumatic childhood experiences, in particular, are well-recognized as strong predictors for the subsequent onset of emotional disorders and even other psychiatric disorders [75-76].

It was seen that the computed regression model could only account for 37.2% of the variance in anxiety disorder prevalence. This indicates that other factors not investigated in the present model, such as biological vulnerability and higher-order psychological constructs beyond just self-esteem, could be responsible for a large proportion of the variance in anxiety disorders across adolescents. Indeed, heritability estimates show that the proportion of liability to anxiety disorders in the general population attributable to additive genetic effects alone range between 30% and 40% [77].

This study has several limitations that must be considered in interpreting the results. Firstly, given the study's cross-sectional design, causal inference cannot be attributed to variables identified to be associated with any of the disorders. Most of the risk variables may as well be outcomes instead of precursors of disorder status. Nevertheless, the direction of the relationship is evident regarding

distal variables like gender and sibship, which ostensibly predate the onset of the disorders. Secondly, because the study was conducted using in-school adolescents, the reported prevalence may be lower than the actual rates. Adolescents with anxiety disorders may be more likely to display school refusal and, consequently, not be included in this study. Thirdly, the possibility of response and recall bias cannot be ruled out for the self-report instruments in this adolescent population, especially for retrospective variables like a history of sexual abuse and domestic violence. However, despite these concerns, some studies have shown that there could be substantial congruence between adolescents' self-report and a parent or other proxy reports [78, 79]. Nevertheless, this study, to the authors' best knowledge, is one of the first attempts to identify significant correlates of adolescent anxiety disorders in our environment. A structured diagnostic interview on all the respondents allowed the diagnosis of clinical disorders and not just mere symptom load. In addition, the use of twelve-month prevalence for the respective disorders might be more beneficial for public policy planning in school settings that typically run a session for one year. It allows school health programs to safely estimate how many students may be expected to develop any disorders throughout an entire school session.

Conclusion

This study showed that adolescent anxiety disorders are as prevalent in our local environment in Nigeria as reported elsewhere in Africa and worldwide, with social phobia being the most prevalent and panic disorder and OCD the least prevalent. In addition, anxiety disorders showed significant associations with female gender, large sibship family, parental psychopathology, perceived family dysfunction, and impaired peer relations.

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Conflict of interest

The authors have no conflict of interest.

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