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Anxiety Disorders Among Children And Adolescents Living With Hiv/Aids Attending Anti-Retroviral Clinics In Maiduguri, Nigeria

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ABSTRACT: The global impact of Human Immunodeficiency Virus (HIV) includes anxiety disorders, which further worsen the impact and are associated with poor medication adherence, recurrent hospitalization, and poorer outcomes. The study aimed to assess the prevalence and correlates of anxiety disorders among CALWHA attending antiretroviral clinics at the University of Maiduguri Teaching Hospital. It was a comparative cross-sectional study, adopting a random systematic sampling method. The instruments used were the socio-demographic questionnaire, clinical proforma, and the Schedule for Affective Disorders and Schizophrenia for School-Aged Children Present and Lifetime Version (K-SAD-PL). Data analysis was done using SPSS version 26. The study population comprises 83 males (51.9%) and 77 females (48.1%). The participants ranged from 6-18 years, with a mean age of 11.4 years (SD=3.15). The prevalence of anxiety disorders among CALWHA is 22.0%. The disclosure of HIV status to CALWHA was more likely to be associated with any anxiety disorder. This was even still significant statistically after adjusting for gender (OR=2.8, CI=1.1-7.1 and (OR=2.8, CI=1.1-7.1) respectively. There is a high prevalence of anxiety disorders among the CALWHA. We, therefore, recommend the need to integrate mental health services into the care of HIV and reinforce consultation liaison psychiatry among children and adolescents.

Keywords: AIDS', 'anxiety disorders', 'Children and Adolescents', 'HIV'

INTRODUCTION

Worldwide, the Human Immunodeficiency Virus (HIV) pandemic has had a gravely detrimental effect on children's and families' mental health.. Despite significant advances in preventing and treating, millions of men, women, and children worldwide are newly diagnosed. According to data from the Global Health Observatory (GHO), by the end of 2015, over 70 million people will be infected with HIV since the onset of the HIV epidemic. (Avert, 2016; UNAIDS, 2016) About 35 million people have died due to HIV infection globally. (Avert, 2016; UNAIDS, 2016) In 2015, Sub-Saharan Africa housed about two-thirds of the total cases of HIV and AIDS

worldwide, which translates to around 36.7 million people. (Avert, 2016; UNAIDS, 2016) Nigeria was reported to be second only to South Africa as having the largest HIV epidemic worldwide with a prevalence of 3.1%, translating to 3.5 million people. (National Agency for the Control of AIDS, 2014) Although Sub-Saharan African countries like South Africa and Zambia have higher prevalence rates than Nigeria, with rates as high as 19.2% and 12.5,% respectively; (Avert, 2016; UNAIDS, 2016) the absolute number of People Living with HIV/AIDs (PLWHA) in Nigeria is higher compared to these countries because of its large population.

According to WHO, 3.2 million children (defined as persons aged 19 years or younger) and adolescents (defined as persons aged 10 to 19 years inclusive) were estimated to be living with HIV/AIDs around the World (WHO, 2013) In 2015, the mortality of Children and Adolescents living with HIV/AIDS (CALWHA) was estimated to be 290 per cent worldwide. (World Health Organization, 2017) This makes HIV/AIDS one of the major causes of mortality among children aged 5 and below in some countries. Mother-to-child transmission (MTCT) is the main route of transmission of the disease, which accounts for about 90% of cases. Additional ways that children can contract the disease include using contaminated needles, receiving infected blood transfusions, and being sexually abused as a youngster by an infected individual. (Aichelburg, Pett, & Cooper, 2002; CDC, 2015) Globally, 10–20% of children and adolescents suffer from mental health issues. (Kieling et al., 2011; Patel, Flisher, Nikapota, & Malhotra, 2008) Children and adolescents with emotional disorders experience mental health issues that impair their capacity to develop socially, academically, and emotionally. (American Psychiatric Association, 2013; Brauner & Stephens, 2006) It is difficult to estimate the prevalence of emotional disorders due to a lack of standard or all-encompassing definitions concerning domain selection. (Brauner & Stephens, 2006)

Anxiety is the brain's reaction to a stimuli or danger that a person will actively try to avoid. (Swift, Cyhlarova, Goldie, & O'Sullivan, 2014) The reaction of this brain is a fundamental feeling that is felt throughout infancy and development and has minor to severe manifestations. Furthermore, anxiety is often adaptive in situations where it helps people escape danger, therefore it is not abnormal. Moreover, the adolescent and childhood years represent the primary risk period for the emergence of anxiety symptoms and syndromes, which can vary from brief, mild symptoms to severe anxiety disorders. (Beesdo, K., Knappe, S., & Pine, D. S. 2009; Marks, 1987)

Anxiety disorder is a disproportionately exaggerated fear and anxiety in the absence of real danger or the presence of a subjectively perceived danger to the individual. (Swift et al., 2014) The prevalence of childhood anxiety disorder has varied substantially throughout studies and nations because of a number of reasons, such as differences in assessment tools, criteria, and sample. In general, 5% of kids and teenagers at any given time fit the description of an anxiety disorder. (Rapee, 2012) According to a meta-analysis, 6.5% of children and adolescents globally suffer from anxiety disorders. (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015) Youth living with HIV have been found to have high rates of anxiety disorders; however, it is unknown how common certain disorders are. (Mellins et al., 2009) This demographic has been linked to reports of social phobias, specific phobias, agoraphobia, panic disorder, separation anxiety, and obsessive-compulsive disorder, in addition to high rates of comorbidity with other psychiatric

illnesses. (Mellins et al., 2009) Scharko and colleagues (Scharko, 2006) in a reviewed study of psychiatric diagnoses among perinatally infected youth, found rates of anxiety disorders to be 24%. Furthermore, Kamau *et al.,* (Kamau, Kuria, Mathai, Atwoli, & Kangethe, 2012) in a study among 162 CALWHA between the ages of 6-18 years found that nearly half of the children have psychiatric disorders and Anxiety disorders were reported to be the most common, affecting about a third of the study participants. In this study, Anxiety disorders comprise Panic disorder, social phobia, Specific phobia, Agoraphobia, Separation Anxiety, and Generalized Anxiety disorder (GAD).

The psychological and social issues faced by Children and adolescents with HIV/AIDS are enormous compared to children and adolescents uninfected with HIV/AIDs. These may include: impaired functioning, dependency on medications, need for more medical care and disfigurement. There may be associated felt stigma as well. (Santos et al., 2005) On the other hand, internalizing disorders like depression and anxiety are linked to HIV risk behaviour. (Eller et al., 2014; Li et al., 2015) Studies show that CALWHA have increased rates of psychiatric co-morbidities,(Brown, Lourie, & Pao, 2000; C, 2009) with about 70% of CALWHA suffering acute psychiatric complications, which are related to HIV infection at some time during the course of their illness. (Murray, Buttner, & Price, 2012)

Biologically, the direct effect of HIV on the brain regions that regulate emotion, behaviour, and cognition increases the risk of developing psychiatric illnesses. Additionally, the physical effects of HIV on the body can manifest with delayed growth and development, disfigurement due to lipodystrophy and body image disturbance with the attending consequence of low self-esteem. (Santos et al., 2005; Williams & Currie, 2000) The psychological factors may include increased frequency of hospitalizations, awareness of HIV status via disclosure of HIV infection (Wiener l, Mellins CA, Marhefka S, 2007) or forced disclosure of HIV status to others, fear of progression to AIDS, fear of death and suffering and poverty. Other psychological factors include a disrupted home life, family conflict, a family history of mental illness and inadequate social support. (Tuck, McCain, & Elswick, 2001) Social factors such as discrimination and stigma, (Bogart et al., 2008; Skinner & Mfecane, 2004; Valdiserri, 2002) loss of a parent or sibling due to AIDS, (Siegel, K. 1994) parental physical ill-health,(Dalmida, 2006; Murphy, Greenwell, Mouttapa, Brecht, & Schuster, 2006) have been seen to predict psychiatric morbidities among CALWHA. Furthermore, poverty, (Cohen, 2000; Fenton, L. 2004.; Whiteside, 2002) overcrowding, Antunes, J. L., & Waldman, E. A. (2001); Nampanya-Serpell, N. (2000) and single-parent households (Newmann et al., 2000) have also been found to be associated with psychiatric morbidities in a group of patients.

In a systematic review of studies conducted among CALWHA, disclosure of HIV status is an important step in the management of this group of patients, because if not properly done can cause psychological distress. Therefore, it is recommended that clinicians should consider the age at which disclosure is appropriate, in the presence of significant others such as parents or caregivers and it should be gradual. Furthermore, disclosure can be partial, full disclosure or even non-disclosure. Full disclosure involves delivering complete information about the disease including potential causes, transmission, impact and treatment with mention of the word HIV.

While partial disclosure is similar to full disclosure the word HIV is not mentioned. (Aderomilehin, Hanciles-Amu, & Ozoya, 2016)

Due to a variety of factors, such as differences in criteria, assessment tools, and sample, prevalence estimates of anxiety in children have varied somewhat between nations and research. According to a meta-analysis, 6.5% of children and adolescents globally suffer from anxiety disorders. (Polanczyk et al., 2015) In the Western population, around 5% of children and adolescents are diagnosed with any form of anxiety disorder during a given period. (Rapee, Schniering, & Hudson, 2009) While data from other cultures are few, one study conducted in Puerto Rico found comparable rates. (Canino, et al., 2004) The majority of studies show that the prevalence of specific phobias is higher and that of separation anxiety, generalised anxiety, and social phobia is modest. The lowest rates are seen for post-traumatic stress disorder and significantly lower rates for obsessive-compulsive disorder. (Mellins et al., 2009)

Anxiety disorders are more common in females than males in the general population. (Beesdo, K., Knappe, S., & Pine, D. S. 2009; Marks, 1987) Most population studies estimate around 1.5-2 times as many females compared to males for most anxiety disorders. (Beesdo, K., Knappe, S., & Pine, D. S. 2009;; Karlsson et al., 2006; Kessler et al., 2005; Mosing et al., 2009)There is some evidence that this gender difference appears as early as 5 years of age. (Beesdo, K., Knappe, S., & Pine, D. S. 2009) In contrast, distributions within treatment-seeking samples in Western societies are more equal and even include slightly more males. (Rapee et al., 2009) Anxiety disorders are among some of the earliest disorders to appear and most commonly begin in middle childhood to mid-adolescence. Beesdo, K., Knappe, S., & Pine, D. S. 2009; Rapee, 2012) It is common for anxiety disorders to appear within a context of temperamental inhibition and fearfulness. (Beesdo, K., Knappe, S., & Pine, D. S. 2009.) Hence it is often difficult to determine exactly when the actual anxiety disorder first begins.

Youth living with HIV have been found to have high rates of anxiety disorders; however, it is unknown how common certain disorders are. (Mellins and others, 2009). This demographic has been linked to reports of social phobias, specific phobias, agoraphobia, panic disorder, separation anxiety, and obsessive-compulsive disorder, in addition to high rates of comorbidity with other psychiatric illnesses. (Mellins and others, 2009). After reviewing published studies of mental diagnoses among children infected during pregnancy, Scharko and colleagues (Scharko, 2006) discovered that 24% of the children had anxiety problems. It could be argued that serious limitations such as small sample sizes, differing diagnostic methods, a variety of ages and lack of a control group. Kamau *et al.,*(Kamau et al., 2012) conducted a study on 162 children and adolescents between the ages of 6-18 years living with HIV/AIDS and found that nearly half of the children have a psychiatric disorder and anxiety disorders were reported to be the most common affecting about a third of the participants.

The benefits of an improved understanding of psychiatric morbidities such as emotional disorders among CALWHA are likely to be substantial. A high index of suspicion is often lacking regarding the identification and management of emotional disorders among CALWHA. This could partly be due to low levels of knowledge of the prevalence and related factors of these disorders amongst CALWHA. Therefore, establishing the prevalence of anxiety disorders among CALWHA in this environment will inform physicians involved in the care of these

patients to regularly screen for these disorders and make the necessary diagnoses. Furthermore, this will serve as a basis for strengthening consultation-liaison practices; allowing prompt diagnosis and appropriate management which will potentially improve the patient's quality of life. It should provide pertinent information that can guide future planning to provide comprehensive and integrated healthcare services for CALWHA. Therefore, the study's objective is to evaluate the clinical correlates, sociodemographic distribution, and prevalence of anxiety disorders among CALWHA patients who visit clinics in Maiduguri. It also established a link between anxiety disorders and HIV status declaration in children and adolescents visiting ART clinics.

METHOD

The study was cross-sectional in design and conducted in the ART clinics of the University of Maiduguri Teaching Hospital (UMTH), a tertiary healthcare facility in northeastern Nigeria. The inclusion criteria include CALWHA between the ages of 6- and 18-years attending ART clinics for not less than six months on anti-retroviral drugs, who assent to participate and whose parents provide informed consent. Children and adolescents who are too ill to be interviewed or have a history of pre-existing psychiatric disorders or another chronic medical condition were excluded from the study. A total of 160 participants were sampled using a systematic random sampling technique with a sampling interval of 4.

The study instruments used were translated into the Hausa language using the iterated back translated method. These include a pre-designed socio-demographic questionnaire used to collect data on socio-demographic status (age, sex, religion, living status of parents, custodianship etc). A clinical proforma was used to extract relevant data from the patient's case notes such as the types of medication prescribed, duration of use, WBC count, PCV, CD4 cells count, WHO staging of the diseases and medical complications arising from the disease, awareness of HIV status, age at disclosure etc.

The Schedule for Affective Disorders and Schizophrenia for School-Aged Children Present and Lifetime Version (K-SADS-PL), a semi-structured interview was also administered for assessing psychiatric disorders in children and adolescents. [174] It assesses current and past episodes of psychopathology in children and adolescents. It is designed for interviewing both the parents and children and has been adapted to the DSM-IV diagnostic criterion.[174, 175] K-SADS-PL includes three components: introductory interview (demographic, health, and other background information), screen interview (82 symptoms related to 20 diagnostic areas), and five diagnostic supplements: (1) affective disorders; (2) psychotic disorders; (3) anxiety disorders (4) disruptive behavioural disorders; and (5) substance abuse, tic disorders, eating disorders, and elimination disorders (enuresis, encopresis). [174] K-SADS-PL has strong content validity because it was designed to tap pre-specified diagnostic criteria and to lead the clinician or the therapist to make DSM-IV diagnoses during interviews with the young patient and his parent. It has a high degree of precision and detail in assessing child symptoms and their onset, severity, duration and associated impairments, and provides global and diagnosis-specific impairment ratings to facilitate the determination of "caseness." The K-SADS-PL provides a clinician-friendly front and screening examination, which may result in a more efficient shorter interview. [175] In

comparison to other child diagnostic instruments, the K-SADS-PL compares favourably with test–retest reliability estimates. The test-retest reliability kappa coefficients are in the excellent range for present and lifetime diagnosis of anxiety disorder. (Kaufman et al., 1997) Its strength remains in diagnoses of affective and anxiety disorders; with an excellent inter-rater reliability and results comparable to semi-structured and fully structured child diagnostic interviews. It has been used in many different epidemiological, clinical and treatment of child and adolescent psychiatric studies. This instrument has been used locally in Paediatric care settings in Nigeria. (Abiodun et al., 2011; Abubakar-Abdullateef, Adedokun, & Omigbodun, 2017). The approval for the study was obtained from the Ethics and Research Committee of the Federal Neuropsychiatric Hospital Maiduguri and the University of Maiduguri Teaching Hospital. Informed written consent and assent were obtained from the parents or caregivers and children respectively where necessary.

The investigators were trained on how to administer the study instruments and practical sessions in the form of role plays were also conducted. The inter-rater reliability was determined while conducting the pre-testing. The research process was explained to the staff of the medical records and nurses at the ART clinic. The procedure and purpose of the study were explained to the participants and their caregivers informed consent was obtained from the parents/caregivers and assent was obtained from the children. Afterwards, parents or caregivers who have provided informed consent and the participants who have given assent were interviewed. The interviews were conducted in the consulting rooms of the paediatric ART clinic of the University of Maiduguri Teaching Hospital. The rooms guarantee privacy and have functional air conditioning systems and comfortable seating arrangements. Respondents who met the inclusion criteria for the study and had given informed consent were sent to the consulting room where the interview was conducted. The investigators administered the questionnaires. To ensure confidentially, only codes were used to label the respondents.

During the interview, the sociodemographic questionnaire and the screening aspect of the K-SAD-PL were administered to all the participants for anxiety. Furthermore, those who scored positive for anxiety were further interviewed using the diagnostic aspect of the K-SAD-PL of the respective disorders and the clinical proforma was used to extract data from the case note. Those found with emotional disorders were psycho-educated and referred to Federal Neuropsychiatric Hospital Maiduguri.

The data collected was entered into a computer and analysis was performed using the Statistical Package for Social Sciences, version 20.0 software (SPSS-20). A descriptive analysis of the data including frequencies, cross-tabulations and charts where appropriate was done. The means and standard deviation of numeric variables were presented. The prevalence of anxiety was determined using descriptive statistics such as frequency and percentages. The association between the socio-clinical variables with anxiety was determined using McNemar's test, chi-square or Fisher's exact test where appropriate. The chi-square test was used to assess for an association between socio-demographic variables, clinical variables on one hand, and anxiety on the other hand. Significant variables at bivariate analysis were subjected to multivariate analysis (logistic regression) to assess the independent predictors of anxiety. The level of statistical significance was set at $p< 0.05$.

RESULT AND DISCUSSION

The study population was made up of a total of 83 males (51.9%) and 77 females (48.1%). The age of the participants ranged from 6-18 years, with a median age of 11 years and a mean age of 11.4 years (SD=3.15). More than half (52.5%) of the participants were between the age of 10 - 14years. 65.6% of the participants were in primary school, forty-five participants (28.1%) were in secondary school 10 participants (6.2%) were in tertiary institutions and about four-fifths of participants (78.1%) were from small family sizes and only 59.4% of the participants still have their parents alive. About 7.5% were not living with their parents. 6.2% of participants had a family history of mental illness.

One-fifth of the participants had at least an admission during their illness about 8 in 10 (81.9%) of the participants lacked awareness of the disease and only slightly over a third (38.5%) of participants were aware of their status before the age of 8 years. Only 58.8% of the participants were adherent to their medication. Nearly all the participants (97.5%) had a CD4 count of above 400 at the time of reporting the study while only 4 (2.5%) of the participants recorded a CD4 count of less than 400.

Table 1: Prevalence of emotional disorders of the participants

N=160	**N (%)**	**χ^2 (^{Y})**	**P-value**
Any anxiety disorders			
Yes	31(22.0)	9.199	**0.002**
No	110(78.0)		
Panic disorder			
Yes	27(16.9)	14.900	**<0.001**
No	133(83.1)		
Social Phobia			
Yes	21(13.1)	10.717	**0.001 (0.002 ^{Y})**
No	139(86.9)	(9.419)	
Specific phobia			
Yes	20(13.7)	11.376	**0.001 (0.002 ^{Y})**
No	126(86.3)	(10.010)	
Agora phobia			
Yes	20(12.5)	0.028	0.867
No	140(87.5)		
Separation Anxiety			
Yes	24(15.0)	8.850	**0.003**
No	136(85.0)		
GAD			

Yes No	20(13.1) 133(86.9)	12.347 (10.899)	**<0.001 (<0.001 ɣ)**

Bold=p<0.05, ɣ= Yate's corrected

In the association of socio-demographic factors with any anxiety disorder, the family type was statistically significant for participants at a p-value of 0.008.

Table 2: Association between Socio-demographic variables with Any anxiety disorder

	Any anxiety disorder	**No anxiety disorder**		
	N=31	**N=110**		
	n(%)	**n(%)**	**χ^2 (ɣ)**	**P-value**
Age (years)				
<14	24(23.8)	77(76.2)	0.655+	0.418
14-18	7(17.5)	33(82.5)		
Gender				
Male	17(23.3)	56(76.7)	0.150+	0.699
Female	14(20.6)	54(39.7)		
Educational level				
Below Secondary	31(22)	110(78)	-	-
Post-secondary	-	-		
Which of your parents are alive?				
None/One parent	10(19.2)	42(80.8)	0.365	0.546
Both parents	21(23.6)	68(76.4)		
Do you live with your parents?				
Yes	30(23.1)	100(76.9)	1.157 (0.485)	0.282 (0.486 ɣ)
No	1(9.1)	10(90.9)		
Family type				
Monogamous	18(19.1)	76(80.9)	1.323	0.250
Polygamous	13(12.8)	34(53.9)		
Family size				
Small (≤7 members)	23(20.2)	91(79.8)	1.138 (0.653)	0.286 (0.419 ɣ)
Large (>7 members)	8(29.6)	19(70.4)		
Parents Occupation				
Elementary /Trade	21(21)	79(79)	0.195	0.659
Semi-skilled/higher-level	10(24.4)	31(75.6)		
Area of Residence				
Rural	8(28.6)	20(71.4)	0.883	0.347
Urban	23(20.4)	90(79.6)		
Family support				
Supportive	31(22.1)	109(77.9)	0.284 (0.000)	0.594 (0.999 ɣ)

Non-supportive	-	1(100)		
Relationship with parents				
Cordial	31(22.1)	109(77.9)	0.284 (0.000)	0.594 (0.999 ¥)
Non-cordial	-	1(100)		
Family history of mental illness				
Yes	3(37.5)	5(62.5)	1.190 (0.424)	0.275 (0.304 ¥)
No	28(21.1)	105(78.9)		

+=McNemar's test, Bold=p<0.05, ¥= Yate's corrected, *Fishers exact test.

a=Semi-skilled/higher level comprises the civil servant; trade comprises trader & artisan; elementary comprises students, apprentice & others.

#=≤7 based on the average household size of the northeast (UNDP, 2016)

On the relationship between clinical and laboratory factors with any anxiety disorders, there was no significant finding in both groups about the relationship between clinical and laboratory findings.

Table 3: Association between Clinical and laboratory findings and any anxiety disorders

	Any anxiety disorder	**No anxiety disorder**		
	N=31	**N=110**		
	n(%)	**n(%)**	**χ^2 (¥)**	**P-value**
No. of Admissions				
<3 times	24(21.6)	87(78.4)	0.04	0.841
≥3	7(23.3)	23(76.7)		
Duration of Treatment				
≤5 years	17(23.0)	57(77.0)	0.088	0.766
> 5 years	14(20.9)	53(79.1)		
WHO Staging				
I	31(23)	104(77)	1.766	0.414
II	-	4(100)		
III	-	2(100)		
Mode of Transmission				
Vertical	31(22.0)	110(78.0)	-	-

Horizontal	-	-		
Medication Adherence				
Yes	21(67.7)	71(64.5)	0.109	0.741
No	10(32.3)	39(35.5)		
CD4 Count				
≤400	-	4(100)	1.160 (0.216)	0.281 (0.642 ɣ)
>400	31(22.6)	106(77.4)		

Bold=p<0.05, ɣ=Yate's corrected,

4d-zidovudine, lamivudine, Nevirapine.

CD4= cluster of differentiation 4

Regarding the association of HIV disclosure and emotional disorders. HIV disclosure (awareness of the disease) is statistically significant for participants with any anxiety disorder at a p-value of 0.025 and a p-value of 0.047 was obtained with Yate's correction.

Table 4: Association between disclosure of HIV status, and anxiety disorder

	Any anxiety disorder	**No anxiety disorder**		
	N=31	**N=110**	**χ^2**	**P-value**
	n(%)	**n(%)**		
Child Awareness of Disease				
Yes	10(38.5)	16(61.5)	5.045(3.936)	**0.025 (0.047)**
No	21(18.3)	94(81.7)		
Age at Awareness				
<8 years	5(50.0)	5(50.0)	0.694 (0.000)	0.405 (0.999)
≥8years	5(33.3)	10(66.7)		

Bold=P<0.005, ɣ =Yate's corrected

On the multiple logistic regression of HIV disclosure. The multivariate logistic regression showed that the disclosure of HIV status to the participants has three times the likelihood of having any anxiety disorder (OR=2.8, CI=1.1-7.1). This prediction remains statistically significant after adjusting for gender (OR=2.8 and CI=1.1-7.1).

Table 5: Multivariate logistic regression (Binomial) analysis

Characteristics	Unadjusted OR (95% C.I)	p-value	Adjusted OR(95%C.I)	P-value
Disclosure of HIV status and Any anxiety disorder in HIV patients				
Child Awareness of Disease				
No	Ref	**0.029**	Ref	**0.031**
Yes	2.8(1.1 to 7.0)		2.8(1.1 to 7.0)*	

adjusted for 'whether a patient lives with parent & gender', *adjusted for gender.

This was a comparative study that assessed the presence of anxiety disorder in children and adolescents living with HIV. In this study, the prevalence of any anxiety disorder among participants with HIV was 22%. Scharko *et al* (Scharko, 2006) reported a similar prevalence of anxiety disorder to be 24% in a review of prenatally infected youths with HIV. On the contrary, a higher prevalence was reported by three previous studies: Kamau *et al*(Kamau et al., 2012), Musisi and Kinyanda(Musisi & Kinyanda, 2009), and Mellins *et al* (Mellins et al., 2009) reported a higher prevalence of 32.2%, 45.6%, and 49% respectively. The two later studies had a narrow age range but older participants were adolescents (10-18 years) and were more cognitively developed than the participants in the current study in which more than half were aged 10-14 years. The Boko Haram insurgency and the ensuing protracted level of insecurity and societal disharmony in north-eastern Nigeria where this study was conducted may also have contributed to the high rate of emotional disorders among HIV participants in this study.

Regarding the association of socio-demographic factors with any anxiety disorder. The age of the participants was statistically significant (p=0.047). This could be explained by the fact that in this study about two-thirds of participants with anxiety disorder were adolescents. The transition to adolescence is a challenge and most of the onset of psychiatric disorder is at this stage. It is at this period where children develop a sense of identity and this may be challenging as they are usually overprotected. All the participants were in secondary school and below level of education. A study in Nigeria reported that two-thirds of participants (CALWHA, aged 8-16 years) were attending primary schools.(Bankole et al., 2017) This could mean that the majority of the participants were not at their age-appropriate educational level (primary, secondary or tertiary). Psychological distress due to emotional disorder might have resulted in the backwardness in education. It may also have resulted from the children missing school because of falling sick due to opportunistic infection(s). The recent insurgency in Borno state that led to the closure of some of the schools and relocation to other places could have resulted in poor adjustment in functioning activities. It could also be a reflection of the fact that children in the northern part of Nigeria attend school late. (National Bureau of Statistics, 2018) In this study, 59.4% of children and adolescents with HIV were having both parents alive while 65% of HIV participants were either having none or

single parents. This finding was statistically significant (P<0.001). Furthermore, living with parents was significant (p=0.002), as the majority of children and adolescents with HIV (92.5%) live with both or either of their parents. These findings are comparable to that of a study conducted in southern Nigeria among CALWHA of similar age groups. (Bankole et al., 2017) The authors found 69.6% of CALWHA were orphans and were more likely to have emotional disorders compared to the control group. An explanation for this might be that having the support of both living parents may be a protective factor and hence less likely to develop psychological problems. (Armstrong, Birnie-Lefcovitch, & Ungar, 2005; Simon, Barakat, Patterson, & Dampier, 2009) The role of parents in a child's development was confirmed also by Bankole *et al* (Bankole et al., 2017) in their study among CALWHA. Furthermore, since the commonest mode of infection for CALWHA is MTCT, it is reasonable to expect one or both parents to be PLWHA. This may account for the higher proportion of parental deaths among CALWHA. The absence of a family history of mental illness is a good prognostic factor in the management of mental illness. In this study, 93.8% of the participants have no family history. This finding was statistically significant (p=0.002). A family history of mental illness is a strong risk factor for developing emotional disorders. Some studies argued that early life onset emotional disorder is less likely to be associated with genetic inheritance whereas adolescent and early adult onset emotional disorder is strongly associated with genetic inheritance.

The frequency of admission (>3 admissions) was 20% among the participants, and this is statistically significant (p<0.001). Based on previous studies, this finding entails that children and adolescents with more frequent hospitalization are more likely to have emotional disorders and repeated hospitalization could mean more psychological distress to the children and adolescents including their parents. (Gaughan et al., 2004) Over half (58.8%) of the participants reported adherence to their medications. This difference was statistically significant (Fisher's exact test=83.150, p<000.1). Studies have demonstrated that adhering to anti-retroviral drugs may decrease the likelihood of having emotional disorders. (Wagner, Ghosh-Dastidar, Garnett, Kityo, & Mugyenyi, 2012) In a study of post-partum women who had a 13-month course of antiretroviral were less likely to have emotional disorders such as depression than their counterparts who had not commenced. In addition, the disclosure of HIV status to children and adolescents is one of the factors that facilitate good adherence to ART medications. In this study, the route of transmission of HIV was vertical for all the HIV participants (100%). A study in a resource-limited setting found vertical transmission to be responsible for HIV infection in 90% of children. (Coutsoudis, Kwaan, & Thomson, 2010) This could mean poor access to prevention of HIV from mother-to-child transmission (PMTCT) services and coverage may be poor. A study in Nigeria showed a reduction in mother-to-child HIV transmission with comprehensive PMTCT coverage and intervention. (Agboghoroma, Audu, & Iregbu, 2015) In addition, it could also mean that the participants are not sexually active and may not be using psychoactive substances or practising safe sex.

About the association of HIV status disclosure and emotional disorders. HIV disclosure (awareness of the disease) is significantly associated with any anxiety disorder. Kamau *et al* (Kamau et al., 2012) reported a significant association between disclosure with anxiety disorder, specifically social phobia. Knowing their HIV status is an emotional and important entity in the life of the child. The reaction to the news may be individual dependent as the degree of resilience and ability to cope differs. A systematic review deduced that children may react with sadness and grief, as well as anxiety and worry about what their diagnosis is. It may be fear of revealing their status to others and possibly fear of complications as well as death. The multivariate logistic regression analysis showed that the disclosure of HIV status to the participants has increased the likelihood of having any anxiety disorder with odds over two times (OR=2.8, CI=1.1-7.1). This finding remained statistically significant with odds over two times after adjusting for gender (OR=2.8 and CI=1.1-7.1).

The limitations of this study include the design as the study was cross-sectional, thus causal relationships could not be established. Also, there may be a confounding effect of trauma as the study area has been ravaged by the Boko haram insurgency for nearly ten years. However, the strengths include the use of Schedule for Affective Disorders and Schizophrenia for School-Aged Children Present and Lifetime Version (K-SADS-PL) to screen and further diagnostics (supplement). Also, the matching of the participants for age and gender is a boost. Finally, the ART clinics of the University of Maiduguri Teaching Hospital are the largest providers of formal care for these conditions in northeast Nigeria. Thus, the findings are likely to be representative of the situation in Northeast Nigeria.

CONCLUSION

This study reported a high prevalence of emotional disorders amongst CALWHA attending clinics in Maiduguri. CALWHA were found to have a high prevalence of anxiety disorder. In addition, disclosure of HIV status increases the risk of developing anxiety disorder. There is a need to integrate mental health services into both HIV care as well as reinforcing consultation liaison psychiatry with the paediatrics department.

The fact that the research has found a significant level of anxiety disorders amongst children and adolescents living with HIV provides a rationale to take actions that will benefit this vulnerable population, and the society at large. We, therefore, recommend an integration of mental health services into both HIV care settings as well as reinforcing consultation liaison psychiatry with the paediatric department. There is a need for training and capacity building of paediatricians and other physicians concerning mental health. In addition, routine screening for anxiety disorders among children and adolescents living with chronic disorders attending the paediatric clinic should be considered. Also, the families and other stakeholders including the organizations that provide support and care to children and adolescents should be enlightened about the risk of emotional disorders among the study population. In

addition, they should be educated and empowered to practice and be involved in advocacy, treatment, and support for this population. Furthermore, research should be done to determine the relationship between the use of ART particularly combination therapy and emotional disorders. Finally, there is a need to encourage the practice and educate parents on the importance and process of HIV disclosure to their wards.

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