RESEARCH PAPER

Mood and anxiety disorders adversely influence medication adherence to antiretroviral therapy among people living with HIV/AIDS in Nigeria

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Abstract

Introduction: Psychological disorders in HIV/AIDS are well documented. However, studies enumerating its impact on medication adherence are scanty in developing countries. This study sought to determine the collective impact of mood and anxiety disorders on medication adherence among persons living with HIV/AIDS (PLWHA), receiving care at a secondary health care facility in Benin-City, Nigeria.

Material and methods: A cross-sectional descriptive study of 410 PLWHA was conducted between April and August 2015. A semi-structured socio-demographic and clinical history study questionnaire, the 8-item Morisky medication adherence scale (MMAS-8) to determine medication adherence to highly active antiretroviral therapy (HAART), and the mini international neuropsychiatric interview (MINI) to diagnose mood and anxiety disorders were administered to participants.

Results: One hundred and fifty-one participants (36.8%) were poorly adherent to their medications, with nearly 1 in 3 (31.5%) diagnosed with a mood or anxiety disorder. On bivariate analysis, poor medication adherence was significantly associated with low (< 200 cell/mm^3) CD4 cell count (crude OR = 3.23; 95% CI: 1.81-5.80; $p < 0.001$) and having a mood or anxiety disorder (crude OR = 17.89; 95% CI: 10.28-31.38; $p < 0.001$). The presence of a mood/anxiety disorder predicted poor adherence (AOR = 16.45; 95% CI: 9.69-27.92; $p < 0.001$) on multivariate analysis.

Conclusions: Mood and anxiety disorders in PLWHA are common and are associated with poorer medication adherence. Further research is required to assess if screening and management of mood and anxiety disorders would improve medication adherence.

Introduction

About 35.3 million people live with HIV/AIDS worldwide with a majority living in sub-Saharan Africa [1]. In Nigeria, the prevalence rate of HIV/AIDS is 3.4% [2], which translates to about 6.3 million people living with the disease [3]. HIV/AIDS remains a major public health problem in the country.

Available evidence reveals a significant association between mental disorders and HIV/AIDS [4-6]. Mood and anxiety disorders are commonly diagnosed in people living with

HIV/AIDS (PLWHA), in excess of rates in the general population [4, 7, 8]; the prevalence rates however, differs across studies [9-12]. Varied ascertainment criteria, study design, and population characteristics may account for the disparity in rates [4]. Mood and anxiety disorders are associated with poor adherence to medication [13] and poorer quality of life [14, 15].

Poor adherence to antiretroviral therapy (ART) is associated with failure to prevent viral replication, increased likelihood of developing viral resistance, development of clinical complications, and reduced life expectancy [16, 17]. In addition, psychiatric morbidity worsens adherence to highly active antiretroviral therapy (HAART) amongst PLWHA [18-22].

This study aimed to elucidate the prevalence and pattern of mood and anxiety disorders among PLWHA receiving care at a secondary health care facility in Benin-City, Nigeria. Since previous studies from sub-Saharan Africa have focused on depression and anxiety symptoms, we also sought to assess adherence using a validated self-report tool as well as to confirm the relationship between having a mood or anxiety disorder and poor adherence to HAART.

Material and methods

Study design

This was a cross-sectional observational study of PLWHA receiving out-patient care at a secondary health care facility in Benin-City, Nigeria.

Setting

The study was conducted at the Out-Patient HIV Clinic of the Central Hospital, Benin-City, Nigeria. This facility was chosen because the records, as at the time this study was conducted, showed that it offers free screening, medication, and counselling to a population of 10,000 PLWHA in or around the city. Free treatment removes cost of care, which is often a barrier to access care, and the cohort is a reflection of population with the illness in the area.

Study participants

To be included in the study, participants must have been aged between 18 and 64 years, confirmed with a diagnosis of HIV/AIDS, provide signed written consent, and must have been on HAART for at least 3 months prior to the study interview. Inability to communicate in English or experiencing an acute illness episode or complication, which would impair participants ability to understand the nature of the study or make appropriate responses were exclusion factors.

Data collection

All socio-demographic and clinical history data were obtained using a semi-structured study questionnaire designed by the researchers, detailing socio-demographic variables such as: age, gender, marital status, ethnicity, employment status, place of residence, educational status, religion, and estimated monthly income and clinical variables. Last recorded CD4 count, year of diagnosis, duration on HAART, and presence of physical co-morbidity were also verified.

Diagnoses of mood and anxiety disorders

The mini international neuro-psychiatric interview (MINI) version 5.0.0 was used to screen and diagnose mood or anxiety disorders. The modules for mood and anxiety disorders were utilized for this process. The MINI is a brief structured interview for the major axis I psychiatric disorders of DSM-IV and ICD-10 [23]. It has been used previously in studies conducted in Nigeria [8, 24, 25].

Assessing medication adherence

The eight-item Morisky medication adherence questionnaire (MMAS-8) [26] was administered to participants to assess self-reported adherence to HAART. We chose to administer the MMAS-8 to overcome knowledge barrier from participants who could communicate in English language but had difficulty reading or writing. The MMAS-8 though initially validated hypertensive persons and has been used for adherence measurement in a wide variety of medical conditions. Each item on MMAS-8 measures a specific medication-taking behavior in a dichotomous 'yes' or 'no' format, with a 5-point Likert response for the last item. The total scores are trichotomized into 'high' (MMAS score of 8), 'moderate' (MMAS score of 6 and 7), or 'low' (MMAS score of less than 6). The MMAS has been used in psychiatric and other medical settings within and outside Nigeria [27, 28].

Ethical considerations

The study was non-invasive, and participants bore no financial burden to participate in the study. Permission and ethical approval to undertake the study was obtained from the Ethics Review Committee of the State Ministry of Health. Participants were informed about the nature of the study, assured of confidentiality and anonymity before voluntarily signing a consent form. Participants diagnosed with a mood or anxiety disorder were counselled and subsequently referred to a mental health specialist within the facility.

Procedure

Permission was obtained from the managing team at the Out-Patient HIV/AIDS Clinic to recruit participants. Participants satisfying the study inclusion criteria were approached to discuss the study protocol. An information sheet on the purpose and procedure of the study was provided for each participant. Written informed consent was obtained from each participant, assuring confidentiality and anonymity.

Participants were systematically sampled using the daily clinic list as a sample frame. Each participant was administered the designed study questionnaire, the MINI and the Morisky 8-item questionnaire. Double sampling was avoided by tagging case records. Recruitment took place between April and August 2015.

Data management

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 21. Descriptive statistics were used to summarize data and are presented in Tables. For the purpose of bivariate and multivariate analysis, the main outcome variable – adherence to antiretroviral medications was dichotomized into 'poor adherence' (equivalent to low adherence on the MMAS-8) and 'good adherence' (which comprised moderate and high adherence on MMAS-8). For the main exposure variable, having any diagnosis of mood or anxiety disorder on the MINI, was dichotomized into 'mood/anxiety disorder present' or 'mood/anxiety disorder absent'.

Bivariate testing was performed using chi-squared tests and multivariate analysis was conducted with data entered into a binary logistic regression model with poor/good adherence as the outcome of interest. Level of significance was set a priori at $p < 0.05$.

Results

Socio-demographic characteristics of participants

The mean age (SD) of the participants was 40.41 (9.76) years, with ages ranging between 18 and 64 years. Three hundred and eleven participants (75.9%) were female, while one hundred and ninety-eight (48.3%) had at least a secondary-level education. Two hundred and eighteen (53.1%) participants were either married or cohabiting. Most participants (n = 353; 86.1%) were employed. The mean monthly income (± SD) was $43.08 (± 36.74), with range between $8 and $277 (Table 1).

Clinical characteristics of participants

The mean duration (SD) since diagnosis of HIV was 51.98 (28.06) months, with a range between 4 and 144 months. The mean duration (SD) on HAART was 41.69 (24.66) months, with a range between 3 and 108 months. Three hundred and forty-four (83.9%) participants had CD4+ count of at least 200 cells/mm³. The mean CD4+ cell count (SD) was 359.37 (171.82) cells/mm³, with range between 64 to 953 cell/mm³. Ninety (22.0%) participants had a current history of physical comorbidity or co-infection (Table 2).

Prevalence and pattern of mood and anxiety disorders among participants

One hundred and twenty-nine participants (31.5%) were diagnosed with at least a mood or anxiety disorder using

Table 1. Socio-demographic characteristics of participants

Variable	Frequency (N = 410)	Percentage (%)
Age (years)		
18-30	70	17.1
31-40	151	36.8
41-50	118	28.8
51-64	71	17.3
Gender		
Male	99	24.1
Female	311	75.9
Educational status		
No formal education	12	2.9
Primary	158	38.6
Secondary	198	48.3
Tertiary	42	10.2
Marital status		
Never married	64	15.7
Married/cohabiting	218	53.1
Widowed	80	19.5
Divorced/separated	48	11.7
Having children		
Yes	326	79.5
No	84	20.5
Living status		
Lives alone	42	10.2
Lives with others	368	89.8
Employment status		
Employed	353	86.1
Unemployed	57	13.9
Average monthly income ($)		
0-30	223	54.4
31-300	187	45.6

the MINI. Among the 129 participants, 96 (23.4%) were diagnosed with mood disorders, while 33 (8.1%) had anxiety disorders. Major depressive disorder was the commonest mood disorder (n = 76; 18.5%), while generalized anxiety disorder was the commonest anxiety disorder (n = 8; 2.0%) (Table 3).

Pattern of adherence and correlates of poor adherence to HAART

One hundred and fifty-one (36.8%) participants reported low medication adherence. Most participants (n = 195; 47.6%) reported a moderate adherence to medications, while 64 (15.6%) participants had a high adherence to medications.

Table 2. Clinical characteristics of participants

Variable	Frequency (N = 410)	Percentage (%)
Duration since HIV diagnosis (months)		
0-48	253	61.7
49-144	157	38.3
Duration on HAART (months)		
0-48	307	74.9
49-108	103	25.1
Presence of medical co-morbidity		
Yes	90	22
No	320	78
CD4+ count (cell/mm^3)		
< 200	66	16.1
≥ 200	344	83.9

Table 3. Prevalence and pattern of psychiatric morbidity

Variable	Frequency (N = 410)	Percentage (%)
Any mood and/or anxiety disorder present	129	31.5
Mood disorders	96	23.4
Major depressive disorders	74	18.1
Dysthymic disorder	12	2.9
Bipolar affective disorder	10	2.4
Anxiety disorders	33	8.0
Panic disorder	7	1.7
Post-traumatic stress disorder (PTSD)	7	1.7
Social phobia	5	1.2
Obsessive compulsive disorder (OCD)	3	0.7
Agoraphobia	3	0.7
Generalized anxiety disorder (GAD)	8	2.0
No mood and/or anxiety disorder present	252	68.5

There were no significant associations between gender ($p = 0.73$), marital status ($p = 0.06$), area of residence ($p = 0.52$), living status ($p = 0.39$), employment status ($p = 0.24$), physical comorbidity ($p = 0.05$), and adherence to HAART. Participants with a CD4 cell count below 200 cells/mm^3 were at least thrice as likely to report poor adherence to HAART (OR = 3.23; 95% CI: 1.81-5.80; $p < 0.001$). Similarly, participants diagnosed with a mood or anxiety disorder were significantly more likely to report poor adherence to antiretroviral therapy (OR = 17.89; 95% CI: 10.28-31.38; $p < 0.001$) (Table 4).

On multivariate analyses, the presence of a mood or anxiety was found to significantly predict poor adherence to HAART among PLWHA (AOR = 16.45; 95% CI: 9.69-27.92; $p < 0.001$).

Discussion

Main findings

Poor adherence to HAART was common among patients attending the Out-Patient HIV/AIDS Clinic. In addition, mood and anxiety disorders were found to be common among the participants. Major depression, dysthymia were common mood disorders diagnosed, while generalized anxiety disorder, post-traumatic stress disorder, and panic disorders were common anxiety disorders. Poor adherence to HAART was associated with a low CD4+ count and having any mood or anxiety disorder. The effect of having a mood or anxiety disorder on poor adherence to HAART was slightly attenuated after controlling for the CD4+ level.

Prevalence and pattern of mood and anxiety disorders

The prevalence of a major depressive disorder among PLWHA was found to be 18.0%. This is a higher percentage than the rate of 3.3% (lifetime prevalence) of major depression reported in general adult populations in Nigeria [29], and is consistent with other studies reporting higher rates of depressive disorder or symptoms amongst PLWHA, compared to the general population [7, 8]. A recent review of prevalence rates of depressive symptoms or disorder among PLWHA in sub-Saharan Africa showed that rates vary due to ascertainment criteria. They report that on average studies utilizing diagnostic tools have an average prevalence rate of 18%, which is in concordance with our study, while those using rating scales showed an average rate of 31.2% [30]. Depression is associated with immune suppression and other poorer health-related outcomes in studies of individuals with and without chronic diseases [31, 32]. Additionally, there is an evidence that in persons living with HIV/AIDS, depression is commoner in females [7, 33, 34], which is consistent with the fact that majority of the participants in this study were females.

A small minority were diagnosed with dysthymia and bipolar disorder. Though dysthymia has been reported among a sample in the USA as a comorbid of major depressive disorder, unlike the scenario from our survey where dysthymia was diagnosed with no other neuro-psychiatric disorder [35]. Dysthymia has been reported to adversely affect medication adherence, particularly in women [36]. We also noted that the prevalence of bipolar disorder in this cohort was low when compared to the rate of 8% from a study in the Brazil [37].

Anxiety disorders were diagnosed in about 8.0% of the participants in this study, which exceeds the 5.7% lifetime

Table 4. Correlates of poor adherence to antiretroviral medications

Variable	Medication adherence		Statistic
	Poor	Good	
Gender			
Male	35	64	$X^2 = 0.122$, $p = 0.73$
Female	116	195	
Area of residence			
Urban	129	227	$X^2 = 0.409$, $p = 0.52$
Rural	22	32	
Living status			
Living alone	18	24	$X^2 = 0.73$, $p = 0.39$
Living with others	133	235	
Marital status			
Single, separated, widowed	80	112	$X^2 = 3.63$, $p = 0.06$
Married, cohabiting	71	147	
Employment status			
Employed	126	227	$X^2 = 1.44$, $p = 0.24$
Unemployed	25	32	
CD4+ cell count			$X^2 = 19.115$, $p < 0.001$
< 200 cells/mm^3	40	26	OR = 3.23
≥ 200 cells/mm^3	111	233	95% CI = 1.81-5.80
Physical co-morbidity			
Present	41	49	$X^2 = 3.774$, $p = 0.05$
Absent	110	210	
Mood and/or anxiety disorder present			$X^2 = 144.350$, $p < 0.001$
Yes	102	27	OR = 17.89
No	49	232	95% CI = 10.28-31.38

prevalence rate of any anxiety disorder in the National Mental Health Surveys (NMHS) [29]. Noteworthy is the fact that in the NMHS, 5.4% of the participants were diagnosed of specific phobias but virtually no cases of generalized anxiety, panic, or post-traumatic stress disorders were identified [29]. In contrast, this study identified generalized anxiety disorder as the commonest anxiety disorder with panic and post-traumatic stress disorder to follow. The prevalence of anxiety disorders in this study is similar to prevalence rates between 7.0% and 8.1% reported in other studies among persons living with HIV/AIDS in Africa [5, 38], though rating scales screening for anxiety symptoms report higher rates [13].

Prevalence of poor adherence to highly active antiretroviral therapy

This study found the rate of poor adherence to HAART to be 36.8%. This is slightly higher than reported prevalence rate of poor adherence to ART found in previous studies [18, 22]. Studies conducted in more developed countries report better adherence to ART, and may reflect better awareness of the benefits of HAART as well as fewer logistic constraints, unlike in developing countries where transport problems, lack of funds to access healthcare services, or treatment payment for co-morbid illness [39].

People living with HIV/AIDS who were poorly adherent to ART had significantly lower mean CD4+ cell count and our findings were consistent with earlier reports [40]. However in Australia, Sternhell and Corr found no significant relationship between CD4+ cell count and poor adherence to antiretroviral medications [19]. Notably, the CD4+ cell count is a predictor of immunological response to antiretroviral treatment in PLWHA [41]. Indeed, the immunological response to ART is usually characterized by a CD4+ cell increase from baseline levels [41]. Therefore, the CD4 cell response is significantly influenced by the level of adherence to HAART. This is important not only at the time of initiation of treatment but also at the phase of treatment maintenance. Accordingly, the consequences of incomplete adherence to antiretroviral treatment include increased risk of drug resistance as well as increased morbidity and mortality.

Correlates of poor adherence to highly active antiretroviral therapy

Participants diagnosed with any DSM-IV mood or anxiety disorder were nearly 16 times more likely to be poorly adherent to medications. The findings from this study are in agreement with the evidence from other studies that have linked a mental comorbidity, especially mood disorders with poor adherence to HAART [18, 21, 22, 40, 42]. This therefore supports the need to address mental health problems in order to improve medication adherence and overall clinical outcomes in people living with HIV/AIDS. Several factors have being known to influence adherence to HAART [43, 44], with psychiatric morbidity being a well-established factor that has been reported in the previous studies [18, 21, 22, 40, 42]. Persons living with HIV/AIDS may experience a lack of desire to take medications as part of depressive symptomatology. Furthermore, cognitive dysfunction manifesting as forgetfulness may lead to poor medication adherence. Patients may also stop taking their medications as a means of deliberate self-harm. These findings therefore suggest the need for physicians managing PLWHA to consider psychological maladjustment to the disease as an important aspect of patient management, as this would improve treatment adherence in the long run. In addition, these findings also suggest that issues regarding the mental health needs of people living with HIV/AIDS are of major public health concern. Therefore, they should be prioritized as much as possible [45-47].

Limitations

Our findings should be interpreted with the following limitations in mind. First, the study design was cross-sectional, and it would be impossible to decide if in all cases a diagnosis of HIV/AIDS preceded the onset of mood and anxiety symptoms to determine direction of causality. Second, we did not assess for other factors (other psychological illnesses, socio-cultural factors (e.g. stigma), personality and coping styles), which may contribute to poor adherence. Third, medication adherence was determined using a self-report measure. This modality tends to result in an underestimation of the magnitude of poor adherence. Fourthly, persons who could not understand English language were excluded, this might have biased our study findings.

Conclusions

This study confirms that poor adherence to HAART is common among PLWHA in Nigeria. PLWHA report a mood and anxiety disorders that include major depression, dysthymia, and bipolar disorder. Generalized anxiety disorder, panic, and post-traumatic disorder were anxiety disorders reported. Having any DSM-IV mood or anxiety disorder was associated with a 16-fold increased risk of poor adherence to HAART.

Conflict of interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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