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Prevalence of and risk factors for depressive symptoms among people living with HIV/AIDS receiving antiretroviral treatment in Nigeria

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Abstract
Background: Depression is a common mental disorder (CMD) with significant contributions to the burden of disease. It can lead to high social, economic and individual costs because it accounts for one-third of the days missed at work and a fifth of all primary health-care appointment.
Objective: We aimed to explore the prevalence of and risk factors for depressive symptoms among people living with HIV/AIDS (PLWHA) receiving antiretroviral treatment (ART) in Kebbi State, Nigeria.
Method: A cross-sectional study evaluating adult PLWHA receiving ART in three designated clinical hospitals was conducted. The validated Beck Depression Inventory (BDI) was used to assess depressive symptoms, ineligible participants.
Result: Multinomial regression analysis was used to explore the risk factors for depressive symptoms. 348 participants were finally included in all analyses. 40.3% were found to have depressive symptoms with 13.7% having mild depressive symptoms and 26.6% having moderate to severe depressive symptoms.
Conclusion: The results of multinomial regression analysis suggested that being married or living with a partner, recent experience of ART-related side effects, and/or history of HCV infection were positively associated with mild depressive symptoms, while increasing age was positively associated with moderate to severe depressive symptoms.

Keywords: Prevalence, risk factor, depressive symptoms, HIV/AIDS, antiretroviral treatment

Introduction
Depressive disorder is one of the common mental disorders (CMDs) with significant contributions to the burden of disease and disability in low- and middle-income countries [1]. It is believed that depression can lead to high social, economic and individual costs because they account for one-third of the days missed at work and a fifth of all primary health-care appointments [2]. CMDs have been known to increase disease progression among PLHIV and are the leading cause of disability among PLWHA [3]. Some of the reasons proffered for the higher prevalence of CMDs among PLWHA include decreased adherence to antiretroviral therapy [4], emotional stress associated with the knowledge of one's HIV-positive status, externalized and internalized AIDS-related stigma and a compromised immune system [6].
A systematic review of PLWHA depression on anti-retroviral therapy (ART) in sub-Saharan Africa reported a pooled estimate of 31.2 percent (95% CI 25.5–38.2%) of the prevalence of depressive symptoms in this population. This systematic review included 30 studies from 10 countries in sub-Saharan Africa (three studies were from Nigeria) with a combined sample size of more than 10,000 participants [7]. In a survey in Lagos, Nigeria, about 29 percent of PLHIV was diagnosed with depression using the Hamilton Depression Scale Rating, [8] although this survey had a low sample size (n = 87). Depression is linked to poor health-related quality of life and poor adherence to medication regimens among PLHIV [9, 10]. The prevalence of depression was found to be approximately 40 per cent in a survey conducted in Kano State, Nigeria, with 162 PLWHA aged 15 to 25 years using the Hospital Anxiety and Depression Scale[11]. Another study involving 310 PLHIV in the town of Zaria, Kaduna State, using the Center for Epidemiological Studies Depression Scale (CES-D), found that 21 percent of PLWHA had severe depressive symptoms [12]. The comparatively large variability in the findings of studies examining the incidence of PLWHA depression in Nigeria can be partly due to the relatively limited sample sizes and variations in the geographical location where these studies have been performed.

Sub-Saharan Africa accounts for about 70 % of the global HIV burden, with a prevalence of 4.4% as of 2015 [13]. Nigeria is the most populous country in Africa with an estimated population of more than 170 million people [14]. HIV prevalence in Nigeria as of 2015 was 3.2% (about 3.5 million people living with HIV in the country) [15]. The rise of the HIV/AIDS pandemic has brought with it many pressures on society, the health care system, families and individuals who are diagnosed with HIV [16]. Throughout the start of the pandemic, initial efforts centered primarily on how to minimize the levels of infection and mortality of those already infected with the virus [16]. More and more attention is being paid internationally to improving the quality of life of people living with HIV/AIDS [17]. This trend is particularly important given the positive steps that have already been taken in the fight against AIDS over the years with regard to improved anti-retroviral drugs (ARVs), leading to an increase in the life expectancy of people infected with the virus, as well as a decrease in the rate of new infections [17].

Despite the availability and expanded use of ART, lifelong adherence to treatment and persistent HIV infection may result in psychological problems in PLWHA [18]. A recent systematic review in Asia concluded that the prevalence of depressive symptoms among PLWHA was greater than 60% across research settings [19], and much higher than that identified in the general population [20]. Untreated depressive symptoms has been found to be associated with poor ART adherence and rapid progression to AIDS [21, 22], while the alleviation of depressive symptoms has been evidenced to benefit both ART adherence and clinic attendance [23]. Hence, knowledge of risk factors for depressive symptoms is necessary to be elucidated for clinicians for better care of PLWHA. Several risk factors for depressive symptoms among PLWHA receiving ART have been reported. Female patients have been reported to be at increased risk for depressive symptoms in most studies [24, 25]. A complex interaction between age and depressive symptoms has been identified [26]. Studies assessing residential status have also shown inconsistent results [27]. However, most previous studies were undertaken in high-income countries, and relatively few studies focused on this issue in low-and-middle-income countries, including Nigeria [28]. In this study, we aimed to explore the prevalence of and risk factors for depressive symptoms among PLWHA receiving ART in Nigeria to narrow this gap in literature, and provide background information for holistic health care for PLWHA.

Method

Study design and setting

This study employed a cross-sectional quantitative survey research design using a structured, interviewer administered clinical assessment tool. The study was carried out in three designated clinical hospitals in Birnin Kebbi, and Arungu of Kebbi State, Nigeria. Nigeria is made up of 36 states and the FCT, Abuja which are further grouped into six geopolitical zones (GPZs). Three GPZs are located in northern Nigeria i.e. North-east, North-central, and North-west GPZs, while southern Nigeria comprises the South-west, South-east and South-south GPZs. Kebbi is part of the North-west GPZ. This study was conducted in three HIV treatment centres in Kebbi. HIV treatment centres are health centres dedicated to provide antiretroviral therapy (ART) to PLWHAS. These centres are run by government and non-governmental organisations in Nigeria.

Study population and sample

The study was carried out among the PLWHAS who were receiving services at HIV treatment centres located in the Argungu and Birnin Kebbi, Kebbi State as at November 2019. Based on available records from the National Agency for the Control of AIDS (NACA) in Nigeria, there was an estimated population of 938,443 PLWHA who were either in-care or on ART at 18 dedicated treatment centres in Kebbi State. The study sample was drawn from three conveniently sampled HIV treatment centres located in the Kebbi State. These treatment sites were selected based mainly on the availability of well-kept patient's records which facilitated the randomization of the study participants and the ability to retrieve contact details of potential study participants. The recruitment criteria were as follows: (1) aged over 18 years and above, (2) confirmed diagnosis of HIV infection, (3) confirmed ART in Kebbi State, and (4) available to participate in the survey. The individual inclusion criteria for participating in this study seeking or receiving treatment in one of the three HIV treatment centres involved in this study. The exclusion criteria were: being under the age of 18, and not being able to communicate in English or Hausa languages.

Measures

Socio-demographic questionnaire created by the research team, epidemiological and clinical data were directly extracted from the case reporting database of the China HIV/AIDS Information Network. Depressive symptoms was measured using the validated Beck Depression Inventory (BDI), a self-rated depression screening instrument with 21 items. It has been applied to assess the presence and severity of depressive symptoms in those greater than 13 years old [29], and has been reported to be an adequate measure for assessing depressive symptoms among PLWHA [30, 31]. Higher scores suggest greater depressive symptoms, with scores $\geq$14 and $\leq$19 reflecting mild depressive symptoms and scores $\geq$20 reflecting moderate to severe depressive symptoms.

Paper-based BDI questionnaires were given to PLWHA during their routine medical visit to the designated clinical hospitals during the study period. When informed consents were obtained, participants were required to fill out questionnaires in a private and quiet room under the supervision of a professional clinician prior to their regular physical examination and consultation. Every investigation lasted nearly half an hour.

Statistical analyses

Descriptive statistics were used to summarize participants' characteristics. Means and standard deviations were used for continuous variables and frequencies and proportions were used for categorical variables. Multinomial regression analysis was used to explore the risk factors for depressive symptoms, with results presented by odds ratio (OR) and 95% confidence interval (CI). $P < 0.05$ was considered significant statistically.

Results

Demographic details of Participants

Participants in the study came from northwest GPZs which

is one of the GPZs in Nigeria. A total of 242 (69.5%) and 106 (30.5%) participants were interviewed in English and Hausa languages, respectively. The sample comprised 24.4% female (n = 85) and 75.6% (n = 263) males. Table 1 shows the main demographic and clinical characteristics with significant differences among participants with minimal, mild and moderate to severe depressive symptoms.

Table 1: The comparison of characteristic among participants with different level of depressive symptoms

	Minimal	Mild	Moderate to severe	Statistics[a]	P value
BDI scores	5.78 ± 3.65	15.25 ± 1.61	30.27 ± 7.67	792.202	<0.002
Age/year	34.65 ± 12.14	37.86 ± 14.52	40.83 ± 14.07	4.407	0.013
Gender					
Male	122(42.6%)	58(22.1%)	83(31.5%)	3.234	0.312
Female	43(50.6%)	15(17.6%)	27(31.7%)		
Marital status					
Married/living with a partner	126(67.7%)	29(15.6%)	31(16.6%)	8.163	0.007
Unmarried/divorced/widowed	89(63.2%)	33(11.0%)	77(25.8%)		
Residence					
Urban	155(59.4%)	29(11.1%)	77(29.5%)	7.165	0.042
Rural	82(50.6%)	35(21.6.8%)	45(27.7%)		
History of HCV infection					
No	119(47.0%)	45(17.7%)	89(35.2%)	10.343	0.028
Yes	4(23.5%)	8(47.0%)	5(29.4%)		
Unknown	28(35.9%)	25(32.0%)	25(32.0%)		
Recent Experience of side effects					
Yes	221(61.8%)	28(11.2%)	37(27.1%)	13.603	0.001
No	32(51.6%)	16(25.8%)	14(22.5%)		

Depression Scale; HCV: Hepatitis C virus

[a]Chi-square test were used for categorical variables, one-way ANOVA were used for continuous variables

Table 2: Multinomial regression analysis for exploring risk factors for depressive symptoms

	Mild		Moderate to Severe	
	OR (95% CI)	P value	OR (95% CI)	P value
Age	1.03 (0.82, 1.08)	0.510	1.08 (1.09, 2.08)	0.032
Gender				
Female	Reference	Reference		
Male	2.20 (1.14, 6.11)	0.719	0.74 (0.55, 1.78)	0.382
Residence				
Rural	Reference	Reference		
Urban	0.66 (0.59, 1.84)	0.881	1.37 (0.75, 2.42)	0.151
Marital status				
Unmarried	Reference	Reference		
Married	2.20 (1.06, 5.32)	0.033	1.13 (0.52, 2.12)	0.562
Recent experience of side effects				
No	Reference	Reference		
Yes	2.38 (1.35, 5.82)	0.003	1.11 (0.43, 2.72)	0.812
History of HCV infection				
No	Reference	Reference		
Yes	4.19(1.21, 14.93)	0.021	1.89 (0.52, 6.41)	0.298
Unknown	0.65(0.21, 2.78)	0.631	1.74 (0.73, 4.77)	0.202

Abbreviations: OR: Odds Ratio; CI: Confidence Interval a Minimal depressive symptoms was created as a dummy variable and adjusted for age, gender and marital status

Regression analysis

Table 2 shows that mild depressive symptoms were significantly associated with being married or living with a partner (OR = 2.20, 95% CI, 1.14–6.11), experience of side effects (OR = 2.38, 95% CI, 1.35–5.82), and history of HCV infection (OR = 4.19, 95% CI, 1.21–14.93), while moderate to severe depressive symptoms were significantly associated with increasing age (OR = 1.08, 95% CI, 1.09–2.08).

Discussion

The study found that the prevalence of depressive symptoms among PLWHA receiving ART was 41.2 per cent, with 12.9 per cent having mild depressive symptoms and 25.3 per cent having moderate to severe depressive symptoms. Being married or living with a partner, experiencing ART-related side effects and a history of HCV infection, independent risk factors for mild depressive symptoms were established, while increasing age was an independent risk factor for moderate to severe depressive symptoms. Being married or living with a partner, recent experience of side effects, history of HCV infection has been associated with 2.20, 2.38, 4.19 times the risk of mild depressive symptoms. Meanwhile, each one year increase in age was found to cause an approximately 2% increase in the odds of moderate to severe depressive symptoms. Our findings were supported by other relevant researches in varied populations, such as Korea, Australia, USA and Spanish [32-35]. Nevertheless, the risk factors for mild and moderate to severe depressive symptoms were different. In patients with mild to severe depressive symptoms, rising age played a more significant role than marital status, recent experience with side effects and history of HCV infection. It could probably be clarified that depressive symptoms were generally ignored in PLWHA [36], and that age could increase the progression of ignored depressive symptoms to more severe status due to age-related risk factors such as social isolation [37]. For patients with mild depressive symptoms, marital status, recent experience with side effects and history of HCV infection have played a more significant role than age. It could probably be clarified that, over time, mild depressive symptoms could be relieved by partner social support [38], treatment and alleviation of side effects [39] and HCV infection [40].

Limitations

Not all prospective participants who were originally routinely screened for this study could be contacted due to out-of-date contact information in clinical records. Therefore, several participants were contacted during their clinical days. There was also a difference between the real

research group in which the participants fall and the list of participants. This study had limitations. First, what we found was based on cross-sectional evidence, the causal relationship needs to be explained. Furthermore, some previously reported risk factors, such as HIV stigma, inadequate social support, income and alcohol use, have not been addressed in this review, which has made our results potentially biased. It might be best to consider these potential risk factors in any related investigations. However, we found a correlation between marital status, side effects of ART, history of HCV infection, increased age and depressive symptoms.

Conclusion

In conclusion, marital status, ART-related side effects, history of HCV infection and aging were positively associated with depressive symptoms in PLWHA receiving ART. It suggested the need for urgent psychological care for PLWHA in ART, particularly for those of growing age, married or living with a partner, experience with side effects, and history of HCV infection.

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