

Prevalence and factors associated with depressive symptoms among people living with HIV/AIDS attending an adult antiretroviral therapy clinic at Federal Medical Centre, Bida

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Abstract

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Background: Depressive symptoms are common among people living with HIV/AIDS (PLWHA) and may adversely affect psychosocial wellbeing and HIV treatment outcomes. Several sociodemographic, psychosocial and clinical factors may be associated with depressive symptoms among PLWHA. This study determined the prevalence of depressive symptoms and examined factors associated with screen-positive depressive symptoms among PLWHA attending the adult Antiretroviral Therapy (ART) Clinic at Federal Medical Centre (FMC), Bida.

Methods: A hospital-based cross-sectional study was conducted from September to November 2021 among adults living with HIV/AIDS attending the ART Clinic of FMC Bida. Participants were selected using systematic sampling. Data were collected using a structured questionnaire, the Patient Health Questionnaire-9 (PHQ-9), Oslo-3 Social Support Scale and AK9 HIV Stigma Scale. The PHQ-9 was used to screen for depressive symptoms, with a score of ≥ 5 classified as screen-positive. Descriptive statistics and bivariate analyses were performed, followed by multivariable binary logistic regression. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were reported, with statistical significance set at $p < 0.05$.

Results: A total of 334 participants were studied. Overall, 202 (60.5%) screened positive for depressive symptoms, while 132 (39.5%) screened negative. The severity distribution was 132 (39.5%) with no/minimal depressive symptoms, 60 (18.0%) with mild symptoms, 51 (15.3%) with moderate symptoms, 47 (14.1%) with moderately severe symptoms and 44 (13.2%) with severe symptoms. In the bivariate analysis, sex, marital status, occupation, educational status, perceived HIV-related stigma, social support, CD4 count at diagnosis and viral load were significantly associated with screen-positive depressive symptoms. In the multivariable model, poor social support (AOR 22.923, 95% CI 7.278–72.195, $p < 0.001$), moderate social support (AOR 27.100, 95% CI 9.459–77.638, $p < 0.001$), no perceived HIV-related stigma compared with perceived stigma (AOR 0.121, 95% CI 0.031–0.473, $p = 0.002$), divorced marital status compared with widowed status (AOR 0.032, 95% CI 0.003–0.371, $p = 0.006$), and artisan occupation compared with unemployment (AOR 0.050, 95% CI 0.007–0.343, $p = 0.002$) showed statistically significant adjusted associations. The estimates for divorced marital status and artisan occupation were imprecise, as reflected by their wide confidence intervals.

Conclusion: Screen-positive depressive symptoms were common among PLWHA attending the ART clinic at FMC Bida. Psychosocial factors, particularly social support and HIV-related stigma, showed strong adjusted associations with depressive symptoms. Integration of mental-health screening and psychosocial support into routine HIV care should be strengthened. Given the cross-sectional design, the observed associations should not be interpreted as causal.

Keywords: Depression, HIV/AIDS, PLWHA, Social support, Stigma, Occupation

Introduction

Human immunodeficiency virus (HIV) infection remains a significant global public health issue, particularly in sub-Saharan Africa, where more than two-thirds of the global population of people living with HIV/AIDS (PLWHA) reside.¹ Advances in antiretroviral therapy (ART) have transformed HIV from a terminal illness into a chronic, manageable condition, improving survival and quality of life. However, this clinical progress has revealed new challenges, particularly concerning the mental health of those living with the disease.²

Depression is the most commonly reported mental health disorder among PLWHA, with prevalence rates estimated to be two to three times higher than in the general population.³ The World Health Organization (WHO) has recognised depression as a leading cause of disability worldwide, often co-occurring with chronic diseases like HIV.⁴

Depression in PLWHA is associated with numerous adverse outcomes, including poor ART adherence, faster disease progression, reduced immune function, higher viral load, and increased morbidity

and mortality.^{5,6}

Several factors contribute to the elevated risk of depression in PLWHA. These include socio-demographic variables such as age, sex, marital status, educational attainment, and employment status, as well as psychosocial and clinical factors like stigma, lack of social support, low income, disease stage, and history of psychiatric illness.⁷⁻⁹ In particular, perceived HIV-related stigma has been repeatedly associated with poor mental health outcomes, including depression, due to its impact on self-esteem, social isolation, and health-seeking behaviours.¹⁰ Similarly, poor social support has been identified as a consistently associated factor of depression, as it limits coping capacity and reinforces feelings of loneliness and helplessness.¹¹

The interplay between HIV and mental health is bidirectional. While HIV infection increases vulnerability to mental health disorders due to the biological impact of the virus and psychosocial stressors, pre-existing or comorbid depression can lead to risky behaviours, poor treatment adherence, and suboptimal clinical outcomes.¹² Research has also shown that depression can influence immunological

responses in PLWHA, including reduced CD4 cell counts and increased viral loads, thereby exacerbating disease progression.¹³

Cultural and environmental contexts play a critical role in shaping the experience and risk of depression in PLWHA. In many low- and middle-income countries (LMICs), where healthcare systems are already strained, mental health services are either unavailable or poorly integrated into primary HIV care.¹⁴ Additionally, social stigma surrounding both mental illness and HIV further discourages affected individuals from seeking help, perpetuating a cycle of neglect and deterioration.¹⁵ This highlights the urgent need for context-specific data to guide mental health interventions and resource allocation.

Several screening tools have been employed in assessing depression in PLWHA, including the Patient Health Questionnaire-9 (PHQ-9), Beck Depression Inventory (BDI), and the Centre for Epidemiologic Studies Depression Scale (CES-D). The PHQ-9 is widely used due to its brevity, ease of administration, and validity across different populations, including PLWHA.¹⁶ In addition to screening, understanding the associated factors of depression, whether demographic, psychosocial, or clinical, can help health providers identify at-risk individuals and design targeted interventions.

Although numerous studies have investigated depression in PLWHA, variations in prevalence and associated factors across regions underscore the importance of localised research.¹⁷ For instance, findings from sub-Saharan Africa may differ substantially from those in Asia or Latin America due to differences in cultural beliefs, healthcare infrastructure, social support systems, and stigma levels.¹⁸ Therefore, country-specific and region-specific studies are essential to build evidence for policy development and program implementation.

This study was designed to determine the prevalence of screen-positive depressive symptoms and examine associated sociodemographic, psychosocial and clinical factors among people living with HIV/AIDS attending the adult antiretroviral therapy clinic at Federal Medical Centre, Bida.

Methods

Study Area

The study took place at the Antiretroviral Therapy (ART) Clinic within the GOP Clinic of Federal Medical Centre (FMC), Bida, a tertiary health facility serving a diverse population in Bida, Nigeria. The clinic offers a broad range of services to people living with HIV/AIDS (PLWHA), including free antiretroviral therapy, CD4 count, and viral load testing, in partnership with the Centre for Clinical Care and Clinical Research (CCCRN).

Study Population

The target population consisted of HIV-positive adults (≥ 18 years) attending the ART clinic who had been on antiretroviral treatment for at least six months and met the inclusion criteria.

Sample Size Calculation:

Using the Kish Leslie formula and a prevalence rate of 56.7% from a similar study in Ilorin, the initial sample size was calculated as 377.13. Adjustments for finite population size and a 10% non-response rate led to a final minimum sample size of 334,

which was ultimately recruited.

Subject Selection:

Systematic sampling was used with a sampling interval of 4. The first participant was selected randomly, followed by every fourth patient. Only those meeting the inclusion criteria and providing informed consent were enrolled.

Inclusion/Exclusion Criteria:

Inclusion: HIV-positive adults (≥ 18 years), on antiretroviral medication for ≥ 6 months, and willing to participate.

Exclusion: Individuals too ill or with a history of severe mental disorders.

Data Collection Instruments:

Patient Health Questionnaire-9 (PHQ-9): The PHQ-9 is a nine-item instrument used to screen for depressive symptoms. Each item is scored from 0 to 3, giving a total score ranging from 0 to 27. In this study, a total score of ≥ 5 was classified as screen-positive for depressive symptoms, while a score < 5 was classified as screen-negative. Severity was categorised as no/minimal symptoms (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27). The PHQ-9 was used as a screening instrument and not as a diagnostic interview.

Oslo-3 Social Support Scale: The Oslo-3 Social Support Scale consists of three items assessing perceived social support. Scores range from 3 to 14 and were categorised as poor (3–8), moderate (9–11) and strong (12–14).

AK9 HIV Stigma Scale: The AK9 HIV Stigma Scale was used to assess perceived HIV-related stigma. Participants were categorised according to the scoring criteria specified for the instrument.

Data Analysis:

Data were analysed using SPSS version 22. Continuous variables were summarised using appropriate measures of central tendency and dispersion, while categorical variables were summarised using frequencies and percentages.

For bivariate analysis, we assessed associations between categorical independent variables and screen-positive depressive symptoms using Pearson's chi-square test. Fisher's exact test was used where the observed cell frequencies were too small for reliable application of the chi-square approximation.

For the treatment-duration variable, participants were categorised according to their recorded duration of ART treatment. Because no participants had less than six months of treatment, the final categories were 6–12 months and > 1 year. The association with screen-positive depressive symptoms was assessed using Fisher's exact test because of the small number of participants in the 6–12-month category.

For multivariable analysis, binary logistic regression was performed with screen-positive depressive symptoms (PHQ-9 ≥ 5) as the outcome event. Variables that demonstrated statistically significant associations at bivariate analysis were entered into the multivariable model. Adjusted odds ratios (AORs), 95% confidence intervals and p-values were reported. Reference categories were explicitly specified in the regression table.

Model adequacy was assessed using the Hosmer–Lemeshow goodness-of-fit test, while multicollinearity among explanatory variables was assessed using variance inflation factors. Statistical significance was set at $p < 0.05$.

Ethical Consideration:

Ethical approval (FMCB/HCS/HREC/APPR/VOL.2/26/19) was granted by FMC Bida's ethics committee. Participants gave informed consent, and confidentiality was strictly maintained using codes instead of names. Data collection occurred from September to November 2021

Results

Association between participants' sociodemographic characteristics and depressive symptoms

Sociodemographic characteristics and depressive symptoms:

Among the 334 participants, 202 (60.5%) screened positive for depressive symptoms based on a PHQ-9 score of ≥ 5 , while 132 (39.5%) screened negative. Female participants had a higher proportion of screen-positive depressive symptoms than male participants (66.7% versus 48.7%; $\chi^2=10.188$, $p=0.001$). Marital status was also significantly associated with screen-positive depressive symptoms ($\chi^2=8.084$, $p=0.044$), with the highest proportion observed among widowed participants (85.2%).

Occupation was significantly associated with screen-positive depressive symptoms ($\chi^2=25.031$, $p<0.001$). The highest proportions were observed among students (75.0%) and traders (74.2%), while civil servants had the lowest proportion (38.8%). Educational status was also significantly associated with screen-positive depressive symptoms ($\chi^2=42.306$, $p<0.001$), with the highest proportion among participants with no formal education (78.8%) and the lowest among those with tertiary education (27.9%).

Age group, tribe, religion and average monthly income were not significantly associated with screen-positive depressive symptoms (Table 1).

Table 1: Association between sociodemographic characteristics and screen-positive depressive symptoms.

Variable	Screen Positive Depression		Chi-square	p-value
	Yes	No		
Age group				
18-24	6(50.0)	6(50.0)	6.944	0.074
25-44	130(64.7)	71(35.3)		
45-64	64(56.6)	49(43.4)		
≥ 65	2(25.0)	6(75.0)		
Sex				
Male	56(48.7)	59(51.3)	10.188	0.001
Female	146(66.7)	73(33.3)		
Tribe				
Nupe	148(63.8)	84(36.2)	7.319	0.120
Yoruba	17(42.5)	23(57.5)		
Hausa	14(63.6)	8(36.4)		
Igbo	8 (66.7)	4(33.3)		
Others	15(53.6)	13(46.4)		
Marital status				
Single	15(51.7)	14(48.3)	8.084	0.044
Married	157(59.0)	109(41.0)		
Divorced	7(58.3)	5(41.7)		
Widowed	23(85.2)	4(14.8)		

Religion				
Christianity	38(52.8)	34(47.2)	2.278	0.131
Islam	164(62.6)	98(37.4)		
Occupation				
Civil servant	26(38.8)	41(61.2)	25.031	< 0.001
Farming	34(63.0)	20(37.0)		
Trading	69(74.2)	24(25.8)		
Artisan	13(44.8)	16(55.2)		
Student	6(75.0)	2(25.0)		
Unemployed	54(65.1)	29(34.9)		
Educational status				
Primary	50(64.9)	27(35.1)	42.306	< 0.001
Secondary	69(67.6)	33(32.4)		
Tertiary	19(27.9)	49(72.1)		
Islamic	12(57.1)	9(42.9)		
None	52(78.8)	14(21.2)		
Average monthly income				
Below minimum wage	104(61.9)	64(38.1)	0.287	0.592
Above minimum wage	98(59.0)	68(41.0)		

Table 2: Association Between Clinical, Stigma, and Laboratory Parameters and Depression

Perceived social support was strongly associated with screen-positive depressive symptoms ($\chi^2=133.938$, $p<0.001$). Screen-positive depressive symptoms were observed in 89.8% of participants with poor social support, 84.1% of those with moderate social support and 25.0% of those with strong social support.

Perceived HIV-related stigma was also significantly associated with screen-positive depressive symptoms ($\chi^2=69.519$, $p<0.001$). The proportion screening positive was 94.1% among participants who perceived HIV-related stigma compared with 45.7% among those who did not.

CD4 count at diagnosis was significantly associated with screen-positive depressive symptoms ($\chi^2=12.977$, $p=0.002$), while CD4 count at enrolment was not significantly associated with the outcome ($\chi^2=1.215$, $p=0.270$). No participants had a CD4 count below 200 cells/mm³ at enrolment.

Viral load was significantly associated with screen-positive depressive symptoms at bivariate analysis, with 79.2% of participants with viral load ≥ 1000 copies/mL screening positive compared with 57.3% among those with viral load < 1000 copies/mL ($\chi^2=8.190$, $p=0.004$).

Treatment duration was not significantly associated with screen-positive depressive symptoms. Among participants treated for 6–12 months, 4 (44.4%) screened positive compared with 198 (60.9%) among those treated for more than one year (Fisher's exact $p=0.326$). No participant had been on ART for less than six months (Table 2).

Table 2: Association between participants' clinical, stigma, and laboratory parameters and screen-positive depressive symptoms.

Variable	Depression		Chi-square	p-value
	Yes	No		
Previous psychiatric illness				
Yes	3(100.0)	0(0.0)	1.978	0.160
No	199(60.1)	132(39.9)		
Duration of illness				
<1	4(44.4)	5(55.6)	2.820	0.244
1-5 years	118(64.1)	66(35.9)		
> 5 years	80(56.7)	61(43.3)		

Duration of treatment				
6-12 months	4 (44.4)	5 (55.6)	0.995	*0.326
> 1 year	198 (60.9)	127 (39.1)		
Perceived social support				
Poor	97(89.8)	11(10.2)	133.938	< 0.001
Moderate	69(84.1)	13(15.9)		
Strong	36(25.0)	108(75.0)		
HIV stigma				
No perceived stigma	106(45.7)	126(54.3)	69.519	< 0.001
Perceived stigma	96(94.1)	6(5.9)		
CD4 at Diagnosis				
<200 (cells/mm ³)	47(75.8)	15(24.2)	12.977	0.002
200-499 (cells/mm ³)	99(52.4)	90(47.6)		
≥ 500 (cells/mm ³)	56(67.5)	27(32.5)		
CD4 at Enrollment into the study				
<200 (cells/mm ³)	0(0.0)	0(0.0)	-	-
200-499 (cells/mm ³)	25(53.2)	22(46.8)	1.215	0.270
≥ 500 (cells/mm ³)	177(61.7)	110(38.3)		
Viral load				
< 1000 (copies/mL)	164(57.3)	122(42.7)	8.190	0.004
≥ 1000 (copies/mL)	38(79.2)	10(20.8)		

The <200 cells/mm³ category contained no participants and was therefore excluded from the inferential comparison.

*Fisher's exact test.

Multivariable logistic regression analysis of the respondents

Table 3 shows that, in multivariable logistic regression, poor and moderate social support were independently associated with higher odds of screen-positive depressive symptoms compared with strong social support (AOR 22.923, 95% CI 7.278–72.195, $p < 0.001$ and AOR 27.100, 95% CI 9.459–77.638, $p < 0.001$, respectively). Participants who reported no perceived HIV-related stigma had lower odds of screening positive compared with those who perceived stigma (AOR 0.121, 95% CI 0.031–0.473, $p = 0.002$). Statistically significant associations were also observed for divorced versus widowed participants (AOR 0.032, 95% CI 0.003–0.371, $p = 0.006$) and artisan versus unemployed participants (AOR 0.050, 95% CI 0.007–0.343, $p = 0.002$).

Although sex, educational status, CD4 count at diagnosis and viral load were significantly associated with screen-positive depressive symptoms in the bivariate analysis, none retained statistical significance in the multivariable model. This indicates that their observed bivariate associations were attenuated after adjustment for the other variables included in the model.

Table 3: Multivariate logistic regression analysis of factors associated with screen-positive depressive symptoms.

Variable	Comparison	B	SE	AOR	95% CI	p-value
Sex	Male vs Female (Ref)	-0.566	0.451	0.568	0.234–1.374	0.209
	Single vs Widowed (Ref)	-0.702	1.037	0.496	0.065–3.780	0.498
Marital status	Married vs Widowed	-1.047	0.766	0.351	0.078–1.576	0.172
	Divorced vs Widowed	-3.427	1.243	0.032	0.003–0.371	0.006
	Civil servant vs Unemployed (Ref)	-1.003	0.754	0.367	0.084–1.608	0.184
Occupation	Farming vs Unemployed	0.466	0.597	1.594	0.495–5.136	0.435
	Trading vs Unemployed	-0.416	0.577	0.660	0.213–2.043	0.471
	Artisan vs Unemployed	-2.987	0.978	0.050	0.007–0.343	0.002
	Student vs Unemployed	0.966	1.342	2.628	0.189–36.452	0.471
	Primary vs None (Ref)	-0.451	0.635	0.637	0.183–2.210	0.477
Educational status	Secondary vs None	-0.027	0.561	0.973	0.324–2.922	0.961
	Tertiary vs None	-1.277	0.768	0.279	0.062–1.256	0.096
	Islamic vs None	-0.734	0.796	0.480	0.101–2.284	0.356
Social support	Poor vs Strong (Ref)	3.132	0.585	22.923	7.278–72.195	<0.001
	Moderate vs Strong	3.300	0.537	27.100	9.459–77.638	<0.001
HIV stigma	No perceived stigma vs Perceived stigma (Ref)	-2.112	0.696	0.121	0.031–0.473	0.002

CD4 at diagnosis	<200 vs ≥500 (Ref)	0.334	0.687	1.397	0.364–5.366	0.626
	200–499 vs ≥500	-0.664	0.482	0.515	0.200–1.324	0.168
Viral load	<1000 copies/mL vs ≥1000 (Ref)	0.242	0.717	1.274	0.312–5.197	0.736

Model diagnostics: Hosmer–Lemeshow $\chi^2 = 12.783$, $df = 8$, $p = 0.120$; maximum VIF ≈ 3.47 .

Ref = reference category; AOR = adjusted odds ratio; CI = confidence interval.

Discussion

Prevalence of depressive symptoms

This study found that 60.5% of participants screened positive for depressive symptoms using a PHQ-9 cut-off of ≥ 5 . This represents a substantial burden of depressive symptoms among people living with HIV/AIDS attending the ART clinic. The observed prevalence is higher than estimates reported in several African studies, although direct comparison should be made cautiously because of differences in study populations, screening instruments, cut-off points and study settings. A systematic review and meta-analysis of depressive disorders among people living with HIV in Africa reported an overall prevalence of depressive disorders of 36.5%, while a more recent African meta-analysis reported a pooled prevalence of depressive symptoms of approximately one-third.^{19,20} The relatively high prevalence observed in the present study may partly reflect the use of the PHQ-9 threshold of ≥ 5 , which identifies a broader spectrum of depressive symptoms rather than clinically diagnosed depressive disorder. Because the PHQ-9 is a screening instrument, the findings should therefore be interpreted as screen-positive depressive symptoms rather than confirmed depressive disorder.

Sex and depressive symptoms

Female participants had a significantly higher proportion of screen-positive depressive symptoms than males at bivariate analysis (66.7% versus 48.7%). This finding is consistent with previous Nigerian and African studies. Obadeji et al. reported a significant association between female sex and depression among PLWHA attending an outpatient clinic in Nigeria.⁷ Chikezie et al. similarly reported that female PLWHA were more likely to experience depression in Benin City, Nigeria.²¹ Eshetu et al. also found a significant association between sex and depression among PLWHA in Ethiopia.⁸ A recent systematic review and meta-analysis involving more than 20,000 PLHIV across Africa similarly found that female participants had higher odds of depressive symptoms than males.²⁰

However, sex did not remain statistically significant in the multivariable model in the present study (AOR 0.568, 95% CI 0.234–1.374, $p = 0.209$). Thus, although the female excess observed in the bivariate analysis is consistent with previous literature, the present study does not provide evidence that sex was an independent factor associated with depressive symptoms after adjustment. This suggests that other sociodemographic and psychosocial factors may partly account for the observed crude association.

Marital status

Marital status was significantly associated with screen-positive

depressive symptoms at bivariate analysis, with the highest proportion observed among widowed participants. Previous studies have reported varying relationships between marital status and depression among PLWHA. El-Badawi and Mirghani reported a significant association between marital status and depression among HIV-positive patients in Sudan, while Bongongo et al. found no significant difference in depressive features between married and unmarried patients.^{22,23} Similarly, Obadeji et al. reported no significant association between marital status and depression among PLWHA in Nigeria.⁷ In the present study, only divorced status remained statistically significant in the adjusted analysis when compared with widowed participants (AOR 0.032, 95% CI 0.003–0.371, $p=0.006$). Divorced participants had lower adjusted odds of screen-positive depressive symptoms than widowed participants in this sample; however, the estimate was imprecise and should be interpreted cautiously. This is because both the divorced and widowed groups were relatively small, resulting in a wide confidence interval. The direction of this adjusted association should also not be interpreted as evidence that being divorced protects against depressive symptoms. Rather, it indicates that the odds of screen-positive depressive symptoms were lower among divorced participants than among the selected widowed reference group in this particular sample. The cross-sectional design prevents any inference regarding causality or temporal direction.

Occupation

Occupation was significantly associated with screen-positive depressive symptoms in the bivariate analysis. The highest observed proportions were among students and traders, while unemployed participants had a prevalence of 65.1%.

The multivariable analysis further clarified this relationship. Using unemployed participants as the reference category, only the artisan category showed a statistically significant adjusted association (AOR 0.050, 95% CI 0.007–0.343, $p=0.002$). The result should therefore not be interpreted as evidence that unemployment causes depression or that artisan occupation is protective. Rather, it represents an association between occupational category and screen-positive depressive symptoms after adjustment for the other variables included in the model.

Previous Nigerian studies have reported associations between socioeconomic or occupational circumstances and depression among PLWHA. Adeoti et al. reported depression and anxiety among PLWHA in a tertiary hospital in South-Western Nigeria, while Chikezie et al. identified occupational status among the sociodemographic factors examined in PLWHA in Benin City.^{9,21} Differences in occupational structure, socioeconomic circumstances and the distribution of occupational categories may explain some of the differences between studies. Given the small number of participants in some occupational categories in the present study and the wide confidence interval around the adjusted estimate, further studies with larger samples are required before firm conclusions can be drawn.

Educational status

Educational status was significantly associated with screen-positive depressive symptoms at bivariate analysis. Participants with no formal education had the highest observed proportion of screen-positive symptoms, while those with tertiary education had the lowest. This

finding is consistent with previous reports suggesting that lower educational attainment may be associated with poorer mental health among PLWHA. El-Badawi et al. and Bhatia and Munjal reported higher levels of depression among participants with lower educational attainment.^{12,22}

However, educational status did not remain statistically significant in the multivariable model. Thus, the present study does not support educational attainment as an independent adjusted association with depressive symptoms. The observed crude relationship may partly reflect differences in other social or psychosocial characteristics across educational groups.

Social support

Social support demonstrated one of the strongest associations with screen-positive depressive symptoms in this study. Participants with poor or moderate social support had markedly higher adjusted odds of screening positive than those with strong social support. This finding is consistent with previous Nigerian evidence. Adimora et al., in a large study involving PLHIV in three teaching hospitals in South-Eastern Nigeria, found an important relationship between social support and depression, with social-support measures demonstrating substantial explanatory value for depression.²⁴ Mekonen et al. also reported an association between poor social support and depressive symptoms among PLHIV.¹¹

The present finding is further supported by international and African systematic reviews. Armoon et al. found that HIV-related stigma was associated with depression and that stronger social support was associated with less stigma among PLWH.²⁵ A recent African systematic review and meta-analysis similarly found that poor social support was associated with substantially higher odds of depressive symptoms among PLHIV.²⁰

Social support may provide emotional, informational and practical resources that facilitate coping with chronic illness and reduce isolation. Conversely, inadequate support may increase vulnerability to psychological distress. However, because of the cross-sectional design, the direction of this relationship cannot be established; depressive symptoms may themselves reduce social engagement and perceived support.

HIV-related stigma

Perceived HIV-related stigma was strongly associated with screen-positive depressive symptoms. Participants who perceived HIV-related stigma had a much higher proportion of depressive symptoms at bivariate analysis, and stigma remained statistically significant after adjustment.

This finding is consistent with previous Nigerian studies. Aguocha et al. reported an association between depression and stigma among PLWHA in Eastern Nigeria, while Onyebuchi-Iwudibia and Brown highlighted the role of HIV-related stigma in depression among PLWHA in Eastern Nigeria.^{10,26} Adewole et al. also reported depression and associated psychosocial factors among PLWHA attending an HIV clinic in South-Western Nigeria.²⁷ Eshetu et al. and Tesfaw et al. similarly documented associations between stigma and depression among PLWHA in Ethiopia.^{8,28}

The present finding is also strongly supported by systematic-review evidence. Rueda et al., in a meta-analysis of 64 studies, found that HIV-related stigma was significantly associated with higher levels

of depression and lower social support.²⁹ Armoon et al. similarly found a detrimental association between HIV-related stigma and depression among PLWH.²⁵ A systematic review of studies from South Africa also reported consistent associations between different forms of HIV-related stigma and depressive symptoms, while noting that the relationship may be bidirectional.³⁰

The relationship may therefore be complex: stigma may contribute to depressive symptoms through social isolation, shame, discrimination and fear of disclosure, while depressive symptoms may also influence how individuals perceive and respond to stigma. The strong adjusted association observed in this study nevertheless supports the importance of addressing HIV-related stigma as part of comprehensive HIV care.

CD4 count and viral load

CD4 count at diagnosis was significantly associated with screen-positive depressive symptoms at bivariate analysis, with the highest proportion observed among participants whose CD4 count was below 200 cells/mm³. Viral load was similarly associated with depressive symptoms at the bivariate level, with a higher proportion of screen-positive symptoms among participants with viral load ≥ 1000 copies/mL.

These findings are broadly consistent with African evidence. A recent systematic review and meta-analysis reported that a CD4 count below 200 cells/mm³ was associated with increased odds of depressive symptoms among PLHIV in Africa.²⁰ Previous studies have also reported relationships between depression and clinical markers of HIV disease progression.¹³

However, neither CD4 count at diagnosis nor viral load remained statistically significant in the multivariable model in the present study. Therefore, these clinical variables should be interpreted as bivariate associations rather than independent adjusted factors. Their loss of statistical significance after adjustment may indicate that the crude associations were partly explained by sociodemographic or psychosocial factors.

Implications for HIV care

The findings have important implications for comprehensive HIV care. The strong adjusted associations observed for social support and HIV-related stigma suggest that mental-health screening should be accompanied by interventions addressing the psychosocial environment in which PLHIV live.

Routine screening for depressive symptoms using validated instruments such as the PHQ-9 may facilitate early identification and referral. In addition, ART programmes should consider strengthening counselling, peer-support groups, family support and stigma-reduction interventions. Evidence from systematic reviews indicates that interventions addressing depression among PLHIV in sub-Saharan Africa can substantially reduce depressive symptoms, supporting the integration of mental-health interventions into HIV services.³¹

The occupational findings may warrant attention to the socioeconomic circumstances of PLHIV, but the present study does not establish that unemployment or any particular occupation causes depressive symptoms. Longitudinal studies and intervention trials are required to determine whether livelihood or economic-support interventions directly influence depressive symptoms.

Conclusion

Screen-positive depressive symptoms were common among people living with HIV/AIDS attending the adult ART clinic at Federal Medical Centre, Bida. Sex, marital status, occupation, educational status, HIV-related stigma, social support, CD4 count at diagnosis and viral load showed associations with depressive symptoms at bivariate analysis. After adjustment, poor and moderate social support, perceived HIV-related stigma, divorced marital status relative to widowed status, and artisan occupation relative to unemployment showed statistically significant associations. The strongest associations were observed for social support and HIV-related stigma.

These findings support the integration of mental-health screening and psychosocial support into routine HIV care. However, because of the cross-sectional design, the observed associations should not be interpreted as causal.

Recommendations

Routine screening for depressive symptoms using validated instruments such as the PHQ-9 should be considered as part of comprehensive HIV care, with appropriate assessment, counselling and referral for individuals who screen positive.

HIV care programmes should strengthen interventions aimed at reducing HIV-related stigma and improving social and family support for people living with HIV/AIDS.

Peer-support groups, counselling and other psychosocial interventions should be considered within ART clinics to strengthen social support and improve coping among PLWHA.

Given the observed association between occupational status and depressive symptoms, appropriate social and livelihood-support initiatives may be considered for vulnerable PLWHA. However, the present findings should not be interpreted as evidence that unemployment or any specific occupation causes depressive symptoms.

Longitudinal and intervention studies involving multiple health facilities and community populations are recommended to clarify temporal relationships and determine whether psychosocial, occupational and economic interventions influence depressive symptoms among PLWHA.

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