



Prevalence and Predictors of Depression Among People Living with HIV Attending an Outpatient's Clinic at the Nigerian Institute of Medical Research Yaba Lagos

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ABSTRACT

This study assessed the prevalence and predictors of depression among PLHIV attending the outpatient clinic of the Nigerian Institute of Medical Research (NIMR), Yaba, Lagos State. A cross-sectional research design was adopted for the study. A total of 371 adult PLHIV receiving antiretroviral therapy (ART) were selected using purposive sampling. Data were collected using a structured questionnaire which included socio-demographic characteristics, clinical and psychosocial factors, and the Patient Health Questionnaire-9 (PHQ-9) for measuring depressive symptoms. Data analysis was carried out using SPSS. Descriptive statistics was used to determine the prevalence of depression. Non-parametric tests (Mann-Whitney U test and Kruskal-Wallis test) engaged to examine differences in depression scores across gender, marital status, and age groups. Spearman's rank correlation was applied to assess the relationship between monthly income and depression, while multiple linear regression analysis was used to identify predictors of depression. The findings revealed that the prevalence of depression among the respondents was (17.85%). Significant differences in depression scores were observed across gender, marital status, and age groups ($p < 0.001$). Monthly income showed a weak but significant negative correlation with depression. Multiple linear regression analysis indicated that age and HIV-related stigma were significant predictors of depression, while other variables such as income, occupation status, duration on ART, substance use, and social support were not statistically significant. The study concludes that depression is prevalent among PLHIV attending NIMR, with younger age and HIV-related stigma being major predictors. Routine depression screening and stigma-reduction interventions were recommended as part of comprehensive HIV care.

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INTRODUCTION

Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDs) represent one of the most significant public health Challenges of modern times. HIV/AIDs has had a profound impact globally, affecting millions of individuals and communities, shaping health care systems, and sparking Social and political responses worldwide.

HIV is a virus that attacks the immune systems, specifically targeting CD₄ Cells (T Cells), weakening the body's ability to fight infections and diseases over time. If left untreated, HIV can progress to AIDs, the advanced stage of the disease characterised by severe immune deficiency.

Since the first recognised cases in the early 1980s HIV/AIDs has evolved into a global pandemic, with an estimated 30 million people living with HIV worldwide. Sub-Saharan Africa remains disproportionately affected by the epidemic though significant progress has been made in prevention and treatment efforts in recent years.

HIV is primarily transmitted through unprotected sexual contact, sharing contaminated needles, mother-to-child transmission during childbirth or breast feeding, and exposure to infected blood products. Prevention strategies include condom use, harm reduction programs, pre-exposure prophylaxis (PrEP), and testing and counseling services.

Timely diagnosis of HIV infection is crucial for effective management and access to care. Antiretroviral therapy (ART) has transformed HIV infection into a manageable chronic condition, reducing viral load, preserving immune function, and improving quality of life for those living with HIV/AIDs. HIV/AIDs has far-reaching social implications, including stigma, discrimination, and barriers to healthcare access for affected individuals. The epidemic has highlighted issues of equity, human rights, and Social justice, underscoring the importance of comprehensive and inclusive responses to HIV/AIDs.

The global response to HIV/AIDs has been multifaceted, involving international organisations, governments, civil society, health care providers, and communities. Efforts have focused on prevention programs, treatment access, awareness campaigns, research funding, and advocacy for policies promoting HIV/AIDs education, prevention, care and support.

Despite significant advancements in HIV/AIDs research and treatment, challenges persist, issues such as stigma and discrimination, access to care in marginalised populations, medication adherence, funding sustainability, and emerging drug resistance continue to shape the landscape of HIV/AIDs prevention and treatment efforts.

HIV/AIDs represents a complex and multifaceted public health issue that requires ongoing commitment, innovation, and solidarity to address effectively. Through comprehensive prevention strategies, universal access to treatment, and community engagement, the global community seeks to achieve the goal of ending the HIV/AIDs epidemic as a public health threat.

The intersection of HIV/AIDs with mental health challenges, particularly depression and other mental health disorder, can significantly impact the well-being, treatment outcomes, and quality of life of individual's living with HIV/AIDs. Understanding this nexus is crucial for providing holistic care and support to those affected by the dual burdens of physical illness and mental health conditions.

Individuals living with HIV/AIDs are at an increased risk of experiencing depression due to the psychological, emotional and social stressors associated with their diagnosis and illness. The stigma surrounding HIV/AIDs fear of disclosure, concerns about health outcomes, and social isolation can contribute to feelings of hopelessness, anxiety, and depression among those affected.

Depression and other mental health issues can adversely affect adherence to antiretroviral therapy (ART) and engagement in HIV care, leading to suboptimal treatment outcomes and progression of the disease. Co-morbid depression is associated with poorer immune function, higher viral loads, increased risk behaviors, and lower quality of life among individuals living with HIV/AIDs.

The biopsychosocial model highlights the interplay between biological, psychological, and social factors in influencing mental health outcomes among individuals with HIV/AIDs. Co-occurring mental health issues can exacerbate the physical symptoms of HIV/AIDs, compromise immune function, and impact overall health and well-being.

Structural barriers, such as limited access to mental health services, stigma around mental illness, and lack of integration of mental health care within HIV/AIDs clinics, can impede the identification and management of mental issues among individuals with health HIV/AIDs. Cultural beliefs, discrimination, and mental health literacy gaps may further hinder help – seeking behavior and appropriate mental health support for those affected.

Comprehensive Care for individuals with HIV/AIDs should include routine screening for mental health issues, counseling services, and access to mental health professionals for diagnosis and treatment of depression and other mental health disorders. Integrated care models that address the physical, psychological, and social needs of individuals living with HIV/AIDs can improve treatment adherence, health outcomes, and quality of life.

Psychotherapeutic interventions, support groups, cognitive behavioral therapy, and mindfulness-based approaches have shown benefit in managing depression and mental health challenges among individuals with HIV/AIDs. Social support networks, peer mentoring programs, and community-based interventions can contribute to resilience, empowerment, and emotional well-being for those facing the dual challenges of HIV/AIDs and mental health conditions.

Advocacy efforts to promote mental health awareness, reduce stigma, advocate for policy changes that prioritise mental health services within care settings are essential for addressing the mental health needs of individuals living with HIV/AIDs. Care settings are essential for addressing the mental health needs of individuals living with HIV/AIDs. Collaboration between health care providers, mental health professionals, community organisations and policymakers is

crucial holistic and integrated approaches to mental health issues in the addressing manta context of HIV/AIDs care.

Since its identification in the early 1980s, Human Immunodeficiency Virus (HIV) has evolved into a major global public-health challenge, affecting millions worldwide. HIV undermines the immune system by targeting CD4 cells—critical components of immune defense thereby increasing susceptibility to opportunistic infections and certain cancers, Oyapero et al., (2023). In the absence of treatment, HIV advances to Acquired Immunodeficiency Syndrome (AIDS), characterised severe immune-deficiency and life-threatening complications. Efforts such as Millennium Development Goals (MDG) whose targets included halting and beginning to reverse the spread of HIV/AIDS and achieving universal access to treatment have led to important gains in HIV prevention and treatment (MDG Monitor). However, the HIV epidemic persists, and is now shifting to a chronic disease paradigm, bringing new burdens beyond mere viral control. The burden of depression in this p opulation is compounded by HIV-related stigma, social isolation, medication side effects, poverty, and fear of disease progression, Molapo et al., (2025). Recent studies conducted across sub-Saharan Africa and other low-resource settings have shown high prevalence rates of depression among PLHIV. For instance, in rural Nigeria, Adedeji et al., (2023) reported a significant correlation between depressive symptoms and sociodemographic factors such as gender, marital status, and education. Similarly, Lukumay et al., (2022) found that newly diagnosed PLHIV in Tanzania exhibited high levels of moderate to severe depressive symptoms, especially those with limited social support. In Southeast Ethiopia, nearly half of PLHIV attending ART clinics experienced depressive symptoms, often influenced by stigma and a lack of family support, Desta et al., (2022). Importantly, depression not only affects the psychological well-being of PLHIV, but also undermines ART adherence, immune function, and overall treatment outcomes. As outlined in the systematic review by Molapo et al. (2025), depression significantly increases the risk of poor ART adherence, which in turn worsens HIV disease progression. Similarly, Amare et al. (2025) concluded that depression among PLHIV is a critical determinant of poor quality of life and must be routinely screened in HIV care programs. Despite this evidence, mental health services remain fragmented or entirely absent in many HIV care settings. This is especially troubling in sub-Saharan Africa, where the dual burden of HIV and mental illness often goes unaddressed due to limited resources and mental health stigma, Vezi et al., (2023). Adolescents, in particular, represent a vulnerable group. A study in Malawi found that HIV-positive adolescents experiencing depression were often subjected to stigma and discrimination, which exacerbated their mental health challenges Ziyaya et al., (2022); BMC Global and Public Health, (2024). From a policy perspective, global initiatives such as Millennium Development Goal 6 (MDG 6) which aimed to halt and reverse the spread of HIV/AIDS by 2015 played a significant role in expanding ART access. However, mental health was not adequately integrated into these goals (MDG Monitor). In the post-MDG era, there is growing consensus that HIV care must adopt a more holistic approach one that includes psychosocial support, routine depression screening, and treatment integration Ndenkeh et al., (2022). Moreover, the co-existence of undernutrition and depression further complicates HIV management. Seid et al., (2023) found a high prevalence of both conditions in sub-Saharan Africa, with undernourished PLHIV more likely to exhibit depressive

symptoms. This reflects the broader syndemic nature of HIV, where biological, psychological, and social factors interact to compound health disparities. While the prevalence of depression among PLHIV has been well-documented in global studies, there remains a need for localised, context-specific research that explores how factors such as age, sex, income, education, social support, and stigma interact to influence mental health outcomes. Understanding these dynamics is essential for designing effective interventions that address not only viral suppression but also quality of life and mental well-being. Among these is the rising psychological burden faced by people living with HIV (PLHIV).

Depression is one of the most common mental health disorders among people living with HIV/AIDS (PLHIV), with significant implications for treatment outcomes and quality of life. Globally, the prevalence of depressive symptoms among PLHIV is estimated at approximately 34%, Getachew et al., (2022). In sub-Saharan Africa, studies report prevalence rates ranging from 30% to 45%, highlighting the burden in low-resource settings, Ayele and Tessema, (2023). Depression in PLHIV is associated with poor adherence to antiretroviral therapy (ART), disease progression, and increased mortality, Mohamud et al., (2023). Numerous studies have identified predictors of depression in PLHIV. Socio-demographic factors such as female gender, low income, unemployment, and lack of education are significantly associated with depressive symptoms, Desta et al., (2022). Clinical factors, including advanced disease stage, low CD4 count, ART side effects, and comorbid chronic illnesses, also contribute to depression, Adedeji et al., (2023). In sub-Saharan Africa, where HIV is highly prevalent, the intersection of mental health and HIV has received increased attention in recent years. Identifying the prevalence and potential predictors of depression among PLHIV is critical for integrating mental health interventions into HIV care programs. Previous studies have shown that factors such as stigma, low social support, economic hardship effects may contribute significantly to depressive symptoms, (Olagunju, 2022; Adewuya 2020). Moreover, evidence suggests that integrated mental health screening in HIV care improves ART adherence and retention in care, Collins et al., (2020). In Nigeria, research by Adewuya, (2020) found a depression prevalence rate of (28%) among HIV- positive patients attending an outpatient clinic. Another study by Olagunju, (2020) highlighted that HIV-related stigma, poor ART adherence, and social isolation were significant predictors of depression among people living with HIV (PLWH) in Nigerian. A significant number of people living with HIV, (86%), knew their HIV status in 2023 World Health Organisation, (2023). Sub-Saharan Africa represents less than one- eighth of the world's population, over two-thirds of the estimated (35.3) million people living with HIV/AIDS worldwide live in the sub-Saharan region Pustil, (2020). The introduction of highly active antiretroviral therapy (HAART) in the 1990s marked a major gain in HIV/AIDS treatment efficacy, and a reduction in morbidity, mortality, and quality of life of these patients. In Brazil, the policy of free and universal access to antiretroviral therapy has been in place since 1996. In Taiwan, under the policy of free ART since 1997, the mortality rate of people living with HIV/AIDS (PLWHA) was also significantly decreased in comparison to the pre-ART era (1984–1997; Yang C.H, 2023). Currently, the recommendation is for early onset of HAART, due to the benefits for people living with HIV/AIDS as well as for viremia control. However, in order for HAART to be successful, adherence is crucial and is strictly associated with

virologic suppression. The efficacy of HAART, depends on maintaining high rates of treatment adherence, considered in most of the scientific literature as adherence equal to or greater than (95%) of the prescribed dosages, Charles, (2022). Furthermore, psychosocial stressors like HIV-related stigma, poor social support, and substance use are strongly linked to depressive outcomes, Nutor et al., (2023). While cross-sectional studies provide important insights, longitudinal research is limited, and causal relationships remain unclear. Most studies are concentrated in African contexts, with limited data from Asia and Latin America. Moreover, variations in depression screening tools and cut-off points contribute to inconsistent prevalence estimates. Overall, the high prevalence and multiple predictors of depression among PLHIV underscore the need for integrated mental health services within HIV care programs to improve health outcomes and quality of life. The dual burden of HIV and mental health disorders complicates treatment adherence, quality of life, and HIV-related outcomes. Understanding how common depression is in PLWH and what factors predict it is essential to designing appropriate screening and intervention strategies. In PLWH, several mechanisms may contribute to elevated depression risk: biological e.g., neuroimmune changes, chronic inflammation, psychosocial e.g., stigma, social isolation), and treatment-related e.g., antiretroviral therapy side-effects. The HIV epidemic remains prominent in many low- and middle-income countries, particularly in sub-Saharan Africa, where mental-health resources can be limited. Thus, it is critical to review up-to-date evidence on prevalence and predictors of depression in this population.

Depression is responsible for more 'years lost' to disability than any other condition. According to the World Health Organization (WHO), 350 million suffer from depression. One review found that patients tended to experience depression or anxiety as a consequence of being diagnosed with a chronic disease, Abdoal Karim et al., (2022).

Adebayo et al., (2020), found that 28% of HIV-positive patients in Lagos had not completed primary education, and 34% were unemployed, pointing to poverty and lack of awareness as major predictors, Okafor et al., (2020) conducted a survey in Anambra State and reported that poor access to healthcare and fear of stigma contributed to underreporting and late diagnosis.

Onyango et al., (2021), discovered in Kenya that substance use and peer pressure were significant predictors among youth aged 18–29. Globally, approximately 39 million people were living with HIV by the end of 2022, with 1.3 million new infections reported that year alone (UNAIDS, 2023). Sub-Saharan Africa remains the most affected region, accounting for about two-thirds of the global total. Though significant progress has been made through prevention campaigns and ART availability, many countries still face high prevalence rates. HIV in Nigeria and Sub-Saharan Africa: Nigeria has one of the largest HIV epidemics in the world, with an estimated 1.8 million people living with HIV (NACA, 2022). Prevalence varies by region, gender, and socio-economic status, with higher rates observed in the South-South and North-Central zones. Women and young girls are disproportionately affected due to gender inequalities, poverty, and limited access to health education, (Adebayo & Akande, 2020)

Gideon et al (2026) conducted an analysis to determine the seroprevalence and risk factors associated with HBV infection among patients attending SUMAS Medical Center, Igbo-Eno, Enugu State, Nigeria. Their findings revealed an intermediate seroprevalence of HBV infection, and

highlighted variables such as sharing of sharps, being sexually active and living with a family member that has HBV infection as risk factors significantly associated with high infection.

Another recent review in Africa, Molapo et al., (2025) found that the estimated pooled prevalence of depressive symptoms among PLWH was 33.32% in Africa. In Africa more specifically, a review reported that among PLWH on ART the pooled prevalence was around ~36% (95% CI 27–40%) from 21,143 PLWH in 34 cross-sectional African studies.

MATERIALS AND METHODS

Study Design

The study employed cross-sectional study design to determine the prevalence and identify the predictors of depression among people living with HIV/AIDS at the Nigerian Institute of Medical Research (NIMR) in Yaba Local Government Area of Lagos state, Nigeria.

Study Setting

The study was conducted at the Nigerian Institute of Medical Research, a public health facility located in Yaba, Lagos State, which provides comprehensive HIV care and treatment services.

Study Population

The target population included adult patients (aged 18 years and above) at the NIMR clinic who were about five thousand diagnosed with HIV and receiving antiretroviral therapy (ART) at the facility during our study period.

Sample Size Determination

The sample size was calculated using the Taro Yamane formula to determine sample sizes in relation to the population under study such that inference and conclusions reached after the survey can be generalised to the entire population from which the sample is obtained as (Pustil R, 2023):

$$n = \frac{N}{1 + N(e^2)} \quad (1)$$

Where

n = sample size

N = population size

e = degree of precision/ error margin

N=5000, e = 0.05

$n = 5000 / 1 + 5000(0.05^2) = 371$

Hence, sample size is 371.

A total of 371 participants were selected using purposive sampling. This sample size was deemed sufficient to ensure diversity and representativeness across age, gender, socioeconomic status, and health-seeking behaviour within the population of people living with HIV in the area. The size also allows for statistical analysis and general insights into predictors and prevalence.

Sampling Technique

Purposive sampling (also known as judgmental sampling) was employed which a non-probability is sampling technique where the researcher selects participants based on specific characteristics or criteria that are relevant to the research objective. This means that all consecutive individuals (who meet the inclusion criteria) during the period of the study (Pustil R, 2023).

Data Collection Tools and Procedures

Data collated using a structured questionnaire included three main sections:

Socio-demographic information (age, gender, education, income, marital status, etc.)

Clinical data (HIV duration, CD 4 count, ART adherence, comorbid conditions)

Depression assessment using a validated tool such as the Patient Health Questionnaire-9 (PHQ-9).

Statistical tools

Mann–Whitney U Test

The Mann–Whitney U test is a non-parametric test used to compare two independent groups on a continuous or ordinal outcome when the data does not meet normality assumptions (Armoon B, 2022).

Formula 1: Mann–Whitney U Test

$$U_{\text{test}} = n_1 \cdot n_2 + \frac{n_1(n_1+1)}{2} \cdot R_1 \quad (2)$$

Where:

n_1 = sample size of group 1

n_2 = sample size of group 2

R_1 = sum of ranks for group 1

The smaller p- value is used for significance testing.

Interpretation:

If $p < 0.05$, the two groups differ significantly

Mean ranks indicate which group has higher scores

Kruskal–Wallis H Test: The Kruskal–Wallis H test compares three or more independent groups on a continuous or ordinal outcome when the data violates normality assumptions (Armoon B, 2022).

Used to compare depression scores across three or more groups (e.g., age groups, marital status).

Formula 2: Kruskal–Wallis H Test

$$H_{\text{test}} = \frac{12}{N(N+1)} \sum \frac{R_i^2}{n_i} - 3(N+1) \quad (3)$$

Where:

N = total sample size

R_i = sum of ranks for group i

n_i = sample size of group i

Interpretation:

If $p < 0.05$, at least one group differs

Post-hoc tests identify where differences lie

Spearman's Rank-Order Correlation (ρ)

Spearman's rank correlation measures the strength and direction of a monotonic relationship between two ranked or non-normally distributed variables. Used to assess relationships between ordinal/continuous non-normal variables (e.g., monthly income and depression score) (Adewuya A.O, 2020).

Formula 3: Spearman's Rank-Order Correlation

$$\rho = 1 - \frac{6 \sum d^2}{n(n^2-1)} \quad (4)$$

Where:

d = difference between paired ranks

n = number of observations

Interpretation:

$\rho = +1$: Perfect positive relationship

$\rho = -1$: Perfect negative relationship

$\rho = 0$: No relationship

Multiple Linear Regression

Multiple Linear Regression was used to examine the combined effect of predictors on depression scores (Armoon B, 2022). In statistical form, a multiple linear regression model is written as:

$$Y = \beta_0 + \beta_1 + \beta_2 + \beta_3 + \dots + \beta_k \quad (5)$$

Y = Dependent variable

β_0 = constant (Intercept)

$\beta_1, \beta_2, \beta_3 \dots \beta_k$ = Independent variables

Variables

Dependent Variable

Presence of depression (assessed using PHQ-9; cutoff score is 27 for moderate to severe depression)

Independent Variables

Duration of HIV diagnosis, CD4 count, ART adherence, Age Social support, substance use, comorbid illnesses

Multiple regression was still appropriate because:

The dependent variable was continuous

The sample size was large ($n > 300$), making regression robust under the Central Limit Theorem

Regression assumptions (multicollinearity, independence) were satisfied

Data Analysis

Data entry were performed using Microsoft Excel. Data analysis were also conducted in SPSS (version 26) to determine the prevalence of depression and identify its predictors among people living with HIV. Descriptive statistics summarized participant characteristics. Non-parametric tests (the Mann–Whitney U and Kruskal–Wallis tests) were used to examine differences in depression scores across gender, marital status, and age groups. Spearman's rank correlation assessed the relationship between monthly income and depression. Finally, multiple linear regression analysis was used to identify significant predictors of depression. Statistical significance was set at $p < 0.05$

Eligibility Criteria

Inclusion Criteria

Eligible participants were people living with HIV (PLHIV) who were at least 18 years of age, had been receiving antiretroviral therapy (ART) for a minimum of six months, and were able to provide informed consent.

Exclusion Criteria

PLHIV were excluded if they, (1) had a known psychiatric diagnosis predating their HIV infection, (2) were unable to

communicate due to severe illness or cognitive impairment, (3) declined to provide informed consent.

Ethical Consideration

Ethical approval for this study were obtained from the National Institute for Medical Research (NIMR). Informed consent were secured from all participants prior to their involvement. To ensure confidentiality, participants were assigned unique identification numbers in lieu of their names, and all collected data were kept strictly confidential. Participation were entirely voluntary, participants were explicitly informed that they could withdraw from the study at any time without penalty, including while completing the questionnaire if they found any questions uncomfortable.

Pilot Study

A pretest (pilot study) were conducted prior to the main data collection to evaluate the clarity, relevance, and reliability of the structured questionnaire. The pre-test aimed to:

Assess comprehension of survey items

Identify ambiguous or unclear questions

Evaluate internal consistency of multi-item scales

Pretest Procedures

The pretest was carried out among 30 people living with HIV (PLHIV) at a comparable facility inside the main study site. Participants completed the full questionnaire and the data has been standardized under similar conditions planned for the main study (Adewuya A.O, 2020).

Reliability Analysis

Internal consistency of the multi-item scales (e.g., depression, psychosocial measures) were assessed using Cronbach's Alpha. The results are shown below:

Interpretation of Reliability Results

Table1 shows the Cronbach's Alpha value of 0.820 indicates high internal consistency for the combined set of 9 items on the questionnaire. This suggests that the items reliably measure the intended constructs and can be confidently used in the main study.

Table 1: Reliability Analysis

Cronbach's Alpha	No. of Items
0.820	9

RESULTS AND DISCUSSION

The results are presented using descriptive statistics, Mann–Whitney U test, Kruskal–Wallis test, Spearman's rank correlation, and multiple linear regression, followed by interpretation in line with the study objectives.

Socio-Demographic Characteristics of Respondents

Interpretation 1

Table 2 Shows that majority of the participants were between the age of 42-49 years (31.3%), and majority of the participants were female with (74.4%). (56.9%) are married and majority of the participants went to tertiary education with (47.8%), and majority of the participants were self-employed with 253(64.9%) and earned above 75,000 as monthly income with (65.6%).

Table 2: Social-Demographic Characteristics of Respondents

Age Interval	Frequency
18-25	21 (5.4%)
26-33	28 (7.2%)
34-41	64 (16.4%)
42-49	122 (31.3%)
50 Above	146 (37.4%)
Gender	
Male	91 (23.3%)
Female	290 (74.4%)
Marital status	

Age Interval	Frequency
Single	82 (21%)
Married	214 (56.9%)
Divorced	26 (6.7%)
Widowed	59 (15.1%)
Educational Level	
None	29 (7.4%)
Primary Education	64 (16.4%)
Secondary Education	106 (27.2%)
Tertiary Education	182 (47.8%)
Monthly Income	
< 75,000 Monthly	105 (26.9%)
≥ 75,000 Monthly	256 (65.6%)
Prefer not to talk	20 (5.1%)
Occupation	
Self-Employed	253(64.9%)
Private Organization	91 (23.3%)
Govern Organization	29 (7.4%)
Student	8 (2.1%)

Prevalence Rate = $\frac{68}{381} * 100 = 17.8477$

Depression prevalence rate is (17.8%) of the total population 381.

Duration on ART

Interpretation 2

Table 3.0 shows the mean duration of patient on ART was 10.82 with Std 4.064 which explains a long-term treatment.

Table 3: Duration on ART

	N	Mean	Std. Deviation
	Statistic	Statistic	Statistic
How long have you been receiving the ART	356	10.82	4.064

Hypotheses Test

Gender and Depression (Mann–Whitney U Test)

Alternative Hypothesis (H_{11})

There is a significant difference in depression scores between male and female people living with HIV.

Interpretation 3

Table 4.0 shows that A Mann-Whitney U test was conducted to examine gender differences in depression scores among PLWH. The test revealed a statistically significant difference between males (n = 91, mean rank = 160.09) and females (n = 290, mean rank = 200.70), U = 10,382.00, z = -3.49, p < .001. Female participants reported significantly higher depression scores than their male counterparts.

Table 4: Gender and Depression (Mann-whitney U-test)

Gender	N	Mean Rank	Sum of Ranks
Male	91	160.09	14568.00
Female	290	200.70	58203.00
Total	381		
Test Statistics	Depression score		
Mann-Whitney U	10382.000		
Wilcoxon W	14568.000		
Z	-3.492		
Asymp. Sig. (2-tailed)	.000		

Marital Status and Depression (Kruskal–Wallis Test)

Alternative Hypothesis (H_{12})

There is a significant difference in depression scores across marital status groups among people living with HIV

Interpretation 4

Table 5.0 shows A Kruskal-Wallis test revealed a statistically significant difference in depression scores across marital status groups (H (3) = 24.75, p < .001). Post-hoc examination of mean ranks showed divorced participants had the highest depression scores (mean rank = 237.77), followed by single (226.44), widowed (187.26), and married participants (172.77)

Table 5: Marital Status and Depression (Kruskal-Wallis Test)

Patients Marital status	N	Mean Rank
Single	82	226.44
Married	214	172.77
Divorced	26	237.77
Widowed	59	187.26
Depression mean score: 7.34	Std. Deviation: 5.171	Kruskal-Wallis H (24.746)
Marital status means: 2.16	Std. Deviation: 0.937	Df (3)

Age Group and Depression (Kruskal-Wallis Test)**Alternative Hypothesis (H_{13})**

There is a significant difference in depression scores across age groups among people living with HIV.

Table 6: Age Group and Depression (Kruskal-Wallis Test)

Patient Age Interval	N	Mean Rank
18-25	21	365.19
26-33	28	198.64
34-41	64	149.44
42-49	122	194.39
50 above	146	179.86
Depression mean score: 7.34	Std. Deviation: 5.171	Kruskal-Wallis H (82.079)
Age mean: 3.90	Std. Deviation: 1.156	Df (4)

Interpretation 5

Table 6.0 shows A Kruskal-Wallis test revealed a statistically significant difference in depression scores across age groups ($H(4) = 82.08$, $p < .001$). Examination of mean ranks showed a distinct pattern: participants aged 18-25 reported the highest depression scores (mean rank = 365.19), followed by those aged 26-33 (198.64), 42-49 (194.39), 50+ (179.86), and 34-41 (149.44)

Descriptive Statistics**Interpretation 6**

Table 7.0 shows A Spearman's rank-order correlation was conducted to assess the relationship between monthly income and depression scores. There was a statistically significant, weak negative correlation between income and depression ($\rho = -.139$, $p = .008$, $n = 365$), indicating that higher income was associated with lower depression scores.

Table 7: Correlation

	Mean	Std. Deviation
Section A: depression score	7.34	5.171
Patients Monthly Income	100453.95	53975.523
Correlations Coefficient		
Correlation Coefficient	depression score	Patients Monthly Income
	1.000	-.139**
N	381	365

Table 8: Multiple regression (Adjusted R)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.545 ^a	.297	.285	4.522

Table 9: Anova

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2989.566	6	498.261	24.365	.000 ^b
	Residual	7075.691	346	20.450		
	Total	10065.258	352			

Table 10: Multiple Linear Regression

Model		Unstandardized Coefficients		Standardized Coefficients
		Beta	Std. Error	Beta
1	(Constant)	12.428	1.174	
	Patients Age Interval	-1.673	.219	-.370
	Patients Occupation Status	.348	.392	.048
	Patients Monthly Income	-2.850E-6	.000	-.029
	Psychosocial score	.410	.089	.280
	Social support score	-.153	.063	-.116
	Substance use score	-.085	.159	-.028

$$\text{Depression Score} = 12.428 - 1.673(\text{Age}) + 0.410(\text{Stigma}) - 0.153(\text{Social Support}) + \text{error} \quad (6)$$

Interpretation in Simple Terms

- i. 12.428 → Expected depression score when all predictors are zero
- ii. Age (-1.673) → Each additional year of age reduces depression score by 1.673 units
- iii. Stigma (+0.410) → Each unit increase in stigma raises depression score by 0.41 units
- iv. Social Support (-0.153) → More support slightly reduces depression

Interpretation 10

Table (8 – 10) shows a multiple linear regression was conducted to predict depression scores from six predictors: age, occupation status, monthly income, psychosocial (stigma) score, social support score, and substance use score. The model was statistically significant, $F(6, 346) = 24.37$, $p < .001$, and explained 28.5% of variance in depression scores (Adjusted $R^2 = .285$). Age was the strongest predictor ($\beta = -.37$, $p < .001$), with younger participants reporting higher depression. Higher stigma scores predicted higher depression ($\beta = .28$, $p < .001$), while greater social support predicted lower depression ($\beta = -.12$, $p = .016$). Occupation, income, and substance use were not significant predictors in the multivariate model.

Discussions

What factors really matter?

1. Age (Very important)

Younger patients are more depressed than older patients.

As patients grow older, their level of depression reduces.

This may be because older patients:

Have accepted their condition better

Have lived longer with treatment

Have developed coping skills

The younger the patient, the higher the chance of depression.

HIV-Related Stigma (Most important factor)

Patients who experience shame, discrimination, rejection, or fear of being judged are much more depressed. Stigma increases depression more than any other factor studied. When people feel rejected or ashamed because of HIV, their depression becomes worse.

What factors did NOT strongly affect depression?

Monthly Income

Whether a patient earns more or less money did not significantly change depression levels. This suggests depression is not just about money.

How Long the Patient Has Been on ART

Being on ART for many years did not by itself reduce or increase depression. Psychological factors matter more than treatment duration.

Social Support

Although support helps emotionally, it was not strong enough alone to predict depression when stigma and age were considered.

Substance Use

Substance use did not strongly explain depression in this study.

This may be because most patients reported low substance use.

Socio-demographic Perceptions

Stress from social conditions showed only a weak influence. Age ($\beta = -0.370$, $p < 0.001$): Younger age independently predicted higher depression scores.

HIV-related Stigma ($\beta = 0.280$, $p < 0.001$)

Stigma was the strongest predictor of depression.

Non-Significant Predictors

Monthly income, duration on ART, social support, substance use, and socio-demographic perceptions did not independently predict depression when other variables were controlled. The study found that depression is prevalent among PLWH attending NIMR. Younger age and HIV-related stigma were the most significant predictors of depression, while income, substance use, and ART duration showed limited independent influence.

Summary of Findings

The study revealed that the prevalence of depression in HIV-infected patients was (17.8%), comparable to previous reports for HIV-infected patients. The Nigerian rural study found a comparatively low (16.3%) prevalence (Okafor, A 2023). The findings of this study also confirm that depression remains a significant mental health concern among people living with HIV. The observed mean depression score (7.34) aligns with previous studies reporting mild to moderate depressive symptoms among PLWH in Nigeria and sub-Saharan Africa (Adewuya, 2020; Olagunju, 2022).

The negative association between age and depression supports existing literature suggesting that younger PLWH experience greater psychological distress due to stigma, fear of disclosure, uncertainty about the future, and socioeconomic instability (Ayano et al., 2021). Older individuals may develop adaptive coping strategies over time. HIV-related stigma emerged as the strongest predictor of depression, corroborating earlier findings that stigma undermines self-esteem, social support, and mental wellbeing (Molapo et al., 2025; Armoon et al., 2022). Stigmatization remains a major psychosocial barrier in HIV care despite advances in treatment.

CONCLUSION

Depression is common among people living with HIV/AIDS attending NIMR, Lagos State. Younger age and HIV-related stigma significantly predict depressive symptoms. These findings underscore the need for routine mental health screening and stigma-reduction strategies within HIV care program. Mental health screening should be integrated into routine HIV care using validated tools such as PHQ-9. Targeted interventions addressing HIV-related stigma should be implemented at clinic and community levels. Mental health programs should prioritize anti-stigma campaigns, particularly in schools, communities, and healthcare settings. Public education can reduce misconceptions about depression and encourage early help-seeking. Encourage group counselling, promote family and peer-support programs should be strengthened, especially for newly diagnosed and younger PLWH. Healthcare workers should be trained to identify and manage depression among PLWH. Mental health services should be incorporated into national HIV/AIDS treatment guidelines. Healthcare providers and ART programmes should expand home-based and community ART delivery systems. This approach can reduce clinic congestion and

waiting time, minimise stigma and discrimination, improve medication adherence and retention in care.

The preference for injections suggests the need to gradually introduce long-acting injectable antiretroviral therapy where clinically appropriate. Educate patients on the benefits and eligibility criteria. This can reduce daily pill fatigue and improve treatment compliance.

The study recommends that, policymakers and healthcare administrators should strengthen subsidy programmes and partner with NGOs and international donors. They could ensure uninterrupted free or low-cost ART access. More so, the reduction of drug cost would improve equity and long-term treatment sustainability.

To address staffing concerns, ART programmes should employ additional doctors, nurses, and counsellors, provide continuous training in mental health, counselling, and ART management. This would improve service quality and patient satisfaction. Healthcare facilities should, implement appointment scheduling systems, reduce unnecessary delays in service delivery, use task-shifting strategies to optimize workflow, improved time management will enhance patient experience and clinic efficiency.

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