

Depressive Symptoms and Associated Factors Among People Living with HIV/AIDS and Undergoing Antiretroviral Therapy: A Cross-Sectional Study in the Amathole District, South Africa

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Background and Aim: People living with HIV/AIDS (PLWHA) are susceptible to depressive symptoms. Consequently, we examined the prevalence of depressive symptoms and associated factors among PLWHA and on antiretroviral therapy (ART) in South Africa.

Methods: We conducted a cross-sectional study of 150 PLWHA on ART in primary health facilities in Amathole District, Eastern Cape Province of South Africa. A self-designed questionnaire solicits information on participant's demographic characteristics. Patient Health Questionnaire (PHQ-9) rating scale was used to screen depressive symptoms (cut-off point of ≤ 5). Data was also collected on lifestyle behaviours, early ART initiation, medication adherence, depression-related symptoms, and depression severity scores.

Results: The prevalence of depressive symptoms was 41.3%, with females exhibited higher prevalence (67.7%) compared to males (32.3%). Depressive symptoms was significantly associated with unemployment, female gender, low educational level, and HIV staging. Predictors of depressive symptoms were lower CD4 cell count of 350 to 500 (OR=4.0; 1.05–17.50), pain and discomfort (OR=6.2; 1.69–28.01), suffering from complications and opportunistic diseases (OR=1.5; 0.19–3.49), experiencing discrimination at health facilities (OR=11.0; 0.93–167.1), and workplaces (OR=18.1; 2.53–43.23), and being satisfied with ART treatment results (OR=0.1; 0.05–1.06).

Conclusion: Depressive symptoms was high among PLWHA in this setting, and particularly in women compared to men. Low CD4 cell count, pain and discomfort, complications and opportunistic diseases, discrimination at health facilities and workplaces were more likely susceptible to depressive symptoms. Mental health screening should be prioritised in primary health care facilities for early detection of depressive symptoms to facilitate prompt referrals and treatment.

Keywords: HIV, AIDS, depression, antiretroviral therapy, ART, South Africa

Introduction

Mental health is a developing global public health concern that affects all populations. People living with HIV/AIDS (PLWHA) are susceptible to depressive and anxiety disorders or their symptoms,¹ but depressive symptoms are the most frequently observed mental disorder among PLWHA.^{1–3} The majority of the PLWHA (36.0 million) lives in sub-Saharan Africa (SSA); 630,000 HIV-related deaths, 1.3 million newly infected with HIV, and 29.8 million receives antiretroviral therapy (ART) in 2021.⁴ Notwithstanding the spectrum of interventions, the HIV prevalence rates continue to increase in developing countries compared to developed countries. In South Africa, 17.8% of people with HIV or AIDS (11.9–23.2%) are on ART,⁴ With an estimated 17.8% of all PLWHA, South Africa has the highest prevalence of HIV in the world.⁴ Despite this alarming prevalence, the mortality rate and risk of poor HIV-treatment outcomes among persons with mental illness have increased considerably in South Africa.⁵ Nonetheless, advancements in HIV treatment have

significantly increased life expectancy and enhanced the quality of life for those living with HIV.^{6,7} With the availability, accessibility, and efficacy of ART, individuals are now able to live with and manage their HIV condition as a chronic illness, similar to hypertension and diabetes. Notably, in South Africa, access to healthcare is free for both citizens and non-citizens, and treatment for HIV and counselling are provided in health facilities to assist clients with depressive problems.

The estimated global prevalence of depressive symptoms among PLWHA is 34.17%.⁸ A systematic and meta-analysis study reports the prevalence of depressive symptoms using screening tool to be 26.0% in sub-Saharan Africa, and 44.7% in South Africa, respectively.⁹ In addition, the prevalence of depressive symptoms among HIV-positive individuals in sub-Saharan Africa was 27.0% with a mean estimate of 6.376 million, while in South Africa it was 29.1% with a mean estimate of 2.076 million.⁹ Notably, compared to the general African adult population, PLWHA have a higher prevalence of depressive symptoms.^{9,10} Thus, considering the burden of HIV/AIDS, efforts to assist PLWHA are crucial to improve their health and well-being.

Socio-demographic, psychosocial, and HIV-related clinical variables constitute the factors associated with depressive symptoms among PLWHA. Studies have shown that older age,^{10–13} female gender,^{14–16} single or divorced/widowed marital status,^{2,10,17} low educational attainment,^{1,13} low financial income or hardships,^{14,18} difficulty accessing HIV care and treatment services,^{19,20} and HIV positive status^{12,21} as the socio-demographic correlates of depressive symptoms in PLWHA. Pertaining to psychosocial factors, low social support,^{3,10,12} food insecurity,²² HIV-related stigma and discrimination,^{1,16,19,23} risky sexual behaviours,²⁴ and social isolation,^{14,25} are significantly associated with depressive symptoms in PLWHA. Other psychosocial correlates of depressive symptoms among this population include family conflict or crises,⁵ stressful life events,²⁶ and alcohol and other substance abuse use.^{18,24,27} Yet, research has shown that HIV-related clinical variables associated with depressive symptoms in PLWHA include side effects of ART,^{28–30} and poor adherence to ART.^{1,8,13,15} Depressive symptoms are detrimental to the health of PLWHA, particularly when adherence to ART is irregular. A recent study found that PLWHA with depressive symptoms were 2.6 times more likely to not adhere to their ART medication than their counterparts.¹⁰ Therefore, research is required to comprehend the multiplicity of correlates influencing depressive symptoms in various contexts in order to inform the development of interventions that are unique and applicable to diverse geographical settings.

Although there are studies on depressive symptoms among PLWHA across geographical regions or provinces in South Africa,^{5,15,26} extrapolating findings from different contexts to inform interventions seeking to address the mental health of PLWHA in South Africa may prove infeasible because of context-specific socio-demographic, psychosocial and HIV-related clinical factors operating in varying settings as well as variations in prevalence estimates across regions or provinces. The paucity of research on PLWHA in Mquma sub-district, a resource-constrained rural and semi-urban region in the Eastern Cape of South Africa, necessitated an understanding of the context-specific factors associated with depressive symptoms among PLWHA from this setting. Such knowledge would inform tailored measures to improve adherence to ART and the health of PLWHA in the setting. Consequently, this study investigated the prevalence of depressive symptoms and associated factors among individuals living with HIV and on ART in Mquma sub-district of the Eastern Cape Province, South Africa.

Methods

Study Design, Setting, and Participants

This cross-sectional health facility-based descriptive study was conducted in South Africa among PLWHA on ART, attending healthcare facilities in Amathole district, Mquma sub-district, Eastern Cape, one of the country's poorest provinces. The population primarily consists of black Africans, with a few Coloureds, Indians, and Whites. The sub-district is comprised of semi-urban and is a mix of deep rural with approximately 75,410 households.³¹ The study targeted public health facilities managing PLWHA on ART in Mquma sub-district which has 28 health facilities covering Butterworth, Centane, and Ngqamakwe.

Sample Size Determination and Sampling Procedure

Using a systematic sampling technique, we chose the third clinical health facility from the district health department's list of 28 clinical health facilities. Nine clinical health facilities administering HIV programs were subsequently chosen for the study. Convenience sampling was used to select 150 participants from the nine designated health facilities in the Mnkuma sub-district due to the sensitivity of the research concerning the disclosure of HIV/AIDS, as well as cost and ease of accessibility and availability. Consequently, PLWHA on ART who were at least 18 years old, on ART for a year, and receiving chronic care were included in the study. However, critically ill participants with significant cognitive and communication difficulties were excluded.

Primary Outcome Measure: Depression (Symptoms)

The Patient Health Questionnaire (PHQ-9) rating scale,³² was used to assess depressive symptoms in PLWHA. The PHQ-9 instrument has been used and validated as a reliable tool for screening depressive symptomatology among PLWHA in several countries: Cameroon,³³ Nigeria,³⁴ Kenya,^{35,36} Thai,³⁷ Uganda,³⁸ and South Africa.³⁹ The PHQ-9 was selected primarily due to its simplicity of administration, especially in settings with limited resources. The PHQ-9 research instrument utilises a 4-Likert scale ranging from 0 ("not at all") to 3 ("nearly every day"). The total score ranges from 0 to 27. In order to assess the severity of depressive symptoms,³² the following scoring system was utilised: 5–9 points=mild; 10–14 points=moderate; 15–19 points=moderately severe, and 20–27 points=severe. In contrast, those who scored below 5 points were not deemed depressed. Depressive symptoms were defined with a cut-off score of ≥ 5 out of a total of 27. On the basis of this criterion, participants who scored ≥ 5 were classified as having depressive symptoms, whereas participants who scored < 5 had no depressive symptoms. This threshold has been used in previous studies of PLWHA in sub-Saharan African nations.^{16,29,40}

Covariates and Other Measurements

We developed a structured questionnaire aimed at collecting participants' information in terms of their socio-demographic characteristics (gender, age, educational level, marital status, employment status, average monthly income (South Africa Rand (ZAR))). In addition, medical variables assessed include: living conditions, HIV period, history of alcohol intake, smoking, ART initiation period (CD4 cell count (cells/ μ L), ART treatment adherence, and quality of treatment received from health facility.

Data Collection Procedure

Data collection took place from May to July 2019. The study employed research assistants who were registered nurses with relevant understanding of HIV/AIDS-related healthcare and who could speak in both isiXhosa and English. Due to the lack of an isiXhosa-language version of the PHQ-9 depression scale, the PHQ-9 questionnaire was translated into the isiXhosa language to accommodate cultural nuances of the instrument and non-English speaking participants. The translation was performed by a professional language translation expert and an independent language translator for improvements and linguistic ambiguities in the test items. The research assistants were taught to administer the questionnaire and to help English and Xhosa-illiterate individuals in isiXhosa (the latter being the predominant dialect of this locality). The unit management offered a private area for the interviews, which were conducted independently of family and relatives.

Data Analysis

Data were analysed using descriptive and inferential statistics. Frequency, percentages, mean, and standard deviation were calculated for categorical variables. In addition, the chi-square test was used to examine comparisons between groups. The crude association of all variables for screening for depressive symptoms (PHQ-9 cut-off score ≥ 5) was evaluated using univariate logistic regression with $p < 0.2$ for the final model.⁴¹ Regarding the final model, the Hosmer-Lemeshow goodness of fit statistic with a p-value greater than 0.05 was deemed appropriate. The multivariate logistic regression analysis examines the factors related to depressive symptoms in PLWHA receiving ART. The Statistical

Package for social sciences (SPSS) version 26.0, IBM SPSS, Chicago, IL, USA) was used for all statistical analyses. Statistical significant values were considered at $p < 0.05$.

Ethical Considerations

The University of Fort Hare Health Research Ethics Committee gave its approval to the study protocol (GOO021SNJA01). The Eastern Cape Health Research Committee, the Amathole District Department of Health, and the administrators of medical facilities all gave their approval. Participants signed an informed consent form. The study was conducted in accordance with the Declaration of Helsinki ethical research guidelines.

Results

The mean age of participants was 35.1 (SD = 7.2). The majority were females (65.3%), while those falling into the age category of 26–33 years (48.0%) had a diploma as their highest education level (42.3%), were single (57.3%), unemployed (47.0%), and, on an average, had a monthly income of above R1 501, but below R14 200 (61.3%) (Table 1).

Approximately 18.7% of participants had received early ART initiation with a CD4 cell count ≥ 500 . The average duration of ART was 3.7 years (SD = 2.1). The mean number of CD4 cell measurements at the start of ART and the last test of treatment duration was 120 (SD = 101) and 144 (SD = 96) (data not shown). Participants' demographic features are presented in Table 1.

Females (67.7%) had more depressive symptoms than males (32.3%). Depressive symptoms was higher among participants who had diploma qualifications (43.5%), were single (80.6%), and unemployed (57.3%). Table 2 shows the association between depressive symptoms and ART-receiving participants' demographic characteristics. The univariate logistic regression analyses revealed that being unemployed, young, female gender, and low educational level were significantly associated with an increased risk for depressive symptoms ($p < 0.05$) (Table 2).

Table 1 Demographic Characteristics of Participants

Variables	n (%)
Gender	
Male	60 (34.7)
Female	90 (65.3)
Age (years)	
18–25	30 (20.0)
26–33	72 (48.0)
34–42	38 (25.3)
42 and above	10 (6.7)
Education level	
Matric or lower	47 (31.3)
Diploma	63 (42.3)
Undergraduate degree	33 (22.0)
Postgraduate degree	7 (4.4)
Marital status	
Single	86 (57.3)
Married/living with a partner	39 (26.0)
Divorced/widowed	25 (16.7)
Employment status	
Unemployed	70 (46.7)
Employed	57 (38.0)
Self-employed	23 (15.3)
Average monthly income (ZAR)	
0–1500	58 (38.7)
1501–14,200	92 (61.3)

Table 2 Prevalence of Depressive Symptoms and Demographic and Medical Characteristics of Participants on ART (n=150)

Variables	Total n (%)	Yes (PHQ-9 Score ≥ 5 n (%))	No n (%)	p-value (χ^2)
Gender				0.19**
Male	60 (40.0)	20 (32.3)	40 (45.5)	
Female	90 (60.0)	42 (67.7)	48 (54.5)	
Education level				0.40**
Matric or lower	47 (31.3)	17 (27.4)	30 (34.0)	
Diploma	63 (42.0)	27 (43.5)	36 (41.0)	
Bachelor degree	33 (22.0)	12 (19.3)	21 (23.9)	
Postgraduate	7 (4.7)	6 (9.7)	1 (1.1)	
Marital status				0.51**
Single	86 (57.3)	50 (80.6)	36 (40.9)	
Married/living with spouse	39 (26.0)	6 (9.7)	33 (37.5)	
Divorced/widowed	25 (16.7)	6 (9.7)	19 (21.6)	
Employment				0.07***
Employed	70 (46.7)	14 (23.0)	56 (63.0)	
Unemployed	57 (38.0)	35 (57.3)	22 (24.7)	
Self-employed	23 (15.3)	13 (19.7)	10 (12.3)	
HIV period				0.02**
Symptomatic	83 (55.3)	39 (62.9)	44 (50.0)	
Asymptomatic	44 (29.3)	15 (24.2)	29 (33.0)	
AIDS	23 (25.3)	8 (12.9)	15 (17.0)	
Smoking	90 (60.0)	40 (57.1)	50 (62.1)	0.09**
Drinking	135 (90.0)	47 (56.1)	88 (66.2)	0.21*
Early ART initiation (CD4 cell count)				0.45**
≤ 350	66 (44.0)	30 (48.3)	36 (41.0)	
$350 < - < 500$	56 (37.3)	19 (30.6)	37 (42.0)	
≥ 500	28 (18.7)	13 (30.0)	15 (17.0)	
Satisfied with ART treatment results	150 (100.0)	62 (41.3)	88 (58.7)	0.04**

Notes: χ^2 test; $\pm$ Mann-Whitney test; significance level was ***p<0.001, **p<0.01, *p < 0.1.

Applying PHQ-9 cut-off point of ≥ 5 , the overall prevalence of depression symptoms was 41.3%. As per category of the severity score, 11.3%, 8.0%, 14.7%, and 7.3% had severe, moderately severe, moderate and mild depressive symptoms, respectively. However, the majority of the participants had no depressive symptoms (88; 58.7%) (Table 3).

Table 4 presents the logistical regression model demonstrating that participants with a CD4 cell count from 350 to 500 (OR=4.0; 1.05–17.50) were more likely to have depressive symptoms compared to those who had a CD4 cell count of ≥ 500 (OR=1.2; 0.42–3.98), while participants who were satisfied with their treatment results (OR=0.1; 0.05–1.06) were less likely to

Table 3 Depressive Symptoms Among Patients Receiving ART (Severity Score) (n=150)

Severity Score	n (%)
Depressive symptoms	
Severe (>20)	17 (11.3)
Moderately severe (15–19)	12 (8.0)
Moderate (10–14)	22 (14.7)
Mild (5–9)	11 (7.3)
Positive depressive screen (cut-off ≥ 5)	
Yes	62 (41.3)

Table 4 Logistic Regression Model of Factors Associated with Depressive Symptoms Among Patients Receiving ART

Variables	OR (95% CI)
Gender (female vs male)	0.3 (0.11–1.20)*
Marital status (single vs married)	4.1 (1.22–6.02)*
Number of CD4 cells at the start of ART (vs>500)	
<350	4.0 (1.05–17.50)*
350<CD4 cell count <500	1.2 (0.42–3.98)
Satisfied with treatment results (Yes vs No)	0.1 (0.05–1.06)*
Current drugs use (Yes vs No)	0.4 (0.07–1.75)
Having problems performing daily activities (Yes vs No)	1.6 (0.60–4.10)
Pain and discomfort (Yes vs No)	6.2 (1.69–28.01)*
Complications and concurrent diseases (Yes vs No)	1.5 (0.19–3.49)**
Suffer from discrimination in (Yes vs No)	
Health facilities	11.0 (0.93–167.1)*
Community	3.0 (1.24–14.03)*
Workplace	18.1 (2.53–43.23)***
Disclosure of health status (Yes vs No)	
Relatives	2.3 (0.56–16.18)
Peer educators	0.1 (0.10–1.89)*

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Abbreviations: OR, Odd ratio, CI, Confidence interval.

suffer from the condition. In addition, ART patients experiencing pain and/or discomfort presented with a higher risk of depressive symptoms (OR=6.2; 1.69–28.01) than those who did not. Furthermore, there was a strong, significant relationship between depressive symptoms and complications and concurrent diseases ($p < 0.05$). In this regard, patients suffering from complications and opportunistic diseases were more likely to have depressive symptoms (OR=1.5; 0.19–3.49). Similarly, those who were discriminated against at health facilities (OR=11.0; 0.93–167.1) and/or their workplaces (OR=18.1; 2.53–43.23) were also more susceptible to depressive symptoms than those who were not.

Discussion

This investigation aimed to determine the prevalence of depressive symptoms and associated factors among PLWHA in the Mquma sub-district of the Eastern Cape Province. Our cohort had a 41.3% prevalence of depressive symptoms. We found that unemployment, female gender, a low level of education, and HIV stage were substantially associated with an increased risk for depressive symptoms. Having a CD4 cell count of 350 to 500, pain and/or discomfort, complications and opportunistic diseases, discrimination from health facilities and/or workplaces, and satisfaction with ART treatment outcomes were predictors of depressive symptoms. These findings underscore the need for designing contextual interventions to improve depressive symptoms in this understudied, poor and rural region.

The higher prevalence of depressive symptoms observed in our sample highlights the need for routine depression screening in our primary health care settings so as to implement preventative measures to address mental health issues among PLHWA in this geographic area. This lends support to the evidence connecting depressive symptoms with non-adherence to ART and lack of viral suppression.^{42,43} The prevalence of depressive symptoms found in our study is comparable to a systematic review and meta-analytical study in Sub-Saharan Africa which reported 44.7% prevalence of depressive symptoms,⁹ but higher than other studies in sub-Saharan African settings: Nigeria (31.0%, 24.8%),^{9,40} Republic of Congo (39%),¹³ Kenya (10.0%, 27.1%, 14.0%),^{19,44,45} Ethiopia (13.3%, 15.5%, 14.6%),^{10,11,30} and including South Africa (27.5%, 21.9%),^{15,46} reporting prevalence of depressive symptoms. In contrast, studies conducted in Uganda (50.3%)⁴⁷ and Ethiopia (44.9%)⁴⁸ found a higher prevalence of depressive symptoms among PLWHA. Likewise, a systematic review and meta-analysis study by Lofgren et al⁹ reported a higher rate of 44.7% in South Africa. In addition, other studies conducted outside SSA, for example, in USA (28.2%),⁴⁹ Thailand (19.0%, 30.0%),^{16,50} Spain (21.4%),¹⁴ and China (6.7%)² have reported varying rates of depressive symptoms among PLHWA. The

discrepancies of the prevalence rates of depressive symptoms obtainable with our study and others in the literature as cited above could be attributed to the differences in the geographical contexts of these studies shape by the interplay of varying factors, sample size and diagnostic instrument used. Notably, this current study used the PHQ-9 ≥ 5 to screen depressive symptoms. Mekonnen et al¹⁰ study in Ethiopia used the PHQ-9 instrument with a cut-off of ≥ 10 , whereas Damtie et al¹¹ also in Ethiopia, and Sule et al⁴⁰ in Nigeria used the PHQ-9 depression scale with a cut-off of >5 to evaluate depressive symptoms in HIV-patients. Notably, the setting of our study is rural, where psychological services are rarely readily available in some primary health facilities in South Africa; consequently, the higher depressive symptoms observed in our study are concerning and reflective of the significantly higher HIV prevalence in South Africa. In addition, the high association between depressive symptoms and antiretroviral medication and non-adherence⁸ suggests that the mental health of PLWHA should be prioritised. This may help to cushion the health economy burden of depressive symptomatology on PLWHA. In addition, depressive symptoms are associated with poorer health-related quality of life (HRQoL) among PLWHA.¹⁴ As advocated by other researchers in SSA,¹⁹ this emphasises the importance of integrating mental health into primary health care facilities.

Our study revealed that females have significantly more depressive symptoms than their male counterparts (67.7%). This finding is consistent with previous research that females manifest substantially greater signs of depression than males. In Sub-Saharan Africa, for instance, Lofgren et al⁹ found that females outnumbered males by 31.1% to 23.5%. In Thailand (22.4% vs 12.6%)⁵⁰ and Spain (32.8% vs 18.13%).¹⁴ In contrast, Chen et al's² study in China found that males had slightly greater depressive symptoms than females (6.9% vs 5.7%). A previous notion⁵¹ attributed the gender difference in depressive symptoms among PLWHA to the effect of hormones; however, this was beyond the scope of the present study. In South Africa, HIV is more prevalent among Black African females compared to men,⁵² and men are less likely to seek assistance more frequently than women. Several studies have identified female gender as a determinant of depressive symptoms in PLWHA.^{14–16} It is necessary to examine the gender disparity in depressive symptoms in order to determine the causes of this disparity. Nonetheless, interventions targeting women living with HIV/AIDS and receiving ART at primary and antenatal clinics are required to identify and address depressive symptoms.

Unemployment was significantly associated with depressive symptoms among participants. This is likely due to the fact that individuals without a source of income would have to worry about a multitude of issues affecting their economic and social lives, and consequently develop depressive symptoms. Low financial income or hardships are associated with depressive symptoms in PLWHA.^{14,18} It is possible that the difficulties or hardships faced by individuals who are not unemployed or living on a meagre income can exacerbate depressive symptoms. In rural South Africa, unemployment and poverty rates are at an all-time high. As a result, a majority of the population relies on government social grants, which are barely adequate to meet the inflationary economic trend. These factors may contribute to depression in HIV-positive individuals receiving ART. In order to improve the health outcomes of PLWHA in rural settings in South Africa, it is essential to address unemployment and inequality.

In addition, this study demonstrated that low educational attainment had a substantial impact on depressive symptoms among PLWHA. About 43.5% of the participants with depressive symptoms had a diploma. This finding is consistent with findings from other studies^{1,13,53} indicating the association of low educational attainment with depressive symptoms among PLWHA. Bayes-Marin et al¹⁴ found males with depressive symptoms having lower educational level compared to those without depressive symptoms. PLWHA should be provided with health education and counselling regardless of their level of education. Health professionals are in an ideal position to provide these services. The participation of community health workers would help to advance the health education and advocacy regarding the importance of adhering to ART and healthy living in order to enhance health and well-being. Furthermore, family and community support are crucial for facilitating the implementation of health education, advocacy, and talks with the community aimed at reducing depressive symptoms among PLWHA within their enclaves.

In addition, those who presented with an advanced stage of HIV exhibited more depressive symptoms than those who presented with a lower stage. Beyene Gebrezgiabher et al³⁰ report that those with an advanced WHO clinical HIV stage are depressed. Similarly, a previous study in Kenya found that participants on second-line ART were 7 times more likely to have depressive symptoms than those on first-line therapy.¹⁹ The author's also asserted that underlying immunologic failure could cause depressive symptoms when patients are informed of a change in their HIV staging and the type of ART provided.¹⁹ In this context, adequate counselling on diet and lifestyle habits associated with immunological enhancement is essential.

In the multivariate analysis, this study revealed that participants having a low CD4 cell count of 350 to 500 were 4 times more likely to experience depressive symptoms compared than those with a CD4 cell count of ≥ 500 . Increasing CD4 cell count is associated with fewer depressive symptoms in PLWHA,⁵⁴ while non-adherence to ART can potentially result to viral non-suppression,⁵⁵ and may cause psychological stress in the event of unfavourable outcome.¹ This suggests that the early initiation of ART can improve the health status of HIV- patients, thereby enhancing their mental health and quality of life. Consequently, health interventions should consider the CD4 cell counts of patients as a key factor when conducting screenings for depressive symptoms.

Similarly, our findings revealed that the likelihood of depressive symptoms among participants experiencing pain and/or discomfort was 6.2 times greater than among those who did not. Our finding resonates with findings from an earlier study which showed that participants with moderate-severe chronic pain experienced higher levels of depressive symptoms compared to those without chronic pain (OR; 1.13; 95% CI: 1.07–1.20).⁵⁶ Moreover, participants with complications and opportunistic diseases were 1.5 times more likely to suffer from depressive symptoms than those without complications and opportunistic diseases. This suggests that PLWHA with complications and opportunistic diseases are more susceptible to depression than those without. This result is consistent with the findings of other studies.^{11,12,19,48} According to Nyongesa et al,¹⁹ having multiple chronic illnesses can impair the mobility and functional ability of PLWHA, resulting in signs of hopelessness, sadness, and loss of faith in the future, which can lead to depressive symptoms. Therefore, it is essential to comprehend and treat HIV-related complications to reduce the risk of patients developing depressive symptoms.

Participants who experienced workplace discrimination had a higher odd ratio (OR 18.1) and workplace odds ratio (OR 11.0) for depressive symptoms. This finding is consistent with findings from other studies^{1,14,16,19,48} reporting HIV-related stigma and discrimination being associated with depressive symptoms. It is a common occurrence for PLWHA to experience various forms of HIV-related stigma.⁴⁶ Regardless of the levels of stigma and discrimination, it may negatively affect PLWHA psychological state, particularly suicidal ideation, as reported by studies conducted in South Africa,⁵⁷ Tanzania,⁵⁸ and China.²³ A previous study in USA has highlighted the need to improve depressive symptoms in PLWHA in order to reduce suicidal ideation.⁵⁹ In addition, HIV-positive individuals who face stigma and discrimination from friends, family and the community may experience feelings being isolated, which can exacerbate their depressive symptoms. These circumstances may affect patients' adherence to treatment and care; thereby worsen their health outcomes. Therefore, PLWHA who are receiving ART require assistance to improve their depressive symptoms and well-being. Health advocacy on supportive strategies and HIV treatment outcomes for people living with HIV is necessary. These should include individual counselling, psychosocial services, and screenings for mental health. As advocated by Wei et al,²³ health workers should collaborate with various stakeholders to offer PLWHA with self-esteem-enhancing counselling services.

Interestingly, this study revealed that participants who were pleased with the outcomes of their ART treatment were less likely to exhibit depressive symptoms. PLWHA are concerned about the difficulty of accessing HIV care and treatment services.^{19,20} HIV-positive individuals who are receiving ART should have access to high-quality healthcare services to improve their health outcomes. They should undergo routine medical evaluations to adhere to their ART. Observably, the poor health services prevalent in most rural communities in South Africa may present frustrations, anxiety and stress. Patients are required to travel long distances to reach the majority of healthcare facilities, which can be discouraging and negatively impact health outcomes. This type of situation may result in depressive symptoms. Therefore, health facilities should be accessible and strive to provide adequate information to those receiving ART in order for them to comprehend its benefits. Understanding its function may increase PLWHA's levels of satisfaction, leading to a decrease in depressive symptoms.

Limitations

Several limitations of this investigation are worth noting. First, it was conducted only among PLWHA receiving antiretroviral therapy in rural and semi-urban areas of the Eastern Cape; consequently, its findings may not apply to all PLWHA in South Africa. In addition, the Patient Health Questionnaire (PHQ-9) rating scale was the only diagnostic instrument for depression symptoms, and because it relies on patient self-report, inherent biases cannot be eliminated. In addition, the cross-sectional design of this study precludes determining a cause-and-effect relationship between the associated factors of depressive symptoms. To the

authors' knowledge, despite these limitations, this is the first study on the prevalence of depression symptoms and associated factors among PLWHA on antiretroviral therapy in the resource-limited Mnquma sub-district of the Amathole District in the Eastern Cape Province. The results of this study enlighten healthcare policymakers about the prevalence of depression symptoms among PLWHA and serve as the basis for crucial measures relating to depression symptoms. To eliminate participants' subjective experiences, which could vary based on their feelings at any given moment, a quantitative approach was used to acquire data in order to objectively evaluate likely underlying variables. Future research should utilise a clinical "gold standard" approach to identify depressive symptoms, involving psychiatrists in a formal interview.

Conclusion

This study found a high prevalence (41.3%) of depressive symptoms in PLWHA receiving ART. Our findings showed that low CD4 cell count, suffering from pain and/or discomfort HIV/AIDS complications and opportunistic diseases, workplace and health facility stigmatisation and discrimination were predictive factors of depressive symptoms, and satisfaction with ART treatment results had protective effects against depressive symptoms among PLWHA. Therefore, proactive screening for symptoms of depression and counselling are crucial to improve the health outcomes of PLWHA receiving ART as well as facilitate the achievement of the UNAIDS 90-90-90 in South Africa, and now 95-95-95 targets.

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Disclosure

The authors report no conflicts of interest in this work.

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