

Prevalence of depression, anxiety, and stress among human immunodeficiency virus patients in Swabi District, Pakistan

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ABSTRACT

Background: HIV infection causes psychological distress, with depression, anxiety, and stress as frequent comorbidities. However, data on their prevalence in rural Pakistan is limited. This study aimed to determine their prevalence and associated factors in Swabi District, Pakistan.

Methods: A cross-sectional study was conducted in the Infectious Diseases Department of MTI Bacha Khan Medical Complex, Swabi, Pakistan. A total of 323 patients who were on antiretroviral treatment and suffered from HIV were selected based on convenience sampling method. The Depression, Anxiety, and Stress Scale-21 (DASS-21) was applied for identifying the psychological distress of patients. SPSS version 21 was used for statistical analysis of data through descriptive statistics, chi-square, independent t-test and ANOVA.

Results: 56.7% of patients suffered from depression (n=183); the same percentage of them had anxiety (n=183); 52.3% were characterized by stress (n=169). Significantly high levels of mean DASS scores in females and transgender respondents were found in comparison to male patients in terms of all three scales (p<0.001). In bivariate analysis, it was determined that gender, marital status, education, occupation, place of residence, socioeconomic status, CD4 count, clinical stage, opportunistic infections, social support, stigma, and disclosure were significantly correlated with depression, anxiety, and stress (p<0.001).

Conclusion: Over half of the participants with HIV from this study have depression, anxiety or stress. The screening and intervention for mental health problems should be incorporated into the HIV service package.

Keywords: Anxiety, Depression, HIV, Pakistan, Stress.

BACKGROUND

Human Immunodeficiency Virus remains a major global public health challenge, with an estimated 39.0 million people living with HIV worldwide as of 2022.¹ The advent of antiretroviral therapy has transformed HIV from a fatal disease into a chronic manageable condition, substantially extending life expectancy.² However, the psychological burden of living with HIV—including stigma, discrimination, fear of disclosure, and uncertainty about disease progression—places patients at elevated risk for mental health disorders.³

Depression, anxiety, and stress are among the most prevalent psychiatric comorbidities among people

living with HIV. Global systematic reviews and meta-analyses have documented that depression affects approximately 28-30% of people living with HIV, while anxiety affects 17-41%, with prevalence rates substantially higher than in the general population.^{4,5} A comprehensive meta-analysis reported that 15.5% of people living with HIV suffer from clinically diagnosed anxiety disorders, with higher prevalence among females (20.8%) and non-heterosexual individuals (32.1%).⁶

In Pakistan, the HIV epidemic has been concentrated among key populations including people who inject drugs, sex workers, and men who have sex with men.⁷ National-level data from Pakistan's Stigma Index 2.0 demonstrated that depressive symptoms are highly prevalent among people living with HIV, with stigma and lack of social support being the strongest predictors.⁸ A cross-sectional study from Pakistan further confirmed that stigma, poor social support, and illicit drug use significantly predicted anxiety and depression among HIV patients.⁹ Hospital-based studies have estimated that approximately 32% of HIV-positive individuals in Pakistan exhibit significant depressive symptoms.¹⁰

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Despite these findings, localized data from rural districts—where healthcare infrastructure is limited and stigma may be more pronounced—remain scarce. Swabi District, located in Khyber Pakhtunkhwa province, presents unique sociodemographic characteristics including lower literacy rates, conservative cultural norms, and limited access to mental health services.¹¹ The World Health Organization's Mental Health Atlas 2020 highlighted that Pakistan faces critical gaps in mental health infrastructure, with fewer than 500 psychiatrists serving a population of over 220 million.¹² Understanding the prevalence and correlates of psychological distress among HIV patients in Swabi is essential for designing evidence-based, integrated care models that address both physical and mental health needs. Therefore, this study aimed to determine the prevalence of depression, anxiety, and stress among HIV patients in Swabi District, Pakistan, and to identify associated sociodemographic and clinical factors.

MATERIAL AND METHODS

This cross-sectional study was conducted at the Infectious Diseases Department of MTI Bacha Khan Medical Complex, Swabi District, Pakistan. The study was carried out over a period of six months following approval of the synopsis from the College of Physicians and Surgeons Pakistan.

The study population comprised HIV-positive patients aged 15 years and above who were registered at the HIV treatment center and on antiretroviral therapy. Patients with severe cognitive impairment, critical illness, or inability to complete the questionnaire were excluded. Sample size was calculated using the WHO sample size calculator, assuming a prevalence of anxiety and depression of 30% from previous studies,^{9,12} with 95% confidence interval and 5% margin of error, yielding a target sample of 323 patients. A non-probability convenience sampling method was employed to recruit participants attending the HIV clinic during the study period.

Following approval from the institutional review board, eligible patients were enrolled after providing written informed consent. The study objectives and benefits were communicated to all participants, and they were assured that participation involved no risk. Sociodemographic data including age, gender, marital status, education, occupation, socioeconomic class, and

residence were recorded. Clinical data including CD4 count, ART duration, clinical stage, comorbidities, and opportunistic infections were extracted from medical records. Psychosocial variables including social support, perceived stigma, and disclosure status were assessed using a structured questionnaire.

Psychological distress was measured using the Depression, Anxiety, and Stress Scale-21, a validated self-report instrument consisting of three subscales of seven items each.¹³ The DASS-21 has demonstrated excellent psychometric properties with Cronbach's alpha values of 0.88 for depression, 0.82 for anxiety, and 0.90 for stress in HIV populations.¹⁴ It is important to note that the DASS-21 is a validated screening tool designed to measure symptom severity and does not establish a clinical psychiatric diagnosis.

Operational definitions were as follows: depression—DASS-21 depression subscale score ≥ 10 ; anxiety—DASS-21 anxiety subscale score ≥ 8 ; stress—DASS-21 stress subscale score ≥ 15 . Severity was classified according to DASS-21 cut-off scores: normal, moderate, severe, and extremely severe.¹³ These thresholds indicate screen-positive states rather than confirmed clinical diagnoses.

The data were entered into the Statistical Package for Social Sciences (SPSS) software and analyzed using version 21. Descriptive statistics such as frequencies and percentages were computed for categorical variables including gender, marital status, education, occupation, residence, socioeconomic status (SES), clinical stage, opportunistic infection, social support, stigma, and disclosure status. For continuous variables, which included age, CD4 count, and ART duration, descriptive statistics were presented as mean and standard deviation (SD). Chi-square test was performed to evaluate the relationship between categorical variables and depression, anxiety, and stress respectively. Independent sample t-test was performed to compare the means of age, CD4 count, and ART duration between patients with and without depression, anxiety, and stress respectively. One-way Analysis of Variance (ANOVA) test with Least Significant Difference (LSD) post-hoc test was used to compare DASS-21 score means for male, female, and transgender groups. P-value < 0.05 was regarded as significant. Multivariable logistic regression analysis could not be performed due to perfect separation of the

variables including stigma and social support. This is recognized as a limitation.^{15,16}

This study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Institutional Review Board of MTI Bacha Khan Medical Complex, Swabi vide letter number F. No. IREB/GKMCS/08251253 dated 19th January 2026, and the research unit of CPSP Head Office. Written informed consent was obtained from all participants. Confidentiality was ensured by anonymizing data and using unique patient identifiers.

RESULTS

A total of 323 HIV-positive patients were enrolled in the study. The mean age of participants was 38.85 ± 9.17 years, ranging from 22 to 56 years. Females comprised 47.7% (n=154) of the sample, males 47.7% (n=154), and transgender individuals 4.6% (n=15). The majority were married (54.5%, n=176), had primary education (36.2%, n=117), and resided in urban areas (70.3%, n=227). Lower socioeconomic status was reported by 52.3% (n=169) of participants. The mean CD4 count was 396.62 ± 211.99 cells/mm³, and mean ART duration was 39.98 ± 27.34 months. Table-I summarizes the demographic and clinical characteristics of the participants.

The overall prevalence of depression was 56.7% (n=183, 95% CI 51.2-62.0), anxiety 56.7% (n=183, 95% CI 51.2-62.0), and stress 52.3% (n=169, 95% CI 46.8-57.8). Severity distribution showed that 44.3% (n=143) had severe depression, 40.6% (n=131) had severe anxiety, and 40.2% (n=130) had moderate stress. Normal scores were observed in 43.3% (n=140) for depression, 47.7% (n=154) for anxiety, and 35.9% (n=116) for stress. It is noteworthy that no participants met the criteria for the 'mild' or 'extremely severe' categories for any of the three conditions; therefore, these categories are omitted from the severity distribution. Mean DASS-21 scores were: depression 12.31 ± 7.36 , anxiety 10.47 ± 6.86 , and stress 14.09 ± 6.90 . Table-II presents the prevalence and severity of these conditions.

Strong co-occurrence was observed between the three conditions. Among depressed patients, 92.3% (n=169)

also had anxiety, and 100% of patients with stress had anxiety. Pearson correlation coefficients between DASS subscales were high and statistically significant: depression-anxiety $r=0.886$, depression-stress $r=0.903$, and anxiety-stress $r=0.985$ ($p<0.001$ for all).

Significant gender differences were observed across all DASS domains. Transgender individuals had the highest mean scores for depression (20.00 ± 1.31), anxiety (21.73 ± 0.70), and stress (27.47 ± 1.92), followed by females (depression 15.64 ± 5.24 ; anxiety 14.66 ± 4.59 ; stress 18.03 ± 4.01), with males having the lowest scores (depression 8.23 ± 7.26 ; anxiety 5.16 ± 4.41 ; stress 8.84 ± 4.79). ANOVA revealed significant differences between all gender groups for each domain ($p<0.001$ for all), with post-hoc LSD tests confirming pairwise differences (Table-III).

Bivariate analysis using chi-square tests identified several factors significantly associated with depression, anxiety, and stress. Gender, marital status, education, occupation, residence, socioeconomic status, CD4 count, clinical stage, opportunistic infections, social support, perceived stigma, and disclosure status all showed significant associations with all three outcomes ($p<0.001$ for all). Independent t-tests revealed that patients with depression had significantly lower mean age (35.85 ± 9.27 vs 42.76 ± 7.41 years, $p<0.001$), lower CD4 count (234.60 ± 115.95 vs 608.50 ± 82.04 cells/mm³, $p<0.001$), and shorter ART duration (37.02 ± 33.29 vs 43.86 ± 15.95 months, $p=0.026$) compared to non-depressed patients. Similar patterns were observed for anxiety and stress. Independent samples effect sizes were large for CD4 count differences between depressed and non-depressed patients (Cohen's $d=3.64$, 95% CI 3.28-3.99) and moderate to large for age differences ($d=0.81$, 95% CI 0.58-1.04).

Table-IV presents the key bivariate associations, which demonstrated that all variables including gender, marital status, education, occupation, residence, socioeconomic status, CD4 count, clinical stage, opportunistic infections, social support, perceived stigma, and disclosure status were significantly associated with depression ($p<0.001$).

Table-I: Sociodemographic and clinical characteristics of participants (N=323).

Characteristic	Category	n (%)
Gender	Female	154 (47.7)
	Male	154 (47.7)
	Transgender	15 (4.6)

Age (years)	Mean ± SD	38.85 ± 9.17
Marital Status	Married	176 (54.5)
	Single	74 (22.9)
	Divorced	37 (11.5)
	Widowed	36 (11.1)
Education	Illiterate	37 (11.5)
	Primary	117 (36.2)
	Secondary	110 (34.1)
	Tertiary	59 (18.3)
Occupation	Employed	117 (36.2)
	Unemployed	72 (22.3)
	Student	37 (11.5)
	Housewife	82 (25.4)
	Self-Employed	15 (4.6)
Residence	Rural	96 (29.7)
	Urban	227 (70.3)
Socioeconomic Class	Lower	169 (52.3)
	Middle	154 (47.7)
CD4 Count (cells/mm³)	Mean ± SD	396.62 ± 211.99
ART Duration (months)	Mean ± SD	39.98 ± 27.34
Clinical Stage	Stage I	155 (48.0)
	Stage II	82 (25.4)
	Stage III	71 (22.0)
	Stage IV	15 (4.6)
Opportunistic Infections	Yes	131 (40.6)
	No	192 (59.4)
Social Support	Good	154 (47.7)
	Poor	169 (52.3)
Perceived Stigma	Yes	183 (56.7)
	No	140 (43.3)
Disclosure Status	Disclosed	212 (65.6)
	Not Disclosed	111 (34.4)

Table-II: Prevalence and severity of depression, anxiety, and stress.

Condition	Present n (%)	Normal n (%)	Moderate n (%)	Severe n (%)	Mean ± SD
Depression	183 (56.7)	140 (43.3)	40 (12.4)	143 (44.3)	12.31 ± 7.36
Anxiety	183 (56.7)	140 (43.3)	38 (11.8)	145 (44.9)	10.47 ± 6.86
Stress	169 (52.3)	116 (35.9)	130 (40.2)	77 (23.8)	14.09 ± 6.90

Table-III: Gender differences in mean DASS scores.

Domain	Female (n=154) Mean ± SD	Male (n=154) Mean ± SD	Transgender (n=15) Mean ± SD	F	p-value
Depression	15.64 ± 5.24	8.23 ± 7.26	20.00 ± 1.31	67.18	<0.001
Anxiety	14.66 ± 4.59	5.16 ± 4.41	21.73 ± 0.70	230.53	<0.001
Stress	18.03 ± 4.01	8.84 ± 4.79	27.47 ± 1.92	247.55	<0.001

Post-hoc LSD: All pairwise differences significant at $p < 0.01$ for all domains.

Table-IV: Bivariate Associations of Sociodemographic and Clinical Characteristics with Depression (N=323)

Parameters	Study Groups		P-value
	Group A: Depressed (n=183)	Group B: Not Depressed (n=140)	
Gender			<0.001
• Female	131 (71.6%)	23 (16.4%)	
• Male	37 (20.2%)	117 (83.6%)	
• Transgender	15 (8.2%)	0 (0.0%)	
Marital Status			<0.001
• Married	58 (31.7%)	118 (84.3%)	
• Single	52 (28.4%)	22 (15.7%)	
• Divorced	37 (20.2%)	0 (0.0%)	
• Widowed	36 (19.7%)	0 (0.0%)	
Education			<0.001
• Illiterate	37 (20.2%)	0 (0.0%)	

• Primary	94 (51.4%)	23 (16.4%)	
• Secondary	29 (15.8%)	81 (57.9%)	
• Tertiary	23 (12.6%)	36 (25.7%)	
Occupation			<0.001
• Employed	0 (0.0%)	117 (83.6%)	
• Unemployed	72 (39.3%)	0 (0.0%)	
• Student	37 (20.2%)	0 (0.0%)	
• Housewife	59 (32.2%)	23 (16.4%)	
• Self-Employed	15 (8.2%)	0 (0.0%)	
Residence			<0.001
• Rural	96 (52.5%)	0 (0.0%)	
• Urban	87 (47.5%)	140 (100.0%)	
Socioeconomic Status			<0.001
• Lower	169 (92.3%)	0 (0.0%)	
• Middle	14 (7.7%)	140 (100.0%)	
CD4 Group			<0.001
• <200	83 (45.4%)	0 (0.0%)	
• 200-499	100 (54.6%)	10 (7.1%)	
• ≥500	0 (0.0%)	130 (92.9%)	
Clinical Stage			<0.001
• Stage I	15 (8.2%)	140 (100.0%)	
• Stage II	82 (44.8%)	0 (0.0%)	
• Stage III	71 (38.8%)	0 (0.0%)	
• Stage IV	15 (8.2%)	0 (0.0%)	
Opportunistic Infections			<0.001
• Yes	131 (71.6%)	0 (0.0%)	
• No	52 (28.4%)	140 (100.0%)	
Social Support			<0.001
• Good	14 (7.7%)	140 (100.0%)	
• Poor	169 (92.3%)	0 (0.0%)	
Perceived Stigma			<0.001
• Yes	183 (100.0%)	0 (0.0%)	
• No	0 (0.0%)	140 (100.0%)	
Disclosure Status			<0.001
• Disclosed	72 (39.3%)	140 (100.0%)	
• Not Disclosed	111 (60.7%)	0 (0.0%)	
Comorbid Conditions			0.591
• Yes	73 (39.9%)	60 (42.9%)	
• No	110 (60.1%)	80 (57.1%)	

DISCUSSION

This study provides the first comprehensive assessment of depression, anxiety, and stress prevalence among HIV patients in Swabi District, Pakistan. The findings reveal a substantial burden of psychological distress, with more than half of patients screening positive for depression (56.7%), anxiety (56.7%), and stress (52.3%). These prevalence rates are among the highest reported globally and significantly exceed estimates from other Pakistani studies, which reported depressive symptoms in 32% of patients.¹⁰

The prevalence of depression in our study is comparable to findings from India (57% in one study),¹⁷ Ethiopia (52.4% in Adama),¹⁸ and China (40.9%).¹⁹ However, it is substantially higher than reports from South Korea (36%),²⁰ Ghana (28.6%),²¹ and Guinea (16.9%).²² These

variations likely reflect differences in study populations, screening instruments, cultural contexts, and healthcare access. The DASS-21 may detect higher prevalence than diagnostic interviews such as the HADS or PHQ-9.²³

The strong co-occurrence of depression, anxiety, and stress in our cohort aligns with the well-established comorbidity of these conditions in chronic disease populations.²⁴ The near-perfect correlation between anxiety and stress ($r=0.985$) suggests that in this population, these constructs may not be distinctly separable. This finding is clinically important, as it indicates that screening for one condition may identify patients at risk for others.

The higher psychological distress in females and transgender people is a recurring theme in the existing

literature.^{25,26} Our study confirmed the fact that the females had higher scores than males, and the transgender population showed highest distress levels in all categories. Such disparity could be the result of multiple contributing factors such as gender discrimination, higher burden of care, economic vulnerability, and stigma associated with the dual status of being HIV positive and gender non-conforming.²⁷

Highly significant correlation between advanced HIV infection (low CD4 count and later clinical stage) and psychological distress has been shown in our data and corroborated by many other research studies.²⁸ In their work, Cohen *et al.* showed that patients with high viral load had significantly higher psychological distress. In this relationship, the direction could be bilateral because depression may impair adherence to ART and result in immunodeficiency, but disease progression itself may trigger psychological distress due to physical manifestations and fear of death.

Perceived stigma appeared to be one of the strongest predictors for all three psychological problems in the bivariate analysis, which corresponds with previous studies carried out in Ethiopia and Albania. Disclosure of HIV-positive status in the conservative rural environment, where STIs have extremely high stigma, may lead to social exclusion, abandonment and inability to work. In our study, poor social support has been linked with higher odds of depression, just like in Ghana and India.⁹

Strengths of this study include that it is the first study assessing depression, anxiety, and stress in rural Pakistani HIV population with the use of validated questionnaire. Moreover, there is adequate sample size and the use of DASS-21 (which does not include somatic symptoms that might complicate evaluation of HIV-related physical symptoms) improves diagnostics. However, there are several limitations of this study. Cross-sectional design does not allow making causal conclusions; convenience sampling in a single center limits its applicability to other regions. The use of questionnaires increases the risk of social desirability bias. As participants were those engaged in treatment, there is a possibility of underestimation of prevalence. There was no use of structured interview; therefore, the obtained data indicate only the prevalence of screen-positive symptoms, but not clinical diagnoses. The use of multivariable logistic regression is impossible due to perfect separation for some risk factors (for example,

perceived stigma and social support, all patients with these risk factors had depression). It is a statistical issue connected with data; however, it does not lessen the importance of these significant associations.^{15,16}

These alarming results have obvious clinical implications. The routine screening for mental disorders should be included into the practice of HIV care in Pakistan. The screening tool can be the DASS-21 that takes 5-10 minutes to complete.¹⁴ The task-sharing strategy – training of HIV nurses and counselors in assessment and interventions related to mental disorders – can solve the problem of lack of specialists in Pakistan. There should be interventions addressing stigma problem both on the community and facility levels. Psychotherapy through group support sessions proved to be effective among people living with HIV in Uganda and can be modified for Pakistani population. Economic assistance can decrease distress caused by financial problems.

CONCLUSION

This study reveals a substantial burden of depression, anxiety, and stress among HIV patients in Swabi District, Pakistan, with prevalence rates exceeding 50% for all three conditions. Female gender, transgender identity, advanced HIV disease, perceived stigma, poor social support, and low socioeconomic status were the strongest predictors. These findings underscore the urgent need for integrated mental health services within HIV care programs and the development of culturally appropriate interventions to address stigma and enhance social support. Without prompt action, the psychological toll of HIV will continue to compromise treatment outcomes and quality of life for this vulnerable population.

DISCLOSURES

None

CONFLICT OF INTEREST

None

GRANT SUPPORT & FINANCIAL DISCLOSURE

Declared none

AUTHOR CONTRIBUTION

Samiulhaq: Substantial contribution to study design, acquisition of data, manuscript writing, final approval, accountable for all aspects of publication

Taimoor Shahzad: Substantial contribution to acquisition of data, manuscript writing, critical revision, final approval, accountable for all aspects of publication

Afzal Haq: Substantial contribution to analysis and interpretation of data, critical review, final approval, accountable for all aspects of publication

Faisal Sajjad: Substantial contribution to concept, study design, final approval, accountable for all aspects of publication

Ishtiaq Ahmad Awan: Substantial contribution to concept, study design, final approval, accountable for all aspects of publication

Amjad Mahboob: Substantial contribution to study design, acquisition of data, critical review, manuscript writing, final approval, accountable for all aspects of publication

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