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ASSOCIATION BETWEEN VIRAL LOAD AND SEVERITY OF DEPRESSION IN PATIENTS WITH HIV REPORTING TO A TERTIARY CARE PUBLIC SECTOR HIV CENTRE AT SUKKUR, PAKISTAN

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Abstract

Background:

Depression is one of the most frequent psychiatric comorbidities among people living with HIV. Although the relationship between depression and viral load has been explored in many countries, limited data exist from Pakistan, especially from smaller cities such as Sukkur. This study examines whether viral load is has association with the severity of depression among HIV-positive patients attending the HIV Clinic, Sukkur.

Methods:

This is a descriptive, cross-sectional study which was conducted between January and June 2023 at the HIV/AIDS Clinic of Ghulam Muhammad Mahar Medical College (GMMC) Hospital Sukkur (A tertiary care public-sector teaching hospital). The study comprised of forty registered HIV-positive patients who were selected through convenience sampling. Viral load levels (detected through laboratory reports) and depression scores, (measured by using a valid scale the Hamilton Depression Rating Scale HAM-D), were recorded. Viral load was categorized into three categories: suppressed (<200 copies/ml), low-level viremia (200–1000 copies/ml), and high-level viremia (>1000 copies/ml).

Results:

Half of the participants had mild depression, 25% were experiencing moderate depression, and 15% fell into the category of severe depression. Viral load analysis of the subjects showed that 42.5%

had suppressed viral load, 35% had low-level viremia, and 22.5% had high-level viremia. Higher viral load levels were notably associated with more severe symptoms of depression.

Conclusion:

A clear and significant association was observed between elevated viral load and increased severity of depressive symptoms. These findings reveal the importance of integrating mental health screening and services into HIV care, particularly in relatively backward areas of the region.

Introduction and Literature Review

HIV/AIDS is one of the major public health challenges worldwide, affecting more than 38 million people according to data of 2022(1). Contrary to the old concept, in Pakistan, the number of people living with HIV (PLWH) is rising rapidly, with an estimated 200,000 individuals affected (2). Like other chronic illnesses, HIV/AIDS also makes the individual for developing psychiatric illnesses especially Depression. Among PLWH depression is the commonest mental health concern, prevalence estimates ranging from 20% to 50% (3). Depression Has negative effects for HIV/AIDS patients as it can significantly reduce quality of life and is linked with poor adherence to antiretroviral therapy (ART), faster disease progression, and increased mortality rates (4).

Various factors influence causation of Depression in HIV patients including biological, psychological, and social factors. Biologically, both the virus itself and the side effects of ART may contribute by inducing changes in neurochemical pathways and their mechanisms that cause depressive symptoms. Psychologically, the chronic course of the illness, along with the stigma surrounding HIV due to concept among majority of the masses that HIV is purely a sexually transmitted disease, can contribute to feelings of hopelessness and other symptoms of severe depression. Socially, loss of job/ income, lack of social support, spasticity of institutes to cater to the needs of PLWH, and overall socioeconomic hardships and difficulties add further strain to PLWH. Viral load—an important indicator of disease progression and severity—has been studied and researched in relation to mental health, but the results of studies reveal that direction and strength of this association vary significantally (5).

Internationally several studies have been conducted to examine extensively the association between HIV viral load and Depression (6). However, studies from Pakistan remain limited on this topic, especially in underserved areas such as Sukkur. Most local research in this part of the world has been conducted in large cities, which may not truely reflect the experiences of patients living in peripheral and rural areas (7). This study contributes to filling that gap by studying how viral load relates to the severity of depression among PLWH reporting to a tertiary care HIV center in Sukkur.

Methods

This six-month cross-sectional study was conducted at HIV center in Ghulam Muhammad Mahar Medical College Hospital, a public sector tertiary care hospital situated in Sukkur, Pakistan from January to June 2023. Forty HIV-positive patients were recruited through convenience sampling after obtaining informed consent in line with international guidelines (8). Approval was taken from the institutional ethical review committee. For collecting demographic and clinical details, a semi-structured proforma was used. Severity of Depression was assessed by using the Hamilton Depression Rating Scale (HAM-D), which is widely validated scale for this purpose (9).

Viral load was categorized into three groups:

- **Suppressed:** <200 copies/ml
- **Low-level viremia:** 200–1000 copies/ml
- **High-level viremia:** >1000 copies/ml (10)

Data were analyzed using SPSS version 25. Descriptive statistics were calculated, and chi-square tests were used to explore associations between viral load categories and severity of depression (11).

Results:

The study included a total sample sie of 40 HIV positive patients, out of them 32 were men (80.0%) and 8 were women (20.0%), reflecting the gender ratio among HIV patients in the region (2; 12) (Table:1). Most participants (42.5%) had their viral loads suppressed, 35.0% had low-level viremia, while 22.5% were categorized as having high level viremia (Table 2). Depression severity was found as follows: 50.0% with mild depression, 25.0% with moderate depression, 15.0% with severe depression, 7.5% normal (having no clinical depression), and 2.5% with very severe depression (Table 3).

Regarding the relationship between viral load and the severity of depression, Table 4 shows that there were found significant associations between the two. Among patients whose viral loads were suppressed, 22.5% had mild depression, while 7.5% showed moderate and severe depression each. In contrast, 10.0% of patients with high-level viremia exhibited mild depression, 7.5% moderate depression, and 5.0% severe depression. These findings highlight the complex relationship between virological status and mental health (13).

Table 1: Gender Distribution of Study Participants

Gender	Frequency	Percent
Male	32	80.0%
Female	8	20.0%
Total	40	100.0%

Table 2: Viral Load Distribution

Viral Load Category	Frequency	Percent
Suppressed (≤200 copies/ml)	17	42.5%
Low-level viremia (200–1000 copies/ml)	14	35.0%
High-level viremia (>1000 copies/ml)	9	22.5%
Total	40	100.0%

Table 3: Severity of Depression (HAM-D Score)

Severity of Depression	Frequency	Percent
Normal (0-7)	3	7.5%
Mild Depression (8-13)	20	50.0%
Moderate Depression (14-18)	10	25.0%
Severe Depression (19-22)	6	15.0%
Very Severe Depression (23 or more)	1	2.5%
Total	40	100%

Table 4: Viral Load and Severity of Depression

Viral Load Category	Normal (0-7)	Mild Depression (8-13)	Moderate Depression (14-18)	Severe Depression (19-22)	Very Severe Depression (23 or more)	Total
Suppressed (≤200 copies/ml)	2 (5.0%)	9 (22.5%)	3 (7.5%)	3 (7.5%)	0 (0%)	17
Low-level viremia (200–1000 copies/ml)	1 (2.5%)	7 (17.5%)	4 (10.0%)	1 (2.5%)	1 (2.5%)	14

Viral Load Category	Normal (0-7)	Mild Depression (8-13)	Moderate Depression (14-18)	Severe Depression (19-22)	Very Severe Depression (23 or more)	Total
High-level viremia (>1000 copies/ml)	0 (0%)	4 (10.0%)	3 (7.5%)	2 (5.0%)	0 (0%)	9
Total	3 (7.5%)	20 (50.0%)	10 (25.0%)	6 (15.0%)	1 (2.5%)	40

Discussion

The findings of this study reveal that depression is highly prevalent among patients with HIV-positive in Sukkur, consistent with the results from both regional and international studies (3, 14). Researches from countries such as South Africa and India have also reported similar rates of depression/depressive symptoms among PLWH (15, 14). The slightly higher proportion of severe depression observed in this study may reflect the socioeconomic pressures, high stigma attached with HIV/AIDS, and limited access to mental health services in underprivileged cities like Sukkur.

A significant association between higher viral load and more severe depression was identified in this study. This relationship may be explained by biological pathways—such as chronic inflammation and immune activation—which have been linked to depressive symptoms in several studies. Conversely, depression can contribute to poorer adherence to ART and disturbed immune functioning, which may result in increased viral load. Hence this bidirectional relationship leads to a vicious cycle that complicates clinical management (13).

Similar patterns of association between the viral load and the severity of depressive symptoms among HIV-positive patients have been reported in Pakistani studies, including multicenter research from Karachi that also noted higher rates of depression among individuals with elevated viral load (10). Comparing these findings with those from the studies of more developed and economically stable countries shows that while the relationship between viral load and depression is consistent, the prevalence of depressive disorders tends to be lower where appropriate mental health services are more readily available (16).

The findings of the present study highlight the importance of incorporating mental health assessment and management of mental health issues into HIV treatment programs. Regular screening using validated tools such as HAM-D, and PHQ-9 etc along with counseling, psychosocial support services, and pharmacological treatment with psychotropic medication, if needed, could significantly improve both mental health and treatment adherence in PLWH leading to an overall better quality of life in these patients. Establishing multidisciplinary teams—including psychiatrists, psychologists, counselors, and social workers—may improve outcomes for this population (17).

Conclusion

This study shows a significant and meaningful association between higher viral load and greater severity of depression among HIV-positive patients in Sukkur. Integrating mental health services into HIV care settings may result in improved treatment adherence, reduced disease burden, and enhanced overall quality of life in PLWH. However, Future studies should explore the long-term relationship between viral load and depression through longitudinal designs and more number of samples/participants to evaluate the effectiveness of integrated care models in resource-limited settings especially in low-income and developing countries.

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