

## Effects of Depression on HIV

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### ABSTRACT

Depression is a pressing issue in individuals living with HIV (PLWH), attracting the attention of epidemiologists and physicians. Approximately 39% of PLWH experience some level of depression associated with accelerated disease progression and poor health outcomes. Depression rates among PLWH range from 22% to 71%, yet it remains underdiagnosed in many cases. HIV infection has significant negative psychological effects due to its neurotropic nature, potentially leading to neuropathological changes in the brain's grey matter and subsequent depression. Furthermore, depression is linked to increased healthcare utilization, decreased quality of life, and higher suicide rates in PLWH. It is also associated with poor adherence to antiretroviral therapy (ART), leading to immunological failure and increased HIV transmission risk. Therefore, effective management of depression is crucial for HIV patients. This literature review aimed to understand the impact of mental disorders, particularly depression, on HIV/AIDS. The methodology involved an extensive search of medical databases using specific keywords and inclusion criteria. The results revealed a disproportionately high level of depression in HIV patients, negatively affecting disease progression and quality of life. Biologically, HIV triggers inflammation and sickness behavior resembling depressive symptoms. Depression is associated with low CD4 cell counts, high viral loads, accelerated HIV-to-AIDS progression, and increased mortality risk. Consequently, integrating depression screening and psychological healthcare into regular HIV/AIDS care is essential to address the elevated prevalence rates of depression in PLWH and improve public health outcomes.

**Keywords:** regional general hospital; medicine; inventory; ABC-VEN; continuous review system

### INTRODUCTION

HIV/AIDS remains a significant global public health concern, posing a threat with over 75 million infections and 32 million AIDS-related deaths since the beginning of the HIV epidemic [1-5].

Consequently, depression has emerged as a critical public health issue, recognized as a global crisis due to its substantial contribution to the overall disease burden, higher rates of co-occurring conditions compared to other diseases, and associated disabilities [1-7].

The prevalence of depression among individuals with HIV varies widely, ranging from 12% to 63% [8, 9]. These rates are particularly pronounced in resource-limited settings, especially in sub-Saharan Africa [10]. A recent systematic review conducted by Rezaei et al. at a global level revealed that approximately 31% of people living with HIV (PLWH) experience depression [11]. The prevalence of depression in individuals with HIV has been found to be more than double that of the general population [12]. Moreover, the comorbidity between depression/anxiety and HIV has significant consequences, reducing the effectiveness of antiretroviral therapy (ART) and leading to a lower quality of life for PLWH [13].

The level of depression among HIV patients is disproportionately high, directly impacting disease progression and overall quality of life for PLWH [14]. This comorbidity is influenced by various factors, including clinical, psychosocial, and socio-demographic factors [15]. For instance, HIV patients who undergo ART without adequate testing and counseling services are at an increased risk of experiencing depression [16]. Additionally, recent adverse life events and being female have been identified as contributing factors to depression in PLWH [17]. However, depression remains an underdiagnosed condition among individuals with HIV [17]. Early detection of depression and identification of associated factors can facilitate its prevention and treatment, particularly when resources are accessible to HIV patients and healthcare providers at the primary care level [16]. Effective prevention and management of depression in PLWH require a comprehensive understanding of the contributing factors. Despite the high prevalence rates and negative outcomes associated with depression in PLWH, many low-income countries with established HIV care programs still provide inadequate depression care [18]. For example, in Ethiopia, the prevalence of depression among PLWH ranges between 15% and 49%, compared to a 9% prevalence rate in the general population [19]. However, no study has yet compared the prevalence of depression in individuals with HIV to that in the general population. It is crucial to determine the significant effects of depression on HIV/AIDS. Therefore, the objective of this study is to gain a better understanding of the various effects of depression on HIV/AIDS. The specific objectives of this study are as follows: (1) To assess the extent of depression in PLWH compared to the general population. (2) To identify the various factors associated with depression in PLWH.

## METHODOLOGY

In this literature review, we conducted a comprehensive search of medical databases, such as Embase, Medline, Scopus, Pubmed, and Google Scholar, to identify relevant literature concerning the effects of depression on HIV/AIDS. Our study design and methodology involved using various combinations of Boolean operators and search terms, including "depression," "PLWH" (persons living with HIV), "HIV," "AIDS," "effect," "and," and "or." We applied inclusion criteria that focused on studies specifically addressing depression and HIV/AIDS, literature written in English, and literature or studies conducted within the last 20 years. During the literature search, we utilized keywords such as depression, HIV/AIDS, HIV/AIDS and depression/anxiety, persons living with HIV/AIDS (PLWH), and HIV stigma. Subsequently, a thorough evaluation of the full-text literature obtained from the diverse databases was performed to select the most relevant studies for inclusion in our review.

## REVIEW

Our literature review has revealed recent research developments regarding the impact of depression on HIV/AIDS, focusing on current interests and the number of

studies conducted. With the substantial increase in scientific literature, the effects of depression in individuals living with HIV have been extensively assessed. Research in this field has explored various aspects, including the causes and behavioral risks associated with HIV-positive populations, the effects of depression on the healthcare outcomes of people living with HIV (PLWH), as well as healthcare services and interventions for this population. Countries with larger HIV-positive populations, such as Sub-Saharan Africa, the United States, India, and China, have produced the highest volume of empirical research. Despite the extensive study of depression in HIV-positive individuals, there is a need for greater attention to be given to the biomedical aspects of how depression affects HIV. Currently, topics such as immune response and viral load receive relatively less focus. This literature review indicates that, in addition to somatic and psychological factors, biological aspects also contribute to the development of depression in PLWH. Previous studies have acknowledged that acute viral infections like HIV can impact the individual's immune system and affect how the central nervous system mediates psychological status, leading to various neuropsychiatric outcomes [20, 21]. Ngum et al. found that HIV can trigger the release of inflammatory cytokines and induce sickness behavior resembling symptoms of depression [21]. Furthermore, HIV can alter the tryptophan precursor, reducing the effectiveness of certain antidepressant medications that work by elevating serotonin neurotransmitter levels [22, 23]. Neuronal injuries have been observed one year after HIV infection, and several studies report a direct link between antiviral treatment use, disease stages, and worsening depression symptoms [23-25]. Consequently, depression has numerous adverse effects on PLWH.

Depression significantly worsens the existing disease state in PLWH, leading to poor health outcomes. Previous studies have demonstrated that depression is associated not only with a low CD4 cell count and increased HIV viral load but also with an accelerated progression from HIV to AIDS and a higher risk of mortality [26, 27]. Seid et al. observed that depression in PLWH is linked to a combination of clinical and socio-demographic factors. Some clinical factors, such as low CD4 count or compromised immunity, HIV-associated stigma, and various opportunistic infections, are specific to PLWH [28]. Socio-demographic factors like unemployment, low educational attainment, and gender have also been linked to depression in PLWH and the general population [28].

Moreover, studies have indicated that depression reduces adherence to antiretroviral therapy (ART) and weakens its therapeutic effects, compromising treatment outcomes at individual and population levels [29, 30]. Adherence refers to the degree to which an individual's behavior aligns with the agreed-upon treatment plan, including taking medication, implementing lifestyle changes, and following a specific diet [31]. Considering the importance of ART medication for treatment efficacy and clinical outcomes, discontinuation or interruption of ART worsens the physical health of PLWH. In conjunction with depressive behaviors, this can lead to further impairments in social relationships, negatively impacting the overall quality of life of the patient [32]. Depression and HIV comorbidities often result in prolonged depressive conditions and chronic symptoms, including self-stigma, increased distress, poor sleep quality, and loss of appetite [33]. Non-adherent patients are three times more likely to experience moderate to severe depression symptoms compared to adherent individuals [34]. Recent studies have also evaluated the effects of depression in PLWH. For example, a 2014 study by Arsenious et al.

focused on methodological limitations and proposed directions for the effective diagnosis and management of depression in PLWH [35]. Marie et al. examined the epidemiological aspects of diagnosing and treating depression in PLWH [36].

A systematic review and meta-analysis by Fialho et al. explored depression in individuals with HIV and HCV co-infections [37]. Perceived stigma has been associated with a higher occurrence of depression in PLWH compared to those who do not experience stigma [28-45]. These findings align with earlier studies conducted in Uganda and Ethiopia [38, 39, 40]. Perceived stigma is often accompanied by social isolation and lower self-esteem and can ultimately lead to the development of depression and mental stress [41]. Furthermore, compromised immune status, indicated by a lower CD4 count and symptomatic individuals, is associated with a higher occurrence of depression than clinically stable individuals with a high and stable CD4 count. Similar findings were reported in previous studies conducted in Malawi and Ethiopia [42, 39-45]. Studies in Uganda found that a CD4 count above 200 was linked to lower depression occurrence, whereas research conducted in Ethiopia indicated that a CD4 count below 250 was associated with depression. In Cameroon, a CD4 count below 100 was linked to higher levels of depression [26]. Furthermore, a systematic review conducted in Greece revealed that symptomatic individuals were more likely to experience depression compared to non-symptomatic individuals [35]. Additionally, recent opportunistic infections are associated with increased rates of depression. These infections often lead to reduced functional status and hospitalization, adversely affecting the patient's economic and psychosocial well-being. This observation aligns with a study conducted in Alert Hospital, Ethiopia [43-45]. Furthermore, PLWH who fail to adhere to the recommended antiretroviral treatment and medication regimen strictly are more likely to experience depression compared to those with better adherence. Poor adherence can result in unstable clinical status, strain patient-physician relationships, diminish focus, and create a sense of unimportance, ultimately leading to difficulties in self-management. Additionally, individuals who have not disclosed their HIV status experience a higher occurrence of depression than those who have voluntarily made their status public. These findings are consistent with research conducted in Dilla, Ethiopia [44].

#### CLINICAL IMPLICATIONS

This literature review has important implications for clinical practice. Despite the detrimental effects of depression on HIV/AIDS, integrating mental health screening and diagnosis into HIV care remains largely unachieved in many clinical settings. Therefore, there is a pressing need to prioritize integrating mental health services into HIV care, as it can significantly improve treatment outcomes, enhance adherence to antiretroviral therapy (ART), and facilitate appropriate referrals. In cases where integration efforts have been initiated, timely implementation is crucial, considering the reported success of such initiatives in developing nations and low-resource contexts. Identifying and diagnosing depression should target specific populations within PLWH who are more vulnerable to severe comorbid illnesses, those on second-line ART regimens, individuals experiencing HIV-related stigma, and those facing challenges accessing essential HIV-associated services. It is also crucial to focus on other vulnerable and high-risk populations at increased risk of experiencing elevated depression symptoms.

Additionally, conducting further studies in countries with a high prevalence of PLWH, particularly in developing nations in Africa and Asia, is necessary to understand the

demographic and contextual factors associated with depression. This knowledge will help establish practical interventions tailored to the unique needs of these populations. Furthermore, given the existing biological correlation between depression and HIV, there is a need for intensified research efforts. This research can significantly contribute to developing appropriate and effective diagnostic procedures and therapies for depression in individuals living with HIV. By investigating the intricate relationship between depression and HIV biologically, we can advance our understanding of the condition and improve the overall care provided to PLWH.

#### RESEARCH LIMITATIONS

Although this literature review employed innovative methods to analyze and summarize the available literature, it is important to acknowledge several limitations. Firstly, only studies published in English were included, which may have resulted in excluding relevant studies published in other languages. This potential language bias could have affected the selection and information presented in this review. Another notable limitation is that this review's inclusion and exclusion criteria did not encompass certain important social demographic factors discussed in the selected papers. These factors include the duration of illness among the participants, specific traumatic experiences that may have contributed to depression, HIV disease stages, and sexual orientations of the participants. These aspects could have significantly influenced the outcomes of this literature review.

#### CONCLUSIONS

In conclusion, this literature review provides compelling evidence of the high susceptibility of individuals living with HIV/AIDS to severe depression. Despite receiving regular follow-up care, significant levels of depression and anxiety persist. Urgent integration of mental health services into HIV/AIDS care programs is imperative to ensure comprehensive mental well-being for HIV patients. This integration should include psychiatric evaluations, psychological counseling, and appropriate treatment measures. By doing so, adherence to antiretroviral therapy can be enhanced, leading to improved health outcomes and reduced overall costs of HIV/AIDS care. It is crucial to target the identification and diagnosis of depression, tailor interventions to meet vulnerable populations' unique needs, and conduct further research to explore the biological aspects of depression and HIV. This will contribute to more accurate diagnostics, effective treatment strategies, and comprehensive management approaches that address the impact of depression on individuals living with HIV.

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