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## The Crucial Role of Erythropoietin in Managing Anemia in HIV: A Review

\*Emmanuel Ifeanyi Obeagu<sup>1</sup> and Getrude Uzoma Obeagu<sup>2</sup>

<sup>1</sup>Department of Medical Laboratory Science, Kampala International University, Uganda.

<sup>2</sup>School of Nursing Science, Kampala International University, Uganda.

\*Corresponding author: Emmanuel Ifeanyi Obeagu, [Department of Medical Laboratory Science, Kampala International University, Uganda, emmanuelobeagu@yahoo.com, ORCID: 0000-0002-4538-0161](#)

### Abstract

Anemia is a pervasive complication in individuals living with HIV/AIDS, significantly diminishing their well-being and overall health. This comprehensive review explores the intricate relationship between anemia and HIV, emphasizing the pivotal role of erythropoietin (EPO) in managing this hematologic challenge. Chronic inflammation, opportunistic infections, and adverse effects of antiretroviral therapy contribute to the multifactorial nature of anemia in HIV. EPO, a key regulator of erythropoiesis, emerges as a promising therapeutic avenue. This review delves into the mechanisms underpinning anemia in HIV, elucidates the physiological regulation of EPO, and investigates the impact of HIV on endogenous EPO production. A critical analysis of clinical studies assessing exogenous EPO supplementation provides insights into optimal dosages, treatment duration, and potential challenges. Recognizing iron deficiency as a common contributor, the review explores strategies to address it concurrently with EPO supplementation. Future directions and challenges in erythropoietin therapy for HIV-associated anemia are discussed, underscoring the need for ongoing research to refine treatment approaches and improve patient outcomes. In conclusion, this review synthesizes current knowledge, positioning erythropoietin as a promising intervention for managing anemia in individuals living with HIV.

**Keywords:** *erythropoietin, anemia, HIV*

### Introduction

Anemia represents a formidable challenge in the landscape of HIV/AIDS, exerting a profound impact on the health and well-being of affected individuals.<sup>1-2</sup> Despite significant advancements in antiretroviral therapy (ART), anemia remains a prevalent and complex complication, **Citation:** Obeagu EI, Obeagu, GU. *The Crucial Role of Erythropoietin in Managing Anemia in HIV: A Review. Elite Journal of Scientific Research and Review, 2024; 2(1): 24-36*

contributing to a myriad of health-related issues. The etiology of anemia in the context of HIV is multifactorial, encompassing chronic inflammation, immune dysregulation, opportunistic infections, and the adverse effects of therapeutic interventions. As individuals living with HIV experience improved longevity with the advent of effective antiretroviral treatments, the burden of anemia has become more pronounced, necessitating a nuanced understanding and targeted interventions for comprehensive patient care.<sup>3-12</sup>

Erythropoietin (EPO), a glycoprotein hormone intricately involved in the regulation of red blood cell production, emerges as a potential cornerstone in the management of HIV-associated anemia. This review seeks to unravel the multifaceted relationship between HIV, anemia, and erythropoietin, shedding light on the physiological intricacies that underlie the hematologic challenges faced by individuals with HIV/AIDS. Understanding the mechanisms by which anemia develops in the context of HIV is fundamental to delineating the role of erythropoietin in its management. Chronic inflammation, a hallmark of HIV, not only contributes to anemia but also disrupts the finely tuned balance of erythropoiesis, further exacerbating hematologic complications.<sup>13-23</sup> The regulation of erythropoietin, both endogenously and exogenously, plays a pivotal role in maintaining homeostasis within the hematopoietic system. As HIV disrupts this delicate equilibrium, exploring the impact of the virus on endogenous EPO production becomes imperative. This exploration aims to uncover potential therapeutic targets and strategies to modulate erythropoiesis, offering a more nuanced approach to managing anemia in individuals living with HIV. Moreover, the adverse effects of antiretroviral therapy, including potential bone marrow toxicity, underscore the need for targeted interventions such as erythropoietin supplementation to alleviate the burden of anemia while ensuring optimal HIV management.<sup>24-34</sup>

In light of the ongoing efforts to improve the quality of life for individuals living with HIV, this review critically examines clinical studies evaluating the efficacy and safety of exogenous erythropoietin supplementation in the context of HIV-associated anemia. By synthesizing current evidence, this review aims to provide clinicians with valuable insights into optimal dosages, treatment durations, and potential challenges associated with incorporating erythropoietin into the comprehensive care of HIV patients with anemia. Additionally, recognizing the frequent coexistence of iron deficiency in HIV-related anemia, this review explores the intricate interplay between erythropoietin supplementation and strategies to address iron deficiency, ensuring a holistic and effective therapeutic approach.

### **Mechanism of Anemia in HIV**

The mechanism of anemia in individuals living with HIV is multifaceted, involving a complex interplay of various factors that disrupt the delicate balance of erythropoiesis and hemoglobin production. Understanding the intricacies of this process is crucial for developing targeted interventions to effectively manage anemia in the context of HIV. The primary mechanisms contributing to anemia in HIV include chronic inflammation, immune dysregulation, direct viral effects, opportunistic infections, and adverse effects of antiretroviral therapy (ART). Chronic inflammation is a hallmark of HIV infection, leading to the release of proinflammatory cytokines such as interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF- $\alpha$ ). These cytokines play a

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pivotal role in disrupting the normal functioning of the bone marrow and impairing erythropoiesis. The inflammatory milieu inhibits the response to erythropoietin, the hormone responsible for stimulating red blood cell production, thereby contributing to anemia. HIV infection results in profound immune dysregulation, affecting various components of the immune system. Dysfunctional immune cells, particularly T lymphocytes, can directly impact erythropoiesis by altering the microenvironment within the bone marrow. This dysregulation contributes to ineffective erythropoiesis and compromises the production of mature red blood cells.<sup>35-54</sup>

The HIV virus itself may have direct effects on hematopoietic stem cells and progenitor cells in the bone marrow. Viral proteins and genetic elements may interfere with the normal differentiation and maturation of red blood cells, leading to reduced erythrocyte production and, consequently, anemia. Opportunistic infections, common in individuals with compromised immune systems due to HIV, can exacerbate anemia. Infections such as *Mycobacterium avium* complex (MAC) and cytomegalovirus (CMV) can directly affect the bone marrow, leading to decreased red blood cell production and increased destruction, further contributing to anemia. While ART has significantly improved the prognosis and life expectancy of individuals with HIV, certain antiretroviral drugs can have adverse effects on the bone marrow. Zidovudine (AZT), for instance, has been associated with bone marrow suppression, causing anemia as a side effect.<sup>55-64</sup>

### **Erythropoietin: Physiology and Regulation**

Erythropoietin (EPO), a glycoprotein hormone crucial for the regulation of red blood cell production, plays a central role in maintaining the delicate balance of oxygen transport within the body. Produced primarily in the kidneys and to a lesser extent in the liver, EPO orchestrates a tightly regulated process known as erythropoiesis, ensuring the continuous renewal of red blood cells to meet the body's oxygen demands. The synthesis of EPO is intricately linked to the body's oxygen-sensing mechanisms. In response to hypoxia, or low oxygen levels, specialized cells in the kidneys, known as peritubular fibroblasts, release EPO. This hypoxia-driven release is mediated by the stabilization of hypoxia-inducible factor (HIF), a transcription factor that upregulates EPO gene expression. Consequently, EPO is released into the bloodstream, where it exerts its effects on the bone marrow, stimulating the production and maturation of erythrocyte precursors. The physiological regulation of EPO extends beyond oxygen sensing. Various factors, including anemia, blood loss, and certain medical conditions, can also trigger EPO release. This responsiveness allows the body to adapt swiftly to changes in oxygen availability or blood volume, maintaining a homeostatic environment.<sup>65-79</sup>

Once released, EPO binds to its receptor, the erythropoietin receptor (EPOR), located on the surface of erythroid progenitor cells in the bone marrow. This binding event activates intracellular signaling cascades, ultimately promoting the survival, proliferation, and differentiation of erythroid progenitor cells. As a result, the production of mature red blood cells is enhanced, replenishing the circulating pool and ensuring an adequate supply for oxygen transport. The regulation of EPO extends beyond the kidneys and liver. Other tissues, including the brain and skeletal muscles, have been identified as sites of EPO production, especially during conditions of

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stress or injury. While the primary role of EPO is erythropoiesis, emerging research suggests additional functions, including neuroprotection and tissue repair.<sup>65</sup>

### **The Impact of HIV on Erythropoietin Production**

HIV, a complex and dynamic retrovirus, not only targets the immune system but also exerts profound effects on various physiological processes, including erythropoiesis and the regulation of erythropoietin (EPO).<sup>80</sup> HIV can directly influence EPO production through its interaction with different cell types involved in erythropoiesis. Studies suggest that HIV may infect and disrupt the function of renal interstitial cells responsible for EPO synthesis. This direct viral effect on renal cells can lead to a decrease in EPO production, contributing to anemia in HIV patients. HIV infection induces a persistent state of chronic inflammation, characterized by elevated levels of pro-inflammatory cytokines. This inflammatory milieu can negatively impact EPO production by disrupting the normal regulatory pathways. Interferon-gamma, a key player in the immune response against HIV, has been shown to suppress EPO synthesis, further exacerbating anemia in individuals with HIV. The immune activation and dysregulation associated with HIV infection contribute to the disruption of erythropoiesis. Altered immune function may lead to the destruction of red blood cell precursors, reducing the pool of cells available for maturation in response to EPO signaling. Additionally, the impaired bone marrow microenvironment due to HIV-induced changes may compromise the efficacy of EPO in stimulating erythropoiesis. While ART has revolutionized the management of HIV, certain antiretroviral drugs may have direct or indirect effects on EPO production. Some medications may contribute to bone marrow toxicity or interfere with renal function, impacting the synthesis and release of EPO. Understanding the specific effects of different ART regimens on EPO dynamics is essential for optimizing the overall care of HIV patients with anemia. HIV infection can disrupt iron metabolism, leading to functional iron deficiency, even in the presence of normal iron stores. Adequate iron availability is crucial for the effectiveness of EPO in promoting erythropoiesis. The altered iron dynamics in HIV further contribute to the complexities of anemia in this population.<sup>81-92</sup>

### **Addressing Iron Deficiency in HIV-Related Anemia**

Iron deficiency is a prevalent and often complicating factor in the landscape of anemia among individuals living with HIV.<sup>93</sup> The interplay between HIV infection and iron metabolism can result in functional iron deficiency, even when iron stores appear sufficient. Addressing iron deficiency is paramount for the effective management of anemia in this population and requires a comprehensive approach that considers the unique challenges posed by both HIV and iron dynamics. Accurately diagnosing iron deficiency in HIV patients can be challenging due to the influence of inflammation on traditional biomarkers such as serum ferritin and transferrin saturation. In the presence of chronic inflammation, these markers may not accurately reflect the body's iron status. Advanced diagnostic tools, including soluble transferrin receptor (sTfR) and reticulocyte hemoglobin content (CHr), may offer more reliable insights into iron deficiency in the context of HIV. Oral iron supplementation is often hindered by issues such as gastrointestinal intolerance and poor absorption, which can be exacerbated in HIV patients. Intravenous iron supplementation emerges as a more effective and well-tolerated option. This approach allows for

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the direct delivery of iron to the reticuloendothelial system and bone marrow, bypassing the gastrointestinal tract and mitigating concerns related to absorption.

Since inflammation is a hallmark of HIV infection, it is crucial to interpret iron parameters in the context of the inflammatory state.<sup>94</sup> Hepcidin, a key regulator of iron metabolism, is often upregulated in chronic inflammation, leading to decreased iron absorption and impaired release from iron stores. Addressing inflammation through antiretroviral therapy (ART) and other anti-inflammatory measures can positively impact iron metabolism and enhance the effectiveness of iron supplementation. Certain antiretroviral drugs may impact iron metabolism, contributing to anemia. Integrating ART regimens that are less likely to disrupt iron dynamics can help mitigate iron-related complications. Close monitoring of the effects of specific antiretroviral medications on iron metabolism is essential for tailoring treatment strategies. In addition to iron supplementation, optimizing nutritional status is crucial for addressing anemia in individuals with HIV. Adequate intake of vitamins and minerals, including vitamin B12 and folic acid, is essential for erythropoiesis. A balanced and nutrient-rich diet complements iron interventions, promoting overall hematologic health. The management of iron deficiency in HIV-related anemia necessitates a collaborative approach involving hematologists, infectious disease specialists, and nutritionists. Regular monitoring of iron parameters and responsiveness to interventions ensures that the chosen strategies effectively address iron deficiency while considering the broader healthcare needs of the individual.

## Conclusion

The intricate relationship between HIV infection and anemia, coupled with the crucial role of erythropoietin (EPO) and the complexities of iron deficiency, necessitates a comprehensive and nuanced approach to management. Anemia remains a significant challenge in individuals living with HIV, impacting not only their quality of life but also posing potential barriers to the effectiveness of antiretroviral therapy and overall health outcomes. Erythropoietin emerges as a promising adjunctive therapeutic strategy, offering the potential to address the dysregulation of erythropoiesis inherent in HIV-related anemia. Understanding the mechanisms by which HIV influences EPO production provides valuable insights into the pathophysiology of anemia, enabling the development of targeted interventions to restore effective erythropoiesis.

Moreover, the coexistence of iron deficiency in HIV-related anemia adds a layer of complexity to its management. Accurate diagnosis, considering the impact of inflammation on traditional iron markers, and the integration of intravenous iron supplementation represent critical components of a holistic approach. The optimization of antiretroviral therapy and nutritional interventions further contribute to the multifaceted care required for individuals facing the dual challenges of HIV and anemia.

## References

1. World Health Organization. The World Health Report 2001: Mental health: new understanding, new hope.

**Citation:** Obeagu EI, Obeagu, GU. The Crucial Role of Erythropoietin in Managing Anemia in HIV: A Review. *Elite Journal of Scientific Research and Review*, 2024; 2(1): 24-36

2. Obeagu EI, Obeagu GU. Unmasking the Truth: Addressing Stigma in the Fight Against HIV. *Elite Journal of Public Health*. 2024;2(1):8-22.
3. Obeagu EI, Okwuanaso CB, Edoho SH, Obeagu GU. Under-nutrition among HIV-exposed Uninfected Children: A Review of African Perspective. *Madonna University journal of Medicine and Health Sciences*. 2022;2(3):120-127.
4. Obeagu EI, Alum EU, Obeagu GU. Factors associated with prevalence of HIV among youths: A review of Africa perspective. *Madonna University journal of Medicine and Health Sciences*. 2023;3(1):13-18.  
<https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/93>.
5. Obeagu EI. A Review of Challenges and Coping Strategies Faced by HIV/AIDS Discordant Couples. *Madonna University journal of Medicine and Health Sciences*. 2023 ;3(1):7-12.  
<https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/91>.
6. Obeagu EI, Obeagu GU. An update on premalignant cervical lesions and cervical cancer screening services among HIV positive women. *J Pub Health Nutri*. 2023; 6 (2). 2023; 141:1-2. [links/63e538ed64252375639dd0df/An-update-on-premalignant-cervical-lesions-and-cervical-cancer-screening-services-among-HIV-positive-women.pdf](https://doi.org/10.22192/ijcrms.2017.03.01.004).
7. Ezeoru VC, Enweani IB, Ochiabuto O, Nwachukwu AC, Ogbonna US, Obeagu EI. Prevalence of Malaria with Anaemia and HIV status in women of reproductive age in Onitsha, Nigeria. *Journal of Pharmaceutical Research International*. 2021;33(4):10-19.
8. Omo-Emmanuel UK, Chinedum OK, Obeagu EI. Evaluation of laboratory logistics management information system in HIV/AIDS comprehensive health facilities in Bayelsa State, Nigeria. *Int J Curr Res Med Sci*. 2017;3(1): 21-38.DOI: [10.22192/ijcrms.2017.03.01.004](https://doi.org/10.22192/ijcrms.2017.03.01.004)
9. Obeagu EI, Obeagu GU, Musiimenta E, Bot YS, Hassan AO. Factors contributing to low utilization of HIV counseling and testing services. *Int. J. Curr. Res. Med. Sci*. 2023;9(2): 1-5.DOI: [10.22192/ijcrms.2023.09.02.001](https://doi.org/10.22192/ijcrms.2023.09.02.001)
10. Obeagu EI, Obeagu GU. An update on survival of people living with HIV in Nigeria. *J Pub Health Nutri*. 2022; 5 (6). 2022;129. [links/645b4bfcf3512f1cc5885784/An-update-on-survival-of-people-living-with-HIV-in-Nigeria.pdf](https://doi.org/10.22192/ijcrms.2023.09.02.001).
11. Offie DC, Obeagu EI, Akueshi C, Njab JE, Ekanem EE, Dike PN, Oguh DN. Facilitators and barriers to retention in HIV care among HIV infected MSM attending Community Health Center Yaba, Lagos Nigeria. *Journal of Pharmaceutical Research International*. 2021;33(52B):10-19.
12. Obeagu EI, Ogbonna US, Nwachukwu AC, Ochiabuto O, Enweani IB, Ezeoru VC. Prevalence of Malaria with Anaemia and HIV status in women of reproductive age in Onitsha, Nigeria. *Journal of Pharmaceutical Research International*. 2021;33(4):10-19.
13. Obeagu EI, Okoroiwu IL, Obeagu G. Molecular mechanism and systemic response of erythropoietin: A Review. *Int. J. Adv. Res. Biol. Sci*. 2015;2(7):58-62.
14. Obeagu EI, Okoroiwu II, Ezimah AC. Evaluation of serum erythropoietin levels in chronic kidney disease patients in Federal Medical centre, Umuahia, Nigeria. *Int. J. Curr. Res. Biol. Med*. 2016;1(4):15-21.
15. Obeagu EI. Erythropoietin in Sickle Cell Anaemia: A Review. *International Journal of Research Studies in Medical and Health Sciences*. 2020;5(2):22-8.

**Citation:** Obeagu EI, Obeagu, GU. The Crucial Role of Erythropoietin in Managing Anemia in HIV: A Review. *Elite Journal of Scientific Research and Review*, 2024; 2(1): 24-36

16. Obeagu EI, Ezimah AC, Obeagu GU. Erythropoietin in the anaemias of pregnancy: a review. *Int J Curr Res Chem Pharm Sci*. 2016;3(3):10-18.
17. Obeagu EI, Ochei KC, Okeke EI, Anode AC. Assessment of the level of haemoglobin and erythropoietin in persons living with HIV in Umuahia. *Int. J. Curr. Res. Med. Sci*. 2016;2(4):29-33.
18. Obeagu EI, Obeagu GU, Nchuma BO, Amazue PO. A Review on erythropoietin receptor (EpoR). *Int. J. Adv. Res. Biol. Sci*. 2015;2(8):80-84.
19. Odo M, Ochei KC, Obeagu EI, Barinaadaa A, Eteng UE, Ikpeme M, Bassey JO, Paul AO. TB Infection Control in TB/HIV Settings in Cross River State, Nigeria: Policy Vs Practice. *Journal of Pharmaceutical Research International*. 2020;32(22):101-119.
20. Obeagu EI, Eze VU, Alaebob EA, Ochei KC. Determination of haematocrit level and iron profile study among persons living with HIV in Umuahia, Abia State, Nigeria. *J BioInnovation*. 2016; 5:464-471. [links/592bb4990f7e9b9979a975cf/DETERMINATION-OF-HAEMATOCRIT-LEVEL-AND-IRON-PROFILE-STUDY-AMONG-PERSONS-LIVING-WITH-HIV-IN-UMUAHIA-ABIA-STATE-NIGERIA.pdf](https://doi.org/10.5923/BJO.20160504000).
21. Ifeanyi OE, Obeagu GU. The values of prothrombin time among HIV positive patients in FMC owerri. *International Journal of Current Microbiology and Applied Sciences*. 2015;4(4):911-916.  
[https://www.academia.edu/download/38320140/Obeagu\\_Emanuel\\_Ifeanyi\\_and\\_Obeagu\\_Getrude\\_Uzoma2.EMMA1.pdf](https://www.academia.edu/download/38320140/Obeagu_Emanuel_Ifeanyi_and_Obeagu_Getrude_Uzoma2.EMMA1.pdf).
22. Izuchukwu IF, Ozims SJ, Agu GC, Obeagu EI, Onu I, Amah H, Nwosu DC, Nwanjo HU, Edward A, Arunsi MO. Knowledge of preventive measures and management of HIV/AIDS victims among parents in Umuna Orlu community of Imo state Nigeria. *Int. J. Adv. Res. Biol. Sci*. 2016;3(10): 55-65.DOI; [10.22192/ijarbs.2016.03.10.009](https://doi.org/10.22192/ijarbs.2016.03.10.009)
23. Chinedu K, Takim AE, Obeagu EI, Chinazor UD, Eloghosa O, Ojong OE, Odunze U. HIV and TB co-infection among patients who used Directly Observed Treatment Short-course centres in Yenagoa, Nigeria. *IOSR J Pharm Biol Sci*. 2017;12(4):70-75.  
[links/5988ab6d0f7e9b6c8539f73d/HIV-and-TB-co-infection-among-patients-who-used-Directly-Observed-Treatment-Short-course-centres-in-Yenagoa-Nigeria.pdf](https://doi.org/10.5988ab6d0f7e9b6c8539f73d/HIV-and-TB-co-infection-among-patients-who-used-Directly-Observed-Treatment-Short-course-centres-in-Yenagoa-Nigeria.pdf)
24. Obeagu EI. Erythrocyte enumeration and serum erythropoietin in chronic kidney disease patients: A study in Federal Medical Centre, Umuahia, Nigeria. *International Journal of Advanced Research in Biological Sciences*. 2016;3(7):163-170.
25. Ifeanyi OE. A review on erythropoietin. *Int J Adv Res Biol Sci*. 2015;2(4):35-47.
26. Obeagu EI. Maximizing longevity: erythropoietin's impact on sickle cell anemia survival rates. *Annals of Medicine and Surgery*. 2024:10-97.
27. Ifeanyi OE, Uzoma OG. A review on erythropoietin in pregnancy. *J. Gynecol. Womens Health*. 2018;8(3):1-4.
28. Obeagu EI, Okoroiwu IL, Obeagu GU. Relationship between Thrombopoietin and Interleukin 3: A Review. *Int J Curr Res Chem Pharm. Sci*. 2022;9(1):7-13.
29. Obeagu EI, Obeagu GU, Amilo GI. Haematological changes in patients of chronic kidney disease in Umuahia, Abia State, Nigeria. *Curr Trends Biomed Eng Biosci*. 2018; 11:34-37.
30. Oloro OH, Oke TO, Obeagu EI. Evaluation of Coagulation Profile Patients with Pulmonary Tuberculosis and Human Immunodeficiency Virus in Owo, Ondo State, Nigeria. *Madonna University journal of Medicine and Health Sciences*. 2022;2(3):110-119.

**Citation:** Obeagu EI, Obeagu, GU. The Crucial Role of Erythropoietin in Managing Anemia in HIV: A Review. *Elite Journal of Scientific Research and Review*, 2024; 2(1): 24-36

31. Nwosu DC, Obeagu EI, Nkwocha BC, Nwanne CA, Nwanjo HU, Amadike JN, Elendu HN, Ofoedeme CN, Ozims SJ, Nwankpa P. Change in Lipid Peroxidation Marker (MDA) and Non enzymatic Antioxidants (VIT C & E) in HIV Seropositive Children in an Urban Community of Abia State. Nigeria. *J. Bio. Innov.* 2016;5(1):24-30. [links/5ae735e9a6fdcc5b33eb8d6a/CHANGE-IN-LIPID-PEROXIDATION-MARKER-MDA-AND-NON-ENZYMATIC-ANTIOXIDANTS-VIT-C-E-IN-HIV-SEROPOSITIVE-CHILDREN-IN-AN-URBAN-COMMUNITY-OF-ABIA-STATE-NIGERIA.pdf](https://www.researchgate.net/publication/311111111/links/5ae735e9a6fdcc5b33eb8d6a/CHANGE-IN-LIPID-PEROXIDATION-MARKER-MDA-AND-NON-ENZYMATIC-ANTIOXIDANTS-VIT-C-E-IN-HIV-SEROPOSITIVE-CHILDREN-IN-AN-URBAN-COMMUNITY-OF-ABIA-STATE-NIGERIA.pdf).
32. Igwe CM, Obeagu IE, Ogbuabor OA. Clinical characteristics of people living with HIV/AIDS on ART in 2014 at tertiary health institutions in Enugu, Nigeria. *J Pub Health Nutri.* 2022; 5 (6). 2022;130. [links/645a166f5762c95ac3817d32/Clinical-characteristics-of-people-living-with-HIV-AIDS-on-ART-in-2014-at-tertiary-health-institutions-in-Enugu.pdf](https://www.researchgate.net/publication/355555555/links/645a166f5762c95ac3817d32/Clinical-characteristics-of-people-living-with-HIV-AIDS-on-ART-in-2014-at-tertiary-health-institutions-in-Enugu.pdf).
33. Ifeanyi OE, Obeagu GU, Ijeoma FO, Chioma UI. The values of activated partial thromboplastin time (APTT) among HIV positive patients in FMC Owerri. *Int J Curr Res Aca Rev.* 2015; 3:139-144. [https://www.academia.edu/download/38320159/Obeagu\\_Emanuel\\_Ifeanyi3\\_et\\_al.IJC\\_RAR.pdf](https://www.academia.edu/download/38320159/Obeagu_Emanuel_Ifeanyi3_et_al.IJC_RAR.pdf).
34. Obiomah CF, Obeagu EI, Ochei KC, Swem CA, Amachukwu BO. Hematological indices o HIV seropositive subjects in Nnamdi Azikiwe University teaching hospital (NAUTH), Nnewi. *Ann Clin Lab Res.* 2018;6(1):1-4. [links/5aa2bb17a6fdccd544b7526e/Haematological-Indices-of-HIV-Seropositive-Subjects-at-Nnamdi-Azikiwe.pdf](https://www.researchgate.net/publication/333333333/links/5aa2bb17a6fdccd544b7526e/Haematological-Indices-of-HIV-Seropositive-Subjects-at-Nnamdi-Azikiwe.pdf)
35. Omo-Emmanuel UK, Ochei KC, Osuala EO, Obeagu EI, Onwuasoanya UF. Impact of prevention of mother to child transmission (PMTCT) of HIV on positivity rate in Kafanchan, Nigeria. *Int. J. Curr. Res. Med. Sci.* 2017;3(2): 28-34.DOI: 10.22192/ijcrms.2017.03.02.005
36. Aizaz M, Abbas FA, Abbas A, Tabassum S, Obeagu EI. Alarming rise in HIV cases in Pakistan: Challenges and future recommendations at hand. *Health Science Reports.* 2023;6(8):e1450.
37. Obeagu EI, Ameorpor F, Scott GY. An update of human immunodeficiency virus infection: Bleeding disorders. *J Pub Health Nutri.* 2023; 6 (1). 2023;139. [links/645b4a6c2edb8e5f094d9bd9/An-update-of-human-immunodeficiency-virus-infection-Bleeding.pdf](https://www.researchgate.net/publication/366666666/links/645b4a6c2edb8e5f094d9bd9/An-update-of-human-immunodeficiency-virus-infection-Bleeding.pdf).
38. Obeagu EI, Scott GY, Ameorpor F, Ofodile AC, Edoho SH, Ahamefula C. Prevention of New Cases of Human Immunodeficiency Virus: Pragmatic Approaches of Saving Life in Developing Countries. *Madonna University journal of Medicine and Health Sciences.* 2022;2(3):128-134. <https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/86>.
39. Walter O, Anaebor QB, Obeagu EI, Okoroiwu IL. Evaluation of Activated Partial Thromboplastin Time and Prothrombin Time in HIV and TB Patients in Owerri Metropolis. *Journal of Pharmaceutical Research International.* 2022:29-34.
40. Odo M, Ochei KC, Obeagu EI, Barinaadaa A, Eteng EU, Ikpeme M, Bassey JO, Paul AO. Cascade variabilities in TB case finding among people living with HIV and the use of IPT:

**Citation:** Obeagu EI, Obeagu, GU. The Crucial Role of Erythropoietin in Managing Anemia in HIV: A Review. *Elite Journal of Scientific Research and Review*, 2024; 2(1): 24-36

- assessment in three levels of care in cross River State, Nigeria. *Journal of Pharmaceutical Research International*. 2020;32(24):9-18.
41. Jakheng SP, Obeagu EI. Seroprevalence of human immunodeficiency virus based on demographic and risk factors among pregnant women attending clinics in Zaria Metropolis, Nigeria. *J Pub Health Nutri*. 2022; 5 (8). 2022;137. [links/6317a6b1acd814437f0ad268/Seroprevalence-of-human-immunodeficiency-virus-based-on-demographic-and-risk-factors-among-pregnant-women-attending-clinics-in-Zaria-Metropolis-Nigeria.pdf](https://doi.org/10.22192/ijarbs.2023.10.09.015).
  42. Obeagu EI, Obeagu GU. A Review of knowledge, attitudes and socio-demographic factors associated with non-adherence to antiretroviral therapy among people living with HIV/AIDS. *Int. J. Adv. Res. Biol. Sci*. 2023;10(9):135-142.DOI: 10.22192/ijarbs.2023.10.09.015 [links/6516faa61e2386049de5e828/A-Review-of-knowledge-attitudes-and-socio-demographic-factors-associated-with-non-adherence-to-antiretroviral-therapy-among-people-living-with-HIV-AIDS.pdf](https://doi.org/10.22192/ijarbs.2023.10.09.015)
  43. Obeagu EI, Onuoha EC. Tuberculosis among HIV Patients: A review of Prevalence and Associated Factors. *Int. J. Adv. Res. Biol. Sci*. 2023;10(9):128-134.DOI: 10.22192/ijarbs.2023.10.09.014 [links/6516f938b0df2f20a2f8b0e0/Tuberculosis-among-HIV-Patients-A-review-of-Prevalence-and-Associated-Factors.pdf](https://doi.org/10.22192/ijarbs.2023.10.09.014).
  44. Obeagu EI, Ibeh NC, Nwobodo HA, Ochei KC, Iwegbulam CP. Haematological indices of malaria patients coinfecting with HIV in Umuahia. *Int. J. Curr. Res. Med. Sci*. 2017;3(5):100-104.DOI: 10.22192/ijcrms.2017.03.05.014 [https://www.academia.edu/download/54317126/Haematological\\_indices\\_of\\_malaria\\_patients\\_coinfected\\_with\\_HIV.pdf](https://www.academia.edu/download/54317126/Haematological_indices_of_malaria_patients_coinfected_with_HIV.pdf)
  45. Jakheng SP, Obeagu EI, Abdullahi IO, Jakheng EW, Chukwueze CM, Eze GC, Essien UC, Madekwe CC, Madekwe CC, Vidya S, Kumar S. Distribution Rate of Chlamydial Infection According to Demographic Factors among Pregnant Women Attending Clinics in Zaria Metropolis, Kaduna State, Nigeria. *South Asian Journal of Research in Microbiology*. 2022;13(2):26-31.
  46. Viola N, Kimono E, Nuruh N, Obeagu EI. Factors Hindering Elimination of Mother to Child Transmission of HIV Service Uptake among HIV Positive Women at Comboni Hospital Kyamuhunga Bushenyi District. *Asian Journal of Dental and Health Sciences*. 2023;3(2):7-14. <http://ajdhs.com/index.php/journal/article/view/39>.
  47. Okorie HM, Obeagu Emmanuel I, Okpoli Henry CH, Chukwu Stella N. Comparative study of enzyme linked immunosorbent assay (Elisa) and rapid test screening methods on HIV, Hbsag, Hcv and Syphilis among voluntary donors in. Owerri, Nigeria. *J Clin Commun Med*. 2020;2(3):180-183.DOI: DOI: 10.32474/JCCM.2020.02.000137 [links/5f344530458515b7291bd95f/Comparative-Study-of-Enzyme-Linked-Immunosorbent-Assay-ElISA-and-Rapid-Test-Screening-Methods-on-HIV-HBsAg-HCV-and-Syphilis-among-Voluntary-Donors-in-Owerri-Nigeria.pdf](https://doi.org/10.32474/JCCM.2020.02.000137).
  48. Ezugwu UM, Onyenekwe CC, Ukibe NR, Ahaneku JE, Onah CE, Obeagu EI, Emeje PI, Awalu JC, Igbokwe GE. Use of ATP, GTP, ADP and AMP as an Index of Energy Utilization and Storage in HIV Infected Individuals at NAUTH, Nigeria: A Longitudinal, Prospective, Case-Controlled Study. *Journal of Pharmaceutical Research International*. 2021;33(47A):78-84.

**Citation:** Obeagu EI, Obeagu, GU. The Crucial Role of Erythropoietin in Managing Anemia in HIV: A Review. *Elite Journal of Scientific Research and Review*, 2024; 2(1): 24-36

49. Emmanuel G, Martin O, Peter OS, Obeagu EI, Daniel K. Factors Influencing Early Neonatal Adverse Outcomes among Women with HIV with Post Dated Pregnancies Delivering at Kampala International University Teaching Hospital, Uganda. *Asian Journal of Pregnancy and Childbirth*. 2023 Jul 29;6(1):203-211.  
<http://research.sdpublishers.net/id/eprint/2819/>.
50. Igwe MC, Obeagu EI, Ogbuabor AO, Eze GC, Ikpenwa JN, Eze-Stephen PE. Socio-Demographic Variables of People Living with HIV/AIDS Initiated on ART in 2014 at Tertiary Health Institution in Enugu State. *Asian Journal of Research in Infectious Diseases*. 2022;10(4):1-7.
51. Vincent CC, Obeagu EI, Agu IS, Ukeagu NC, Onyekachi-Chigbu AC. Adherence to Antiretroviral Therapy among HIV/AIDS in Federal Medical Centre, Owerri. *Journal of Pharmaceutical Research International*. 2021;33(57A):360-368.
52. Igwe MC, Obeagu EI, Ogbuabor AO. ANALYSIS OF THE FACTORS AND PREDICTORS OF ADHERENCE TO HEALTHCARE OF PEOPLE LIVING WITH HIV/AIDS IN TERTIARY HEALTH INSTITUTIONS IN ENUGU STATE. *Madonna University journal of Medicine and Health Sciences*. 2022;2(3):42-57.  
<https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/75>.
53. Madekwe CC, Madekwe CC, Obeagu EI. Inequality of monitoring in Human Immunodeficiency Virus, Tuberculosis and Malaria: A Review. *Madonna University journal of Medicine and Health Sciences*. 2022;2(3):6-15.  
<https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/69>
54. Echendu GE, Vincent CC, Ibebuike J, Asodike M, Naze N, Chinedu EP, Ohale B, Obeagu EI. WEIGHTS OF INFANTS BORN TO HIV INFECTED MOTHERS: A PROSPECTIVE COHORT STUDY IN FEDERAL MEDICAL CENTRE, OWERRI, IMO STATE. *European Journal of Pharmaceutical and Medical Research*, 2023; 10(8): 564-568
55. Nwosu DC, Nwanjo HU, Okolie NJ, Ikeh K, Ajero CM, Dike J, Ojiegbe GC, Oze GO, Obeagu EI, Nnatunanya I, Azuonwu O. BIOCHEMICAL ALTERATIONS IN ADULT HIV PATIENTS ON ANTIRETROVIRAL THERAPY. *World Journal of Pharmacy and Pharmaceutical Sciences*, 2015; 4(3): 153-160.  
<links/5a4fd0500f7e9bbc10526b38/BIOCHEMICAL-ALTERATIONS-IN-ADULT-HIV-PATIENTS-ON-ANTIRETROVIRAL-THERAPY.pdf>.
56. Obeagu EI, Obeagu GU. Effect of CD4 Counts on Coagulation Parameters among HIV Positive Patients in Federal Medical Centre, Owerri, Nigeria. *Int. J. Curr. Res. Biosci. Plant Biol*. 2015;2(4):45-49.
57. Obeagu EI, Nwosu DC. Adverse drug reactions in HIV/AIDS patients on highly active antiretroviral therapy: a review of prevalence. *Int. J. Curr. Res. Chem. Pharm. Sci*. 2019;6(12):45-8. DOI: [10.22192/ijcrps.2019.06.12.004](https://doi.org/10.22192/ijcrps.2019.06.12.004)  
<links/650aba1582f01628f0335795/Adverse-drug-reactions-in-HIV-AIDS-patients-on-highly-active-antiretro-viral-therapy-a-review-of-prevalence.pdf>.
58. Obeagu EI, Scott GY, Amekpor F, Obeagu GU. Implications of CD4/CD8 ratios in Human Immunodeficiency Virus infections. *Int. J. Curr. Res. Med. Sci*. 2023;9(2):6-13. DOI: [10.22192/ijcrms.2023.09.02.002](https://doi.org/10.22192/ijcrms.2023.09.02.002) <links/645a4a462edb8e5f094ad37c/Implications-of-CD4-CD8-ratios-in-Human-Immunodeficiency-Virus-infections.pdf>.

**Citation:** Obeagu EI, Obeagu, GU. The Crucial Role of Erythropoietin in Managing Anemia in HIV: A Review. *Elite Journal of Scientific Research and Review*, 2024; 2(1): 24-36

59. Obeagu EI, Ochei KC, Okeke EI, Anode AC. Assessment of the level of haemoglobin and erythropoietin in persons living with HIV in Umuahia. *Int. J. Curr. Res. Med. Sci.* 2016;2(4):29-33. <links/5711c47508aeebe07c02496b/Assessment-of-the-level-of-haemoglobin-and-erythropoietin-in-persons-living-with-HIV-in-Umuahia.pdf>.
60. Ifeanyi OE, Obeagu GU. The Values of CD4 Count, among HIV Positive Patients in FMC Owerri. *Int. J. Curr. Microbiol. App. Sci.* 2015;4(4):906-910. [https://www.academia.edu/download/38320134/Obeagu\\_Emanuel\\_Ifeanyi\\_and\\_Obeagu\\_Getrude\\_Uzoma.EMMA2.pdf](https://www.academia.edu/download/38320134/Obeagu_Emanuel_Ifeanyi_and_Obeagu_Getrude_Uzoma.EMMA2.pdf).
61. Obeagu EI, Okeke EI, Anonde Andrew C. Evaluation of haemoglobin and iron profile study among persons living with HIV in Umuahia, Abia state, Nigeria. *Int. J. Curr. Res. Biol. Med.* 2016;1(2):1-5.
62. Alum EU, Ugwu OP, Obeagu EI, Okon MB. Curtailing HIV/AIDS Spread: Impact of Religious Leaders. *Newport International Journal of Research in Medical Sciences (NIJRS)*. 2023;3(2):28-31.
63. Obeagu EI, Obeagu GU, Paul-Chima UO. Stigma Associated With HIV. *AIDS: A Review. Newport International Journal of Public Health and Pharmacy (NIJPP)*. 2023;3(2):64-67.
64. Alum EU, Obeagu EI, Ugwu OP, Aja PM, Okon MB. HIV Infection and Cardiovascular diseases: The obnoxious Duos. *Newport International Journal of Research in Medical Sciences (NIJRS)*. 2023;3(2):95-99.
65. Obeagu EI, Okoroiwu IL, Azuonwu O. An update on hypoxic regulation of iron homeostasis and bone marrow environment. *Int. J. Curr. Res. Med. Sci.* 2018;4(10):42-8.
66. Obeagu EI. Blood Transfusion: A Powerful Process of Saving Anaemic Patients. *EC Emergency Medicine and Critical Care.* 2020;4(7):33-40.
67. Obeagu EI, Obeagu GU. Platelet Distribution Width (PDW) as a Prognostic Marker for Anemia Severity in HIV Patients: A Comprehensive Review. *Journal home page: http://www.journalijar.com*;12(01).
68. Obeagu EI, Obeagu GU, Obiezu J, Ezeonwumelu C, Ogunnaya FU, Ngwoke AO, Emeka-Obi OR, Ugwu OP. Hematologic Support in HIV Patients: Blood Transfusion Strategies and Immunological Considerations. *APPLIED SCIENCES (NIJBAS)*. 2023;3(3).
69. Ibebuike JE, Nwokike GI, Nwosu DC, Obeagu EI. A Retrospective Study on Human Immune Deficiency Virus among Pregnant Women Attending Antenatal Clinic in Imo State University Teaching Hospital. *International Journal of Medical Science and Dental Research*, 2018; 1 (2):08-14. <https://www.ijmsdr.org/published%20paper/li1i2/A%20Retrospective%20Study%20on%20Human%20Immune%20Deficiency%20Virus%20among%20Pregnant%20Women%20Attending%20Antenatal%20Clinic%20in%20Imo%20State%20University%20Teaching%20Hospital.pdf>.
70. Obeagu EI, Obarezi TN, Omeh YN, Okoro NK, Eze OB. Assessment of some haematological and biochemical parameters in HIV patients before receiving treatment in Aba, Abia State, Nigeria. *Res J Pharma Biol Chem Sci.* 2014; 5:825-830.
71. Obeagu EI, Obarezi TN, Ogbuabor BN, Anaebo QB, Eze GC. Pattern of total white blood cell and differential count values in HIV positive patients receiving treatment in Federal Teaching Hospital Abakaliki, Ebonyi State, Nigeria. *International Journal of Life Science, Biotechnology and Pharama Research.* 2014; 391:186-189.

**Citation:** Obeagu EI, Obeagu, GU. The Crucial Role of Erythropoietin in Managing Anemia in HIV: A Review. *Elite Journal of Scientific Research and Review*, 2024; 2(1): 24-36

72. Obeagu EI. A Review of Challenges and Coping Strategies Faced by HIV/AIDS Discordant Couples. *Madonna University journal of Medicine and Health Sciences*. 2023; 3 (1): 7-12.
73. Oloro OH, Obeagu EI. A Systematic Review on Some Coagulation Profile in HIV Infection. *International Journal of Innovative and Applied Research*. 2022;10(5):1-11.
74. Nwosu DC, Obeagu EI, Nkwuocha BC, Nwanna CA, Nwanjo HU, Amadike JN, Ezemma MC, Okpomeshine EA, Ozims SJ, Agu GC. Alterations in superoxide dismutase, vitamins C and E in HIV infected children in Umuahia, Abia state. *International Journal of Advanced Research in Biological Sciences*. 2015;2(11):268-271.
75. Obeagu EI, Malot S, Obeagu GU, Ugwu OP. HIV resistance in patients with Sickle Cell Anaemia. *Newport International Journal of Scientific and Experimental Sciences (NIJSES)*. 2023;3(2):56-59.
76. Ifeanyi OE, Uzoma OG, Stella EI, Chinedum OK, Abum SC. Vitamin D and insulin resistance in HIV sero positive individuals in Umudike. *Int. J. Curr. Res. Med. Sci*. 2018;4(2):104-108.
77. Ifeanyi OE, Leticia OI, Nwosu D, Chinedum OK. A Review on blood borne viral infections: universal precautions. *Int. J. Adv. Res. Biol. Sci*. 2018;5(6):60-66.
78. Nwovu AI, Ifeanyi OE, Uzoma OG, Nwebonyi NS. Occurrence of Some Blood Borne Viral Infection and Adherence to Universal Precautions among Laboratory Staff in Federal Teaching Hospital Abakaliki Ebonyi State. *Arch Blood Transfus Disord*. 2018;1(2).
79. Chinedu K, Takim AE, Obeagu EI, Chinazor UD, Eloghosa O, Ojong OE, Odunze U. HIV and TB co-infection among patients who used Directly Observed Treatment Short-course centres in Yenagoa, Nigeria. *IOSR J Pharm Biol Sci*. 2017;12(4):70-75.
80. Vignjević Petrinović S, Jauković A, Milošević M, Bugarski D, Budeč M. Targeting stress erythropoiesis pathways in cancer. *Frontiers in Physiology*. 2022; 13:844042.
81. Offie DC, Obeagu EI, Akueshi C, Njab JE, Ekanem EE, Dike PN, Oguh DN. Facilitators and barriers to retention in HIV care among HIV infected MSM attending Community Health Center Yaba, Lagos Nigeria. *Journal of Pharmaceutical Research International*. 2021;33(52B):10-19.
82. Obeagu EI, Obeagu GU, Ede MO, Odo EO, Buhari HA. Translation of HIV/AIDS knowledge into behavior change among secondary school adolescents in Uganda: A review. *Medicine (Baltimore)*. 2023;102(49): e36599. doi: 10.1097/MD.00000000000036599. PMID: 38065920; PMCID: PMC10713174.
83. Anyiam AF, Arinze-Anyiam OC, Ironi EA, Obeagu EI. Distribution of ABO and rhesus blood grouping with HIV infection among blood donors in Ekiti State Nigeria. *Medicine (Baltimore)*. 2023;102(47): e36342. doi: 10.1097/MD.00000000000036342. PMID: 38013335; PMCID: PMC10681551.
84. Echefu SN, Udosen JE, Akwiwu EC, Akpotuzor JO, Obeagu EI. Effect of Dolutegravir regimen against other regimens on some hematological parameters, CD4 count and viral load of people living with HIV infection in South Eastern Nigeria. *Medicine (Baltimore)*. 2023;102(47): e35910. doi: 10.1097/MD.00000000000035910. PMID: 38013350; PMCID: PMC10681510.
85. Opeyemi AA, Obeagu EI. Regulations of malaria in children with human immunodeficiency virus infection: A review. *Medicine (Baltimore)*. 2023;102(46):

**Citation:** Obeagu EI, Obeagu, GU. The Crucial Role of Erythropoietin in Managing Anemia in HIV: A Review. *Elite Journal of Scientific Research and Review*, 2024; 2(1): 24-36

- e36166. doi: 10.1097/MD.00000000000036166. PMID: 37986340; PMCID: PMC10659731.
86. Alum EU, Obeagu EI, Ugwu OPC, Samson AO, Adepoju AO, Amusa MO. Inclusion of nutritional counseling and mental health services in HIV/AIDS management: A paradigm shift. *Medicine (Baltimore)*. 2023;102(41): e35673. doi: 10.1097/MD.00000000000035673. PMID: 37832059; PMCID: PMC10578718.
  87. Aizaz M, Abbas FA, Abbas A, Tabassum S, Obeagu EI. Alarming rise in HIV cases in Pakistan: Challenges and future recommendations at hand. *Health Sci Rep*. 2023;6(8): e1450. doi: 10.1002/hsr2.1450. PMID: 37520460; PMCID: PMC10375546.
  88. Obeagu EI, Obeagu GU, Obiezu J, Ezeonwumelu C, Ogunnaya FU, Ngwoke AO, Emeka-Obi OR, Ugwu OP. Hematologic Support in HIV Patients: Blood Transfusion Strategies and Immunological Considerations. *APPLIED SCIENCES (NIJBAS)*. 2023;3(3).
  89. Obeagu EI, Ubosi NI, Uzoma G. Storms and Struggles: Managing HIV Amid Natural Disasters. *Int. J. Curr. Res. Chem. Pharm. Sci*. 2023;10(11):14-25.
  90. Obeagu EI, Obeagu GU. Human Immunodeficiency Virus and tuberculosis infection: A review of prevalence of associated factors. *Int. J. Adv. Multidiscip. Res*. 2023;10(10):56-62.
  91. Obeagu EI, Malot S, Obeagu GU, Ugwu OP. HIV resistance in patients with Sickle Cell Anaemia. *Newport International Journal of Scientific and Experimental Sciences (NIJSES)*. 2023;3(2):56-9.
  92. Alum EU, Ugwu OP, Obeagu EI, Aja PM, Okon MB, Uti DE. Reducing HIV Infection Rate in Women: A Catalyst to reducing HIV Infection pervasiveness in Africa. *International Journal of Innovative and Applied Research*. 2023;11(10):01-6.
  93. Obeagu EI, Obeagu GU, Ukibe NR, Oyebadejo SA. Anemia, iron, and HIV: decoding the interconnected pathways: A review. *Medicine*. 2024;103(2): e36937.
  94. Demitto FO, Araújo-Pereira M, Schmaltz CA, Sant'Anna FM, Arriaga MB, Andrade BB, Rolla VC. Impact of persistent anemia on systemic inflammation and tuberculosis outcomes in persons living with HIV. *Frontiers in immunology*. 2020; 11:588405.

**Citation:** Obeagu EI, Obeagu, GU. The Crucial Role of Erythropoietin in Managing Anemia in HIV: A Review. *Elite Journal of Scientific Research and Review*, 2024; 2(1): 24-36