Elite Journal of Medicine. Volume 2 issue 4(2024), Pp. 19-36
https://epjournals.com/journals/EJM

# GATA-1 and Hematopoietic Stem Cell Quiescence in HIV: Implications for Therapy

*Emmanuel Ifeanyi Obeagu[1] and Getrude Uzoma Obeagu[2]

[1]Department of Medical Laboratory Science, Kampala International University, Uganda

[2]School of Nursing Science, Kampala International University, Uganda

*Corresponding authour: Emmanuel Ifeanyi Obeagu, Department of Medical Laboratory Science, Kampala International University, Uganda, emmanuelobeagu@yahoo.com, ORCID: 0000-0002-4538-0161

## Abstract

Hematopoietic stem cell (HSC) quiescence is crucial for maintaining the regenerative capacity of the hematopoietic system, and dysregulation of HSC quiescence has been implicated in hematological disorders, including those associated with Human Immunodeficiency Virus (HIV) infection. This review focuses on the role of GATA-1, a key transcription factor in hematopoiesis, in regulating HSC quiescence and its implications for therapy in HIV-infected individuals. We discuss the molecular mechanisms underlying GATA-1-mediated HSC quiescence, the impact of HIV on HSC function, and potential therapeutic strategies targeting GATA-1 to restore HSC homeostasis in HIV-infected individuals. Understanding the interplay between GATA-1 and HSC quiescence in the context of HIV infection may lead to the development of novel therapeutic approaches aimed at preserving hematopoietic function and improving clinical outcomes in HIV-infected individuals.

***Keywords****: GATA-1, hematopoietic stem cells, quiescence, HIV, therapy*

## Introduction

Hematopoietic stem cells (HSCs) play a central role in maintaining the integrity and functionality of the hematopoietic system by continuously generating a diverse array of blood cell lineages throughout life. A critical aspect of HSC biology is their ability to exist in a quiescent state, characterized by reversible cell cycle arrest, which ensures their long-term self-renewal capacity and preserves the regenerative potential of the hematopoietic system. Dysregulation of HSC quiescence has been implicated in various hematological disorders, including myelodysplastic syndromes (MDS), leukemia, and bone marrow failure syndromes. GATA-1, a zinc finger

transcription factor, is a key regulator of hematopoietic differentiation and lineage commitment. While traditionally known for its role in erythroid and megakaryocytic differentiation, emerging evidence suggests that GATA-1 also plays a crucial role in the maintenance of HSC quiescence. Through its transcriptional regulatory functions, GATA-1 governs the expression of genes involved in cell cycle control, DNA repair, and maintenance of stem cell identity, thereby influencing HSC quiescence and self-renewal capacity.[1-30]

Human Immunodeficiency Virus (HIV) infection is associated with various hematological abnormalities, including cytopenias, bone marrow suppression, and impaired hematopoietic function. Recent studies have implicated HIV in the dysregulation of HSC function, leading to perturbations in hematopoietic homeostasis and the development of hematological complications. The interplay between HIV infection and HSC quiescence represents an intriguing area of investigation with potential implications for the understanding and management of hematopoietic disorders in HIV-infected individuals. Understanding the molecular mechanisms underlying GATA-1-mediated HSC quiescence and its dysregulation in the context of HIV infection holds promise for the development of novel therapeutic strategies. Targeting GATA-1 and its downstream effectors may provide opportunities to restore HSC quiescence, preserve hematopoietic function, and mitigate the hematological complications associated with HIV infection. Additionally, elucidating the interplay between HIV and HSC quiescence may offer insights into the pathogenesis of HIV-associated hematological disorders and inform the development of targeted therapeutic approaches.[31-60]

In this review, it aims to provide an overview of the role of GATA-1 in regulating HSC quiescence, the impact of HIV on HSC function, and potential therapeutic implications for targeting GATA-1 in the context of HIV-associated hematological disorders.

**GATA-1 Regulation of HSC Quiescence**

GATA-1, a pivotal transcription factor in hematopoiesis, has been recognized not only for its role in lineage commitment but also for its influence on the maintenance of hematopoietic stem cell (HSC) quiescence. Quiescence, characterized by reversible cell cycle arrest, is fundamental for HSCs to preserve their regenerative potential and self-renewal capacity over the long term. GATA-1 regulates HSC quiescence through intricate transcriptional mechanisms that govern key genes involved in cell cycle control, DNA repair, and stem cell identity. Several studies have provided insights into the regulatory role of GATA-1 in HSC quiescence. GATA-1 expression has been detected in HSCs, and its deletion or dysregulation has been associated with alterations in HSC behavior, including increased proliferation and reduced quiescence. Mechanistically, GATA-1 regulates the expression of cyclin-dependent kinase inhibitors (CDKIs), such as p21 and p27, which inhibit cell cycle progression and promote HSC quiescence. Additionally, GATA-1 controls the expression of genes involved in DNA repair pathways, ensuring genomic stability and preserving HSC integrity during periods of quiescence.[61-90]

The influence of GATA-1 on HSC quiescence extends beyond cell cycle regulation to encompass other critical aspects of stem cell biology. GATA-1 directly regulates the expression of genes

involved in maintaining HSC identity and multipotency, thereby safeguarding the stemness of quiescent HSCs. Moreover, GATA-1-mediated transcriptional programs contribute to the establishment and maintenance of the hematopoietic niche, creating a supportive microenvironment for quiescent HSCs. Dysregulation of GATA-1 activity can disrupt HSC quiescence and lead to hematopoietic dysfunction. Under conditions of GATA-1 deficiency or aberrant expression, HSCs may exhibit increased proliferation, decreased self-renewal capacity, and impaired regenerative potential. These alterations in HSC behavior may contribute to the pathogenesis of hematological disorders, including myelodysplastic syndromes (MDS) and leukemia, where dysregulated HSC quiescence is observed.[91-100]

**Impact of HIV on HSC Function**

Human Immunodeficiency Virus (HIV) infection profoundly affects hematopoietic stem cell (HSC) function, leading to disruptions in hematopoietic homeostasis and the development of hematological complications. HIV-associated immune activation, chronic inflammation, and direct viral effects contribute to alterations in the bone marrow microenvironment, hematopoietic stem and progenitor cells (HSPCs), and mature blood cell lineages. One of the key consequences of HIV infection is the dysregulation of HSC quiescence. HIV-induced immune activation and inflammation disrupt the balance between HSC quiescence and proliferation, leading to increased HSC turnover and exhaustion of the stem cell pool. Chronic immune activation also promotes the expansion of activated HSPCs, which may exhibit altered differentiation potential and impaired self-renewal capacity. These changes in HSC behavior contribute to bone marrow suppression, cytopenias, and impaired hematopoietic regeneration observed in HIV-infected individuals. HIV infection directly affects HSCs and their progeny through viral replication and integration into the host genome. HIV can infect HSPCs, leading to the persistence of viral reservoirs within the bone marrow microenvironment. Viral integration into the host genome may disrupt normal hematopoietic differentiation processes and contribute to the emergence of dysplastic hematopoietic clones. Additionally, HIV proteins and regulatory elements may modulate intracellular signaling pathways involved in HSC function, further exacerbating hematopoietic dysfunction.[101-140]

Furthermore, HIV-associated comorbidities, including opportunistic infections and malignancies, exert additional stress on the hematopoietic system and contribute to HSC dysfunction. Opportunistic infections such as cytomegalovirus (CMV) and mycobacterial infections can directly affect HSCs and impair hematopoietic function. Similarly, HIV-associated malignancies, such as lymphomas and Kaposi's sarcoma, disrupt normal hematopoiesis and contribute to bone marrow suppression and cytopenias. The impact of HIV on HSC function extends beyond the hematopoietic system to affect immune reconstitution and overall clinical outcomes in HIV-infected individuals. Impaired hematopoietic regeneration and dysregulated immune responses increase the risk of opportunistic infections, treatment-related toxicities, and mortality in HIV-infected individuals. Understanding the mechanisms underlying HIV-induced alterations in HSC function is crucial for developing targeted therapeutic strategies to preserve hematopoietic homeostasis and improve clinical outcomes in HIV-infected individuals.[141-160]

## Therapeutic Implications

Therapeutic interventions targeting hematopoietic stem cell (HSC) dysfunction in HIV-infected individuals hold promise for improving hematopoietic homeostasis, reducing the incidence of hematological complications, and enhancing overall clinical outcomes. Initiation and optimization of ART represent the cornerstone of HIV management and have been shown to reduce viral load, restore immune function, and mitigate HIV-associated hematological abnormalities. Effective suppression of viral replication with ART may alleviate the direct effects of HIV on HSCs and mitigate immune activation and inflammation, thereby preserving HSC function and hematopoietic homeostasis. Administration of hematopoietic growth factors, such as erythropoietin (EPO) and granulocyte-colony stimulating factor (G-CSF), may be considered to stimulate erythropoiesis and granulopoiesis in individuals with HIV-associated anemia and neutropenia, respectively. These growth factors can help alleviate cytopenias, improve quality of life, and reduce the need for blood transfusions in HIV-infected individuals with hematological complications. Allogeneic Hematopoietic Stem Cell Transplantation (HSCT) may be considered for select HIV-infected individuals with hematological malignancies or severe bone marrow failure syndromes refractory to conventional therapies. Advances in HSCT techniques, including reduced-intensity conditioning regimens and donor selection strategies, have improved outcomes and expanded the eligibility criteria for HSCT in HIV-infected individuals. Immunomodulatory agents, such as lenalidomide and thalidomide, have shown promise in the treatment of hematological disorders characterized by immune dysregulation, including myelodysplastic syndromes (MDS) and autoimmune cytopenias. These agents modulate immune responses, enhance erythropoiesis, and may mitigate the inflammatory milieu associated with HIV infection, thereby potentially improving hematopoietic function. Emerging targeted therapies aimed at modulating specific molecular pathways implicated in HSC dysfunction may offer novel treatment approaches for HIV-associated hematological disorders. Targeting transcription factors, signaling pathways, and epigenetic regulators involved in HSC regulation, such as GATA-1, may restore hematopoietic homeostasis and mitigate the risk of hematological complications in HIV-infected individuals.[161-184]

## Conclusion

Hematopoietic stem cell (HSC) dysfunction represents a significant contributor to the hematological complications observed in individuals living with Human Immunodeficiency Virus (HIV) infection. HIV-induced immune activation, chronic inflammation, direct viral effects, and associated comorbidities collectively contribute to alterations in HSC function, leading to bone marrow suppression, cytopenias, and increased susceptibility to hematological disorders. Efforts to address HSC dysfunction in HIV-infected individuals have centered on a multifaceted approach, including antiretroviral therapy (ART), supportive care measures, disease-modifying therapies, and targeted interventions. Optimization of ART remains paramount for suppressing viral replication, mitigating immune activation and inflammation, and preserving HSC function. Additionally, supportive care measures, hematopoietic growth factors, and immune modulation therapies can alleviate cytopenias and improve quality of life for affected individuals.

**References**

1. Mann Z, Sengar M, Verma YK, Rajalingam R, Raghav PK. Hematopoietic stem cell factors: their functional role in self-renewal and clinical aspects. Frontiers in Cell and Developmental Biology. 2022; 10:664261.
2. Sezaki M, Hayashi Y, Wang Y, Johansson A, Umemoto T, Takizawa H. Immuno-modulation of hematopoietic stem and progenitor cells in inflammation. Frontiers in immunology. 2020; 11:585367.
3. Okeke C, Silas U, Okeke C, Chikwendu C. Current trends on hemopoietic stem cells. Current Stem Cell Research & Therapy. 2021;16(2):199-208.
4. Lee J, Yoon SR, Choi I, Jung H. Causes and mechanisms of hematopoietic stem cell aging. International Journal of Molecular Sciences. 2019;20(6):1272.
5. Govindarajah V, Reynaud D. Tuning of the hematopoietic stem cell compartment in its inflammatory environment. Current stem cell reports. 2018; 4:189-200.
6. Abunimye DA, Okafor IM, Okorowo H, Obeagu EI. The role of GATA family transcriptional factors in haematological malignancies: A review. Medicine. 2024;103(12): e37487.
7. 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.
8. 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.
9. Ifeanyi OE. Acute Leukaemia: A Sudden Killer to Human Beings. EC Emergency Medicine and Critical Care. 2020;4(6):154-67.
10. 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.
11. 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.
12. 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.
13. 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.
14. 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
15. 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

16. 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.
17. 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.
18. 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.
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, Alaeboh 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.
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_Emmanuel_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
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
24. 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.
25. Nwosu DC, Obeagu EI, Nkwocha BC, Nwanna 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-MDAAND-NON-ENZYMATIC-ANTIOXIDANTS-VIT-C-E-IN-HIV-SEROPOSITIVE-CHILDREN-IN-AN-URBAN-COMMUNITY-OF-ABIA-STATE-NIGERIA.pdf.

26. 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.
27. 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_Emmanuel_Ifeanyi3__et_al.IJCRAR.pdf.
28. 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
29. 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
30. 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.
31. Obeagu EI, Amekpor 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.
32. Obeagu EI, Scott GY, Amekpor 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.
33. Walter O, Anaebo 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.
34. 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: assessment in three levels of care in cross River State, Nigeria. Journal of Pharmaceutical Research International. 2020;32(24):9-18.
35. 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.

36. 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
37. 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.
38. Obeagu EI, Ibeh NC, Nwobodo HA, Ochei KC, Iwegbulam CP. Haematological indices of malaria patients coinfected 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
39. 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.
40. 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.
41. 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.
42. Emannuel 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/.
43. Igwe MC, Obeagu EI, Ogbuabor AO, Eze GC, Ikpenwa JN, Eze-Steven 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.
44. 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.

45. 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.
46. 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
47. 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
48. 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 ANTIRETRQVIRAL THERAPY. World Journal of Pharmacy and Pharmaceutical Sciences, 2015; 4(3): 153-160**.** links/5a4fd0500f7e9bbc10526b38/BIOCHEMICAL-ALTERATIONS-IN-ADULT-HIV-PATIENTS-ON-ANTIRETRQVIRAL-THERAPY.pdf.
49. 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.
50. Lionberger JM, Stirewalt DL. Gene expression changes in normal haematopoietic cells. Best Practice & Research Clinical Haematology. 2009;22(2):249-269.
51. Obeagu EI, Nwosu DC. Adverse drug reactions in HIV/AIDS patients on highly active antiretro viral therapy: a review of prevalence. Int. J. Curr. Res. Chem. Pharm. Sci. 2019;6(12):45-8.DOI: 10.22192/ijcrcps.2019.06.12.004 links/650aba1582f01628f0335795/Adverse-drug-reactions-in-HIV-AIDS-patients-on-highly-active-antiretro-viral-therapy-a-review-of-prevalence.pdf.
52. 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 links/645a4a462edb8e5f094ad37c/Implications-of-CD4-CD8-ratios-in-Human-Immunodeficiency-Virus-infections.pdf.
53. 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.
54. 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_Emmanuel_Ifeanyi_and_Obeagu__Getrude_Uzoma.EMMA2.pdf.
55. 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.

56. 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.
57. Obeagu EI, Obarezi TN, Omeh YN, Okoro NK, Eze OB. Assessment of some haematological and biochemical parametrs in HIV patients before receiving treatment in Aba, Abia State, Nigeria. Res J Pharma Biol Chem Sci. 2014; 5:825-830.
58. 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.
59. 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.
60. 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.
61. Alvarez F, Fritz JH, Piccirillo CA. Pleiotropic effects of IL-33 on CD4+ T cell differentiation and effector functions. Frontiers in immunology. 2019; 10:438556.
62. Chirumbolo S, Bjørklund G, Sboarina A, Vella A. The role of basophils as innate immune regulatory cells in allergy and immunotherapy. Human vaccines & immunotherapeutics. 2018;14(4):815-831.
63. Nwosu DC, Obeagu EI, Nkwuocha BC, Nwanna CA, Nwanjo HU, Amadike JN, Ezemma MC, Okpomeshine EA, Ozims SJ, Agu GC. Alterations in superoxide dismutiase, 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.
64. 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.
65. 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.
66. 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).
67. 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.
68. 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.

69. 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.0000000000036599. PMID: 38065920; PMCID: PMC10713174.
70. Anyiam AF, Arinze-Anyiam OC, Irondi 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.0000000000036342. PMID: 38013335; PMCID: PMC10681551.
71. 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.0000000000035910. PMID: 38013350; PMCID: PMC10681510.
72. Opeyemi AA, Obeagu EI. Regulations of malaria in children with human immunodeficiency virus infection: A review. Medicine (Baltimore). 2023;102(46): e36166. doi: 10.1097/MD.0000000000036166. PMID: 37986340; PMCID: PMC10659731.
73. Obeagu EI, Obeagu GU, Obiezu J, Ezeonwumelu C, Ogunnaya FU, Ngwoke AO, Emeka-Obi OR,
74. 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.
75. 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.
76. Obeagu EI, Obeagu GU. Unmasking the Truth: Addressing Stigma in the Fight Against HIV. Elite Journal of Public Health. 2024;2(1):8-22.
77. Obeagu EI, Obeagu GU, Okwuanaso CB. Optimizing Immune Health in HIV Patients through Nutrition: A Review. Elite Journal of Immunology. 2024;2(1):14-33.
78. Obeagu EI, Obeagu GU. Utilization of immunological ratios in HIV: Implications for monitoring and therapeutic strategies. Medicine. 2024;103(9): e37354.
79. Obeagu EI, Obeagu GU. CD8 Dynamics in HIV Infection: A Synoptic Review. Elite Journal of Immunology. 2024;2(1):1-3.
80. Obeagu EI, Obeagu GU. Implications of B Lymphocyte Dysfunction in HIV/AIDS. Elite Journal of Immunology. 2024;2(1):34-46.
81. Obeagu EI, Obeagu GU. Maternal Influence on Infant Immunological Responses to HIV: A Review. Elite Journal of Laboratory Medicine. 2024;2(1):46-58.
82. Obeagu EI, Obeagu GU. Understanding B Lymphocyte Functions in HIV Infection: Implications for Immune Dysfunction and Therapeutic Strategies. Elite Journal of Medicine. 2024;2(1):35-46.
83. Obeagu EI, Obeagu GU. Platelet-Driven Modulation of HIV: Unraveling Interactions and Implications. Journal home page: http://www. journalijiar. com.;12(01).
84. Obeagu EI, Anyiam AF, Obeagu GU. Managing Hematological Complications in HIV: Erythropoietin Considerations. Elite Journal of HIV. 2024;2(1):65-78.

85. Obeagu EI, Obeagu GU, Hauwa BA, Umar AI. Hematocrit Variations in HIV Patients Co-infected with Malaria: A Comprehensive Review. Journal home page: http://www. journalijiar. com.;12(01).
86. ObeaguEI AA, Obeagu GU. Synergistic Effects of Blood Transfusion and HIV in Children Under 5 Years with Severe Malaria: A Review. Elite Journal of HIV. 2024;2(1):31-50.
87. Obeagu EI, Anyiam AF, Obeagu GU. Unveiling B Cell Mediated Immunity in HIV Infection: Insights, Challenges, and Potential Therapeutic Avenues. Elite Journal of HIV. 2024;2(1):1-5.
88. Obeagu EI, Obeagu GU. Hematocrit Fluctuations in HIV Patients Co-infected with Malaria Parasites: A Comprehensive Review. Int. J. Curr. Res. Med. Sci. 2024;10(1):25-36.
89. Obeagu EI, Obeagu GU. Transfusion Therapy in HIV: Risk Mitigation and Benefits for Improved Patient Outcomes. Sciences. 2024;4(1):32-7.
90. Obeagu EI, Obeagu GU. Mental Health and Psychosocial Effects of natural disaster on HIV Patients. Sciences. 2024;4(1):38-44.
91. Obeagu EI, Obeagu GU. Eosinophil-Associated Changes in Neonatal Thymic T Regulatory Cell Populations in HIV-Infected Pregnancies. Elite Journal of Health Science. 2024;2(1):33-42.
92. Obeagu EI, Obeagu GU. Advances in Understanding the Impact of Blood Transfusion on Anemia Resolution in HIV-Positive Children with Severe Malaria: A Comprehensive Review. Elite Journal of Haematology. 2024;2(1):26-41.
93. Obeagu EI, Ayogu EE, Obeagu GU. Interactions between Blood Transfusion and Antiretroviral Medications: Implications for Patient Care. Elite Journal of Medicine. 2024;2(2):104-15.
94. Obeagu EI, Obeagu GU. Maternal Eosinophilic Responses in HIV-Positive Pregnant Women: Unraveling Immunological Dynamics for Improved Maternal-Fetal Health. Elite Journal of Immunology. 2024;2(1):47-64.
95. Obeagu EI, Anyanwu CN, Obeagu GU. Challenges and Considerations in Managing Blood Transfusion for Individuals with HIV. Elite Journal of HIV. 2024;2(2):1-7.
96. Obeagu EI, Ubosi NI, Obeagu GU, Akram M. Early Infant Diagnosis: Key to Breaking the Chain of HIV Transmission. Elite Journal of Public Health. 2024;2(1):52-61.
97. Obeagu EI, Obeagu GU. Understanding Hematocrit Fluctuations in HIV-Malaria Coinfection for Improved Management. Elite Journal of Public Health. 2024;2(1):22-34.
98. Obeagu EI, Obeagu GU. The Impact of Erythropoietin on Preeclampsia in HIV-Positive Women: A Review. Elite Journal of Nursing and Health Science. 2024;2(1):21-31.
99. 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. journalijiar. com.;12(01).
100. Obeagu EI, Obeagu GU. Neonatal Outcomes in Children Born to Mothers with Severe Malaria, HIV, and Transfusion History: A Review. Elite Journal of Nursing and Health Science. 2024;2(3):38-58.
101. Obeagu EI, Obeagu GU. Assessing Platelet Functionality in HIV Patients Receiving Antiretroviral Therapy: Implications for Risk Assessment. Elite Journal of HIV. 2024;2(3):14-26.

102. Obeagu EI, Obeagu GU. Advancements in HIV Prevention: Africa's Trailblazing Initiatives and Breakthroughs. Elite Journal of Public Health. 2024;2(1):52-63.
103. Obeagu EI, Obeagu GU. Maternal Influence on Infant Immunological Responses to HIV: A Review. Elite Journal of Laboratory Medicine. 2024;2(1):46-58.
104. Obeagu EI, Obeagu GU. Counting Cells, Shaping Fates: CD4/CD8 Ratios in HIV. Elite Journal of Scientific Research and Review. 2024;2(1):37-50.
105. Obeagu EI, Anyiam AF, Obeagu GU. Managing Hematological Complications in HIV: Erythropoietin Considerations. Elite Journal of HIV. 2024;2(1):65-78.
106. Obeagu EI, Obeagu GU. Immune Modulation in HIV-Positive Neonates: Insights and Implications for Clinical Management. Elite Journal of Nursing and Health Science. 2024;2(3):59-72.
107. Obeagu EI, Ayogu EE, Obeagu GU. Impact on Viral Load Dynamics: Understanding the Interplay between Blood Transfusion and Antiretroviral Therapy in HIV Management. Elite Journal of Nursing and Health Science. 2024;2(2):5-15.
108. Obeagu EI, Obeagu GU. Understanding B Lymphocyte Functions in HIV Infection: Implications for Immune Dysfunction and Therapeutic Strategies. Elite Journal of Medicine. 2024;2(1):35-46.
109. Obeagu EI, Anyanwu CN, Obeagu GU. Challenges and Considerations in Managing Blood Transfusion for Individuals with HIV. Elite Journal of HIV. 2024;2(2):1-7.
110. Obeagu EI, Obeagu GU. Understanding ART and Platelet Functionality: Implications for HIV Patients. Elite Journal of HIV. 2024;2(2):60-73.
111. Obeagu EI, Obeagu GU. The Role of Blood Transfusion Strategies in HIV Management: Current Insights and Future Directions. Elite Journal of Medicine. 2024;2(1):10-22.
112. Obeagu EI, AmaezeAA O, Obeagu GU. B Cell Deficiency and Implications in HIV Pathogenesis: Unraveling the Complex Interplay. Elite Journal of Nursing and Health Science. 2024;2(2):33-46.
113. Obeagu EI, Obeagu GU. Eosinophil Dynamics in Pregnancy among Women Living with HIV: A Comprehensive Review. Int. J. Curr. Res. Med. Sci. 2024;10(1):11-24.
114. Obeagu EI, Obeagu GU. Hematocrit Fluctuations in HIV Patients Co-infected with Malaria Parasites: A Comprehensive Review. Int. J. Curr. Res. Med. Sci. 2024;10(1):25-36.
115. Obeagu EI, Obeagu GU. Unveiling the Role of Innate Immune Activation in Pediatric HIV: A Review. Elite Journal of Immunology. 2024;2(3):33-44.
116. Obeagu EI, Obeagu GU. Harnessing B Cell Responses for Personalized Approaches in HIV Management. Elite Journal of Immunology. 2024;2(2):15-28.
117. Obeagu EI, Obeagu GU, Hauwa BA, Umar AI. Neutrophil Dynamics: Unveiling Their Role in HIV Progression within Malaria Patients. Journal home page: http://www. journalijiar. com.;12(01).
118. Obeagu EI, Obeagu GU, Hauwa BA, Umar AI. Hematocrit Variations in HIV Patients Co-infected with Malaria: A Comprehensive Review. Journal home page: http://www. journalijiar. com.;12(01).

119. Obeagu EI, Igwe MC, Obeagu GU. The Power of Unity: Collective Efforts in Confronting HIV Stigma. Elite Journal of Public Health. 2024;2(3):22-36.
120. Obeagu EI, Anyiam AF, Obeagu GU. Managing Anemia in HIV through Blood Transfusions: Clinical Considerations and Innovations. Elite Journal of HIV. 2024;2(1):16-30.
121. Obeagu EI, Obeagu GU. Maternal Eosinophilic Responses in HIV-Positive Pregnant Women: Unraveling Immunological Dynamics for Improved Maternal-Fetal Health. Elite Journal of Immunology. 2024;2(1):47-64.
122. Obeagu EI, Obeagu GU. Platelet Aberrations in HIV Patients: Assessing Impacts of ART. Elite Journal of Haematology, 2024; 2 (3).:10-24.
123. Obeagu EI, Obeagu GU. Hematological Changes Following Blood Transfusion in Young Children with Severe Malaria and HIV: A Critical Review. Elite Journal of Laboratory Medicine. 2024;2(1):33-45.
124. Obeagu EI, Anyiam AF, Obeagu GU. Erythropoietin Therapy in HIV-Infected Individuals: A Critical Review. Elite Journal of HIV. 2024;2(1):51-64.
125. Obeagu EI, Ubosi NI, Obeagu GU, Obeagu AA. Nutritional Strategies for Enhancing Immune Resilience in HIV: A Review. Int. J. Curr. Res. Chem. Pharm. Sci. 2024;11(2):41-51.
126. 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.
127. Obeagu EI, Obeagu GU. Impact of Maternal Eosinophils on Neonatal Immunity in HIV-Exposed Infants: A Review. Elite Journal of Immunology. 2024;2(3):1-8.
128. Obeagu EI, Anyiam AF, Obeagu GU. Unveiling B Cell Mediated Immunity in HIV Infection: Insights, Challenges, and Potential Therapeutic Avenues. Elite Journal of HIV. 2024;2(1):1-5.
129. Obeagu EI, Obeagu GU. Anemia and Erythropoietin: Key Players in HIV Disease Progression. Elite Journal of Haematology, 2024; 2 (3).:42-57.
130. Obeagu EI, Obeagu GU. Platelet Dysfunction in HIV Patients: Assessing ART Risks. Elite Journal of Scientific Research and Review. 2024;2(1):1-6.
131. Obeagu EI, Ubosi NI, Obeagu GU, Akram M. Early Infant Diagnosis: Key to Breaking the Chain of HIV Transmission. Elite Journal of Public Health. 2024;2(1):52-61.
132. Obeagu EI, Obeagu GU. Transfusion Therapy in HIV: Risk Mitigation and Benefits for Improved Patient Outcomes. Sciences. 2024;4(1):32-7.
133. Obeagu EI, Obeagu GU. P-Selectin and Immune Activation in HIV: Clinical Implications. Elite Journal of Health Science. 2024;2(2):16-29.
134. Obeagu EI, Obeagu GU. Mental Health and Psychosocial Effects of natural disaster on HIV Patients. Sciences. 2024;4(1):38-44.
135. Obeagu EI, Obeagu GU. Optimizing Blood Transfusion Protocols for Breast Cancer Patients Living with HIV: A Comprehensive Review. Elite Journal of Nursing and Health Science. 2024;2(2):1-7.
136. Obeagu EI, Obeagu GU. Advances in Understanding the Impact of Blood Transfusion on Anemia Resolution in HIV-Positive Children with Severe Malaria: A Comprehensive Review. Elite Journal of Haematology. 2024;2(1):26-41.

137. Obeagu EI, Obeagu GU. Transfusion-Related Complications in Children Under 5 with Coexisting HIV and Severe Malaria: A Review. Int. J. Curr. Res. Chem. Pharm. Sci. 2024;11(2):9-19.
138. Obeagu EI, Obeagu GU. Impact of Blood Transfusion on Viral Load Dynamics in HIV-Positive Neonates with Severe Malaria: A Review. Elite Journal of Scientific Research and Review. 2024;2(1):42-60.
139. Obeagu EI, Ayogu EE, Obeagu GU. Interactions between Blood Transfusion and Antiretroviral Medications: Implications for Patient Care. Elite Journal of Medicine. 2024;2(2):104-5.
140. Obeagu EI, Obeagu GU, Odo EO, Igwe MC, Ugwu OP, Alum EU, Racheal P. Combatting Stigma: Essential Steps in Halting HIV Spread. IAA Journal of Applied Sciences. 2024;11(1):22-9.
141. Obeagu EI, Obeagu GU. P-Selectin Expression in HIV-Associated Coagulopathy: Implications for Treatment. Elite Journal of Haematology, 2024; 2 (3).:25-41.
142. Obeagu EI, Obeagu GU. Eosinophil-Associated Changes in Neonatal Thymic T Regulatory Cell Populations in HIV-Infected Pregnancies. Elite Journal of Health Science. 2024;2(1):33-42.
143. Obeagu EI, Obeagu GU. Exploring the Role of L-selectin in HIV-related Immune Exhaustion: Insights and Therapeutic Implications. Elite Journal of HIV. 2024;2(2):43-59.
144. Obeagu EI. Erythropoietin and the Immune System: Relevance in HIV Management. Elite Journal of Health Science. 2024;2(3):23-35.
145. Obeagu EI, Obeagu GU. The Impact of Erythropoietin on Preeclampsia in HIV-Positive Women: A Review. Elite Journal of Nursing and Health Science. 2024;2(1):21-31.
146. Obeagu EI, Obeagu GU. Unraveling the Role of Eosinophil Extracellular Traps (EETs) in HIV-Infected Pregnant Women: A Review. Elite Journal of Nursing and Health Science. 2024;2(3):84-99.
147. Obeagu EI, Obeagu GU. Hematologic Considerations in Breast Cancer Patients with HIV: Insights into Blood Transfusion Strategies. Elite Journal of Health Science. 2024;2(2):20-35.
148. Obeagu EI, Obeagu GU. L-selectin and HIV-Induced Immune Cell Trafficking: Implications for Pathogenesis and Therapeutic Strategies. Elite Journal of Laboratory Medicine. 2024;2(2):30-46.
149. Obeagu EI, Obeagu GU. The Intricate Relationship Between Erythropoietin and HIV-Induced Anemia: Unraveling Pathways for Therapeutic Insights. Int. J. Curr. Res. Chem. Pharm. Sci. 2024;11(2):30-40.
150. Obeagu EI, Obeagu GU. The Role of L-selectin in Tuberculosis and HIV Coinfection: Implications for Disease Diagnosis and Management. Elite Journal of Public Health. 2024;2(1):35-51.
151. Kalu OA, Ukibe NR, Onyenekwe CC, Okoyeagu RC, Nnaemeka WS, Onyenekwe AJ, Ukibe EG, Ukibe BC, Ukibe VE, Obeagu EI. Assessment of Serum Cystatin C, Microalbumin Levels and Egfr in HIV Seropositive Individuals based on Age and Gender in NAUTH, Nnewi, Nigeria. Elite Journal of Medicine. 2024;2(3):48-59.

152. Obeagu EI, Obeagu GU. Understanding Immune Cell Trafficking in Tuberculosis-HIV Coinfection: The Role of L-selectin Pathways. Elite Journal of Immunology. 2024;2(2):43-59.
153. Obeagu EI, Obeagu GU. Eosinophilic Changes in Placental Tissues of HIV-Positive Pregnant Women: A Review. Elite Journal of Laboratory Medicine. 2024;2(1):14-32.
154. Obeagu EI, Obeagu GU. P-Selectin and Platelet Activation in HIV: Implications for Antiviral Therapy. Elite Journal of Scientific Research and Review. 2024;2(1):17-41.
155. Obeagu EI, Obeagu GU. Strength in Unity: Building Support Networks for HIV Patients in Uganda. Elite Journal of Medicine. 2024;2(1):1-6.
156. Obeagu EI, GU EE. Understanding the Intersection of Highly Active Antiretroviral Therapy and Platelets in HIV Patients: A Review. Elite Journal of Haematology, 2024; 2 (3).:111-7.
157. Obeagu EI, Obeagu GU. Anemia in HIV: The Role of Erythropoietin in Disease Progression. *Elite Journal of Haematology, 2024; 2(4):* 51-67
158. Obeagu EI, Obeagu GU. **ART and Platelet Dynamics: Assessing Implications for HIV Patient Care.** *Elite Journal of Haematology, 2024; 2(4):* 68-85
159. Obeagu EI, Obeagu GU. Impact of Breastfeeding on Infant Immune Responses in the Context of HIV**.** Elite Journal of Nursing and Health Science, 2024; 2(4):23-39
160. Obeagu EI, Obeagu GU. HIV-Induced Immune Exhaustion in Neonates: A Review of Mechanisms and Implications. Elite Journal of Immunology, 2024; 2(3): 45-61
161. Obeagu EI, Obeagu GU. Immunodeficiency and Immune Reconstitution in Pediatric HIV: Mechanisms, Challenges, and Therapeutic Strategies. Elite Journal of Immunology, 2024; 2(3): 62-79
162. Obeagu EI, Obeagu GU. Hematological Consequences of Erythropoietin in HIV: Clinical Implications. *Elite Journal of Haematology, 2024; 2(4):* 86-104
163. Obeagu EI, Obeagu GU. GATA-1 and Hematopoietic Stem Cell Dysfunction in HIV-Related Hematological Malignancies: A Review. *Elite Journal of Haematology, 2024; 2(4):* 105-122
164. Obeagu EI, Obeagu GU. Exploration of Intricate Relationship between GATA-1 and Anemia in HIV. *Elite Journal of Haematology, 2024; 2(4):* 123-140
165. Obeagu EI, Obeagu GU. GATA-1 and Immune Dysregulation in HIV/AIDS: Implications for Therapy. Elite Journal of HIV, 2024; 2(3): 69-85
166. Obeagu EI, Obeagu GU. The Role of GATA-1 in Erythropoietin Response and Resistance in HIV/AIDS. Elite Journal of HIV, 2024; 2(4): 1-17
167. Obeagu EI, Obeagu GU. Understanding the Role of GATA-1 in T-Cell Development in the Context of HIV Infection. Elite Journal of HIV, 2024; 2(4): 18-34
168. Obeagu EI, Obeagu GU. Programmed Cell Death Protein 1 (PD-1) Pathway Modulation in HIV/AIDS: From Bench to Bedside. Elite Journal of HIV, 2024; 2(4): 35-53
169. Obeagu EI, Obeagu GU. Programmed Cell Death Protein 1 (PD-1) and Immune Checkpoint Inhibitors in HIV-Related Lymphomas: Current Insights and Future Directions**.** Elite Journal of Immunology, 2024; 2(4): 1-17

170. Obeagu EI, Obeagu, GU. Programmed Cell Death Protein 1 (PD-1) Signaling in HIV-Associated Cardiovascular Disease: Mechanisms and Therapeutic Implications. *Elite Journal of Scientific Research and Review*, 2024; 2(1): 61-77
171. Obeagu EI, Obeagu, GU. Cytotoxic T-Lymphocyte-Associated Protein 4 (CTLA-4) Blockade and HIV-Associated Kaposi Sarcoma: A Promising Therapeutic Strategy. *Elite Journal of Scientific Research and Review*, 2024; 2(1): 78-94
172. Obeagu EI, Obeagu GU. The Impact of Cytotoxic T-Lymphocyte-Associated Protein 4 (CTLA-4) Genetic Variations on HIV Susceptibility and Progression**.** Elite Journal of Immunology, 2024; 2(4): 18-35
173. Obeagu EI, Obeagu, GU. Antacid Use in HIV Patients: Implications for Drug Absorption, Metabolism, and Adverse Effects. *Elite Journal of Scientific Research and Review*, 2024; 2(3): 1-19
174. Obeagu EI, Obeagu GU. Erythropoietin Signaling and its Implications in HIV-Related Anemia: A Comprehensive Review. Elite Journal of HIV, 2024; 2(4): 54-71
**175.** Obeagu EI, Obeagu, GU. The Role of GATA-1 in Megakaryocyte Function and Platelet Production During HIV Infection: A Review. *Elite Journal of Scientific Research and Review*, 2024; 2(3): 20-36
**176.** Obeagu EI, Obeagu GU. GATA-1 and Bone Marrow Failure Syndromes in the Context of HIV Infection: A Review of Molecular Mechanisms and Therapeutic Implications. Elite Journal of Laboratory Medicine, 2024; 2(3): 39-56
**177.** Obeagu EI, Obeagu GU. GATA-1 Mutations and Their Association with HIV-Associated Hematological Disorders: A Review. Elite Journal of Health Science, 2024; 2(4): 7-23
**178.** Obeagu EI, Obeagu GU. GATA-1 and Hematopoietic Stem Cell Maintenance in HIV: Mechanisms and Implications. Elite Journal of Health Science, 2024; 2(4): 24-40
**179.** Obeagu EI, Obeagu GU. GATA-1 Regulation of Erythroid Progenitor Cell Differentiation in HIV/AIDS: Molecular Insights and Therapeutic Implications. *Elite Journal of Haematology*, *2024; 2(4):* 141-159
**180.** Obeagu EI, Obeagu GU. Role of GATA-1 in Megakaryopoiesis and Thrombopoiesis During HIV Infection: Molecular Insights and Therapeutic Implications**.** Elite Journal of Nursing and Health Science, 2024; 2(4):40-59
**181.** Obeagu EI, Obeagu GU. GATA-1 as a Modulator of Immune Responses in HIV-Infected Individuals: Implications for Disease Pathogenesis and Therapeutic Interventions. Elite Journal of Laboratory Medicine, 2024; 2(3): 57-74
**182.** Obeagu EI, Obeagu GU. GATA-1 and Inflammatory Signaling Pathways in HIV-Related Hematological Disorders: Mechanisms and Therapeutic Implications. Elite Journal of Health Science, 2024; 2(3):27-44
**183.** Obeagu EI, Obeagu GU. GATA-1 and Coagulation Cascade Regulation in HIV-Associated Hematological Complications: Mechanisms and Therapeutic Implications. Elite Journal of Health Science, 2024; 2(3):45-63
**184.** Obeagu EI, Obeagu GU. GATA-1 and HIV-Associated Myelodysplastic Syndromes: Pathogenesis and Treatment Strategies. Elite Journal of Medicine, 2024; 2(4): 1-18