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Dendritic Cell Function in HIV-Infected Pediatric Populations

*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 author: Emmanuel Ifeanyi Obeagu, Department of Medical Laboratory Science, Kampala International University, Uganda. emmanuelobeagu@yahoo.com, obeagu.emmanuel@kiu.ac.ug 0000-0002-4538-0161

Abstract

Pediatric HIV infection presents unique challenges due to the dynamic interplay between the virus and the developing immune system. Dendritic cells, key regulators of immune responses, play a crucial role in shaping the outcomes of HIV infection in children. This comprehensive review explores the multifaceted functions of dendritic cells in pediatric HIV, unraveling their contributions to immune modulation, antigen presentation, and adaptive immunity. The review delves into the complex interactions between dendritic cells and HIV, shedding light on the implications for viral pathogenesis in pediatric populations. Furthermore, it discusses the therapeutic implications, including innovative strategies and vaccine development, aiming to leverage dendritic cell function for improved clinical outcomes in children living with HIV. The nuanced considerations in pediatric HIV care, ethical aspects, and challenges unique to this population are also addressed. Through this exploration, the review provides a roadmap for advancing our understanding of dendritic cell dynamics in pediatric HIV and underscores the potential for tailored therapeutic interventions to pave the way towards an HIV-free future for children.

Keywords: HIV, Pediatric, Dendritic Cells, Immune Response, Antigen Presentation, Immune Modulation, Adaptive Immunity, Viral Pathogenesis, Therapeutic Strategies, Vaccine Development

Introduction

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Human Immunodeficiency Virus (HIV) infection in pediatric populations poses intricate challenges, necessitating a nuanced understanding of the immune responses that shape the course of the disease. Among the orchestrators of the immune system, dendritic cells (DCs) emerge as pivotal players in the intricate dance between the developing immune system and the relentless virus [1-11]. Pediatric HIV infection, often acquired through vertical transmission from infected mothers, presents a distinct immunological landscape. Children manifest unique patterns of viral control, immune activation, and immune maturation, which are intricately linked to the interplay with dendritic cells [12-21].

Dendritic cells serve as sentinels of the immune system, bridging innate and adaptive immunity. In the context of pediatric HIV, studying dendritic cells is crucial due to their central role in shaping the immune responses against the virus. Their ability to capture, process, and present viral antigens to T cells positions them at the forefront of the immune response, making them key targets for therapeutic interventions [22-31]. This paper aims to elucidate the multifaceted functions of dendritic cells in pediatric HIV infection. By navigating the complex interactions between dendritic cells and the virus, the review seeks to shed light on the contributions of dendritic cells to immune dysregulation, viral pathogenesis, and potential avenues for therapeutic interventions. Additionally, the review explores the specific considerations essential for advancing pediatric HIV care.

Dendritic Cell Subtypes and Their Functions

Dendritic cells (DCs) are a diverse group of immune cells that play a pivotal role in orchestrating immune responses. In the context of pediatric HIV infection, understanding the specific functions of distinct DC subtypes is essential for unraveling the complexities of the immune system's response to the virus [32-41]. Conventional dendritic cells, comprising both cDC1 and cDC2 subsets, are adept at capturing and presenting antigens to T cells. In pediatric HIV, cDCs act as sentinels at mucosal surfaces, where initial viral encounters occur. The cDC1 subset excels in cross-presentation, crucial for priming cytotoxic T cell responses [42].

Plasmacytoid dendritic cells are specialized in the production of type I interferons, pivotal for antiviral responses. In pediatric HIV, pDCs play a dual role—initiating early antiviral responses through interferon production and modulating adaptive immunity through antigen presentation. Examining the dynamics of pDC responses in pediatric populations provides insights into the balance between antiviral defenses and immune regulation [43]. Myeloid-derived dendritic cells are potent antigen-presenting cells with a prominent role in T cell activation. In pediatric HIV, mDCs bridge innate and adaptive immunity by capturing and presenting viral antigens. The crosstalk between mDCs and T cells shapes the nature of the immune response. Exploring how mDCs modulate T cell activation in pediatric HIV contributes to understanding the adaptive arm of the immune response. Each DC subtype contributes uniquely to immune modulation. While cDC1s are involved in the induction of cytotoxic responses, cDC2s drive helper T cell differentiation. pDCs, through interferon production, exert antiviral effects and influence the adaptive immune landscape. mDCs, as master regulators, orchestrate the overall immune response.

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The intricate balance and cooperation between these DC subtypes form the basis for an effective immune response against HIV in pediatric populations. The developmental stage of the pediatric immune system influences DC function. Neonates and infants exhibit unique characteristics, such as distinct proportions of DC subsets and varying responsiveness.

Dendritic Cell Interactions with HIV

The intricate dance between dendritic cells (DCs) and the Human Immunodeficiency Virus (HIV) significantly influences the immune response in pediatric populations. Dendritic cells, particularly cDCs and mDCs, serve as primary sentinels for HIV at mucosal surfaces. The capture of viral particles by DCs is a critical step in initiating immune responses. Following capture, DCs process viral antigens into smaller peptides, which are then presented on major histocompatibility complexes (MHC) for recognition by T cells. Investigating the efficiency of viral capture and antigen processing in pediatric DCs provides insights into the early events of the immune response [44-53]. DCs are renowned for their ability to present antigens to T cells, a process pivotal for the activation of adaptive immunity. In pediatric HIV, the presentation of HIV-derived antigens by DCs to CD4+ and CD8+ T cells influences the nature and strength of the ensuing immune response. HIV has been shown to modulate the maturation process of DCs, impacting their phenotype and function. The virus can induce a semi-mature or tolerogenic DC state, leading to altered cytokine profiles and suboptimal T cell activation. Investigating the consequences of HIV-induced DC maturation alterations in pediatric populations is crucial for understanding the factors that contribute to immune dysregulation in early life [54-64].

DCs, particularly immature DCs, can facilitate the transmission of HIV to CD4+ T cells through a process known as trans-infection. This mechanism contributes to viral dissemination and immune evasion. Examining the dynamics of DC-mediated transmission in pediatric HIV provides insights into potential vulnerabilities in the early stages of infection [65-72]. Plasmacytoid dendritic cells (pDCs) respond to HIV by producing type I interferons (IFNs), crucial for antiviral defenses. However, chronic exposure to HIV can lead to pDC exhaustion and impaired IFN production. Investigating the delicate balance between protective IFN responses and exhaustion in pediatric pDCs is essential for understanding their contributions to immune modulation. The unique characteristics of the developing pediatric immune system, such as distinct proportions of DC subsets and variations in responsiveness, influence the interactions between DCs and HIV. Age-dependent differences in DC function impact the trajectory of the immune response. Understanding how these developmental influences shape the interactions between DCs and HIV is fundamental for tailoring interventions to different pediatric age groups.

Immune Dysregulation and Pediatric HIV

The interplay between dendritic cells (DCs) and Human Immunodeficiency Virus (HIV) significantly contributes to immune dysregulation in pediatric populations. Pediatric HIV is marked by alterations in the phenotype and function of dendritic cells, impacting their ability to mount effective immune responses. HIV-induced semi-mature or tolerogenic DC states contribute

to suboptimal antigen presentation and T cell activation. Understanding the specific alterations in DC phenotype and function in pediatric populations is essential for unraveling the mechanisms driving immune dysregulation [73-75]. Dysfunctional DCs in pediatric HIV exhibit impaired antigen presentation and suboptimal T cell activation. This compromised ability to effectively prime T cell responses contributes to weakened antiviral immunity. Investigating the intricacies of antigen presentation and T cell activation in the context of pediatric HIV sheds light on the dynamics of immune dysregulation and the potential points of intervention.

DCs play a crucial role in the induction and maintenance of regulatory T cells (Tregs), contributing to immune tolerance. In pediatric HIV, alterations in DC-Treg interactions may skew the balance towards immune suppression, hampering effective antiviral responses. Understanding the nuances of DC-mediated Treg modulation in pediatric populations is vital for comprehending the immune landscape. The dysregulation of DC function in pediatric HIV extends to B cell responses. Altered DC-B cell interactions influence antibody production and the establishment of immunological memory. Investigating the impact of HIV-induced DC dysregulation on B cell responses provides insights into the factors influencing the humoral arm of the immune response in pediatric populations. Persistent HIV replication and dysregulated DC responses contribute to chronic immune activation and inflammation, hallmarks of pediatric HIV progression. Chronic activation may lead to immune exhaustion, further compromising the effectiveness of antiviral responses. Examining the role of DC-mediated chronic immune activation in pediatric populations is crucial for understanding the factors influencing disease outcomes. The developmental stage of the pediatric immune system, characterized by age-dependent differences in DC subsets and responsiveness, influences the degree of immune dysregulation. Understanding how these developmental influences intersect with HIV-induced alterations in DC function provides a nuanced perspective on the complexities of pediatric immune dysregulation.

Therapeutic Strategies Targeting Dendritic Cells

Enhancing dendritic cell function through immune-based interventions represents a promising avenue in pediatric HIV therapeutics. Approaches such as cytokine therapies, designed to bolster DC maturation and antigen presentation, hold potential for optimizing the immune response. Investigating the safety and efficacy of immune-based interventions tailored to pediatric immune landscapes is crucial for refining therapeutic strategies [76]. The adoptive transfer of dendritic cells engineered ex vivo presents an innovative strategy for precision interventions. Engineered DCs can be tailored to express specific antigens or modulators, enhancing their ability to stimulate effective immune responses. Exploring the feasibility and safety of adoptive transfer approaches in pediatric populations offers a glimpse into the potential for personalized therapies. Vaccine development, with a focus on leveraging DC function, holds promise as a therapeutic strategy for pediatric HIV. Tailored vaccine candidates designed to enhance DC-mediated antigen presentation and elicit robust immune responses are under investigation. Evaluating the immunogenicity and safety of therapeutic vaccines in pediatric cohorts informs the potential for vaccine-driven interventions.

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Modulating immune checkpoints represents a novel strategy for mitigating DC exhaustion and enhancing antiviral responses. Therapies targeting immune checkpoint molecules, such as programmed cell death protein 1 (PD-1) and cytotoxic T-lymphocyte-associated protein 4 (CTLA-4), aim to rejuvenate exhausted DCs and T cells. Clinical trials exploring the safety and efficacy of immune checkpoint inhibitors in pediatric HIV contribute to understanding their potential in restoring immune function. Tailoring antiretroviral therapy (ART) strategies based on an understanding of their impact on DC function offers a pragmatic approach. Early initiation of ART, guided by insights into its effects on DC-mediated responses, may contribute to preserving effective immune control. Investigating the optimal timing and regimens for pediatric ART enhances the potential for personalized therapeutic interventions [76]. Strategies aimed at disrupting or eliminating viral reservoirs in pediatric HIV complement DC-focused therapeutic interventions. Innovative approaches, including latency-reversing agents and immunotherapies targeting reservoirs, may enhance the effectiveness of strategies aimed at restoring DC-mediated immune responses. Exploring the safety and feasibility of these approaches is vital for their potential integration into pediatric HIV care.

Vaccine Development and Dendritic Cells

Dendritic cells are instrumental in the induction of immune responses through efficient antigen presentation. Vaccine design hinges on the ability of DCs to capture, process, and present viral antigens to T cells. Understanding the nuances of DC-mediated antigen presentation in pediatric HIV is paramount for developing vaccines that elicit robust and targeted immune responses. Tailoring vaccines to enhance DC immunogenicity is a key strategy in pediatric HIV vaccine development. Formulating vaccines to optimize DC maturation, antigen uptake, and presentation holds promise for eliciting potent immune responses. Investigating adjuvants and delivery systems that specifically engage DCs contributes to enhancing vaccine immunogenicity in the unique immune landscape of pediatric populations [76].

Pediatric HIV introduces distinct challenges to vaccine development, necessitating careful consideration of the developing immune system and viral dynamics. Factors such as age-dependent differences in DC subsets, immune tolerance mechanisms, and the impact of early antiretroviral therapy influence vaccine responses. Overcoming these challenges requires a comprehensive understanding of how DCs shape the immune responses in pediatric HIV. Advances in vaccine candidates for pediatric HIV underscore the ongoing efforts to harness DC function for effective immunization. From protein subunit vaccines to viral vector-based approaches, each candidate aims to stimulate robust DC-mediated responses. Evaluating the safety and efficacy of these candidates in pediatric cohorts informs the progress and challenges in the quest for an HIV vaccine tailored for children.

Dendritic cells play a pivotal role in the establishment and maintenance of immune memory. Designing vaccines with a focus on generating durable memory responses is crucial for sustained protection. Investigating the longevity and recall responses of DC-mediated immune memory in

pediatric HIV vaccine candidates provides insights into optimizing long-term immunological resilience.

Considerations in Pediatric HIV Care

The developing immune system undergoes dynamic changes throughout childhood, influencing responses to HIV and therapeutic interventions. Understanding age-dependent differences in dendritic cell subsets, immune tolerance mechanisms, and the maturation of antiviral responses is crucial for tailoring interventions to different pediatric age groups. Pediatric HIV care must account for the evolving immune landscape during critical developmental stages. The timely initiation of antiretroviral therapy (ART) is a cornerstone of pediatric HIV care. Early ART not only suppresses viral replication but also preserves dendritic cell function and immune responses. Initiating therapy at the earliest opportunity, guided by an understanding of its impact on the developing immune system, contributes to optimizing long-term clinical outcomes in pediatric populations.

Conducting research in pediatric HIV involves navigating complex ethical considerations. Ensuring the inclusion of children in clinical trials, with a focus on their unique medical, psychological, and developmental needs, is essential. Ethical research practices, including informed consent processes tailored for pediatric participants, uphold the principles of autonomy, beneficence, and justice in advancing knowledge and therapeutic options. The psychosocial well-being of children living with HIV is integral to comprehensive care. Pediatric HIV care must encompass psychosocial support, addressing the emotional, social, and mental health aspects of children and their families. Holistic support fosters resilience, mitigates stigma, and contributes to improved adherence to treatment regimens, ultimately enhancing overall pediatric well-being.

Pediatric HIV care extends beyond medical interventions to address educational and developmental needs. Understanding the impact of HIV on cognitive development, educational attainment, and social integration is crucial. Tailoring educational support and developmental interventions to the unique challenges faced by children living with HIV promotes resilience and a positive trajectory into adulthood. As children with HIV transition into adolescence and adulthood, the continuity of care is paramount. Preparing adolescents for the transition to adult care involves addressing medical, psychosocial, and educational aspects. Ensuring a seamless transition fosters autonomy, self-efficacy, and the ongoing management of HIV in adulthood. Family-centered care, involving caregivers and the broader community, is instrumental in pediatric HIV care. Inclusive care models that consider the family as a unit contribute to a supportive environment. Community involvement, including awareness programs and peer support networks, enhances the resilience of children and families affected by HIV.

Conclusion

Dendritic cells, orchestrators of immune responses, play a central role in shaping the trajectory of pediatric HIV. Understanding their interactions with the virus and the consequent immune

dysregulation provides a foundation for therapeutic innovations. Immune-based interventions, adoptive transfer strategies, and the modulation of viral reservoirs offer promising avenues for restoring effective immune responses. Vaccine development, leveraging dendritic cell function, represents a beacon of hope in the quest for an HIV-free future for children. Tailored vaccines, designed to optimize DC-mediated antigen presentation, hold the potential to elicit durable immune memory and protect against the challenges posed by HIV.

The commitment to personalized approaches becomes the cornerstone of pediatric HIV care. The intricate tapestry of dendritic cell-mediated responses, therapeutic interventions, vaccine development, and comprehensive care considerations underscores the need for tailored strategies. Through this commitment, we envision a future where children living with HIV not only achieve viral suppression but also experience an enhanced quality of life—a future where the resilience of the developing immune system is nurtured through innovation, compassion, and a steadfast dedication to the well-being of every child affected by HIV.

References

1. 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.
2. 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):13-8. https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/93.
3. 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.
4. 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.
5. 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):10-9.
6. 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
7. 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

Citation: Obeagu EI, Obeagu GU. Dendritic Cell Function in HIV-Infected Pediatric Populations. Elite Journal of Immunology, 2024; 2(2): 1-14

8. 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.
9. 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):10-9.
10. 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):10-9.
11. 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.
12. 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.
13. 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):911-6. https://www.academia.edu/download/38320140/Obeagu_Emmanuel_Ifeanyi_and_Obeagu__Getrude_Uzoma2.EMMA1.pdf.
14. 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
15. 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):70-5. links/5988ab6d0f7e9b6c8539f73d/HIV-and-TB-co-infection-among-patients-who-used-Directly-Observed-Treatment-Short-course-centres-in-Yenagoa-Nigeria.pdf
16. 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):110-9.
17. 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.

Citation: Obeagu EI, Obeagu GU. Dendritic Cell Function in HIV-Infected Pediatric Populations. Elite Journal of Immunology, 2024; 2(2): 1-14

18. 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.
19. 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.
20. 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
21. 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
22. 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.
23. 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.
24. 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):128-34. https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/86.
25. 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.
26. 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.
27. 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.

28. 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):135-42.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
29. Obeagu EI, Onuoha EC. Tuberculosis among HIV Patients: A review of Prevalence and Associated Factors. Int. J. Adv. Res. Biol. Sci. 2023;10(9):128-34.DOI: 10.22192/ijarbs.2023.10.09.014 links/6516f938b0df2f20a2f8b0e0/Tuberculosis-among-HIV-Patients-A-review-of-Prevalence-and-Associated-Factors.pdf.
30. 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):100-4.DOI: 10.22192/ijcrms.2017.03.05.014 https://www.academia.edu/download/54317126/Haematological_indices_of_malaria_patients_coinfected_with_HIV.pdf
31. 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.
32. 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.
33. 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):180-83.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.
34. 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.
35. 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):203-11. http://research.sdpublishers.net/id/eprint/2819/.

Citation: Obeagu EI, Obeagu GU. Dendritic Cell Function in HIV-Infected Pediatric Populations. Elite Journal of Immunology, 2024; 2(2): 1-14

36. 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.
37. 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):360-8.
38. 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.
39. 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
40. 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
41. 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.
42. Amon L, Hatscher L, Heger L, Dudziak D, Lehmann CH. Harnessing the complete repertoire of conventional dendritic cell functions for cancer immunotherapy. Pharmaceutics. 2020;12(7):663.
43. McKenna K, Beignon AS, Bhardwaj N. Plasmacytoid dendritic cells: linking innate and adaptive immunity. Journal of virology. 2005;79(1):17-27.
44. 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):45-9.
45. 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.
46. 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.

Citation: Obeagu EI, Obeagu GU. Dendritic Cell Function in HIV-Infected Pediatric Populations. Elite Journal of Immunology, 2024; 2(2): 1-14

47. 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.
48. 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):906-10. https://www.academia.edu/download/38320134/Obeagu_Emmanuel_Ifeanyi_and_Obeagu__Getrude_Uzoma.EMMA2.pdf.
49. 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.
50. Alum EU, Ugwu OP, Obeagu EI, Okon MB. Curtailing HIV/AIDS Spread: Impact of Religious Leaders. Newport International Journal of Research in Medical Sciences (NIJRMS). 2023;3(2):28-31.
51. 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):64-7.
52. 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 (NIJRMS). 2023;3(2):95-9.
53. 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/Ii1i2/A%20Retrospective%20Study%20on%20Human%20Immune%20Deficiency%20Virus%20among%20Pregnant%20Women%20Attending%20Antenatal%20Clinic%20in%20Imo%20State%20University%20Teaching%20Hospital.pdf.
54. 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; 5:825-30.
55. 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.
56. 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.
57. 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.
58. 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.

Citation: Obeagu EI, Obeagu GU. Dendritic Cell Function in HIV-Infected Pediatric Populations. Elite Journal of Immunology, 2024; 2(2): 1-14

59. 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.
60. 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.
61. 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):60-6.
62. 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).
63. 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):70-5.
64. 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):10-9.
65. 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.
66. 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.
67. 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.
68. 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.
69. 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.0000000000035673. PMID: 37832059; PMCID: PMC10578718.
70. 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.

Citation: Obeagu EI, Obeagu GU. Dendritic Cell Function in HIV-Infected Pediatric Populations. Elite Journal of Immunology, 2024; 2(2): 1-14

71. 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).
72. 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.
73. 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.
74. 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.
75. 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.
76. Kokate RA, Chaudhary P, Sun X, Thamake SI, Maji S, Chib R, Vishwanatha JK, Jones HP. Rationalizing the use of functionalized poly-lactic-co-glycolic acid nanoparticles for dendritic cell-based targeted anticancer therapy. Nanomedicine. 2016;11(5):479-94.

Citation: Obeagu EI, Obeagu GU. Dendritic Cell Function in HIV-Infected Pediatric Populations. Elite Journal of Immunology, 2024; 2(2): 1-14