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Early Infant Diagnosis: Shielding Infants from HIV Transmission

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Abstract

Early infant diagnosis (EID) plays a pivotal role in safeguarding infants from HIV transmission, particularly in regions burdened by high prevalence rates. This paper delves into the significance of EID as a cornerstone of prevention of mother-to-child transmission (PMTCT) programs, exploring its impact on infant health outcomes and public health initiatives. Despite notable progress in recent years, challenges persist in ensuring universal access to EID services, including limited infrastructure and social stigma. However, emerging technologies and innovative strategies offer promise in enhancing EID accessibility, accuracy, and efficiency. By addressing these challenges and leveraging advancements in the field, EID programs can strengthen their role in shielding infants from HIV transmission and advancing global efforts towards an AIDS-free generation.

Keywords*: Early Infant Diagnosis, HIV Transmission, Pediatrics, Prevention of Mother-to-Child Transmission (PMTCT), Antiretroviral Therapy, Public Health*

Introduction

Early infant diagnosis (EID) of HIV is a crucial strategy in shielding infants from HIV transmission and improving pediatric health outcomes. In regions with high prevalence rates, particularly in sub-Saharan Africa, the risk of mother-to-child transmission of HIV remains a significant public health concern. EID programs play a pivotal role in identifying HIV-exposed infants early in life, enabling timely initiation of antiretroviral therapy (ART) and reducing the risk of disease progression and mortality. By integrating EID within prevention of mother-to-child transmission (PMTCT) programs, significant progress has been made in reducing vertical transmission rates

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and improving child survival outcomes. However, challenges persist in ensuring universal access to EID services, including limited healthcare infrastructure, social stigma, and logistical barriers. The significance of EID extends beyond individual health outcomes, contributing to broader public health initiatives aimed at curbing the HIV epidemic. Timely diagnosis and treatment initiation not only improve infant survival rates but also reduce the overall burden of HIV/AIDS on society by preventing onward transmission of the virus. By identifying HIV-exposed infants early in life, EID programs play a critical role in breaking the cycle of transmission within communities, ultimately advancing the goal of an AIDS-free generation. However, to realize the full potential of EID in halting HIV transmission, it is essential to address the challenges hindering its effectiveness and leverage emerging technologies and innovative strategies to enhance EID access and efficiency.[1-20]

Despite notable progress in recent years, universal access to EID services remains elusive in many regions, particularly in low-resource settings. Limited healthcare infrastructure, shortages of trained personnel, and social stigma surrounding HIV/AIDS continue to impede the effectiveness of EID programs. Logistical challenges, such as sample transportation and laboratory processing times, further exacerbate the barriers to timely diagnosis and treatment initiation for HIV-exposed infants. Addressing these challenges requires a multifaceted approach that encompasses strengthening healthcare systems, reducing social stigma, and enhancing access to innovative diagnostic technologies. Emerging technologies and innovative strategies offer promise in overcoming existing barriers to EID access and effectiveness. Point-of-care testing devices, dried blood spot (DBS) sampling, and nucleic acid amplification tests (NAATs) present opportunities for decentralized testing and rapid diagnosis, particularly in resource-limited settings. Furthermore, telemedicine and mobile health interventions enable remote monitoring and support for EID programs, bridging gaps in healthcare access and improving patient outcomes. By leveraging these advancements, EID programs can strengthen their role in shielding infants from HIV transmission and advancing global efforts towards an AIDS-free generation.[21-30]

Significance of Early Infant Diagnosis in PMTCT

The significance of early infant diagnosis (EID) in prevention of mother-to-child transmission (PMTCT) of HIV cannot be overstated. EID plays a pivotal role in identifying HIV-exposed infants promptly, allowing for timely initiation of antiretroviral therapy (ART) and comprehensive care. This proactive approach not only improves infant health outcomes but also serves as a critical strategy in breaking the cycle of HIV transmission from mother to child. By diagnosing HIV infection early in infancy, EID programs enable healthcare providers to initiate ART promptly, thereby suppressing viral replication and reducing the risk of disease progression. Studies have shown that early initiation of ART in HIV-infected infants significantly improves their long-term health outcomes, including reduced mortality rates and improved neurodevelopmental outcomes. Furthermore, early treatment initiation lowers the viral load in HIV-infected infants, reducing the likelihood of onward transmission to other individuals. Moreover, EID plays a crucial role in preventing mother-to-child transmission of HIV by identifying HIV-exposed infants who require close monitoring and intervention. Without timely diagnosis and treatment, HIV-exposed infants are at risk of acquiring the virus through breastfeeding or other modes of transmission. By

identifying HIV-exposed infants early in life, EID programs enable healthcare providers to implement preventive measures, such as exclusive breastfeeding with maternal ART or formula feeding, to reduce the risk of transmission.[31-40]

In addition to its impact on individual health outcomes, EID contributes to broader public health initiatives aimed at curbing the HIV epidemic. By identifying HIV-infected infants early in life, EID programs help to reduce the overall burden of HIV/AIDS on society by preventing onward transmission of the virus. Moreover, EID programs are integral components of PMTCT strategies aimed at achieving the ambitious targets set forth by global initiatives such as UNAIDS' 95-95-95 goals. Despite its significance, challenges remain in ensuring universal access to EID services, particularly in resource-limited settings. These challenges include limited healthcare infrastructure, shortages of trained personnel, and logistical barriers such as sample transportation and laboratory processing times. Addressing these challenges requires concerted efforts from governments, healthcare providers, and international stakeholders to strengthen healthcare systems and improve access to EID services.[41-45]

Challenges in Universal Access to EID Services

Universal access to early infant diagnosis (EID) services remains a significant challenge, particularly in resource-limited settings where the burden of HIV/AIDS is most pronounced. Many regions, especially in low-income countries, lack adequate healthcare infrastructure to support comprehensive EID programs. This includes shortages of healthcare facilities, trained personnel, and laboratory equipment necessary for conducting diagnostic tests. In rural or remote areas, the scarcity of healthcare facilities further exacerbates the challenge of accessing EID services. Shortages of trained healthcare personnel, including laboratory technicians, nurses, and clinicians, pose a significant barrier to the provision of EID services. In many resource-limited settings, healthcare workers are overburdened and may lack the necessary training to conduct EID testing and provide appropriate care to HIV-exposed infants. Addressing human resource constraints requires investment in training programs and workforce development initiatives to build capacity in EID service delivery. Logistical barriers, such as sample transportation and laboratory processing times, can delay the delivery of test results and impede timely diagnosis and treatment initiation for HIV-exposed infants. Inadequate transportation networks, lack of cold chain storage facilities, and lengthy turnaround times for test results can hinder the effectiveness of EID programs, particularly in remote or rural areas where access to healthcare services is limited. Social stigma surrounding HIV/AIDS remains a significant barrier to EID uptake, particularly in communities where HIV-related discrimination and prejudice are prevalent. Fear of disclosure, misconceptions about HIV/AIDS, and cultural beliefs may deter caregivers from seeking EID testing for their infants or adhering to treatment recommendations. Addressing social and cultural barriers requires targeted community engagement and education efforts to promote awareness, acceptance, and uptake of EID services. Financial barriers, including out-of-pocket costs for testing and treatment, can pose challenges for caregivers seeking EID services for their infants. In many resource-limited settings, healthcare services are not fully covered by public health insurance schemes, leaving families to bear the financial burden of healthcare costs.

Addressing financial constraints requires policy interventions to ensure that EID services are affordable and accessible to all families, regardless of socioeconomic status.[46-60]

Emerging Technologies and Innovative Strategies

Emerging technologies and innovative strategies hold promise for overcoming the challenges associated with early infant diagnosis (EID) of HIV and expanding access to testing services. These advancements aim to enhance the accessibility, accuracy, and efficiency of EID programs, particularly in resource-limited settings. Point-of-Care Testing (POCT) Devices enable rapid, on-site testing for HIV infection, allowing for timely diagnosis and treatment initiation in remote or underserved areas. These portable devices are easy to use and require minimal training, making them suitable for deployment in primary healthcare settings, community clinics, and mobile testing units. By providing immediate results, POCT devices reduce the turnaround time for test results and improve patient outcomes. Dried Blood Spot (DBS) Sampling involves collecting a small volume of blood onto filter paper, which can be easily transported and stored at room temperature. DBS samples are stable for extended periods, making them ideal for EID testing in resource-limited settings where access to cold chain storage may be limited. DBS sampling offers a convenient and cost-effective alternative to traditional venous blood collection, enabling decentralized testing and improving access to EID services. Nucleic Acid Amplification Tests (NAATs) are highly sensitive molecular diagnostic assays that amplify and detect the genetic material of HIV in infant blood samples. These tests offer superior sensitivity and specificity compared to conventional PCR testing, enabling earlier detection of HIV infection in infants. NAATs can also be performed on DBS samples, further enhancing their utility for EID testing in resource-limited settings.

Telemedicine and mHealth interventions leverage mobile technology and digital platforms to provide remote consultation, monitoring, and support for EID programs. These interventions enable healthcare providers to access expert guidance, share diagnostic information, and communicate with caregivers in real-time, regardless of geographic location. By expanding access to expert care and support, telemedicine and mHealth interventions improve the efficiency and effectiveness of EID services. Electronic Medical Record (EMR) Systems facilitate the electronic documentation, storage, and retrieval of patient data and test results, streamlining EID program management and improving data accuracy and accessibility. EMR systems enable healthcare providers to track patient progress, monitor treatment outcomes, and generate real-time reports for program monitoring and evaluation. By digitizing EID data and integrating with existing health information systems, EMR systems enhance the coordination and continuity of care for HIV-exposed infants.[61-66]

Conclusion

Emerging technologies and innovative strategies are poised to revolutionize early infant diagnosis (EID) programs, offering promising solutions to overcome existing challenges and improve access to HIV testing services for infants worldwide. From point-of-care testing devices to telemedicine and mobile health interventions, these advancements hold the potential to enhance the

accessibility, accuracy, and efficiency of EID programs, particularly in resource-limited settings where the burden of HIV/AIDS is most profound. By leveraging emerging technologies such as dried blood spot (DBS) sampling and nucleic acid amplification tests (NAATs), EID programs can decentralize testing and reach populations in remote or underserved areas, enabling timely diagnosis and treatment initiation. Furthermore, telemedicine and mobile health interventions provide opportunities to expand access to expert care and support, bridging gaps in healthcare access and improving patient outcomes.

Electronic medical record (EMR) systems offer a platform for digitizing EID data, streamlining program management, and improving data accuracy and accessibility. By integrating EMR systems with existing health information systems, EID programs can enhance the coordination and continuity of care for HIV-exposed infants, ultimately improving child health outcomes and advancing the goal of an AIDS-free generation. In light of these advancements, it is essential for stakeholders to prioritize investment in research, development, and implementation of emerging technologies and innovative strategies for EID programs. By fostering collaboration between governments, healthcare providers, researchers, and international organizations, we can accelerate progress towards universal access to early infant diagnosis of HIV and improve child health outcomes worldwide.

References

1. Shrivastava R, Fonjungo PN, Kebede Y, Bhimaraj R, Zavahir S, Mwangi C, Gadde R, Alexander H, Riley PL, Kim A, Nkengasong JN. Role of public-private partnerships in achieving UNAIDS HIV treatment targets. BMC health services research. 2019; 19:1-10.
2. Kiyaga C, Narayan V, McConnell I, Elyanu P, Kisaakye LN, Joseph E, Kekitiinwa A, Grosz J. Uganda's "EID Systems Strengthening" model produces significant gains in testing, linkage, and retention of HIV-exposed and infected infants: an impact evaluation. Plos one. 2021;16(2): e0246546.
3. Abrams EJ, Strasser S. 90-90-90–Charting a steady course to end the paediatric HIV epidemic. Journal of the International AIDS Society. 2015; 18:20296.
4. 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.
5. Obeagu EI. A Review of Challenges and Coping Strategies Faced by HIV/AIDS Discordant Couples. Madonna University journal of Medicine and Health Sciences. 2023 ;3(1):7-12. https://madonnauniversity.edu.ng/journals/index.php/medicine/article/view/91.
6. Obeagu EI, Obeagu GU. An update on premalignant cervical lesions and cervical cancer screening services among HIV positive women. J Pub Health Nutri. 2023; 6 (2). 2023; 141:1-2. links/63e538ed64252375639dd0df/An-update-on-premalignant-cervical-lesions-and-cervical-cancer-screening-services-among-HIV-positive-women.pdf.
7. Ezeoru VC, Enweani IB, Ochiabuto O, Nwachukwu AC, Ogbonna US, Obeagu EI. Prevalence of Malaria with Anaemia and HIV status in women of reproductive age in Onitsha, Nigeria. Journal of Pharmaceutical Research International. 2021;33(4):10-19.

8. Omo-Emmanuel UK, Chinedum OK, Obeagu EI. Evaluation of laboratory logistics management information system in HIV/AIDS comprehensive health facilities in Bayelsa State, Nigeria. Int J Curr Res Med Sci. 2017;3(1): 21-38.DOI: 10.22192/ijcrms.2017.03.01.004
9. 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.
10. 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.
11. 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.
12. 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.
13. 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.
14. 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.
15. 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
16. 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
17. 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.
18. 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.

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):128-134. 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):135-142.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

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):128-134.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):100-104.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. 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.
33. 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.
34. 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/.
35. 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.
36. 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
37. 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

38. 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.
39. 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.
40. 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.
41. 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.
42. 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.
43. 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.
44. 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.
45. 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.
46. 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.
47. 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.
48. 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.
49. 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.
50. 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.
51. 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.
52. 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.
53. 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).
54. 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.
55. 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.
56. 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.
57. 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.
58. 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.
59. 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.

60. Obeagu EI, Obeagu GU, Obiezu J, Ezeonwumelu C, Ogunnaya FU, Ngwoke AO, Emeka-Obi OR, 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.
61. 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.
62. 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.
63. Katoba J, Kuupiel D, Mashamba-Thompson TP. Toward improving accessibility of point-of-care diagnostic services for maternal and child health in low-and middle-income countries. Point of care. 2019;18(1):17-25.
64. Sallam M, Alabbadi AM, Abdel-Razeq S, Battah K, Malkawi L, Al-Abbadi MA, Mahafzah A. HIV knowledge and stigmatizing attitude towards people living with HIV/AIDS among medical students in Jordan. International Journal of Environmental Research and Public Health. 2022;19(2):745.
65. Nayak S, Blumenfeld NR, Laksanasopin T, Sia SK. Point-of-care diagnostics: recent developments in a connected age. Analytical chemistry. 2017;89(1):102-123.
66. Kang T, Lu J, Yu T, Long Y, Liu G. Advances in nucleic acid amplification techniques (NAATs): COVID-19 point-of-care diagnostics as an example. Biosensors and Bioelectronics. 2022; 206:114109.