

Early Infant Diagnosis: Safeguarding the Next Generation from HIV

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Abstract

Early Infant Diagnosis (EID) of HIV is a pivotal strategy in public health aimed at identifying HIV-infected infants early to initiate timely antiretroviral therapy (ART), significantly reducing morbidity and mortality rates. EID's importance cannot be overstated, as it facilitates the prompt initiation of treatment, thereby improving health outcomes and quality of life for HIV-positive infants. Furthermore, it helps in reducing the risk of secondary transmission of HIV from infants to others. The primary methods for EID include Polymerase Chain Reaction (PCR) testing, Dried Blood Spot (DBS) testing, and HIV serological testing. PCR testing is considered the gold standard due to its accuracy in detecting HIV DNA or RNA, while DBS testing is particularly useful in resource-limited settings due to its practicality in sample collection and transportation. However, the implementation of EID faces significant challenges, such as resource limitations, high rates of loss to follow-up, maternal health issues, and the need for better integration with Prevention of Mother-to-Child Transmission (PMTCT) programs. To overcome these challenges and enhance the effectiveness of EID, future directions include the development of point-of-care (POC) diagnostic tools, improved sample collection methods, and the strengthening of health systems. Community engagement and reducing stigma through targeted interventions are also crucial for improving the uptake of EID services. Continued global commitment and innovative approaches are essential to ensure that the next generation is safeguarded from the impact of HIV.

Keywords: *Early Infant Diagnosis, HIV, pediatric HIV, antiretroviral therapy (ART), mother-to-child transmission (MTCT), public health, HIV testing*

Introduction

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Early Infant Diagnosis (EID) of HIV is an essential public health intervention designed to detect HIV infection in infants as soon as possible. The timely identification and initiation of antiretroviral therapy (ART) are critical for reducing morbidity and mortality among HIV-infected infants, thus significantly improving their health outcomes and quality of life. The first few months of life are particularly crucial, as infants with untreated HIV face high risks of severe illness and death. EID not only saves lives but also helps in curtailing the spread of HIV within communities by preventing further transmission.¹⁻⁴ Mother-to-child transmission (MTCT) of HIV can occur during pregnancy, childbirth, or breastfeeding. Without any interventions, the transmission rates can be alarmingly high, ranging from 15% to 45%. However, with effective prevention strategies, including the use of ART during pregnancy and breastfeeding, the transmission rates can be reduced to below 5%. EID plays a crucial role in these prevention strategies by ensuring that HIV-exposed infants are promptly tested and, if found positive, immediately started on treatment.⁵⁻⁸ Polymerase Chain Reaction (PCR) testing is the gold standard for diagnosing HIV in infants.⁹ This method detects the presence of HIV DNA or RNA in the blood, providing a definitive diagnosis even in the presence of maternal antibodies that can persist in infants for several months after birth. Dried Blood Spot (DBS) testing, which involves collecting blood samples on filter paper, is particularly valuable in resource-limited settings due to its ease of collection, storage, and transportation. Additionally, HIV serological tests, though less reliable in infants due to maternal antibodies, can be used as supplementary methods in certain contexts. Despite the effectiveness of these diagnostic methods, several challenges hinder the widespread implementation of EID. Resource limitations, including inadequate laboratory infrastructure and shortages of trained personnel, pose significant barriers in many low- and middle-income countries. High rates of loss to follow-up among HIV-exposed infants and their caregivers further complicate efforts to ensure timely diagnosis and treatment. Maternal health and socio-economic factors, including stigma and discrimination, also impact the ability of mothers to seek and adhere to EID services for their infants.¹⁰⁻¹³

Integration with Prevention of Mother-to-Child Transmission (PMTCT) programs is essential for the success of EID initiatives.¹⁴ PMTCT programs aim to provide comprehensive care to HIV-positive mothers and their infants, including ART, safe delivery practices, and appropriate infant feeding options. However, fragmented healthcare services and lack of coordination between maternal and pediatric care often lead to missed opportunities for early diagnosis and treatment. Strengthening the linkage between EID and PMTCT programs is therefore critical to achieving better health outcomes for both mothers and infants. Innovations in diagnostic technologies offer promising avenues for overcoming some of the challenges associated with EID.¹⁵ Point-of-care (POC) testing devices, which can deliver rapid results at the site of patient care, have the potential to significantly reduce turnaround times for HIV test results. This enables quicker initiation of ART, which is crucial for improving the survival and health of HIV-infected infants. Improved sample collection methods, including non-invasive techniques, can also enhance the accessibility and acceptability of EID services. Strengthening health systems is another key component in enhancing the effectiveness of EID. This includes building laboratory capacity, training healthcare workers, and ensuring reliable supply chains for diagnostic materials. Robust health information systems are also essential for tracking HIV-exposed infants and ensuring timely follow-up and

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care. Investments in health infrastructure and workforce development are therefore fundamental to the success of EID programs. Community engagement and education are crucial for increasing the uptake of EID services. Efforts to reduce stigma and discrimination against HIV-positive individuals can encourage more mothers to seek testing and treatment for themselves and their infants.¹⁶ Community-based interventions, such as peer support groups and home-based care, can also play a vital role in supporting mothers and improving adherence to EID and PMTCT programs. Global commitment and cooperation are essential to sustain and expand EID efforts. International organizations, governments, non-governmental organizations, and community groups must work together to mobilize resources, share best practices, and implement effective policies and programs. Continued research and innovation are also needed to develop new diagnostic tools and treatment strategies that can further improve the outcomes for HIV-exposed infants.

Significance of Early Infant Diagnosis

The significance of Early Infant Diagnosis (EID) in the context of HIV cannot be overstated, as it serves as a linchpin in the efforts to safeguard the next generation from the devastating effects of the virus.¹⁷ Early diagnosis through EID allows for the prompt initiation of antiretroviral therapy (ART) in HIV-infected infants.¹⁸ ART has been shown to significantly reduce mortality rates and improve health outcomes in HIV-positive children. By identifying HIV infection early, EID facilitates timely intervention, ensuring that infants receive the necessary treatment to combat the virus effectively. Untreated HIV infection in infants can lead to rapid disease progression and increased morbidity and mortality rates. However, with early diagnosis and initiation of ART, the progression of the disease can be slowed down, reducing the risk of opportunistic infections and other HIV-related complications. EID plays a crucial role in mitigating the adverse health effects associated with HIV infection in infants, ultimately improving their quality of life and long-term health outcomes. Early diagnosis of HIV in infants not only benefits the affected child but also helps prevent further transmission of the virus within the community. Infants who are diagnosed early and started on ART are less likely to transmit the virus to others, including their caregivers and other children. By breaking the cycle of transmission, EID contributes to the broader goal of reducing the overall burden of HIV/AIDS and achieving epidemic control. EID provides valuable insights into the effectiveness of existing treatment regimens and helps healthcare providers tailor treatment strategies to meet the specific needs of HIV-infected infants. By monitoring viral load levels and treatment responses from an early age, healthcare providers can make informed decisions about the management of HIV infection in infants, optimizing treatment outcomes and minimizing the risk of drug resistance. Early diagnosis and initiation of ART not only improve short-term health outcomes but also confer long-term health benefits for HIV-infected infants. By controlling viral replication and preserving immune function, ART helps HIV-infected children lead healthier and more productive lives into adulthood. EID sets the stage for lifelong management of HIV infection, empowering individuals to live well with the virus and reducing the overall burden of HIV-related morbidity and mortality.¹⁹⁻²⁴

Methods of Early Infant Diagnosis

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Early Infant Diagnosis (EID) of HIV employs several methods to detect HIV infection in infants as early as possible. These methods are crucial for timely initiation of antiretroviral therapy (ART) and improved health outcomes. Here are the primary methods used for EID:

1. **Polymerase Chain Reaction (PCR) Testing:** PCR testing is considered the gold standard for diagnosing HIV infection in infants. This method detects the presence of HIV DNA or RNA in blood samples collected from the infant. PCR testing can be performed on samples collected via venipuncture or dried blood spots (DBS). PCR testing is highly sensitive and specific, allowing for accurate diagnosis even in the presence of maternal antibodies that may persist in infants for several months after birth.
2. **Dried Blood Spot (DBS) Testing:** DBS testing is a practical method for collecting and storing blood samples for PCR testing, particularly in resource-limited settings. Blood samples obtained through a heel prick are spotted onto filter paper and allowed to dry before being sent to the laboratory for analysis. DBS testing offers several advantages, including ease of sample collection, minimal sample volume requirement, and simplified transportation and storage. It is widely used in EID programs globally, especially in settings where access to laboratory facilities is limited.
3. **HIV Serological Testing:** Serological tests detect antibodies produced by the immune system in response to HIV infection. While serological testing is less reliable in infants due to the presence of maternal antibodies, it can be used as a supplementary method for EID in certain situations. Serological tests are often performed on blood samples collected via venipuncture and can provide rapid results. However, confirmatory testing with PCR is necessary for definitive diagnosis in infants.
4. **Point-of-Care (POC) Testing:** POC testing refers to diagnostic tests that can be performed near the point of patient care, with results available rapidly, often within minutes. POC tests for HIV typically use lateral flow assays to detect HIV antibodies or antigens in blood samples. While POC testing has the potential to facilitate early diagnosis of HIV in infants, its utility in EID programs is limited by factors such as sensitivity, specificity, and cost. Research is ongoing to develop POC tests specifically designed for use in EID settings.
5. **Other Laboratory Methods:** In addition to PCR, DBS, serological testing, and POC testing, other laboratory methods may be employed for EID, depending on the availability of resources and infrastructure. These methods may include nucleic acid amplification tests (NAATs), viral culture, and antigen detection assays. However, these methods are less commonly used in EID programs due to their complexity, cost, and requirements for specialized laboratory facilities and expertise.

Challenges in Early Infant Diagnosis

Early Infant Diagnosis (EID) of HIV, while crucial for timely intervention and treatment initiation, faces several challenges that hinder its effectiveness.²⁵ These challenges range from logistical and infrastructural constraints to social and cultural barriers. Understanding and addressing these challenges are essential for improving the accessibility and efficacy of EID programs. In many resource-limited settings, access to healthcare facilities equipped with the necessary laboratory

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infrastructure for conducting EID tests is limited. Remote and rural areas often lack adequate diagnostic facilities, forcing caregivers to travel long distances to access testing services. This geographical barrier contributes to delays in diagnosis and treatment initiation, particularly for infants living in underserved communities. The shortage of trained healthcare workers, particularly laboratory technicians and counselors proficient in EID procedures, poses a significant challenge. Inadequate staffing levels and limited opportunities for specialized training hinder the capacity of healthcare facilities to conduct EID tests and provide counseling and support to caregivers. Addressing this human resource gap is essential for scaling up EID services and improving the quality of care for HIV-exposed infants.

High rates of loss to follow-up among HIV-exposed infants and their caregivers present a major obstacle to EID programs.²⁶ Many caregivers fail to return for test results or follow through with treatment recommendations due to factors such as transportation costs, competing priorities, stigma, and fear of HIV-related discrimination. Improving retention strategies, such as community-based follow-up and mobile health interventions, is critical for ensuring continuity of care and maximizing the impact of EID efforts. The health and well-being of mothers play a significant role in the success of EID programs. HIV-positive mothers may face barriers to seeking and accessing healthcare services, including stigma, discrimination, and fear of disclosure. Maternal mental health issues, such as depression and anxiety, can also impact the caregiver's ability to adhere to EID recommendations and support their infant's health needs. Integrating maternal support services into EID programs is essential for addressing these challenges and promoting holistic care for both mothers and infants. Fragmentation and lack of integration between maternal and pediatric healthcare services pose challenges to the continuity of care for HIV-exposed infants. Disjointed referral pathways and communication gaps between prenatal, delivery, and postnatal care providers can lead to missed opportunities for EID testing and treatment initiation. Strengthening health systems and promoting collaboration and coordination among different healthcare providers are essential for ensuring seamless transitions and improving the effectiveness of EID programs. The cost of EID tests and related services, including transportation and medication, can pose financial barriers for caregivers, particularly those from low-income households. Affordability issues may deter caregivers from seeking testing and treatment for their infants, leading to delays in diagnosis and suboptimal health outcomes. Subsidized testing services, fee waivers, and financial assistance programs can help alleviate the financial burden on caregivers and improve access to EID services for vulnerable populations.

Future Directions and Innovations

The future of Early Infant Diagnosis (EID) of HIV holds promise for advancements and innovations that can overcome current challenges and further improve the effectiveness of EID programs.²⁷ The development and implementation of Point-of-Care Testing (POC) diagnostic tests for HIV can revolutionize EID by providing rapid and decentralized testing at the point of care. POC tests offer the advantage of quick turnaround times, enabling immediate diagnosis and treatment initiation during the same clinical visit. Continued research and investment in POC technologies tailored specifically for infants could greatly enhance access to EID services,

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particularly in resource-limited settings with limited laboratory infrastructure. Innovations in sample collection methods, such as non-invasive techniques like saliva or urine testing, can improve the acceptability and feasibility of EID testing, especially in settings where blood collection may be challenging or culturally sensitive. Non-invasive sample collection methods can also reduce the risk of needlestick injuries and transmission of bloodborne infections among healthcare workers, further enhancing the safety and accessibility of EID services.

Strengthening laboratory capacity and infrastructure is essential for expanding access to EID testing services and improving the quality and reliability of test results. Investments in laboratory equipment, training of laboratory personnel, and quality assurance programs can help ensure accurate and timely diagnosis of HIV infection in infants.²⁸ Collaborative efforts between governments, international organizations, and private sector partners are needed to build and sustain robust laboratory systems capable of supporting EID programs. Integration of EID programs with digital health technologies, such as mobile health (mHealth) platforms and electronic health records (EHRs), can streamline data management, improve patient tracking, and enhance communication between healthcare providers and caregivers. Mobile applications for appointment reminders, test result notifications, and medication adherence support can help overcome barriers to follow-up care and retention in EID programs, ultimately improving health outcomes for HIV-exposed infants. Community-based approaches that engage and empower caregivers, community leaders, and peer support networks can enhance awareness, acceptance, and uptake of EID services. Community health workers (CHWs) play a vital role in delivering EID testing and counseling services directly to communities, addressing cultural beliefs, and facilitating linkage to care. By leveraging existing community structures and resources, EID programs can reach underserved populations and bridge gaps in access to care. Continued investment in research and innovation is essential for developing new diagnostic technologies, treatment strategies, and preventive interventions for HIV-exposed infants. Advances in molecular biology, genomics, and immunology hold promise for the development of novel biomarkers and diagnostic tools that can improve the accuracy and sensitivity of EID testing. Research on novel antiretroviral drugs, formulations, and delivery methods tailored for infants can further optimize treatment outcomes and minimize the risk of drug resistance.²⁹⁻³³

Conclusion

Early Infant Diagnosis (EID) of HIV is a critical component of global efforts to combat pediatric HIV/AIDS and safeguard the health of the next generation. Despite its significance, EID faces numerous challenges, including limited access to testing facilities, shortage of trained personnel, high rates of loss to follow-up, maternal health issues, fragmented healthcare systems, and cost barriers. However, the future of EID holds promise for advancements and innovations that can overcome these challenges and further improve the effectiveness of EID programs. Potential future directions and innovations in EID include the development and implementation of point-of-care testing (POC) technologies, improved sample collection methods, enhanced laboratory capacity, integration with digital health technologies, community engagement and empowerment, and continued research and innovation. By embracing these advancements and collaborating across

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sectors, EID programs can expand access to testing services, improve the quality and reliability of test results, enhance patient tracking and retention, and ultimately improve health outcomes for HIV-exposed infants.

References

1. Spooner E, Govender K, Reddy T, Ramjee G, Mbadi N, Singh S, Coutoudis A. Point-of-care HIV testing best practice for early infant diagnosis: an implementation study. *BMC Public Health*. 2019 Dec; 19:1-4.
2. Ciaranello AL, Park JE, Ramirez-Avila L, Freedberg KA, Walensky RP, Leroy V. Early infant HIV-1 diagnosis programs in resource-limited settings: opportunities for improved outcomes and more cost-effective interventions. *BMC medicine*. 2011; 9:1-5.
3. Early Infant Diagnosis: A Crucial Step in Halting HIV Transmission. *Elite Journal of Health Science*. 2023;1(1):1-11.
4. Obeagu EI, Obeagu GU. Early Infant Diagnosis: Shielding Infants from HIV Transmission. *Elite Journal of Health Science*. 2023;1(1):12-22.
5. Newell ML. Prevention of mother-to-child transmission of HIV: challenges for the current decade. *Bulletin of the World Health Organization*. 2001;79(12):1138-44.
6. Maputle MS, Jali MN. Pregnant women's knowledge about mother-to-child transmission (MTCT) of HIV infection through breast feeding. *Curationis*. 2008;31(1):45-51.
7. Obeagu EI, Obeagu GU. Securing Health: The Role of Early Infant Diagnosis in Preventing HIV in Newborns. *Elite Journal of Public Health*. 2023;1(1):12-22.
8. Obeagu EI, Obeagu GU. Protecting Generations: Early Infant Diagnosis's Role in Preventing HIV Spread. *Elite Journal of Public Health*. 2023;1(1):1-11.
9. Bremer JW, Lew JF, Cooper E, Hillyer GV, Pitt J, Handelsman E, Brambilla D, Moyo J, Hoff R, Women and Infants' Transmission Study Group. Diagnosis of infection with human immunodeficiency virus type 1 by a DNA polymerase chain reaction assay among infants enrolled in the Women and Infants' Transmission Study. *The Journal of pediatrics*. 1996;129(2):198-207.
10. Obeagu EI, Obeagu GU. Early Infant Diagnosis: Fortifying Efforts to Stop HIV in Newborns. *Elite Journal of HIV*. 2024;2(3):27-41.
11. 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.
12. Obeagu EI OG. Empowering Health Systems: Early Infant Diagnosis's Impact on Preventing HIV in Newborns. *Elite Journal of Public Health*. 2023;1(1):23-33.
13. Obeagu EI, Obeagu GU. Strengthening Laboratory Systems for Ensuring Accurate Diagnoses in Mother-to-Child Transmission (MTCT) Prevention Programs in Uganda: A Narrative Review. *Annals of Medicine and Surgery*:10-97.
14. Sibanda EL, Webb K, Fahey CA, Kang Dufour MS, McCoy SI, Watadzaushe C, Dirawo J, Deda M, Chimwaza A, Taramusi I, Mushavi A. Use of data from various sources to evaluate and improve the prevention of mother-to-child transmission of HIV programme

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- in Zimbabwe: a data integration exercise. *Journal of the International AIDS Society*. 2020;23: e25524.
15. Schito M, Peter TF, Cavanaugh S, Piatek AS, Young GJ, Alexander H, Coggin W, Domingo GJ, Ellenberger D, Ermantraut E, Jani IV. Opportunities and challenges for cost-efficient implementation of new point-of-care diagnostics for HIV and tuberculosis. *Journal of Infectious Diseases*. 2012;205(suppl_2):S169-180.
 16. Bond V, Chase E, Aggleton P. Stigma, HIV/AIDS and prevention of mother-to-child transmission in Zambia. *Evaluation and program planning*. 2002;25(4):347-356.
 17. Kemp C, Rasbridge LA. Refugee and immigrant health: A handbook for health professionals. Cambridge University Press; 2004.
 18. Okusanya B, Kimaru LJ, Mantina N, Gerald LB, Pettygrove S, Taren D, Ehiri J. Interventions to increase early infant diagnosis of HIV infection: A systematic review and meta-analysis. *PloS one*. 2022;17(2):e0258863.
 19. 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>.
 20. Obeagu EI, Obeagu GU. An update on premalignant cervical lesions and cervical cancer screening services among HIV positive women. *J Pub Health Nutri*. 2023; 6 (2). 2023; 141:1-2. [links/63e538ed64252375639dd0df/An-update-on-premalignant-cervical-lesions-and-cervical-cancer-screening-services-among-HIV-positive-women.pdf](https://doi.org/10.22192/ijcrms.2017.03.01.004)
 21. Omo-Emmanuel UK, Chinedum OK, Obeagu EI. Evaluation of laboratory logistics management information system in HIV/AIDS comprehensive health facilities in Bayelsa State, Nigeria. *Int J Curr Res Med Sci*. 2017;3(1): 21-38.DOI: [10.22192/ijcrms.2017.03.01.004](https://doi.org/10.22192/ijcrms.2017.03.01.004)
 22. Obeagu EI, Obeagu GU. An update on survival of people living with HIV in Nigeria. *J Pub Health Nutri*. 2022; 5 (6). 2022;129. [links/645b4bfcf3512f1cc5885784/An-update-on-survival-of-people-living-with-HIV-in-Nigeria.pdf](https://doi.org/10.22192/ijcrms.2017.03.01.004).
 23. 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.
 24. 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.
 25. Ghadrshenas A, Amor YB, Chang J, Dale H, Sherman G, Vojnov L, Young P, Yogev R, Child Survival Working Group of the Interagency Task Team on the Prevention and Treatment of HIV infection in Pregnant Women, Mothers and Children. Improved access to early infant diagnosis is a critical part of a child-centric prevention of mother-to-child transmission agenda. *Aids*. 2013;27: S197-205.
 26. Nkhonjera J, Suwedi-Kapesa LC, Kumwenda B, Nyondo-Mipando AL. Factors influencing loss to follow-up among human immunodeficiency virus exposed infants in the

Citation: Obeagu EI, Obeagu GU. Early Infant Diagnosis: Safeguarding the Next Generation from HIV. *Elite Journal of HIV*, 2024; 2(5): 60-68

- early infant diagnosis program in Phalombe, Malawi. *Global Pediatric Health*. 2021; 8:2333794X211004166.
27. Essajee S, Vojnov L, Penazzato M, Jani I, Siberry GK, Fiscus SA, Markby J. Reducing mortality in HIV-infected infants and achieving the 90–90–90 target through innovative diagnosis approaches. *Journal of the International AIDS Society*. 2015; 18:20299.
 28. Alemnji G, Peter T, Vojnov L, Alexander H, Zeh C, Cohn J, Watts DH, de Lussigny S. Building and sustaining optimized diagnostic networks to scale-up HIV viral load and early infant diagnosis. *JAIDS Journal of Acquired Immune Deficiency Syndromes*. 2020;84: S56-62.
 29. 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.
 30. Obeagu EI, Eze VU, Alaebob EA, Ochei KC. Determination of haematocrit level and iron profile study among persons living with HIV in Umuahia, Abia State, Nigeria. *J BioInnovation*. 2016; 5:464-471. [links/592bb4990f7e9b9979a975cf/DETERMINATION-OF-HAEMATOCRIT-LEVEL-AND-IRON-PROFILE-STUDY-AMONG-PERSONS-LIVING-WITH-HIV-IN-UMUAHIA-ABIA-STATE-NIGERIA.pdf](https://www.researchgate.net/publication/312511111-DETERMINATION-OF-HAEMATOCRIT-LEVEL-AND-IRON-PROFILE-STUDY-AMONG-PERSONS-LIVING-WITH-HIV-IN-UMUAHIA-ABIA-STATE-NIGERIA).
 31. Ifeanyi OE, Obeagu GU. The values of prothrombin time among HIV positive patients in FMC owerri. *International Journal of Current Microbiology and Applied Sciences*. 2015;4(4):911-916.
https://www.academia.edu/download/38320140/Obeagu_Emanuel_Ifeanyi_and_Obeagu_Getrude_Uzoma2.EMMA1.pdf.
 32. Izuchukwu IF, Ozims SJ, Agu GC, Obeagu EI, Onu I, Amah H, Nwosu DC, Nwanjo HU, Edward A, Arunsi MO. Knowledge of preventive measures and management of HIV/AIDS victims among parents in Umuna Orlu community of Imo state Nigeria. *Int. J. Adv. Res. Biol. Sci*. 2016;3(10): 55-65.DOI; [10.22192/ijarbs.2016.03.10.009](https://doi.org/10.22192/ijarbs.2016.03.10.009)
 33. Chinedu K, Takim AE, Obeagu EI, Chinazor UD, Eloghosa O, Ojong OE, Odunze U. HIV and TB co-infection among patients who used Directly Observed Treatment Short-course centres in Yenagoa, Nigeria. *IOSR J Pharm Biol Sci*. 2017;12(4):70-75.
[links/5988ab6d0f7e9b6c8539f73d/HIV-and-TB-co-infection-among-patients-who-used-Directly-Observed-Treatment-Short-course-centres-in-Yenagoa-Nigeria.pdf](https://www.researchgate.net/publication/312511111-HIV-and-TB-co-infection-among-patients-who-used-Directly-Observed-Treatment-Short-course-centres-in-Yenagoa-Nigeria.pdf)

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