OPEN ACCESS

e-Journal of Medical and Pharmaceutical Science
ISSN XXXX-XXXX | Abbreviated Key Title: e Jrnl Med Phrm Sci

Research Article Volume-2, Issue-1, 2026 (Jan-Mar) DOI: 10.62046/ejmps.2026.v02i01.004

Assessment of Delivery Outcomes and Infant Antiretroviral Prophylaxis Among Women Receiving Prevention of Mother-to-Child Transmission (PMTCT) of HIV Services at ESUTH Parklane, Enugu, South-East Nigeria

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Received: 13.10.2025 Revised: 29.12.2025 Accepted: 14.02.2026 Published: 12.02.2026

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Abstract: **Background:** Mother-to-child transmission (MTCT) of HIV remains one of the leading sources of HIV infection among children. Although Prevention of Mother-to-Child Transmission (PMTCT) programmes have significantly reduced transmission rates globally, successful outcomes depend on effective facility-based delivery and timely administration of infant antiretroviral (ART) prophylaxis. Monitoring delivery outcomes and infant prophylaxis is essential for evaluating the effectiveness of PMTCT programmes. **Objective:** To assess facility delivery outcomes and infant antiretroviral prophylaxis among women receiving Prevention of Mother-to-Child Transmission (PMTCT) services at Enugu State University Teaching Hospital (ESUTH), Parklane, Enugu State, South-East Nigeria. **Methods:** A four-year retrospective descriptive study was conducted using records of pregnant women living with HIV who received PMTCT services at ESUTH Parklane between January 2021 and December 2024. A census of all eligible records was used. Data were extracted from the Antenatal Care (ANC), Antiretroviral Therapy (ART), Labour Ward, Postnatal, and Paediatric Clinic records using a structured proforma. Data were analysed using descriptive statistics and presented as frequencies and percentages. **Results:** A total of 35 pregnant women living with HIV receiving PMTCT services were included in the study. Of these, 23 (65.7%) delivered at ESUTH Parklane. Facility delivery was highest in 2021 (43.5%), declined in 2022 (13.0%) and 2023 (8.7%), and increased again in 2024 (34.8%). A similar trend was observed for infant antiretroviral prophylaxis, with the highest proportions recorded in 2021 (43.5%) and 2024 (34.8%), while lower proportions were observed in 2022 (13.0%) and 2023 (8.7%). **Conclusion:** Facility-based delivery and infant antiretroviral prophylaxis remain important components of PMTCT services at ESUTH Parklane. Although most women receiving PMTCT services delivered within the health facility and HIV-exposed infants received antiretroviral prophylaxis, strengthening institutional delivery services, postnatal follow-up, and timely infant prophylaxis is essential to improve PMTCT outcomes and sustain progress toward eliminating mother-to-child transmission of HIV.

Keywords: Obesity; Metabolic syndrome; Insulin resistance; Weight management; GLP-1 receptor agonists; Bariatric surgery.

Citation: Nnadozie John-Miracle *et al*. PMTCT, Facility Delivery, Infant Prophylaxis, HIV, Antiretroviral Therapy, ESUTH Parklane. e Jrnl Med Phrm Sci, 2026 Jan-Mar 2(1): 39-46.

INTRODUCTION

The success of Prevention of Mother-to-Child Transmission (PMTCT) programmes depends not only on identifying pregnant women living with HIV during antenatal care but also on ensuring safe delivery practices and appropriate postnatal care for HIV-exposed infants. Facility-based childbirth and prompt administration of infant antiretroviral (ART) prophylaxis are widely recognized as essential interventions for preventing vertical transmission of HIV and improving maternal and neonatal health outcomes. Failure to provide these interventions at the time of delivery increases the likelihood of HIV transmission and compromises the overall effectiveness of PMTCT programmes [1–9].

Mother-to-child transmission (MTCT) of HIV remains the principal source of HIV infection among children worldwide. Transmission can occur during pregnancy, labour, delivery, or breastfeeding, with the estimated risk ranging from 15% to 45% in the absence of preventive interventions [8]. However, widespread implementation of lifelong maternal

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antiretroviral therapy, skilled obstetric care, and infant antiretroviral prophylaxis has reduced the transmission risk to below 5% in many settings [8,9].

Over the past two decades, global expansion of PMTCT services has contributed substantially to the decline in paediatric HIV infections. According to recent UNAIDS reports, increased access to antiretroviral therapy among pregnant women has markedly reduced new HIV infections among children [8]. Despite this progress, Nigeria continues to account for a considerable proportion of paediatric HIV infections globally, reflecting persistent challenges in achieving universal access to comprehensive PMTCT services [10]. Ensuring that women receiving HIV care complete the continuum from antenatal care through delivery and infant follow-up remains a major public health priority [10,11].

Delivery within a healthcare facility provides opportunities for skilled birth attendance, adherence to recommended obstetric practices, uninterrupted maternal antiretroviral therapy, and immediate initiation of newborn HIV prevention measures. Women who give birth outside health facilities are more likely to experience missed opportunities for timely clinical interventions, thereby increasing the risk of vertical HIV transmission and adverse neonatal outcomes [12,13]. Consequently, the World Health Organization recommends skilled delivery and comprehensive postnatal management as integral components of PMTCT programmes [14].

Administration of antiretroviral prophylaxis to HIV-exposed infants immediately after birth is another cornerstone of PMTCT. Current WHO and national treatment guidelines recommend that newborns exposed to HIV receive prophylactic antiretroviral medication as early as possible after delivery, followed by early infant diagnosis and continued follow-up according to established protocols [14,15]. When combined with sustained maternal ART adherence, infant prophylaxis significantly reduces the likelihood of HIV acquisition during the neonatal period [16].

Nigeria introduced the PMTCT programme in 2002 and has subsequently strengthened national policies to improve maternal HIV care, institutional delivery, newborn prophylaxis, and early infant diagnosis [10,11,15]. Although these initiatives have expanded access to PMTCT services, variations in delivery outcomes and infant prophylaxis coverage continue to exist across health facilities due to factors including delayed presentation, poor retention in care, stigma, socioeconomic barriers, and health system limitations [17–20]. Regular evaluation of programme performance is therefore essential for identifying implementation gaps and improving the quality of PMTCT services.

Enugu State University Teaching Hospital (ESUTH), Parklane, is a tertiary referral hospital that provides integrated HIV care through its Antenatal Care, Antiretroviral Therapy, Labour Ward, Postnatal, and Paediatric services. The hospital's PMTCT programme supports pregnant women living with HIV from antenatal enrolment through childbirth and infant follow-up, making it an appropriate setting for evaluating delivery outcomes and newborn HIV prevention practices.

Assessing facility-based delivery and infant antiretroviral prophylaxis among women receiving PMTCT services provides important evidence on programme performance and helps identify opportunities to strengthen maternal and child HIV services. Such information is valuable for improving clinical practice, guiding health policy, and supporting Nigeria's efforts toward the elimination of mother-to-child transmission of HIV.

Objective of the Study

To assess facility delivery outcomes and infant antiretroviral prophylaxis among women receiving Prevention of Mother-to-Child Transmission (PMTCT) services at Enugu State University Teaching Hospital (ESUTH), Parklane, Enugu State, South-East Nigeria.

METHODOLOGY

Study Setting

The study was conducted at **Enugu State University Teaching Hospital (ESUTH), Parklane**, a government-owned tertiary healthcare facility situated in the Government Reserved Area (GRA), Enugu North Local Government Area, Enugu State, Nigeria. The hospital serves as a major referral centre in South-East Nigeria and provides specialized maternal, neonatal, and HIV-related healthcare services. PMTCT services are delivered through an integrated system involving the Antenatal Care (ANC) Clinic, Antiretroviral Therapy (ART) Clinic, Labour Ward, Postnatal Clinic, and Paediatric Clinic.

The PMTCT programme at ESUTH Parklane commenced in October 2008 and provides comprehensive care that includes HIV counselling and testing, lifelong antiretroviral therapy, skilled facility-based delivery, infant antiretroviral prophylaxis, early infant diagnosis, and routine postnatal follow-up.

Enugu State is located in South-East Nigeria and had an estimated population of approximately 4.69 million according to the 2022 population projection. The state lies between latitudes 6°53′64″N and 7°43′56″N north of the Equator and east

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of the Greenwich Meridian. The population is predominantly engaged in civil service, commerce, and small-scale businesses.

Study Design
A retrospective descriptive study was undertaken to evaluate delivery outcomes and infant antiretroviral prophylaxis among women who received Prevention of Mother-to-Child Transmission (PMTCT) services at ESUTH Parklane over a four-year period spanning January 2021 to December 2024.

Study Population
The study population consisted of hospital records of pregnant women living with HIV who received PMTCT services and subsequently delivered at ESUTH Parklane during the study period, together with records relating to their HIV-exposed infants.

Eligibility Criteria
Inclusion Criteria
Records were included if they:
belonged to HIV-positive pregnant women enrolled in the PMTCT programme; contained documented delivery information; and included complete records of infant antiretroviral prophylaxis during the study period.

Exclusion Criteria
Records were excluded if they:
lacked complete information on delivery outcomes; or
contained missing or incomplete infant prophylaxis data.

Sample Size
A formal sample size calculation was not required because the study adopted a census approach. Consequently, every eligible record available between January 2021 and December 2024 was included in the analysis.
Sampling Technique

Complete enumeration (census sampling) was employed. Eligible records were identified from the ANC Clinic, ART Clinic, Labour Ward, Postnatal Clinic, and Paediatric Clinic registers, and all records satisfying the selection criteria were reviewed.

Data Collection Instrument
Data were extracted using a structured researcher-designed proforma specifically developed to capture variables related to facility delivery and infant antiretroviral prophylaxis from routine hospital records.
Data Collection Procedure

Secondary data were retrieved from hospital registers and patient records maintained within the ANC, ART, Labour Ward, Postnatal, and Paediatric units. Information relevant to the study objectives was transferred to the data extraction proforma by trained research personnel. Data collection was completed over a three-week period following approval from the relevant authorities.

Study Variables
Outcome Variables
The primary outcome variables were:
facility-based delivery among women receiving PMTCT services; and
administration of antiretroviral prophylaxis to HIV-exposed infants following delivery.

Measurement of Facility Delivery
Facility delivery was assessed by determining the number and proportion of women enrolled in the PMTCT programme who delivered at ESUTH Parklane between 2021 and 2024. Delivery records obtained from the Labour Ward were summarized using frequencies and percentages.

Measurement of Infant Antiretroviral Prophylaxis
Infant antiretroviral prophylaxis was assessed by determining the number and proportion of HIV-exposed newborns who received prophylactic antiretroviral medication following birth during the study period. Information was extracted from PMTCT infant follow-up records and summarized descriptively.

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Data Management and Analysis

Completed data extraction forms were checked for completeness before entry into IBM SPSS Statistics version 27. The dataset was cleaned prior to analysis.

Descriptive statistical methods were used throughout the study. Frequencies and percentages were calculated for facility delivery outcomes and infant antiretroviral prophylaxis. The findings are presented in tables and graphical illustrations corresponding to the study objectives.

Ethical Considerations

Ethical approval for the study was obtained from the Health Research Ethics Committee of Enugu State University Teaching Hospital (ESUTH), Parklane before commencement of the study.

Additional authorization to access hospital records was obtained from the Head of the Department of Obstetrics and Gynaecology, the Deputy Director of Nursing Services (DDNS), and the Head of the Medical Records Unit. Confidentiality was maintained by removing personal identifiers and using hospital registration numbers throughout data collection and analysis.

Limitation

The principal limitation of the study was incomplete documentation within some delivery and infant follow-up records, which reduced the amount of information available for analysis.

A total of 35 pregnant women living with HIV who received Prevention of Mother-to-Child Transmission (PMTCT) services at ESUTH Parklane between January 2021 and December 2024 were included in the study. The findings are presented according to the study objectives, namely facility-based delivery among women enrolled in PMTCT services and administration of infant antiretroviral prophylaxis following birth.

Facility Delivery Among Women Receiving PMTCT Services

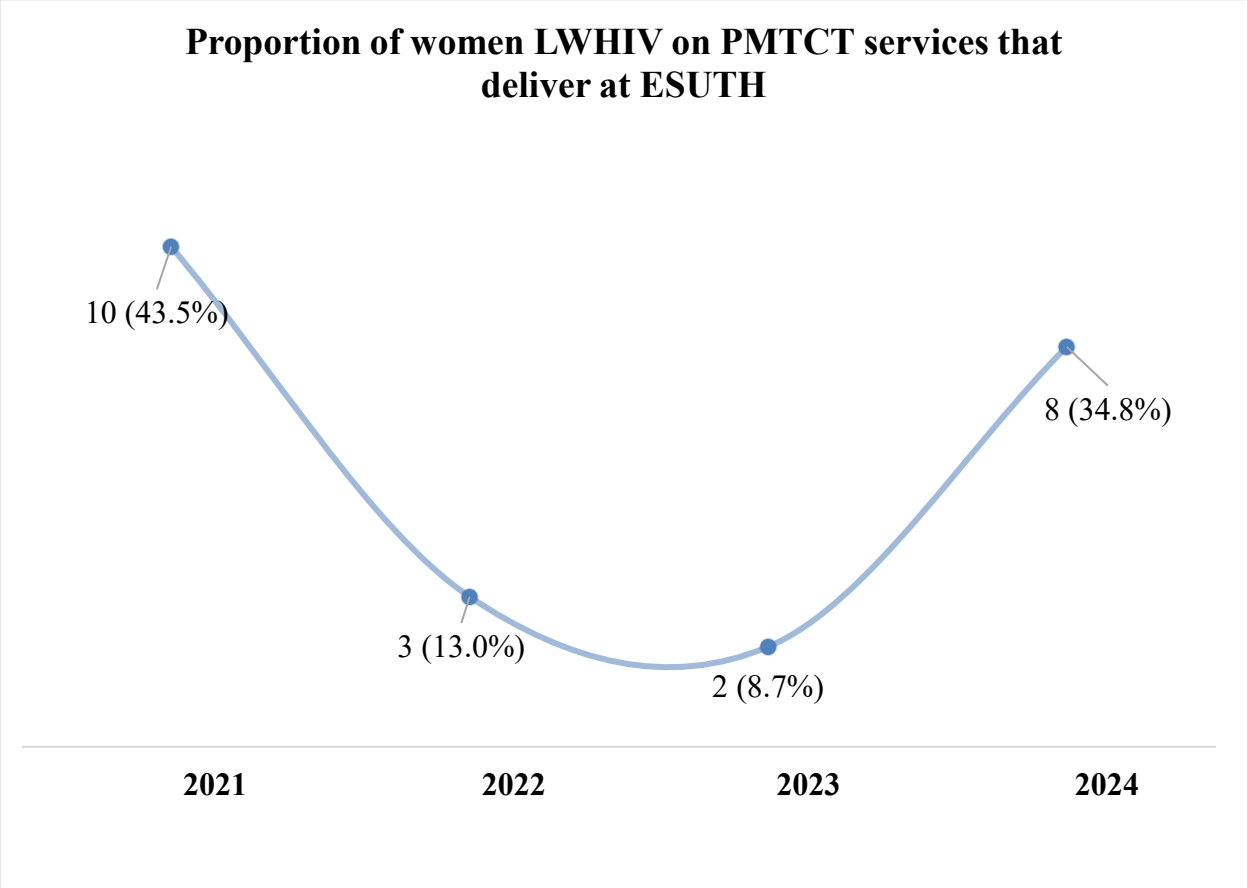


Figure 1: Proportion of women living with HIV (LWHIV) receiving PMTCT services who delivered at ESUTH Parklane between 2021 and 2024.

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Figure 1 summarizes the yearly distribution of facility-based deliveries among women receiving PMTCT services during the four-year study period. Of the 35 women included in the analysis, 23 (65.7%) delivered at ESUTH Parklane. The largest proportion of facility deliveries occurred in 2021 (43.5%), followed by 2024 (34.8%). Comparatively fewer deliveries were documented in 2022 (13.0%) and 2023 (8.7%), indicating a decline during the middle years of the study before an increase was observed in the final year.

Table 1: Monthly distribution of women living with HIV (LWHIV) on PMTCT services who delivered at ESUTH Parklane between 2021 and 2024.

Months	2021 N (%)	2022 N (%)	2023 N (%)	2024 N (%)
January	1 (50.0)	0 (0.0)	0 (0.0)	1 (50.0)
February	3 (60.0)	0 (0.0)	0 (0.0)	2 (40.0)
March	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)
April	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
May	2 (66.7)	1 (33.3)	0 (0.0)	0 (0.0)
June	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)
July	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
August	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
September	1 (33.3)	1 (33.3)	1 (33.3)	0 (0.0)
October	1 (50.0)	0 (0.0)	0 (0.0)	1 (50.0)
November	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
December	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)

The monthly distribution of facility deliveries is presented in Table 1. The highest monthly frequency was recorded in February 2021, when three women delivered at the study facility. March 2021 and May 2021 each recorded two deliveries, while single deliveries were documented across several other months, including January, June, September, October, November, and December in different years of the study. No deliveries were recorded during April or August throughout the four-year observation period.

Infant Antiretroviral Prophylaxis After Delivery

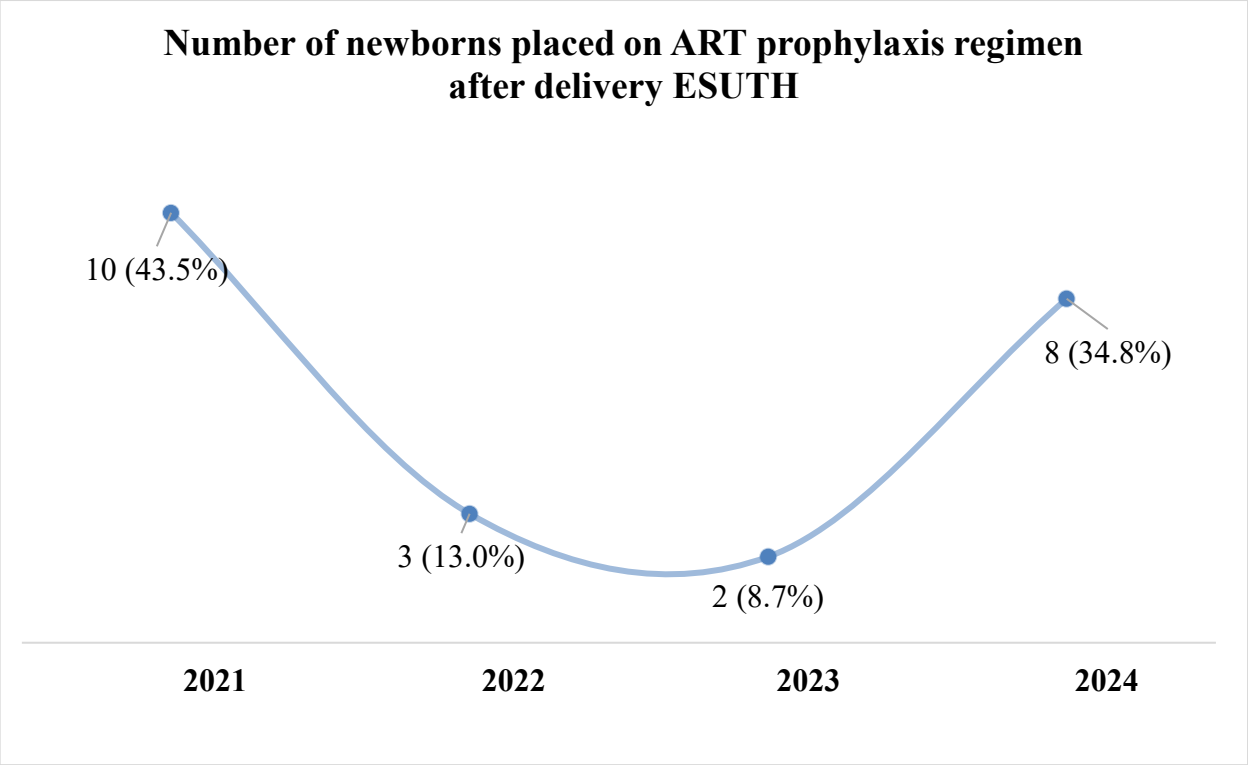


Figure 2: Number of newborns placed on antiretroviral (ART) prophylaxis following delivery at ESUTH Parklane between 2021 and 2024

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Figure 2 illustrates the annual pattern of infant antiretroviral prophylaxis among HIV-exposed newborns delivered at ESUTH Parklane. Uptake of prophylaxis followed a trend similar to that observed for facility delivery. The highest proportions were documented in 2021 (43.5%) and 2024 (34.8%), whereas considerably lower proportions were recorded in **2022 (13.0%)** and **2023 (8.7%)**. These findings indicate fluctuations in infant prophylaxis coverage across the study period while demonstrating that most prophylaxis administrations occurred during the first and final years included in the analysis.

DISCUSSION

This study evaluated facility-based delivery and infant antiretroviral prophylaxis among women enrolled in the Prevention of Mother-to-Child Transmission (PMTCT) programme at Enugu State University Teaching Hospital (ESUTH), Parklane, Enugu State, Nigeria, over a four-year period (2021–2024). The findings provide insight into two important indicators of PMTCT programme performance, namely institutional delivery among women living with HIV and timely administration of antiretroviral prophylaxis to HIV-exposed infants.

Approximately two-thirds (65.7%) of women enrolled in the PMTCT programme delivered at ESUTH Parklane, with the highest proportions observed in 2021 (43.5%) and 2024 (34.8%). Although this demonstrates continued utilization of institutional maternity services by many women receiving PMTCT care, the observed facility delivery rate remains lower than figures reported from several comparable settings. Studies from South Africa have shown that about 87% of women initiating PMTCT services remained engaged in care until delivery, with approximately 72% delivering under skilled facility-based supervision [21]. Likewise, Kenyan studies have reported that over 90% of HIV-positive pregnant women commenced antiretroviral therapy during antenatal care, while nearly 68% subsequently delivered in health facilities [22]. A multicountry review involving West African countries, including Nigeria, also identified institutional delivery as a key determinant of PMTCT success and reported an average facility delivery rate of approximately 62%, although programme performance varied across countries because of socioeconomic and health-system constraints [23].

Within Nigeria, the National Agency for the Control of AIDS (NACA) reported progressive improvement in facility-based delivery among pregnant women receiving antiretroviral therapy, increasing from 62% in 2015 to approximately 72% by 2020 [11]. Similarly, Ikechebelu and colleagues documented hospital delivery among 89% of women enrolled in PMTCT services at Nnamdi Azikiwe University Teaching Hospital, Nnewi [24]. The comparatively lower proportion observed in the present study may reflect persistent barriers including transportation difficulties, financial limitations, HIV-related stigma, interruptions in continuity of care, and loss to follow-up before delivery, all of which have previously been identified as obstacles to successful PMTCT implementation [21,23].

The study further demonstrated that infant antiretroviral prophylaxis followed a pattern similar to facility delivery, with the greatest proportions recorded in 2021 (43.5%) and 2024 (34.8%), while lower proportions were observed during 2022 and 2023. Prompt initiation of prophylactic antiretroviral medication remains one of the most effective strategies for reducing HIV transmission during the neonatal period, and current World Health Organization guidelines recommend that every HIV-exposed infant should receive prophylaxis immediately after birth [14]. Recent UNAIDS estimates indicate that approximately 94% of HIV-exposed infants globally received antiretroviral prophylaxis in 2024 [25].

Coverage of infant prophylaxis reported in the present study was lower than findings from several African countries. Studies from Uganda have documented prophylaxis coverage of approximately 81% within the first 72 hours after birth [26], while Kenyan programmes reported timely prophylaxis among about 78% of HIV-exposed infants [27]. Similarly, a PMTCT implementation study conducted across Ghana and Nigeria found that nearly two-thirds of HIV-exposed newborns received nevirapine prophylaxis within the recommended time frame, although weak linkage between maternal and infant follow-up services remained an important operational challenge [28].

National programme reports from Nigeria have estimated infant prophylaxis coverage at approximately 75% among HIV-exposed infants receiving PMTCT services [11]. Higher coverage has also been reported from individual tertiary hospitals, including the University of Port Harcourt Teaching Hospital, where approximately 89% of HIV-exposed infants received prophylaxis within 48 hours of birth [29]. In another South-East Nigerian study, Ikechebelu et al. reported immediate postnatal prophylaxis for more than 90% of HIV-exposed infants [25]. The comparatively lower coverage observed at ESUTH Parklane may be associated with incomplete documentation, missed postnatal appointments, deliveries occurring outside the study facility, and suboptimal linkage between delivery services and infant follow-up clinics. Addressing these operational gaps may further strengthen PMTCT programme performance and improve neonatal HIV prevention outcomes.

CONCLUSION

This study demonstrates that facility-based delivery and infant antiretroviral prophylaxis remain fundamental components of effective Prevention of Mother-to-Child Transmission (PMTCT) services at ESUTH Parklane. Although a

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substantial proportion of women enrolled in PMTCT services delivered within the hospital and their HIV-exposed infants received antiretroviral prophylaxis, the observed levels remain below those reported in several comparable settings. Strengthening continuity of maternal care, promoting institutional delivery, improving linkage between maternity and postnatal services, and ensuring prompt administration of infant antiretroviral prophylaxis are essential for enhancing PMTCT programme performance and accelerating progress toward the elimination of mother-to-child transmission of HIV.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed:

Enugu State Ministry of Health: Expand community-based interventions that encourage early birth planning and utilization of skilled facility-based delivery among pregnant women living with HIV while reinforcing completion of the PMTCT continuum of care.

ESUTH Parklane Management: Strengthen integrated maternal and infant follow-up systems through improved patient tracking, coordinated documentation, and closer linkage between antenatal, labour, postnatal, and paediatric services to minimize missed opportunities for infant prophylaxis.

Healthcare Providers: Reinforce counselling throughout pregnancy on the importance of hospital delivery, immediate newborn antiretroviral prophylaxis, adherence to maternal ART, and attendance at scheduled postnatal follow-up visits.

National Agency for the Control of AIDS (NACA): Support health facilities by strengthening referral pathways, improving monitoring systems, and promoting standardized documentation to enhance institutional delivery rates and infant prophylaxis coverage nationwide.

Researchers and Academic Institutions: Conduct multicentre prospective studies to identify patient-, provider-, and health system-related factors influencing facility delivery and infant antiretroviral prophylaxis, thereby generating evidence for targeted interventions aimed at improving PMTCT outcomes.

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