Evaluating The Effectiveness of Hepatitis B Pmtct Interventions: A Comparative Analysis of Models of Care in Sardauna and Kurmi Lgas, Taraba State, Nigeria

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ABSTRACT

Background:

Hepatitis B virus (HBV) remains a major public health concern in Nigeria, where mother-to-child transmission (MTCT) contributes significantly to chronic infections. This study evaluated the effectiveness of HBV PMTCT interventions implemented in Sardauna LGA (2023) and Kurmi LGA (2024) in Taraba State, comparing screening coverage, prophylaxis uptake, and childhood immunization outcomes across the two models of care.

Methods:

A descriptive analysis was conducted using programme data from both LGAs, encompassing HBV/HCV screening among pregnant women, women of childbearing age (CBA), and male partners; initiation of Tenofovir prophylaxis for HBV-positive pregnant women; and uptake of HBV birth-dose and subsequent childhood vaccinations. Health worker capacity-building outputs and step-down training outcomes were also assessed.

Results:

In Sardauna LGA, 2,426 individuals were screened, identifying 99 HBsAg-positive and 34 Anti-HCV-positive cases; all 56 HBV-positive pregnant women received Tenofovir prophylaxis. Similarly, Kurmi LGA screened 1,435 individuals, identifying 101 HBsAg-positive and 65 Anti-HCV-positive cases, with full prophylaxis initiation for all 58 HBV-positive pregnant women. Birth-dose vaccination within 24 hours was high in both LGAs—1,357 infants in Sardauna and 850 in Kurmi—although attrition across the vaccine series persisted, with only 1,005 and 484 infants completing the pentavalent schedule, respectively. Screening indicators fell short of five-year EMTCT targets, whereas infant vaccination and health workforce training exceeded expectations. Step-down training improved health worker knowledge, service readiness, antenatal care uptake, HBV screening rates, and birth-dose vaccination performance.

Conclusion: The HBV PMTCT interventions demonstrated strong maternal prophylaxis coverage, improved service availability, and high birth-dose uptake across both LGAs. However, screening coverage for pregnant women, women of CBA, and male partners remained below targets, and vaccine completion rates showed notable drop-offs. Strengthening community outreach, improving facility-based deliveries, and enhancing follow-up systems are critical to achieving HBV EMTCT goals in Taraba State.

Keywords: Hepatitis B, PMTCT, Tenofovir prophylaxis, birth-dose vaccination, immunization dropout, maternal screening, Taraba State, Nigeria.

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INTRODUCTION

Hepatitis B virus (HBV) infection presents a significant global health burden, as highlighted by the World Health Organization (WHO) in 2023. Chronic HBV infection, particularly in women, poses an increased risk of mother-to-child transmission (MTCT), a critical pathway for the perpetuation of the disease (Sintusek et al., 2023). Recognizing this threat, the World Health Assembly in 2016 set forth an ambitious goal to eliminate viral hepatitis as a public health threat by 2030 with eradicating MTCT of HBV as one of the key pillars. (WHO, 2020; Kabore et al., 2023). The WHO estimates that as of 2019, approximately 296 million individuals globally were living with chronic hepatitis B, with an annual incidence of 1.5 million new infections. Out of this, Africa alone constitutes 63% of the burden, and Nigeria, as the largest country in Africa with a population of over 220 million people having the largest burden out of the 63% in Africa. This condition is a leading cause of acute and chronic liver diseases, contributing significantly to the global health burden.

In Nigeria, the prevalence of hepatitis B is notably high, with approximately 8% of the general population and 5.9% of pregnant women affected, as reported by the Nigerian AIDS Indicator and Impact Survey (NAIIS) in 2018. Furthermore, the prevalence of Hepatitis B surface antigen (HBsAg) among children under five years ranges between 4.1% and 13.5% (FMoH, 2018). Specifically, in Taraba State, a prevalence of 12.8% for hepatitis B and 4.7% for hepatitis C has been documented (CFID, 2021).

In regions with high endemicity such as Nigeria and particularly Taraba State, HBV transmission predominantly occurs perinatally or during early childhood. Over the past decade, organizations like CFID and Chagro-Care Trust have implemented numerous interventions targeting HIV/AIDS, hepatitis B, and C testing among Pregnant Women, women of child bearing age and their male partners, health care workers, children between the ages of 0 – 14 years, adolescent and young persons, general and special populations, along with sexual and reproductive health services across Taraba State, with a focused effort on HBV/PMTCT in Sardauna and Kurmi Local Government Area (LGAs). The interventions were conducted across secondary and primary health care facilities and communities. These interventions have revealed program, structural, cultural, behavioural and health care systems gaps and challenges which affect the goals of achieving the HBV PMTCT services. This intervention sought to demonstrate HBV and HCV testing of pregnant women at community and facility-based to achieve PMTCT goals in Taraba State, Nigeria, by comparing the outcomes of interventions implemented in Sardauna and Kurmi Local Government Areas with the sole goal of identifying the effectiveness of these interventions and highlight areas that need improvement to better prevent and manage HBV transmission.

METHODOLOGY

Study Design

A mixed-methods approach was used, combining quantitative data analysis with qualitative interviews.

Study Population:

Quantitative Component: Individuals tested for HBsAg and Anti-HCV in 2023 and 2024, including pregnant women, women of childbearing age, and male partners.

Qualitative Component: Healthcare workers and traditional birth attendants trained during the project years (2023-2024).

Data Collection:

Quantitative Data:

Data Source: Maternal and Child Health registers (MCHRs), Hepatitis registers, Client Intake Forms and project reports from participating facilities in Sardauna and Kurmi LGAs

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Variables:

Number of individuals tested for HBsAg and Anti-HCV.
Number of individuals positive for HBsAg, HBeAg, and Anti-HCV.
Number of pregnant women on Tenofovir prophylaxis.

Vaccination data: Number of babies receiving hepatitis B Birth dose Vaccine within 24 hours, vaccinated after 24 hours, babies who completed their hepatitis B second and third doses, and those who have not completed their hepatitis B vaccination.

Qualitative Data:

Data Source: Interviews and focus group discussions with healthcare workers, Pregnant Women, Male partners, communities and the TBAs trained during 2023-2024.

Data Analysis

Quantitative Analysis:

Descriptive statistics were used to summarize the data.

Comparative analysis was performed to assess differences in uptake of care, training of health care workers, prevalence rates, vaccination coverage, and TDF (prophylaxis) among pregnant women outcomes between 2023 - 2024.

Qualitative Analysis:

Thematic analysis of interview and focus group data to identify key themes and insights regarding training effectiveness and challenges in HBV management.

Ethical clearance

Ethical clearance was obtained from the National Health Research Ethics Committee of Nigeria,

Federal Ministry of Health with NHREC Protocol Number NHREC/01/01/2007-16/01/2024 and NHREC Approval Number NHREC/01/01/2007- 22/01/2024. Support letters were acquired from the Taraba state Ministry of Health. Pregnant women were informed about the study's purpose, and their anonymity and right to decline. Permission and written informed consent were sought before and during data collection, with consent provided by CFID's legally authorized representatives for women aged 15–18 years. Privacy and confidentiality were ensured through the use of a unique identification number and a separate interview room, adhering to relevant guidelines and regulations.

RESULTS

Table 1. Summary Data on HBV PMTCT Program 2023 in Sardauna LGA of Taraba State

Description	**HBsAg & Anti-HCV Tested**	**HBsAg +ve**	**Ani-HCV +ve**	**On Tenofovir Prophylaxis.**	**Monovalent**	**Pentavalent**			
					Children Born in the facility monovalent dose within 24hrs	**Children born outside the facility & vaccinated within 24 weeks**	**No. of children who received their second HBV dose**	**Number of children who received 3rd dose**	**No. of children who completed their pentavalent**
Pregnant Women	1789	56	21	56	1357	572	1231	1029	1005

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Women of CBA	392	15	8	0	Total number of children born within the project year=1929
Male Partners	245	28	5	0	
Total	2426	99	34	56	

Table 2. Summary Data on HBV PMTCT Program 2024 in Kurmi LGA of Taraba State

Description	**HBsAg & Anti-HCV Tested**	**HBsAg +ve**	**Ani-HCV +ve**	**On Tenofovir Prophylaxis.**	**Monovalent**	**Pentavalent**			
					Children Born in the facility monovalent dose within 24hrs	**Children born outside the facility & vaccinated within 24 weeks**	**No. of children who received their second HBV dose**	**Number of children who received 3rd dose**	**No. of children who completed their pentavalent**
Pregnant Women	850	58	35	58	850	245	780	680	484
Women of CBA	317	27	15	0	Total number of children born within the project year=1095				
Male Partners	268	16	13	0					
Total	1435	101	65	58					

Fig. 1. Hbv Emtct Target Vs Target Achieved In 2023-2024 (Sardauna And Kurmi Lga)

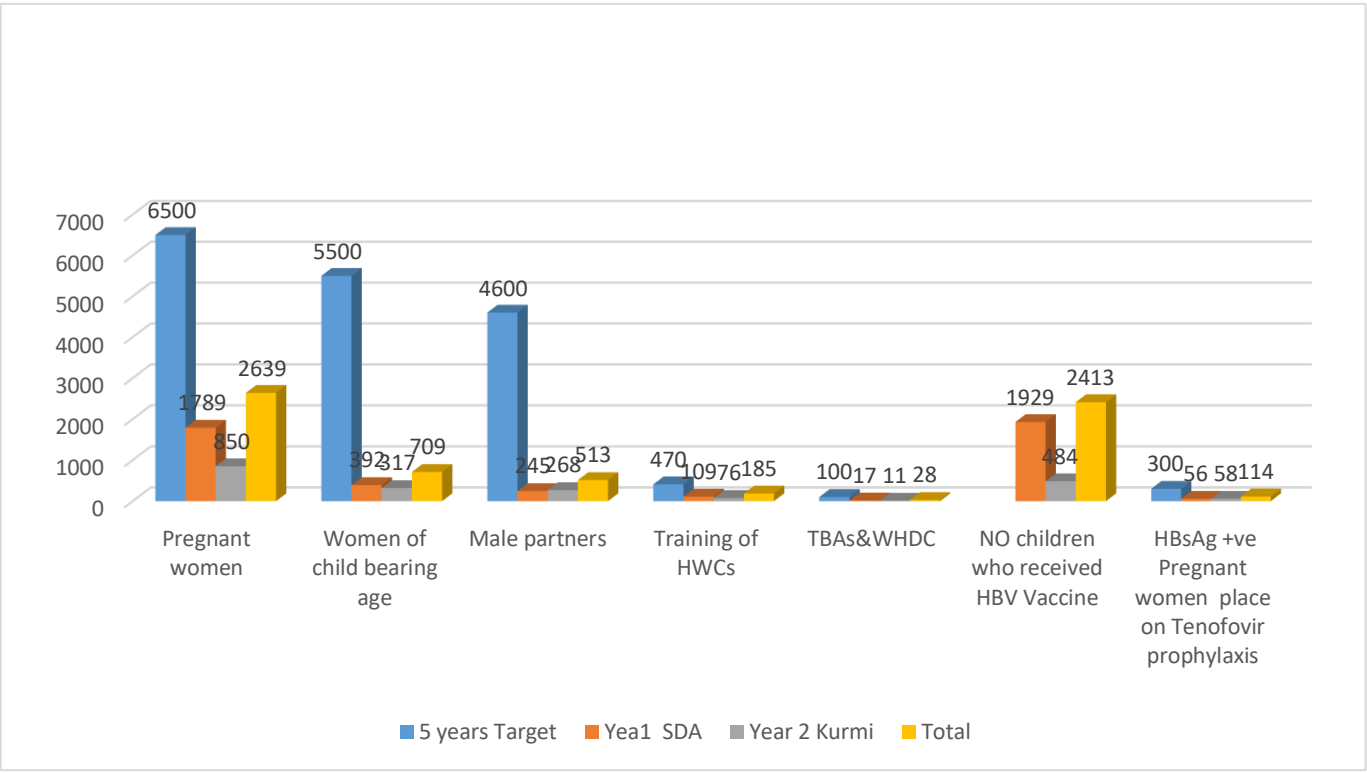

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Fig. 2. Step-Down Training For Hcws In Sardauna And Kurmi Lgas 2023-2024

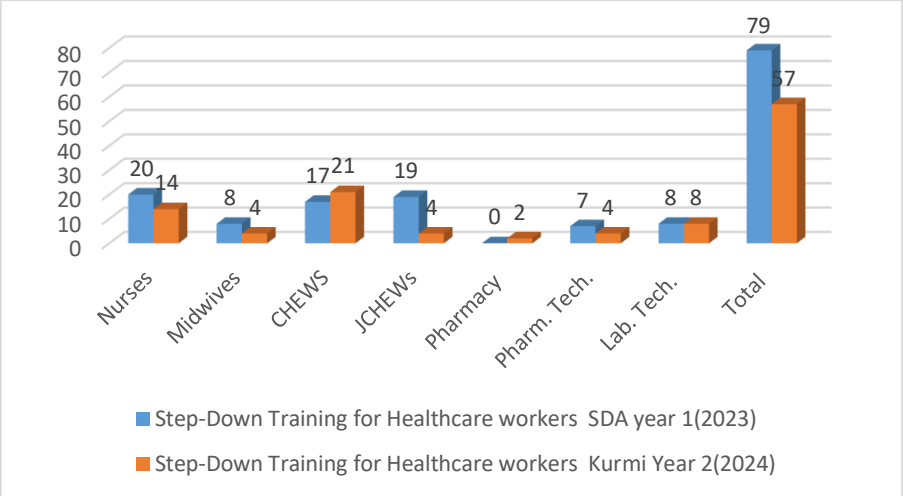
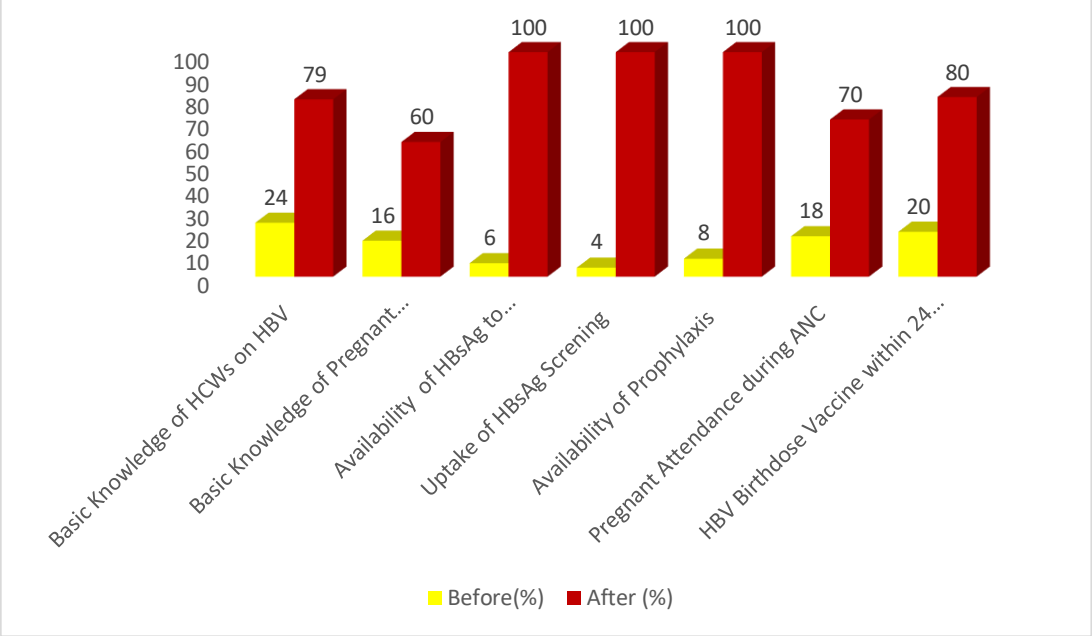


Figure 3.0 Pre And Post Results Of Step Down Training In SDA And Kurmi Lgas 2023-2024



Description of Results

Table 1 shows that a total of 2,426 individuals were screened in Sardauna LGA in 2023, identifying 99 HBV-positive cases and 34 Anti-HCV-positive individuals, with all 56 HBsAg-positive pregnant women placed on Tenofovir prophylaxis, while 1,929 births were recorded with 1,357 facility-born infants vaccinated within 24 hours and 572 non-facility births vaccinated within 24 weeks, and 1,231 infants received dose two, 1,029 received dose three, and 1,005 completed the pentavalent schedule, alongside the training of 79 healthcare workers.

In Kurmi LGA in 2024, 1,435 individuals were screened (Table 2), yielding 101 HBV-positive and 65 Anti-HCV-positive cases, with all 58 HBsAg-positive pregnant women initiated on Tenofovir, and among the 1,095 births recorded, 850 facility-born infants received the birth dose within 24 hours and 245 non-facility births were vaccinated within 24 weeks, while 780 infants received dose two, 680 received dose three, and 484 completed the pentavalent series, with 57 healthcare workers trained in the LGA.

Across both LGAs, Figure 1 shows that screenings reached 2,639 pregnant women, 709 women of childbearing age, and 513 male partners against five-year targets of 6,500, 5,500, and 4,600 respectively, while

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2,413 infants received the HBV birth dose compared to a target of 1,000, 114 HBsAg-positive pregnant women were identified, and workforce strengthening reached 685 healthcare workers and 128 TBAs/WDC members (Figure 2).

Figure 3 indicates that following step-down training, healthcare workers' HBV knowledge increased from 24% to 79%, pregnant women's knowledge rose from 16% to 60%, availability of HBsAg test kits and prophylaxis increased from single-digit figures to 100%, pregnant women's screening rose to 100%, ANC attendance increased from 18% to 70%, and birth-dose vaccination within 24 hours improved from 20% to 80%.

DISCUSSION OF RESULTS

The findings from the HBV PMTCT programme implemented in Sardauna LGA (2023) and Kurmi LGA (2024) reveal important progress and persistent gaps in hepatitis B virus (HBV) prevention, maternal health screening, and childhood immunization coverage. Screening uptake among pregnant women was relatively high in both LGAs, with 1,789 pregnant women tested in Sardauna and 850 in Kurmi. This aligns with WHO recommendations for universal HBV screening during antenatal care as a key strategy to prevent mother-to-child transmission (WHO, 2023). However, the positivity rates observed—56 HBsAg-positive cases in Sardauna and 58 in Kurmi—underscore the continuing burden of chronic HBV infection among pregnant women, consistent with national reports indicating medium-to-high HBV endemicity in Nigeria (Oluwole et al., 2022).

The program also screened women of childbearing age (CBA) and male partners. In Sardauna LGA, 392 women of CBA and 245 male partners were screened, while Kurmi LGA recorded 317 women of CBA and 268 male partners. Although these numbers are lower than the pregnant women screened, they highlight the need for expanded community-based screening to identify HBV carriers early and interrupt household-level transmission (Eke et al., 2021).

Positivity for HCV, while lower than HBV, was notable across both LGAs, with 34 positive cases in Sardauna and 65 in Kurmi. The dual burden of HBV and HCV has implications for maternal and child health outcomes, given the potential complications associated with co-infections (Adekanle et al., 2020).

A key achievement of the programme was the placement of all HBV-positive pregnant women identified in both LGAs on Tenofovir prophylaxis—56 in Sardauna and 58 in Kurmi. This demonstrates strong adherence to national PMTCT guidelines, which recommend Tenofovir for high-risk pregnant women to prevent vertical transmission (Federal Ministry of Health [FMOH], 2021).

The immunization data further demonstrate variations in childhood vaccine uptake. In Sardauna LGA, 1,357 children received the monovalent HBV vaccine within 24 hours of birth, while 572 children born outside the facility received the vaccine within 24 weeks. Kurmi LGA showed a similar pattern, with 850 children vaccinated within 24 hours and 245 vaccinated within 24 weeks. These differences suggest facility delivery remains an important determinant of early HBV birth-dose administration, consistent with previous findings that facility-based delivery improves adherence to the birth-dose timeline (Umar et al., 2023).

Completion of the HBV immunization series (second and third doses) revealed attrition across the vaccination schedule. In Sardauna, 1,231 children received the second dose, 1,029 the third dose, and 1,005 completed the pentavalent series. In Kurmi, drop-offs were more pronounced, with 780 receiving the second dose, 680 the third dose, and only 484 completing the pentavalent series. This dropout pattern reflects nationwide challenges with immunization completion attributed to access constraints, caregiver hesitancy, and inconsistent follow-up systems (NPHCDA, 2022).

Overall, the programme demonstrated strong implementation of HBV screening and maternal prophylaxis, but

childhood vaccination completion remains suboptimal. These findings highlight the need for intensified community mobilization, improved tracking mechanisms, and expanded outreach to ensure timely

immunization adherence. Strengthening facility delivery rates and addressing barriers to follow-up vaccination could significantly reduce vertical and early childhood HBV transmission in these LGAs.

CONCLUSION

In conclusion, the comparative evaluation of Sardauna and Kurmi LGAs shows that targeted investments in training, commodity availability, and facility-based birth-dose delivery can produce rapid and large gains in key PMTCT outcomes — notably universal maternal prophylaxis initiation and very high birth-dose coverage — but that scaling screening, improving male partner engagement, and retaining infants through the full vaccine series remain pressing priorities. These findings are consistent with national and regional evidence and point the way to pragmatic, evidence-based adjustments that should accelerate progress toward HBV EMTCT targets.

RECOMMENDATIONS

1. Strengthen routine HBV screening for pregnant women, women of childbearing age, and male partners by expanding outreach and integrating testing into all entry points of care.
2. Sustain and scale up Tenofovir prophylaxis for all eligible HBsAg-positive pregnant women, ensuring uninterrupted drug supply and adherence monitoring.
3. Improve facility-based delivery rates through community sensitization and incentives, as early birth-dose vaccination was higher among facility deliveries.
4. Enhance early childhood vaccination coverage by ensuring timely administration of the HBV monovalent birth dose, particularly for children born outside health facilities.
5. Address immunization drop-out rates by implementing reminder systems, defaulter tracking, and community health worker follow-up to improve completion of the second, third, and pentavalent doses.
6. Increase community awareness on HBV and HCV through targeted behaviour change communication to reduce stigma and promote preventive behaviours.
7. Strengthen data quality and reporting systems to improve accuracy, completeness, and use of HBV PMTCT data for decision-making.
8. Integrate partner testing and counselling into maternal health services to reduce household transmission risks.

Conflicts of interest: All authors – none to declare**.**

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REFERENCES

1. Musa, B. M., Bussell, S., Borodo, M. M., Samaila, A. A., & Femi, O. L. (2015). Prevalence of hepatitis B virus infection in Nigeria, 2000–2013: a systematic review and meta-analysis. Nigerian Journal of Clinical Practice, 18(2), 163–172.
2. WHO (2020). Prevention of mother-to-child transmission of hepatitis B virus: Guidelines on antiviral prophylaxis in pregnancy. World Health Organization.

3. Adjei, C. A., Asamoah, R., Atibilla, D., Owusu-Agyei, S., & Ameme, D. K. (2021). Uptake of birth dose hepatitis B vaccine in rural Ghana: Challenges and strategies. BMC Public Health, 21(1), 1-10.
4. Nelson, N. P., Easterbrook, P. J., & McMahon, B. J. (2023). Epidemiology of hepatitis B virus infection and impact of vaccination on disease. Clinical Liver Disease, 19(1), 1-14.
5. Eke, A. C., Eleje, G. U., Eke, U. A., Xia, Y., & Liu, J. (2019). Hepatitis B immunization in pregnancy: Effect of knowledge and attitude of antenatal women in Nigeria. BMC Public Health, 19(1), 1-9.
6. Olayinka, A. T., Oyemakinde, A., Balogun, M. S., Ajudua, A., Nguku, P., Aderinola, M., ... & Nasidi, A. (2016). Seroprevalence of hepatitis B infection in Nigeria: A national survey. The American Journal of Tropical Medicine and Hygiene, 95(4), 902–907.
7. Federal Ministry of Health, Nigeria (2016). National Guidelines for the Prevention of Mother-to-Child Transmission of Hepatitis B Virus.
8. CFID. (2021). Report on hepatitis B and C prevalence in Taraba State. www.cfidtaraba.org
9. Federal Ministry of Health (FMoH). (2018). National Hepatitis B and C control guidelines.
10. Hyun, M. H., et al. (2020). "Impact of early HBV vaccination on the prevention of vertical transmission." Vaccine, 38(3), 465-471.
11. Kabore HJ, Li X, Alleman MM, et al. Progress Toward Hepatitis B Control and Elimination of Mother-to-Child Transmission of Hepatitis B Virus — World Health Organization African Region, 2016–2021. MMWR Morb Mortal Wkly Rep 2023;72:782–787. DOI: http://dx.doi.org/10.15585/mmwr.mm7229a2
12. Kabore, H. A., et al. (2023). Viral hepatitis elimination goals. The Lancet.
13. NAIIS. (2018). Nigerian AIDS Indicator and Impact Survey: Technical Report.
14. Prevention of Mother-to-Child Transmission of Hepatitis B Virus: Guidelines on Antiviral Prophylaxis in Pregnancy. Geneva: World Health Organization 2020 PubMed/NCBI
15. Sintusek P, Wanlapakorn N, Poovorawan Y. Strategies to Prevent Mother-to-child Transmission of Hepatitis B Virus. J Clin Transl Hepatol. 2023;11(4):967-974. doi: 10.14218/JCTH.2023.00332.
16. WHO. (2020). Elimination of mother-to-child transmission of hepatitis B. World Health Organization.
17. WHO. (2023). Global hepatitis report. World Health Organization.
18. World Health Organization (WHO). (2021). "Global health sector strategy on viral hepatitis 2016–2021: towards ending viral hepatitis." Geneva: World Health Organization.
19. Xu, Y., et al. (2019). "Tenofovir prophylaxis for preventing perinatal transmission of hepatitis B virus infection." Journal of Clinical Virology, 112, 15-20.