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Barriers to utilization of anti-retroviral therapy among HIV positive pregnant women in Birnin Kebbi, North West Nigeria

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Abstract

Mother-to-child transmission of HIV remains a significant public health concern, particularly in resource-limited societies. Antiretroviral therapy, which effectively reduces transmission risks and enhances maternal health, is central to global efforts to control HIV among pregnant women. However, uptake of this therapy continues to face various challenges. This study investigates barriers to the utilization of antiretroviral therapy among HIV-positive pregnant women in Birnin Kebbi, North West Nigeria. A cross-sectional study design was adopted, employing key informant and in-depth interviews involving 320 HIV-positive pregnant women accessing antenatal care. Findings show that key barriers include socio-demographic factors such as younger age, low educational attainment and poor socio-economic status. HIV-related stigma significantly discouraged disclosure and delayed healthcare-seeking behaviors. Misconceptions regarding the safety of antiretroviral therapy during pregnancy further deterred women from initiating and adhering to treatment. Inadequate healthcare infrastructure and geographical accessibility also hindered access to therapy services. This study concludes that interventions focusing on community education to reduce stigma, correcting misconceptions about therapy safety, improving healthcare infrastructure, and integrating antiretroviral therapy into antenatal care could substantially increase utilization, reduce transmission, and improve maternal and child health outcomes in Nigeria. (*Afr J Reprod Health* 2025; 29 [6]: 82-93).

Keywords: HIV/AIDS; Antiretroviral Therapy; Mother-to-Child Transmission; Healthcare Access

Résumé

La transmission mère-enfant du VIH demeure un problème majeur de santé publique, en particulier dans les sociétés à ressources limitées. Le traitement antirétroviral, qui réduit efficacement les risques de transmission et améliore la santé maternelle, est au cœur des efforts mondiaux de lutte contre le VIH chez les femmes enceintes. Cependant, l'adoption de ce traitement continue de se heurter à divers défis. Cette étude examine les obstacles à l'utilisation du traitement antirétroviral chez les femmes enceintes séropositives à Birnin Kebbi, dans le nord-ouest du Nigéria. Une étude transversale a été adoptée, utilisant des informateurs clés et des entretiens approfondis impliquant 320 femmes enceintes séropositives accédant aux soins prénatals. Les résultats montrent que les principaux obstacles incluent des facteurs sociodémographiques tels que le jeune âge, le faible niveau d'éducation et le statut socio-économique défavorable. La stigmatisation liée au VIH a considérablement découragé la divulgation et retardé les comportements de recours aux soins de santé. Les idées fausses concernant la sécurité du traitement antirétroviral pendant la grossesse ont dissuadé les femmes de commencer et d'adhérer au traitement. L'insuffisance des infrastructures de santé et l'accessibilité géographique ont également entravé l'accès aux services de traitement. Cette étude conclut que les interventions axées sur l'éducation communautaire pour réduire la stigmatisation, corriger les idées fausses sur la sécurité des traitements, améliorer les infrastructures de santé et intégrer le traitement antirétroviral aux soins prénatals pourraient accroître considérablement l'utilisation, réduire la transmission et améliorer la santé maternelle et infantile au Nigéria. (*Afr J Reprod Health* 2024; 29 [6]: 82-93).

Mots-clés: VIH/sida; traitement antirétroviral; transmission mère-enfant; accès aux soins

Introduction

HIV/AIDS continues to be a major public health concern worldwide, with sub-Saharan Africa bearing the burden of the epidemic. Nigeria, as one of the countries with the highest burden of HIV, faces significant challenges in managing the disease, particularly among vulnerable populations such as pregnant women. The World Health Organization (WHO) estimates that approximately 1.9 million people are living with HIV in Nigeria, with a notable prevalence among pregnant women. The implications of HIV infection during pregnancy extend beyond maternal health^{1,2,3}. It significantly impacts neonatal outcomes, including the risk of mother-to-child transmission (MTCT) of the virus.

Antiretroviral therapy (ART) has been established as an effective intervention to reduce the viral load in HIV-positive individuals, thereby minimizing the risk of MTCT and improving overall health outcomes for both mothers and infants^{1,2,3}. Despite the known benefits of ART, its utilization among HIV-positive pregnant women in Nigeria remains alarmingly low. Various studies have highlighted that many women do not initiate or adhere to ART during pregnancy, leading to preventable health complications and increased rates of MTCT^{2,4,5}. Understanding the barriers to ART utilization is critical for developing targeted interventions that can enhance access to treatment and ultimately improve maternal and child health outcomes^{6,7}.

Socio-demographic factors influencing ART utilization

Socio-demographic factors play significant roles in influencing healthcare access and treatment adherence among HIV-positive pregnant women. Age, education level, marital status, and socio-economic status are critical variables that can affect a woman's ability to utilize ART. For instance, younger women may experience higher levels of stigma and discrimination, which could deter them from seeking treatment^{8,9,10,1,4}. Furthermore, lower educational attainment may limit awareness about the benefits of ART and the importance of adherence. Socio-economic challenges, including poverty and a lack of transportation, further

exacerbate these issues, making it difficult for women to access healthcare facilities that provide ART.

In Birnin Kebbi, the capital city of Kebbi State in North West Nigeria, these socio-demographic factors may interact with cultural beliefs and practices that influence health-seeking behavior. Traditional beliefs regarding illness and treatment seeking can impact a woman's decision to seek ART. For instance, some women may rely on traditional healers or herbal remedies instead of modern medical interventions, thereby delaying access to necessary care^{11,12}. Understanding how these socio-demographic factors intersect with cultural beliefs is essential for addressing barriers to ART utilization.

Perceptions and attitudes towards ART

The perceptions and attitudes of HIV-positive pregnant women towards ART are crucial determinants of treatment engagement. Stigma associated with HIV remains pervasive in many communities in Nigeria, often leading to fear of discrimination and social isolation. This stigma can discourage women from disclosing their HIV status to family members or healthcare providers, thereby hindering their access to ART^{2,13,14}. Also, misconceptions about ART such as beliefs that it is harmful or that it signifies a terminal illness can further deter women from initiating or adhering to treatment.

Moreover, fear of side effects and concerns about the impact of ART on their unborn child can also contribute to a reluctance to utilize these life-saving medications. Qualitative studies have shown that many women express anxiety about potential adverse effects of ART during pregnancy, leading them to forego treatment altogether^{1,15,16}. Addressing these perceptions through targeted education and counseling is vital for improving ART uptake among this population.

Accessibility and availability of healthcare services

The accessibility and availability of healthcare services are fundamental components affecting ART utilization among HIV-positive pregnant women. In many regions of Nigeria, including

Birnin Kebbi, healthcare infrastructure is often inadequate, with limited access to facilities that provide comprehensive HIV care^{17,18}. This includes challenges such as insufficient trained healthcare personnel, stockouts of essential medications, and lack of supportive services like counseling and testing.

Furthermore, geographical barriers can hinder access to healthcare facilities. Women living in rural areas may face significant challenges in reaching clinics that offer ART due to poor transportation infrastructure or long distances. Furthermore, systemic issues within the healthcare system such as discrimination from healthcare providers or lack of confidentiality can create an unwelcoming environment for HIV-positive pregnant women seeking care^{19,4,7,10}. Understanding these systemic barriers is crucial for developing strategies that enhance service delivery and accessibility.

To address the barriers to ART utilization among HIV-positive pregnant women in Birnin Kebbi, it is essential to implement multifaceted interventions that target individual, societal, and systemic factors. Educational campaigns aimed at reducing stigma and increasing awareness about the benefits of ART should be prioritized. These campaigns can involve community leaders and influencers to foster a supportive environment for women seeking treatment^{20,21}.

Furthermore, improving healthcare infrastructure is critical for enhancing accessibility to ART services. This includes increasing the number of trained healthcare providers, ensuring the availability of medications, and establishing supportive services such as counseling for pregnant women living with HIV. Besides, integrating ART services into antenatal care programs can facilitate early identification and treatment initiation for HIV-positive pregnant women^{12,22}.

The broad objective of this research is to investigate the barriers to the utilization of anti-retroviral therapy (ART) among HIV-positive pregnant women in Birnin Kebbi, North West Nigeria. To achieve this, the research focuses on three specific objectives: first, to identify the socio-economic and cultural factors that influence the decision-making process regarding ART uptake among these women; second, to assess the

accessibility and availability of healthcare services, including ART, for pregnant women living with HIV in the region; and third, to evaluate the level of awareness and knowledge about the benefits of ART and its role in preventing mother-to-child transmission of HIV among the target population. Through these objectives, the research aims to provide insights that can inform strategies to improve ART utilization and overall maternal and child health outcomes in this context.

The barriers to ART utilization among HIV-positive pregnant women in Birnin Kebbi are multifaceted. Addressing these challenges requires a comprehensive understanding of the socio-demographic factors influencing access to treatment, as well as the perceptions and attitudes that shape women's health-seeking behavior. By identifying and tackling these barriers through targeted interventions, it is possible to improve ART uptake among this vulnerable population, ultimately reducing the incidence of mother-to-child transmission of HIV and enhancing maternal and child health outcomes in Nigeria^{3,23-25}.

Conceptual framework

This study is anchored on the Health Belief Model (HBM), developed in the 1950s by social psychologists Irwin M. Rosenstock, Godfrey M. Hochbaum, S. Stephen Kegeles, and Howard Leventhal at the U.S. Public Health Service²⁶. The model was created to explain why individuals engage or fail to engage in preventive health measures, such as screenings and immunizations. It posits that personal beliefs about health conditions, perceived benefits of action, and barriers to action can predict health-related behaviors. The model was initially developed to understand the factors influencing the uptake of healthcare services, particularly the likelihood of individuals adopting preventive health behaviors. The Health Belief Model has since been widely used and adopted in various health-related fields to study and promote behavioral change^{3,6,26}.

Individuals assess high risk of transmitting HIV to their child without engaging in MTCT services, and the perception of personal vulnerability to the consequences of not utilizing MTCT services varies, recognition of the potential negative outcomes for both the mother and the child

if MTCT services are not utilized, understanding the seriousness of the health risks associated with mother-to-child transmission of HIV. There are perceived benefits: awareness of the advantages of MTCT services in preventing transmission, recognition of the positive outcomes, such as having a healthy child and preserving the mother's health. Some perceived barriers also include; identification of obstacles or challenges hindering the utilization of MTCT services.

Consideration of factors like stigma, lack of access to healthcare, or concerns about confidentiality is important alongside external factors or events that prompt individuals to act and utilize MTCT services. Examples include community awareness campaigns, healthcare provider recommendations, or peer influence. Confidence in one's ability to successfully engage with and navigate MTCT services. Furthermore, addressing concerns about the ability to adhere to treatment plans and overcome potential challenges is germane. The influence of family, friends, and community greatly influences either encouragement or discouragement in MTCT utilization, also recognizing the importance of a supportive social network in the decision-making process²⁷⁻²⁹. Individuals are more likely to utilize MTCT services when they perceive themselves as susceptible to HIV transmission, recognize the severity of the consequences, and believe in the benefits of the services. Overcoming perceived barriers, increasing cues to action through targeted interventions, enhancing self-efficacy, and fostering social support can contribute to higher MTCT utilization rates. Continuous monitoring and evaluation are essential to adopt interventions and address evolving perceptions and barriers within the community. Individuals' beliefs about their chances of getting a particular health condition is influenced by personal experiences, family history, and awareness of risk factors. Individual perception of the seriousness of the health condition and its consequences reveals the emotional and cognitive assessments of the impact of the condition on one's life^{1,5,8,29-31}

Methods

This study was carried out at the Federal Medical Centre (FMC), Birnin Kebbi, in Kebbi State,

northwest Nigeria. FMC, Birnin Kebbi is a tertiary health care institution, with over three hundred bed capacity with state-of-the-art medical equipment, and well-trained professionals. In 2009, the hospital recorded an average patients' turnover of about one hundred and sixteen thousand, four hundred and ten patients (160,410) including those from the neighboring states and Niger republic, a neighboring country.

The study population, sample and data

The study employed qualitative method which was executed through Key informant interviews (KII) and In-Depth Interviews (IDIs). The key informants for this study included experienced medical consultants and nurses from the Obstetrics and Gynecology unit at the Federal Medical Centre, Birnin Kebbi. This selection was carefully made due to their specialized knowledge and extensive experience in managing cases involving pregnant and breastfeeding mothers, making their insights invaluable to the research.

Specifically, the key informants consisted of one male doctor from the Community Medicine unit to bring a broader understanding of community health dynamics, and two female doctors from the Obstetrics and Gynecology unit, whose expertise in maternal and reproductive health is essential. Moreover, one matron from the Community Medicine unit, known for her leadership and hands-on experience in maternal healthcare, is included. Two nurses from the Obstetrics and Gynecology unit, recognized for their close interaction with patients and day-to-day care responsibilities, also form part of the team, providing a well-rounded perspective for the study.

As part of the In-Depth Interview (IDI) process, a total of fifteen HIV-positive women participated in the study. These participants included ten pregnant women and five breastfeeding mothers, ensuring representation from different stages of maternal health. To facilitate structured discussions and allow for a more focused exchange of experiences, the participants were further divided into three groups, each consisting of five individuals. This grouping approach allowed for a more interactive and manageable discussion, ensuring that all

participants had the opportunity to share their experiences, challenges, and perspectives.

The selection of participants was based on their scheduled appointment dates within the data collection period. This method not only ensured convenience for both the research team and the participants but also helped minimize disruptions to their routine healthcare visits. By aligning data collection with scheduled medical check-ups, the study maximized participation rates while reducing the burden on respondents. To enhance effective communication and facilitate a smooth interview process, a trained counsellor was included in the research team. The counsellor played a vital role in ensuring that participants fully understood the questions presented in the interview.

Given that the majority of the participants primarily spoke Hausa or Fulani, the counsellor assisted with translations and interpretations where necessary. This approach was crucial in breaking language barriers and fostering an environment where participants felt comfortable sharing their thoughts. By ensuring clarity and comprehension, the counsellor's involvement contributed to the reliability and integrity of the data collected, ultimately strengthening the overall findings of the study.

Data retrieval, management and analysis

In this sub-section, we describe the detailed processes employed in gathering, handling, and analyzing qualitative data for the study. It outlines how participants were selected, how information was collected through Key Informant Interviews (KIIs) and In-Depth Interviews (IDIs), and how data were managed securely and systematically analyzed to identify themes relevant to the barriers influencing antiretroviral therapy utilization among HIV-positive pregnant women.

This study adopted a qualitative research approach to comprehensively explore the factors influencing the utilization of antiretroviral therapy among HIV-positive pregnant women. Data collection was conducted at the Federal Medical Centre (FMC), Birnin Kebbi, located in Kebbi State, North West Nigeria, selected due to its central role in providing healthcare services, including specialized maternal care, to the region. To gain diverse insights, two primary qualitative

methods were employed: Key Informant Interviews (KIIs) and In-Depth Interviews (IDIs).

The KIIs were conducted with medical professionals strategically chosen due to their extensive experience, knowledge, and direct involvement in the care and management of HIV-positive pregnant and breastfeeding women. Specifically, key informants comprised one male doctor from the Community Medicine unit, two female doctors from the Obstetrics and Gynecology unit, one matron from Community Medicine, and two nurses from the Obstetrics and Gynecology department. This purposeful selection ensured a comprehensive understanding of clinical, social, and community-based perspectives regarding barriers to therapy utilization.

For the IDIs, fifteen HIV-positive women participated, consisting of ten pregnant women and five breastfeeding mothers. These participants were purposefully selected based on their scheduled appointment dates within the data collection period. This approach helped minimize disruption to participants' routines, promoted convenience, and encouraged active participation. To facilitate richer, more detailed, and manageable discussions, the participants were subdivided into three groups of five individuals each. Grouping participants this way created a supportive environment where they felt more comfortable sharing personal experiences and discussing sensitive topics.

All interviews were guided by semi-structured interview schedules designed to explore specific aspects related to antiretroviral therapy uptake, adherence, and the barriers encountered. A trained counsellor, fluent in Hausa and Fulani, participated in every interview session to overcome language barriers, ensure effective communication, and enhance the quality and reliability of collected data. The counsellor facilitated clear communication by translating questions and responses, ensuring that participants fully understood the topics under discussion, thus enhancing the accuracy and reliability of responses.

Concerning data management, all interviews were audio-recorded with the explicit consent of participants to ensure comprehensive documentation. Recorded interviews were subsequently transcribed verbatim and translated into English where required. Transcripts underwent

thorough reviews for accuracy and completeness, and each was assigned unique identifiers (e.g., KII_001, IDI_001) to ensure participant anonymity and confidentiality.

Data analysis followed a rigorous thematic approach. First, researchers familiarized themselves with the transcripts through repeated readings to gain comprehensive insights into the data. Following familiarization, initial coding was carried out, identifying significant statements and relevant expressions related to the research objectives. Subsequently, similar codes were systematically grouped into broader themes that reflected the major barriers identified, such as socio-economic factors, stigma, misconceptions about antiretroviral therapy, accessibility, and healthcare infrastructure issues. The resulting themes were reviewed iteratively to ensure clarity, coherence, and alignment with the study objectives, providing a robust foundation for interpreting the results and drawing meaningful conclusions.

Ethical considerations

To ensure the fulfilment of ethical considerations in this research, the researchers complied with the following: The Research and Ethics Committee at the Department of Health Studies, Federal Medical Centre, Birnin Kebbi, provided administrative proposal. Approval to conduct the study was requested and obtained from the State Team Lead of Health System Consult Limited, Kebbi State with ref: FMC/BK/045/P/517/VOL.IV/10, dated December 4, 2023

Results

The results of this study are presented in this section, incorporating qualitative data. Qualitative findings were obtained through Key Informant Interviews (KII) and Focus Group Discussions (FGD), providing a comprehensive analysis of the research outcomes.

Key informant interview

Regarding the KII, the antenatal care unit is managed by a dedicated medical consultant who oversees all aspects of maternal health services provided to pregnant women.

The consultant ensures that expectant mothers receive proper medical attention throughout their pregnancy. As one respondent noted,

“My role is to make sure that every pregnant woman gets the necessary care, from regular check-ups to managing any complications that may arise” (KII_001)

A doctor in charge of community health plays a vital role in addressing the broader health needs of pregnant women in the community. This doctor ensures that health education, preventive measures, and necessary treatments are provided. One respondent shared,

“We are responsible for ensuring that pregnant women in our community have access to quality healthcare services and are well-informed about maternal health.” (KII_002)

A dedicated nurse offers essential support by attending to the routine needs of pregnant women, such as administering medications, monitoring vital signs, and offering advice on prenatal care. The nurse explained,

“I ensure that mothers take their medications correctly and come for regular check-ups to avoid complications.” (KII_003)

Furthermore, a counsellor for pregnant women and breastfeeding mothers provides psychological and emotional support. This counsellor helps expectant and new mothers cope with the physical and emotional demands of motherhood. One participant mentioned,

“I counsel pregnant women on how to manage stress, eat well, and prepare for childbirth, while also supporting breastfeeding mothers with any challenges they face.” (KII_004)

An index case testing manager is responsible for identifying and managing cases related to maternal and child health, especially in the context of preventing mother-to-child transmission of diseases. This manager ensures that any potential health risks are promptly addressed. As one respondent highlighted,

“My job is to ensure that both the mother and baby are safe, especially when it comes to managing drug intake and checking for any side effects.” (KII_005)

Moreover, patient folders are thoroughly evaluated during each clinic visit for medication refills or routine check-ups. Doctors also monitor the health of babies, ensuring that no adverse effects arise from maternal drug intake. One doctor emphasized,

“Whenever a mother comes in for a refill, we don’t just give the drugs; we also check the baby to make sure everything is okay.” (KII_006)

In-depth Interviews (IDIs)

One of the significant findings from the in-depth interviews (IDIs) is that socio-economic factors play a critical role in influencing poor follow-up of HIV treatment after initiation. Many respondents highlighted the challenges posed by the distance from their residences to the healthcare facility. This issue is compounded by transportation challenges, as motorcycles are often the quickest and most affordable means of transportation in the area. However, motorcycles are not an ideal mode of transport for pregnant mothers, especially those in their third trimester, and for breastfeeding mothers with infants less than three months old. A pregnant respondent shared,

“It is difficult for me to travel on a motorcycle when I am heavily pregnant; the bumps on the road make it uncomfortable and risky for me and my baby.” (IDI_001).

According to the study, 75% of pregnant women and 53% of breastfeeding mothers described transportation challenges as a major barrier to consistent follow-up.

Another socio-economic factor identified is the educational status of the mothers. Limited education often restricts access to crucial information about the importance of regular follow-up for positive health outcomes, particularly for their infants. Data from the interviews revealed that 75% of pregnant women and 60% of breastfeeding mothers did not have secondary education. This lack of education affects their perception and

understanding of the necessity for regular consultations and adherence to treatment. One breastfeeding mother expressed,

“I did not know how important it was to keep coming back for check-ups until the nurse explained it to me in a way I could understand.” (IDI_002).

Despite these challenges, all interviewees acknowledged the effectiveness of antiretroviral therapy (ART). Many shared personal experiences of improved health after starting the treatment. A pregnant mother recounted,

“Before starting my treatment, I was always sick, tired, and had no appetite. But now, I feel healthy, strong, and can take care of my daily activities” (IDI_003).

However, several respondents mentioned an increase in appetite due to the multivitamins in the drug composition, which act as immune boosters and appetite stimulants. One mother humorously noted,

“Since I started taking these drugs, I eat like never before. It’s like my body is always asking for more food” (IDI_004).

For infants on medication, 97% of the respondents reported significant improvements in their children’s health. They observed that many infants gained weight, slept well, and appeared more active and content. One mother joyfully stated,

“Seeing my baby healthy and happy after starting the medication is the best feeling. She sleeps well and looks so lively now” (IDI_005).

This positive change brought immense relief and happiness to the mothers, reinforcing their commitment to adhering to the treatment regimen. Environmental factors, particularly discrimination, were explored in the interviews. Encouragingly, none of the respondents reported experiencing discrimination from healthcare workers. Healthcare professionals were commended for their professionalism and commitment to providing care regardless of patients' health status, religion, or tribe. A respondent shared,

“The nurses and doctors here treat us with respect and care. They never make us feel different because of our status” (IDI_006).

Effective communication between healthcare workers and patients was also highlighted, with 75% of pregnant women and 60% of breastfeeding mothers expressing satisfaction with the communication. This effective communication contributed significantly to improving the health conditions of the patients. A mother from a remote area mentioned,

“Even when I call from my village, the nurse always responds and helps me with my questions. It makes me feel cared for” (IDI_007).

Family discrimination, although still present, is gradually decreasing due to increased awareness about HIV. Most respondents acknowledged that while HIV has no cure, it is no longer a death sentence if properly managed. Among the participants, 75% of pregnant women and 87% of breastfeeding mothers felt comfortable discussing their HIV status with their spouses and an elite member of their family. One pregnant woman shared,

“I told my husband and my elder sister about my status. They support me and remind me to take my medication” (IDI_008).

However, for the remaining respondents who faced discrimination, further probing revealed that some experienced stigma from co-wives. One woman explained,

“My husband’s other wife avoids me since she found out about my status” (IDI_009).

Others reported that their spouses became distant and reluctant to engage in intimate relations after the disclosure of their HIV status. To address these issues, plans for proper counseling have been initiated to educate spouses and reduce stigma.

The occupational status of the participants also emerged as a critical factor influencing poor follow-up in the Prevention of Mother-to-Child Transmission (PMTCT) services. A significant

percentage, 75% of pregnant women and 67% of breastfeeding mothers, were unemployed and fully dependent on their spouses for financial support. This financial dependency often limited their ability to attend follow-up appointments regularly, as they could only access funds when their spouses provided them. One pregnant mother lamented,

“I stay at home and rely on my husband for everything. If he has no money, I cannot go to the clinic.” (IDI_010).

Although unemployment was not directly linked to the spread of HIV among married women in this study, empowerment through job creation was suggested as a potential solution. Providing women with employment opportunities could enable them to make independent decisions about their health and well-being. A respondent noted,

“If I had a small business, I would not have to wait for my husband to give me money for my clinic visits” (IDI_012).

Those whose husbands were gainfully employed or financially stable found it easier to access antenatal services regularly. One breastfeeding mother shared,

“My husband works as a trader and ensures I have what I need for my clinic visits. It makes a big difference” (IDI_013).

In summary, the in-depth interviews revealed that socio-economic factors such as transportation challenges, low educational levels, and financial dependency significantly impact the follow-up of HIV treatment among pregnant and breastfeeding mothers. However, the support from healthcare workers and increasing awareness within families have contributed positively to managing HIV. Addressing these socio-economic challenges through improved transportation, education, and economic empowerment can further enhance the adherence to PMTCT services, ultimately improving health outcomes for both mothers and their infants

Discussion

The study revealed that the majority of patients received the virus post-marriage and were aware of

it during their antenatal visits. A section of the population with prior knowledge of the virus experienced fear. Nevertheless, through extensive counselling from various health professionals, they came to comprehend that, despite the absence of a cure, they possess a greater likelihood of longevity and maintaining physical, mental, and emotional well-being, provided they comply with the services offered. Furthermore, to safeguard their fetuses, pregnant mothers were urged to consistently adhere to their medication regimens and ensure attendance at all antenatal appointments. This resulted in a significant percentage of HIV-negative infants following the 18 months of prophylaxis administered.

The study revealed that majority of pregnant women and breastfeeding mothers were aware of the risk of HIV transmission from mother to child. The findings emphasize the significance of continuous awareness of HIV/AIDS and interventions during antenatal visits and thereafter. These findings should significantly aid policymakers, healthcare professionals, and individuals engaged in providing PMTCT/HIV/AIDS services^{5,9,13}. The findings underline the crucial role of sustained awareness regarding HIV/AIDS and the integration of effective interventions within antenatal and maternal healthcare services. Ensuring that expectant mothers have access to comprehensive healthcare services not only mitigates the risk of HIV transmission but also improves overall maternal and child health outcomes. Moreover, household economic conditions and socioeconomic factors play a pivotal role in shaping healthcare utilization among women of reproductive age, influencing their access to antenatal care and facility-based deliveries^{2,22,31,32}.

Furthermore, findings from previous studies have shown that household economic wealth and health insurance coverage significantly impact women's decisions to seek antenatal care and deliver in health facilities. A comparative study by Nasir *et al.*²² highlights the positive effect of health insurance on healthcare utilization, demonstrating that insured women are more likely to access facility-based deliveries. Additionally, public health expenditure has been linked to reductions in under-five mortality rates, further

emphasizing the need for strategic policy interventions in maternal and child healthcare^{23,24,26}. Beyond Nigeria, broader discussions on the political economy of health financing in the Global South provide insights into the structural challenges affecting healthcare access and spending²⁵. Factors such as women's empowerment indices also play a significant role in shaping demand for childcare services, which in turn affects maternal healthcare-seeking behavior²⁵⁻²⁸. The interplay of these socioeconomic determinants suggests that a multi-faceted approach is necessary to enhance maternal and child health outcomes in Nigeria and other similar settings²⁶. The findings of this study align with broader evidence highlighting misconceptions about medication safety, particularly among vulnerable populations such as pregnant women.

In another similar findings, Hu *et al.*³³ emphasized the necessity of addressing misinformation to enhance medication adherence, which is essential for vulnerable groups like HIV-positive pregnant women. Additionally, innovative therapeutic interventions, such as lentiviral globin gene therapy examined by Li *et al.*³⁴, underline the potential impact specialized and accessible healthcare can have on patient outcomes, supporting the need for strengthened healthcare infrastructure and tailored care. Furthermore, the study by Gao *et al.*³⁵ on environmental stressors highlights the broader implications of robust healthcare systems to mitigate physiological and environmental challenges faced by patients, aligning with the current study's recommendations for improved healthcare accessibility, similar to Li *et al.*³⁶

Moreover, Chen and Pan³⁷ provided causal evidence linking increased healthcare service availability to improved maternal health outcomes, reinforcing this study's findings that healthcare accessibility significantly influences ART utilization among pregnant women. Similarly, Tian and Pan³⁸ underscored how inequalities in hospital resources directly contribute to maternal mortality, further supporting recommendations for equitable healthcare resource distribution to improve maternal health outcomes. These findings are critical for policymakers, healthcare professionals, and stakeholders involved in PMTCT, HIV/AIDS prevention, and maternal health services.

Strengthening healthcare systems, expanding insurance coverage, and addressing socioeconomic barriers will be instrumental in improving antenatal care utilization and reducing maternal and child mortality rates.

Strengths and limitations

One of the main strengths of the study is its significance to public health, as it tackles essential issues concerning the health of HIV-positive pregnant women, potentially enhancing maternal and neonatal outcomes. Also, conducting research locally provides insights that are directly relevant to the socio-cultural context of Birnin Kebbi, hence augmenting the study's relevance. The work should greatly enhance the current understanding of ART effectiveness in resource-constrained environments, potentially guiding policy and clinical protocols. Nonetheless, the study encounters some limitations, including issues pertaining to sample size and generalizability, as the results may not accurately represent all HIV-positive pregnant women in all the states in Nigeria.

Conclusion

The attending physician specializing in community health medicine recommended that the government promote universal blood testing, suggesting that every Nigerian should have a free general blood test annually. This will enable the clear detection of HIV status and other conditions detectable through blood tests. The Index Case Testing practitioner advised genealogical testing for appropriate partners and children under 15 years to reduce the risk of virus transmission to family members. Pre-Exposure Prophylaxis (PrEP) can be provided to sero-discordant couples to protect HIV-negative

individuals against virus infection.

The mentor mother in charge of all pregnant and breastfeeding women stated that health workers and mass media had greatly enhanced knowledge of MTCT of HIV in Birnin Kebbi. Health staff, as a main source of information, should undergo training to provide more thorough insights during health talks to address this knowledge gap. The mass media must recalibrate its messaging to improve the quality and substance of information distributed, ensuring that women have access to

precise and up-to-date information regarding MTCT of HIV.

Educational institutions function as a crucial mechanism to mitigate knowledge gaps. Schools must expedite the integration of the family and HIV education curriculum, specifically designed for secondary education, especially in northern areas like Kebbi, where early marriage is common. The federal government should promote the incorporation of this curriculum within the educational framework to improve access to quality knowledge. The risk of mother-to-child transmission (MTCT) of HIV is markedly increased during labor and delivery; therefore, this should be emphasized in communications to improve the probability of pregnant women choosing to give birth in healthcare facilities instead of at home or with untrained attendants.

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