

Assessment of knowledge, attitude and practice of antenatal attendees towards prevention of mother-to-child transmission (PMTCT) of HIV infection in ITAS/GADAU local government area, Bauchi state, Nigeria

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ABSTRACT

Mother-to-child transmission (MTCT) remains an important route of paediatric HIV acquisition, although timely testing, antiretroviral therapy (ART), appropriate infant feeding support and continuity of maternal and infant care can markedly reduce transmission. Knowledge, attitudes and practices (KAP) among antenatal care (ANC) attendees can influence uptake of prevention services. To assess the knowledge, attitude and practice of ANC attendees regarding prevention of mother-to-child transmission (PMTCT) of HIV in Itas/Gadau Local Government Area, Bauchi State, Nigeria. A health-facility-based descriptive cross-sectional study was conducted among 109 ANC attendees selected by simple random sampling from four selected government health facilities. Data were collected using a semi-structured questionnaire covering sociodemographic characteristics, reproductive history, knowledge, attitude, practice and sociocultural factors. Data were analysed using SPSS version 16.0. Associations were examined using the chi-square test at a significance level of 0.05. All 109 participants responded. Mean age was 30.4 ± 9.7 years; 93.6% were married and 33.0% had secondary education. All participants had heard of HIV. Based on the study scoring criteria, 88 (80.7%) had good PMTCT knowledge, 101 (92.7%) had a positive attitude and 74 (67.9%) had good PMTCT practice. HIV testing was reported by 108 (99.1%) participants, and 103 (95.4%) of those tested reported receiving pre- and post-test counselling. Previous ANC attendance, gravidity, knowledge and attitude were associated with PMTCT practice; occupation was also associated with practice. Permission giver was associated with practice among the reported sociocultural variables. The study demonstrated generally favourable KAP toward PMTCT among ANC attendees, but important gaps remained in specific knowledge and preventive practices, particularly disclosure, continuity of care and sociocultural barriers. Strengthening ANC-based education, partner involvement, stigma reduction and linkage to comprehensive PMTCT services is recommended.

Keywords HIV, Mother-to-child transmission, PMTCT, Antenatal care, Knowledge, Nigeria.

INTRODUCTION

Human immunodeficiency virus (HIV) infection remains a major public health problem. Mother-to-child transmission (MTCT), also referred to as vertical transmission, can occur during pregnancy, labour, delivery or breastfeeding. Without effective interventions, the risk of transmission is substantial; WHO estimates an overall transmission risk of approximately 15%–45% in the absence of intervention.[1] Effective prevention therefore requires identification of HIV infection,

prompt linkage to lifelong ART, adherence support and appropriate maternal and infant services.[1,2] WHO describes PMTCT as a comprehensive strategy that includes prevention of HIV acquisition among women of reproductive age, prevention of unintended pregnancies among women living with HIV, prevention of HIV transmission from women living with HIV to their infants, and provision of treatment, care and support to mothers, children and families.[2] These components are most effectively delivered through integrated maternal, newborn and

child health services. Nigeria continues to carry a substantial HIV burden. National survey data reported an adult HIV prevalence of about 1.4% and approximately 1.9 million people living with HIV, with women accounting for a larger share of infections than men.[3] UNAIDS has also documented persistent gaps in prevention of vertical transmission in western and central Africa, including Nigeria.[4] National HIV strategies have therefore prioritised HIV testing, elimination of MTCT, treatment, adherence and community-system strengthening.[5]

ANC provides an important platform for HIV testing, counselling, health education, ART linkage and birth planning. Evidence from Kenya indicates that male partner attendance and HIV testing can be associated with lower infant HIV acquisition and improved HIV-free survival.[6] Conversely, stigma, facility constraints and personal beliefs can contribute to disengagement from PMTCT care.[7] Loss to follow-up across the PMTCT cascade has also been documented in Nigeria, demonstrating that initial testing alone does not guarantee completion of maternal and infant prevention services.[8] Knowledge and attitudes may influence whether women accept testing, disclose results, adhere to treatment, attend ANC and deliver in health facilities. Studies from Nigeria and Tanzania have reported high HIV awareness but continuing gaps in detailed knowledge, particularly regarding the timing of antiretroviral prophylaxis and other components of PMTCT. [9,10] Infant-feeding decisions are similarly influenced by social and cultural expectations. WHO guidance now supports context-specific counselling and, where breastfeeding is nationally recommended, exclusive breastfeeding for the first six months with maternal ART adherence and continued breastfeeding with complementary feeding thereafter.[11] Therefore, older questionnaire responses that treat formula feeding as universally preferable should be interpreted in the historical context of PMTCT counselling rather than as current clinical guidance. The present study assessed KAP regarding PMTCT among ANC attendees in Itas/Gadau Local Government Area, Bauchi State, with particular attention to sociodemographic, reproductive and sociocultural factors associated with PMTCT practice.

MATERIALS AND METHODS

Study design and setting

A health-facility-based descriptive cross-sectional study was conducted in Itas/Gadau Local Government Area (LGA), Bauchi State, northeastern Nigeria. The LGA is located in the northern part of Bauchi State and includes Itas and Gadau among its districts. The population is predominantly Hausa and Fulani. Government health facilities providing ANC services were selected for the study.

Study population and eligibility

The study population comprised pregnant women attending ANC at selected government health facilities. Women attending the selected ANC clinics during the study period and willing to participate were eligible. Participants who declined participation were excluded.

Sample size and sampling

The initial sample size was estimated using the single-proportion formula $n = Z^2pq/d^2$, with $Z = 1.96$, $p = 0.936$, $q = 0.064$ and $d = 0.05$, giving an initial estimate of approximately 92 participants. Because the estimated annual ANC population was 7,488, finite population correction was applied, producing approximately 91 participants. Allowing 20% for possible non-response resulted in a target sample of 109. The study ultimately recruited 109 participants, representing a 100% response rate.

Four government health facilities were selected. The investigators reported average ANC attendance and allocated participants proportionately across the selected facilities, resulting in the final sample of 109 women. The original description contains some internal arithmetic inconsistencies in facility-level attendance; the overall sample size of 109 and reported participant-level results were retained in this manuscript.

Data collection instrument

Data were collected using a semi-structured questionnaire comprising six sections: sociodemographic characteristics; reproductive/obstetric history; knowledge of PMTCT; attitude toward PMTCT; PMTCT-related practices; and sociocultural factors affecting practice. The questionnaire was administered to participants during ANC attendance. Items addressed HIV transmission, MTCT, PMTCT interventions, HIV testing, counselling, infant feeding, facility delivery, ART and health-seeking behaviour.

Measurement of KAP

Knowledge was assessed using 11 scored questions. Participants scoring $\geq 8/11$ (72.7%) were classified as having good knowledge, while those scoring ≤ 7 were classified as having poor knowledge. Attitude was assessed using eight items; scores $\geq 5/8$ (62.5%) were classified as positive attitude and scores $\leq 4/8$ as negative attitude. Practice was assessed using nine scored items; scores $\geq 6/9$ (66.7%) were classified as good practice and scores $\leq 5/9$ as poor practice. These cut-offs were based on the scoring system used in the original study.

Data management and statistical analysis

Completed questionnaires were checked for completeness, coded and entered into a computer database. Analysis was performed using SPSS version 16.0. Descriptive statistics were presented as frequencies, percentages and mean $\pm$ standard deviation. Pearson's chi-square test was used to examine associations between categorical variables. Statistical significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

A total of 109 ANC attendees participated. The mean age was 30.4 ± 9.7 years. The largest age group was 15–24 years (35.8%). Hausa participants constituted 45.9% and Fulani participants 38.5%. Most participants were Muslim (95.4%), married (93.6%) and engaged in business (45.9%). Secondary education was the most common educational category (33.0%). Nearly all participants (96.3%) lived within 5 km of a health facility and 89.0% reported paying ≤ 50 Nigerian naira as transport fare (Table 1).

Table 1. Socio-demographic characteristics of respondents (n=109).

Characteristic	Category	n (%)
Age	15–24 years	39 (35.8)
	25–34 years	30 (27.5)
	35–44 years	29 (26.6)
	>45 years	11 (10.1)
Marital status	Married	102 (93.6)
	Separated/divorced/widowed	7 (6.4)
Education	None/non-formal	42 (38.5)
	Primary	19 (17.4)
	Secondary	36 (33.0)
	Post-secondary	12 (11.0)
Occupation	Business	50 (45.9)
	Housewife	28 (25.7)
	Civil servant	9 (8.3)
	Student/other	22 (20.1)

Table 2. Respondents' reproductive health history (n=109).

Reproductive variable	Category	n (%)
Gravidity	1	26 (23.9)
	2–4	39 (35.8)
	≥5	41 (37.6)
ANC in previous pregnancy*	Yes	76 (91.6)
	No	7 (8.4)
Current ANC visits	1	27 (24.8)
	2	30 (27.5)
	3	33 (30.3)
	≥4	19 (17.4)
Live children	0	30 (27.5)
	1	13 (11.9)
	2–4	32 (29.4)
	≥5	34 (31.2)

*Previous-pregnancy ANC item was applicable to 83 participants.

Among the 109 participants, 26 (23.9%) were primigravida, 39 (35.8%) had gravidity of 2–4 and 41 (37.6%) had five or more pregnancies; one participant's denominator was not clearly represented in the source table. Among women to whom the previous-pregnancy question was applicable, 76 (91.6%) reported attending ANC during the previous pregnancy. During the current pregnancy, 27 (24.8%) had attended ANC once, 30 (27.5%) twice, 33 (30.3%) three times and 19 (17.4%) four or more times (Table 2). All 109 respondents had heard of HIV. Most recognised sexual intercourse (89.0%), sharing sharp objects (78.9%), blood transfusion (67.9%) and MTCT (68.8%) as routes of HIV transmission. An apparently healthy person could be infected with HIV according to 94.5% of participants. Nearly all (99.1%) recognised that HIV could be transmitted from an infected pregnant woman to her child. Knowledge of

the timing of MTCT was variable: 85.2% identified pregnancy, 54.6% labour, 41.7% delivery and 71.3% breastfeeding. Among those aware that MTCT could be prevented, commonly identified measures included HIV counselling/testing (81.8%), maternal antiretroviral medication (77.8%), infant antiretroviral medication (59.6%), exclusive formula feeding (47.5%) and early infant diagnosis (35.4%). These responses reflect the questionnaire's historical wording; current infant-feeding recommendations are context-specific and should follow national guidance and WHO recommendations.[11] Regarding timing of maternal ART prophylaxis, 44.0% did not know when it should be initiated. Similarly, 44.0% did not know when infant prophylaxis should begin. Using the study's predefined scoring system, 88 (80.7%) participants had good overall PMTCT knowledge and 21 (19.3%) had poor knowledge (Table 3).

Table 3. Respondents' knowledge toward PMTCT of HIV (n=109).

Knowledge indicator	Yes/correct n (%)
Ever heard of HIV	109 (100.0)
HIV can be transmitted to child	108 (99.1)
Healthy-looking person can have HIV	103 (94.5)
Aware MTCT can be prevented	99 (90.8)
Recognised pregnancy as MTCT period	92 (85.2)
Recognised breastfeeding as MTCT period	77 (71.3)
Knew ART can be used in HIV-positive pregnancy	99 (90.8)
Overall good PMTCT knowledge	88 (80.7)

A positive attitude was common (Figure 1). Most participants agreed that all pregnant women should be offered HIV testing during ANC (83.5%), partners should be tested (79.8%), HIV-positive women should avoid home/TBA delivery (75.2%), HIV-positive women should receive ART during pregnancy

(81.7%), and facility-based skilled delivery was important (58.7%). A total of 101 (92.7%) were classified as having a positive attitude and 8 (7.3%) as having a negative attitude (Table 4).

Table 4. Attitude of respondent toward PMTCT of HIV (n=109).

Attitude statement	Agree n (%)
All pregnant women should be offered HIV testing	91 (83.5)
Partners should be tested	87 (79.8)
HIV-positive women should not deliver at home/TBA	82 (75.2)
HIV-positive women should deliver with skilled personnel	64 (58.7)
HIV-positive women can have a baby	84 (77.1)
ART should be taken during pregnancy	89 (81.7)
Positive attitude overall	101 (92.7)

HIV testing was highly reported: 108 (99.1%) had ever been tested and 103 (95.4% of those tested) reported receiving pre- and post-test counselling. Among those tested, 54 (50.0%) reported that their most recent test was during the recent pregnancy. Ninety-seven (89.8%) accepted their HIV test result. Disclosure to husbands/partners was less consistent: 49 (45.4%) reported sharing the result, whereas 52 (48.1%) did not. A total of 104 (95.4%) were willing to undergo HIV testing during the

current pregnancy. Among 83 women for whom previous delivery information was applicable, 69 (83.1%) reported facility delivery and 14 (16.9%) home delivery. Only 39 (35.8%) reported encouraging other pregnant women to test for HIV and deliver in a health facility. Slightly more than half, 55 (50.5%), reported personally doing something to prevent MTCT. Overall, 74 (67.9%) were classified as having good PMTCT practice and 35 (32.1%) as having poor practice.

Tables 5. Respondents' practice regarding PMTCT of HIV (n=109).

Practice indicator	n (%)
Ever tested for HIV	108 (99.1)
Received pre/post-test counselling among tested	103 (95.4)
Accepted HIV test result among tested	97 (89.8)
Disclosed result to husband/partner	49 (45.4)
Willing to test in current pregnancy	104 (95.4)
Previous delivery in health facility*	69 (83.1)
Encouraged other pregnant women to test/deliver in facility	39 (35.8)
Reported personal PMTCT action	55 (50.5)
Good PMTCT practice	74 (67.9)

*Denominator for previous delivery was 83 participants.

Most participants sought healthcare at health facilities (97.2%) and reported permission to attend ANC (99.1%). Among those reporting permission, the husband was the most common person granting permission (82.4%). Husband support for ANC attendance was reported by 66 (64.7%) of married participants. Most participants reported cultural support for facility delivery

(88.1%) and believed that home delivery by an HIV-positive woman could increase MTCT and birth complications (82.6%). However, 61 (56.0%) believed that HIV-positive mothers using bottle feeding would experience stigma or discrimination, highlighting the importance of culturally sensitive counselling and confidentiality.

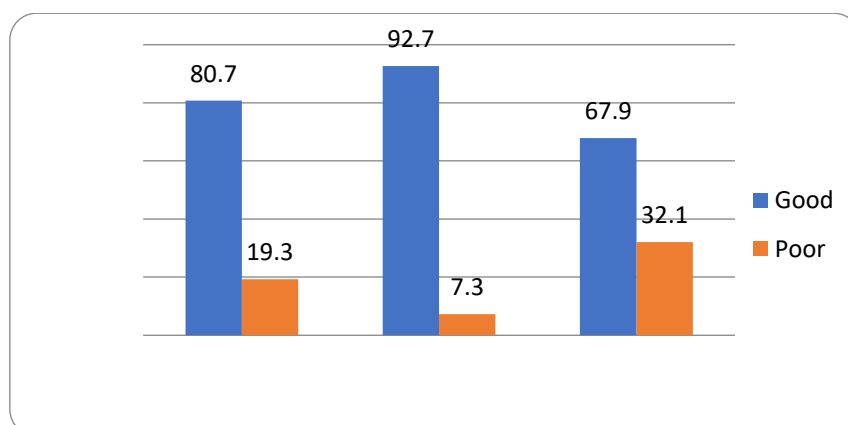


Figure 1. Knowledge, attitude and practice of antenatal attendees towards PMTCT of HIV infection in Itas/Gadau Local Government Area.

Table 6. Socio-cultural factors affecting practice of PMTCT of HIV (n=109).

Sociocultural factor	n (%)
Seek healthcare at health facility	106 (97.2)
Permitted to attend ANC	108 (99.1)
Permission granted by husband*	89 (82.4)
Husband supports ANC visit*	66 (64.7)
Culture supports facility delivery	96 (88.1)
Home delivery increases perceived MTCT/complication risk	90 (82.6)
Perceived stigma/discrimination with bottle feeding	61 (56.0)
Compliance and regular follow-up improve infant outcome	88 (80.7)

*Denominator is the applicable subgroup.

The original chi-square analyses indicated that age and occupation were associated with knowledge, while age was associated with attitude. Occupation was associated with practice. Reproductive variables including gravidity, previous ANC attendance, current ANC attendance frequency and parity were reported to be associated with knowledge. For practice, gravidity, previous ANC attendance, knowledge and attitude were statistically significant in the original analysis. Among sociocultural variables, the person granting permission for ANC attendance was reported as associated with practice. Because several source tables contain implausible degrees of freedom and mismatched totals, the exact χ^2 statistics should not be reproduced as definitive without re-running the analysis from the original dataset. The manuscript therefore emphasises the direction of the reported associations rather than presenting potentially erroneous test statistics. This study found high awareness of HIV and generally favourable KAP toward PMTCT among ANC attendees. All participants had heard of HIV, 80.7% met the study's threshold for good PMTCT knowledge, 92.7% had a positive attitude and 67.9% demonstrated good practice. The high awareness is consistent with findings from Kano, where 100% of mothers attending a paediatric HIV clinic had heard of HIV/AIDS, although detailed knowledge of MTCT prevention was less complete.[9] Similar work in Tanzania found high general knowledge but poor knowledge of the correct timing of antiretroviral prophylaxis, illustrating that general awareness does not necessarily translate into comprehensive PMTCT knowledge.[10] A major strength in the present findings was recognition of MTCT itself: 99.1% of participants recognised that HIV can be transmitted from an infected mother to her child. Nevertheless, detailed knowledge was weaker for specific transmission periods and timing of prophylaxis. Less than half recognised delivery as a route in the relevant questionnaire item, and 44% could not identify the appropriate timing of infant prophylaxis. These gaps are important because PMTCT depends on a continuum of care rather than a single HIV test. WHO recommends immediate linkage to lifelong ART and ongoing support for women diagnosed with HIV. [1,2] The high proportion of participants reporting HIV testing (99.1%) and counselling (95.4% among those tested) suggests strong integration of HIV services within ANC at the participating facilities. This is encouraging because HIV testing is the entry point to PMTCT. However, disclosure to husbands was substantially lower than testing uptake. Male partner involvement can strengthen PMTCT, and evidence from Kenya has linked male antenatal attendance and HIV testing with reduced infant HIV acquisition and improved HIV-free survival.[6] Programmes should therefore encourage voluntary partner testing and supportive couple communication while protecting women's autonomy and confidentiality. The study identified a gap between attitude and practice. Although 92.7% had a positive attitude, only 67.9% had good practice. For example, only 35.8% reported encouraging other pregnant

women to test and deliver in health facilities, and only 50.5% reported taking a personal action to prevent MTCT. This suggests that favourable beliefs alone may be insufficient when practical, social or health-system barriers remain. Previous research in Nigeria has documented loss to follow-up across the PMTCT cascade, supporting the importance of retention and continuity after initial testing.[8] Sociocultural factors also deserve attention. Almost all women reported permission to attend ANC, and the husband was the most common source of permission. Although husband support was not statistically significant at the conventional 0.05 level in the original table, the reported pattern indicates substantial male influence over ANC access. Partner involvement should be promoted as supportive participation rather than as a condition for women's access to care. Evidence indicates that constructive male involvement can improve PMTCT-related outcomes.[6]

Stigma and infant feeding were another important concern. More than half of participants perceived stigma or discrimination associated with bottle feeding among HIV-positive mothers. This is consistent with evidence that stigma and facility constraints can contribute to disengagement from HIV care.[7] Current WHO guidance recognises that infant-feeding recommendations must be adapted to national policy and context; where breastfeeding is recommended, mothers living with HIV should receive lifelong ART, adherence support and counselling on exclusive breastfeeding for the first six months followed by complementary feeding.[11] Consequently, PMTCT education in the study setting should avoid presenting formula feeding as a universally applicable option and should instead follow current Nigerian and WHO guidance. The association between occupation and practice may reflect differences in economic resources, exposure to health information, time available for ANC and ability to access services. The association between gravidity and previous ANC attendance with knowledge and practice suggests that repeated contact with maternity services may reinforce PMTCT information. These findings support the integration of repeated, simple and standardised PMTCT messages throughout ANC rather than relying on a single counselling encounter. The findings should be interpreted in light of the study design. Because the study was cross-sectional, associations cannot be interpreted as causal. Participants were recruited from health facilities and may have had greater access to health information than pregnant women who do not attend ANC. Self-reported HIV testing, disclosure and preventive practices are also susceptible to recall and social-desirability bias.

CONCLUSION

ANC attendees in Itas/Gadau LGA demonstrated high awareness and generally good knowledge and positive attitudes toward PMTCT, with a lower proportion demonstrating good

preventive practices. The principal gaps concerned detailed knowledge of the timing of PMTCT interventions, disclosure and partner involvement, continuity of preventive behaviour, and sociocultural concerns surrounding infant feeding. Strengthening repeated ANC-based PMTCT education, voluntary partner engagement, stigma-reduction interventions, facility delivery counselling and continuity of maternal-infant care may help translate favourable attitudes into sustained preventive practice.

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CONFLICT OF INTERESTS

This manuscript the authors declare no conflict of interest

ETHICS APPROVAL

Ethical/administrative approval was reported as having been obtained through the Department of Public Health, Faculty of Basic Medical Sciences, Bauchi State University, Gadau. Participation was voluntary, and participants were informed of their right to decline or withdraw. Anonymity and confidentiality were maintained through coding rather than recording personal identifiers. Written informed consent was reported. For journal submission, the authors should insert the exact name and approval/reference number of the responsible ethics committee if a formal institutional review board or research ethics committee approval was obtained.

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AI TOOL DECLARATION

The authors declare that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on based on their request

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