



# Predictors of HIV Positive Pregnant Women's Use of Prevention of Mother-to-Child Transmission of HIV Services in Taraba State: A Mixed Method Approach

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**Abstract:** Background: It has been estimated that 90 per cent of paediatric HIV is through mother – to – child transmission, and the incidence of mother-to-child transmission is 40% among HIV positive pregnant women. Research has shown a reduction in the risk of mother-to-child transmission of HIV (MTCT) to less than 2% to 5% in non-breastfeeding and breastfeeding mothers respectively with the introduction of PMTCT services such as; reproductive health services, family planning services, HIV counseling and testing/partner counselling and referral services (PCRS), antiretroviral drugs for infected women and children, safe delivery services, infant feeding options and support, early infant diagnosis within six weeks, PCR (polymerase chain reaction) test done six weeks after cessation of breast feeding, and community support. These services may be available but certain factors may interfere with their access and utilization by HIV positive pregnant women. This study therefore sought to determine factors that predict the utilization of PMTCT services among HIV positive pregnant women in Taraba State, Nigeria. Methods: The study adopted a mixed- method research design employing an institutional based cross sectional design. The population for the study consisted of 3,315 HIV positive pregnant women attending Antenatal Clinic and their service providers. Cluster random sampling technique was used to select facilities for the study. Convenience random sampling technique was used to select 605 HIV positive pregnant women (HIV positive pregnant women who were present during antenatal clinic days, who give their consent will be included in the study). The key informants for the study were selected using purposive sampling technique. A questionnaire and Key informant interview protocol were used for data collection. Percentages, Chi-square and logistic regression analyses were used to analyze the quantitative data while the qualitative data were thematically analyzed using Nvivo software. Results: Demographic factors of age, education, marital status and distance were associated with PMTCT services utilization, however, only age was a predictor of PMTCT services utilization ( $p \leq 0.05$ ). Conclusion: The study concluded that some demographic factors (age, occupation, educational level) are associated with PMTCT services utilization, while only age predicted HIV positive pregnant women's utilization of PMTCT services. This predictor could be addressed through health education especially among the older women, text message reminders and some incentives.

**Keywords:** HIV/AIDS, Socio-Demographic, Utilization, Predictors, MTCT

## 1. Introduction

Mother-to-child transmission (MTCT) or vertical transmission or peri-natal transmission (these terms will be

used interchangeably) refer to a situation where an HIV-positive mother passes the virus to her child during pregnancy, labour, delivery or breastfeeding (Avert, 2014). HIV prevalence among women attending antenatal clinic

(ANC) has risen in the past decade, leading to an increase in the number of HIV positive children born to HIV- infected mothers. It has been estimated that 90% of paediatric HIV is through mother-to-child transmission [1, 2].

Studies have proved that 40-47 per cent of infant HIV could be averted through the prevention of mother- to- child transmission of HIV (PMTCT) program (3). Lately, epidemiological reports have shown that the global scale-up of PMTCT services is credited for a 52% world- wide decline in new HIV infections among children between 2001- 2012 [4]. As such, it is arguably the most critical HIV intervention for children. Despite the proven effectiveness of the PMTCT program, Nigeria currently has one of the highest burdens of vertical transmission of HIV in the world, and currently contributes 32 per cent to the world burden of HIV, partly due to poor or lack of utilization of the PMTCT services by HIV positive pregnant women [5]. It was estimated that there are about 6,258,277 pregnant women in Nigeria in 2015, out of which 177, 993 of them are HIV positive [6]. If these number of infected women are allowed to go through pregnancy, labour, childbirth and breast feeding without any form of intervention they may give birth to about 80,000 HIV infected children, which will constitute a national epidemic.

HIV transmission in children has become a critical Public health problem which has threatened to reverse the gains of the child survival strategy if nothing is done to halt it [5]. Despite the proven effectiveness of antiretroviral drugs, a number of children in Sub – Saharan African countries like Nigeria still acquire HIV through vertical transmission [8]. Due to a number of barriers for the implementation of PMTCT program, in 2010, it was estimated that only 45% of HIV positive pregnant women in the Sub-Saharan Africa had access to PMTCT program [8]. In 2017, 159,000 of the 180,000 new infections among children globally occurred in Sub-Saharan Africa, and Nigeria alone accounted for 23 per cent of these new infections in the sub region [8].

Nigeria had an estimated 3.1 million people living with HIV and AIDS, with an annual HIV positive births of 64,900-103,840 [11].

The national prevention of mother-to-child transmission of HIV program in Nigeria started in 2001 in six tertiary institutions [6]. The program was built on four prong/pillars: primary prevention of HIV among women of child bearing age; prevention of unintended pregnancy among women of child bearing age especially among HIV positive pregnant women, prevention of mother- to -child transmission of HIV, adequate provision of antiretroviral drugs, safe delivery and provision of care and support for the HIV infected mother and her family. it has the following components; reproductive health services (sex education of abstinence, safer sex and monogamy), family planning services (contraceptive services, pregnancy testing and counselling, helping clients achieve pregnancy, basic infertility services, preconception health services, child spacing and prevention of pregnancy), HIV counseling and testing/partner counselling and referral services (PCRS), antiretroviral drugs for infected women and

children, [12], safe delivery services (the use of ART for mother and infant duo, minimal vaginal examination (not earlier than 4 hours apart), avoidance of invasive procedure (e.g. amniocentesis, forceps delivery, vacuum extraction), proper use of infection prevention and control measures (IPAC), avoidance of premature rupture of membranes, avoidance of prolonged labour, caesarian section), [13, 15], infant feeding options and support (exclusive breast feeding (EBF) for the first six months, introducing complementary food in addition to breast feeding [14] or exclusive replacement feeding (ERF)), early infant diagnosis within six weeks, second DNA PCR (polymerase chain reaction) test done six weeks after cessation of breast feeding, family and community support [7].

Records from Taraba State Ministry of Health indicated that PMTCT program was launched in Taraba State in 2013. Presently, there are 81 functional facilities offering PMTCT services to women of child bearing age. However, limited coverage of PMTCT services, missed opportunities, drop-out rates and lack of use have continued to affect Taraba State performance in reducing new infections among children.

Many factors could determine the utilization of PMTCT services in spite of efforts to make them available [10]. These factors which are referred to as predictors in this study include; maternal age, educational level, distance to health facility and marital status. The younger a woman is, the easier for her to move about, has less house chores, she has so much to leave for and is strong enough to walk long distance to access health facilities/services. A young woman also has a small family to cater for so she has time to access health facilities [15]. Furthermore, the nearer the facility to the users, the higher their level of access and utilization [2, 25, 27]. Education also plays an important role in the utilization of health facilities. The more educated a woman is the more her bargaining power as it concerns her health; she is also more aware of the pros and cons of her health and so she is more likely to utilize health facilities than her uneducated partner [18-20]. The unmarried lady may find herself in a dilemma if she is HIV positive because of the stigma attached to pregnancy out of wedlock and even worse with her HIV status which makes her a topic for discussion among health personnels and neighbors and so she finds it inconvenient to attend antenatal clinic because of stigma [1, 18, 27]. The objective of the present study was to determine if these factors predict the utilization of PMTCT services among HIV positive pregnant women attending ANC in Taraba State health facilities.

## 2. Methods

### 2.1. Study Area, Design, and Sampling Techniques

Mixed method institutional based cross-sectional study was conducted in Taraba State. Six hundred and five HIV positive pregnant women were randomly selected using convenience sampling technique while the health facilities were selected through a two stage-cluster sampling technique.

Exclusion criteria were primi-gravida (women who were pregnant for the first time) as information regarding previous pregnancies and infant feeding options cannot be elicited from them. Key informant interview was conducted using fifteen health care providers selected through convenience sampling procedure from the three geographical zones of the state (five from each zone).

## 2.2. Data Collection Procedure, Processing, and Analysis

Questionnaire and key informant interview guides were used to collect data. The utilization of PMTCT services was measured using two sections of a questionnaire. Section A of the questionnaire elicited information about the respondent's demographic variables. Section B elicited information on the utilization of PMTCT services. The chi-square statistic and logistic regression were used to test the association at .05 level of significance.

The main outcome variables (PMTCT) services, include: health education, family planning, HIV counseling and testing, partner counseling and testing services, antiretroviral test, safe delivery practices and infant feeding options and support services were measured dichotomously. Respondents were asked to indicate 'yes' if they have used the services, otherwise 'no'. Explanatory variables include demographic variables of age, educational level, marital status and distance to health facility.

## 3. Results

Table 1 shows the demographic characteristics of the respondents. Five hundred and ninety seven HIV positive

pregnant women between the ages of 15 to 49 with a mean age of 33.8 years attending PMTCT services in Taraba State responded to the questionnaire. More than half (50.3%) of the respondents were between 15-29 years, slightly more than a quarter of them (28.0%) had no formal education, majority of them (67.7%) were married, slightly less than half (46.1%) were leaving 1-2 km from the nearest health facility offering PMTCT.

Table 2 shows the overall percentage total of 51.8% utilization of PMTCT services with almost half (48%) of the respondents reported using HIV counselling and testing and PCR services, 41% used health education services, 37.6% used antiretroviral therapy services, 34% used infant feeding option services, 33.0% use safe delivery services while only 14.0% used family planning services.

Table 3 shows that age ( $p=0.02$ ), educational level ( $p=0.043$ ), marital status ( $p=0.006$ ) and distance ( $p=0.00$ ) were significantly associated with utilization of screening and family planning services, HIV counseling and testing services, antiretroviral therapy services and safe delivery services. The table further shows that distance ( $p=0.71$ , 0.31. 0.11) was not significantly associated with health education services, HIV counseling and testing services and antiretroviral services. Table 4 shows that demographic factor of age 15 -29 years (OR=1.66; CI - 1.089 -2.53;  $P=0.04$ ) was significantly associated with higher odds of PMTCT services utilization, while educational level (OR=1.63; CI=.910 - 3.31;  $p=0.20$ ), marital status (OR=0.61; CI=0.46 - 3.55;  $p=0.28$ ) and distance (OR=0.770; CI=0.68 - 2.26;  $P=0.13$ ) were significantly associated with lower odds of utilizing PMTCT services.

**Table 1.** Demographic Characteristics of HIV Positive Pregnant women that Responded to the Questionnaire on Utilization of PMTCT Services ( $n=605$ ).

Characteristics	%
Age	
15-29	50.3
30-39	28.8
40-49	20.9
Total	100.00
Educational Level	
No Formal Education	28.0
First School Leaving Certificate	17.0
Senior Secondary School	21.6
Diploma	25.0
First Degree and above	8.2
Total	100.00
Marital Status	
Married	67.7
Divorced	9.9
Widowed	12.6
Single	9.9
Total	100.00
Distance	
1-2km	46.1
3-4km	32.0
5km and above	21.9
Total	100.00

**Table 2.** Percentage Responses on the Utilization of PMTCT Services for HIV Positive Women in Taraba State (n=605).

Items	%
PMTCT Services	
Health Education	41.0
C&T and Family Planning	14.0
HCT and PCRS Services	48.0
ART Services	37.6
Safe Motherhood services	33.0
Infant Feeding Options	34.0
Overall % Total	51.8

**Table 3.** Factors Associated with Utilization of PMTCT Service (n=605).

Factors	Heath Education			Screening & FP ser			HCT/S PCRS			ART Services			Safe Delivery			Infant feeding Options			
	%	$\chi^2$	p	%	$\chi^2$	p	%	$\chi^2$	p	%	$\chi^2$	p	%	$\chi^2$	p	%	$\chi^2$	p	
Age																			
15-29	50.3			21.3			56.9			36.3			35.8						
30-39	28.8	11.403	.02	15.7	66.745	.000	48.3	33.141	.000	34.0	29.595	.000	35.0	25.593	.001	33.2	18.363	.019	
40-49	20.9			28.0			56.8			44.7			30.2						
Level of Education																			
No F Education	38.9			44.9			47.7			40.1			45.5			33.4			
First SL Certificate	37.9			42.7			48.9			41.1			50.5			36.7			
S S C E	37.2	26.892	.043	44.4	63.992	.001	49.9	40.088	.001	36.7	51.504	.000	46.5	37.118	.002	33.9	101.905	.000	
Diploma	45.0			43.6			45.0			43.9			38.3			29.5			
Degree and above	44.9			57.6			52.2			38.1			51.0			38.4			
Marital Status																			
Married	42.7			15.2			50.8			40.3			45.1			36.4			
Divorced	36.8			9.4			38.4			30.7			36.0			27.2			
Widowed	32.0	33.908	.000	8.4	91.097	.000	41.1	72.192	.000	33.3	55.800	.000	30.7	75.026	.000	25.1	148.006	.006	
Single	44.1			14.1			45.8			30.5			44.6			30.5			
Separated	33.3			18.0			44.8			33.3			36.5			22.2			
Distance																			
1-2km	42.1			16.8			49.2			37.7			38.1			35.4			
3-4km	38.7	5.370	.717	12.4	35.735	.000	48.2	9.350	.314	38.9	13.020	.111	36.0	21.134	.007	31.3	47.050	.000	
5km and above	41.2			14.1			45.6			35.4			34.5			33.8			

**Table 4.** Predictors of Utilization of PMTCT Services (n=605).

Variable	Odds Ratio	p-value	95% Conf. interval
Age (15–29 years)	1.66	0.02	1.089-2.53
Educational level	0.63	0.20	.910-3.31
Marital Status	0.61	0.28	.46–3.55
Distance	0.49	0.13	.98–2.26

Results generated through interviewing 15 key informants (health care providers) using the KIIG revealed that HIV positive pregnant women utilize PMTCT services (50-80%), the interviewees also agreed that the services were adequately utilized 35% only (4 visits). However, they reported that screening and family planning services were not adequately utilized. In the words of one of the informants: "there are a lot of centres where women go to access family planning services in this area, therefore I cannot say exactly the percentage but I think one quarter of women in this Local Government area access family planning service." (Central zone 002). "they don't come for reproductive health services except we refer them when they come for something else". (KII, 001, Southern Zone). Data also revealed that more of the younger women utilized PMTCT services than the older ones. "yah age is affecting them because like a woman that is up to 40 years and above and is still delivering. She finds it difficult, she become very weak but people that are

may be 35 and below access it more" (KII Central zone 001). The interview also revealed that distance, educational level and marital status did not determine the utilization of PMTCT services.

## 4. Discussion

The utilization of PMTCT services by HIV positive pregnant is essential for the prevention of pediatric HIV in Sub Saharan Africa [9, 15]. Determining the factors that make HIV positive pregnant women use or not to use these services is very crucial in designing interventions to promote the utilization of these programs.

The study found out that only age could be used to predict the utilization of PMTCT services among HIV positive pregnant women.

The utilization of PMTCT services among HIV positive pregnant women was slightly more than half, however, Counseling and testing and PCR services were the only PMTCT service utilized by almost half of the respondents. The finding may be because these services offer direct protection against the transmission of HIV from mother to child and also provide early detection of the HIV virus in a child from six weeks after birth and thereby providing early treatment.

Previous studies in other countries, however, reported [9, 15, 21] low utilization of PMTCT services among HIV positive pregnant women. Similarly, qualitative data generated through KII revealed that the utilization of PMTCT services is high, however, only a few utilized the services adequately (4 visits) apart from HIV counseling and testing and PCR services.

The utilization of health education services, counseling and testing and PCR services, antiretroviral therapy services, antenatal care services, safe delivery services and infant feeding options services was associated with demographic factors of age, educational level, marital status and distance from health facility. Younger women utilized PMTCT services more than the older respondents. This, according to information from qualitative data might not be unconnected to the fact that they have more to live for than their older respondents. The finding is consistent with that of Worku and Fanta, [22] who reported that age (27 year) or younger is significantly associated with PMTCT services utilization but the study differed from that of Muraguri [23], who reported that maternal age is often presented as a proxy for accumulated experience, including the use of health services. Older women are possibly more confident and influential in household's decision-making than younger women and adolescents in particular. Maternal education is associated with screening and family planning services, counseling and testing and PCR services, safe delivery services. Although some studies reported no difference in the utilization of PMTCT services according to education [17, 24], the general consensus is that the higher the educational status of a woman the higher the rate of utilization of these services.

The finding showed that maternal age (15-29) was associated with higher odds of PMTCT services utilization, while tertiary education, marital status and distance to health facilities were associated with lower odds of PMTCT services utilization. This showed that only maternal age (15 - 29 year) could be used to predict HIV pregnant women's utilization of PMTCT services. The findings agree with previous studies which reported some of these demographic factors as predictors of PMTCT services utilization [17, 18, 23, 24]. The common reason why some unmarried pregnant women are unwilling to utilize HIV counseling and testing services is due to fear of the reaction from their families and community if they test positive for HIV or fear of the judgmental views of health care providers towards pregnancy without a husband and a positive HIV result [25].

## 5. Conclusion

The study revealed that HIV positive pregnant women in Taraba state utilized counseling and testing and partner counseling and referral services adequately. The finding may be because these services offer direct protection against the transmission of HIV from mother to child and also provide early detection of the HIV virus in a child from six weeks after birth and thereby providing early treatment. However, services like reproductive health services, ART,

safe delivery and infant feeding options were not adequately utilized by HIV positive pregnant women. Family planning services were the least utilized by HIV Pregnant women in Taraba State. The study also revealed that demographic factors of age, educational level, marital status and distance to health facilities were associated with the utilization of PMTCT services, however, only age (15-29 years) predicted HIV positive pregnant women's utilization of PMTCT services. This predictor could be addressed through massive health education especially among the older women, providing incentives, telephone reminders and policy reforms.

## 6. Limitations

The study utilized the cross sectional design, therefore cannot assume cause and effect association. Nigeria being a multi- ethnic country language barrier was also a problem. Also this study was conducted in one state therefore our findings may not be generalized to other states even though Taraba State is a multi lingual and multi cultural state.

## Abbreviations

FGD (focus group discussion), KII (key informants interview), HIV (Human immunodeficiency virus), AIDS (acquired immunodeficiency syndrome), PMTCT (prevention of mother-to-child transmission of HIV), PCRs (partner counseling and referral services).

## Authors Contributions

OR and ES designed the research work, OR collected data with the help of research assistants. Other authors contributed to data analysis and drafting of the manuscript. The author (s) read and approved the final manuscript.

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## Ethics Approval and Consent to Participate

Participation was made voluntary. The participants gave their written and oral consent. Study procedure was approved by Taraba State ethics committee.

## Consent for Publication

Not applicable.

## Competing Interests

The authors declare that they have no competing interests.

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