

## Original Research Article

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# Uptake of prevention of mother-to-child transmission of human immunodeficiency virus interventions among infected mothers attending health facilities in Mombasa County, Kenya

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## ABSTRACT

**Background:** The study was conducted in Mombasa County, Kenya, and aimed at the uptake of Prevention of Mother-to-Child Transmission interventions among HIV-infected mothers attending health facilities. A hospital-based cross-sectional study was used between May 2021 and October 2021, utilizing a self-administered structured questionnaire to collect data. The collected information was then analyzed using SPSS version 17 and STATA version 9.2.

**Methods:** The study utilized a descriptive cross-sectional research design.

**Results:** 84.8% of respondents exclusively breastfed their babies, and 77.3% received antiretroviral drugs (ARVs). Education level, being a housewife, and religion showed statistically significant associations with PMTCT service uptake ( $p<0.05$ ). Additionally, 53.7% of participants demonstrated awareness of the importance of enrolling in PMTCT intervention services. The study highlighted high levels of knowledge among participants regarding PMTCT interventions, with 89.9% having correct knowledge of ARVs for children, 83.5% understanding the importance of counselling, 77.3% practicing modified infant feeding, and 85% acknowledging the necessity of delivering in a health facility. Knowledge of PMTCT components such as HIV counselling, ARV usage, facility-based delivery, and early diagnosis was significantly associated with the uptake of PMTCT interventions.

**Conclusions:** Utilization of PMTCT services among postnatal HIV-positive mothers was high among postnatal HIV-positive women who embraced the PMTCT interventions. The respondents had average knowledge concerning PMTCT services. This study suggests supporting and encouraging related stakeholders to provide education about MTCT.

**Keywords:** Prevention, Mother-to-child transmission, Antenatal care, HIV/AIDS knowledge

## INTRODUCTION

Mother-to-child transmission (MTCT) of HIV occurs when an HIV-positive mother transmits the virus to the baby. This takes place either antenatally, peripartum, or during breastfeeding. The virus infects 15-30% of infants born to HIV-positive mothers during pregnancy and

childbirth, and 5-20% of them do so while nursing the baby.<sup>1</sup> In 2016, 36.7 million persons with HIV were found to be living in the globally. Among these, 2.1 million were children with a maximum age of 15.<sup>2</sup> One hundred and sixty thousand children between 0-14 contracted HIV in the same year.<sup>3</sup> Sub-Saharan Africa has the highest rates of mother-to-child HIV transmission.

The global plan has 22 priority nations, 21 of which are in sub-Saharan Africa. Targets for universal coverage have not yet been met, with only 65% of HIV-positive pregnant women receiving ARV medication during PMTCT.<sup>4</sup> Sub-Saharan Africa is home to up to 90% of all vertical HIV infections worldwide.<sup>3</sup> Although the growth of PMTCT facilities has greatly benefited the Sub-Saharan region, penetration and usage remain low. The PMTCT interventions, including delivery in facilities and use of ARV, range from 20% to 57%.<sup>1</sup>

Developing countries may not reach their goal of reducing the prevalence of HIV infections in infants by 90% if this condition persists.<sup>5</sup> Globally, the Uptake of PMTCT interventions is estimated to be at 10 %, while in Africa, the Uptake is estimated to be between 10-15%. In Kenya, the Uptake could be better nationally at 8.5% and worse for Mombasa at 9.1%.<sup>6</sup> Kenya is one of the 22 countries that account for 90% of all pregnant mothers with HIV worldwide.<sup>7</sup> In Kenya, initiatives to reduce mother-to-child transmission (PMTCT) are seamlessly incorporated into Maternal and Child Health (MCH) services within healthcare institutions.<sup>8</sup> Twenty-seven percent of Mombasa County women, as per the Kenya Demographic and Health Survey (KDHS) in 2022, are not aware that PMTCT for HIV is an option during pregnancy. Additionally, only 45.9 percent of newborns delivered to HIV-infected mothers receive infant prophylaxis, whereas 87 percent of maternal prophylaxis is administered.<sup>9</sup> Both moms who are HIV-positive and mothers who are HIV-negative experience different pregnancy outcomes depending on their level of knowledge about maternal care and lifestyle choices.<sup>5</sup> Effective prenatal care (ANC) depends on mothers' awareness and comprehension of these visits' advantages, which can encourage beneficial behavioral adjustments regarding health and the pursuit of reproductive health for both couples.<sup>10</sup> Poor knowledge has been related to many factors, including a lack of formal education, poor infrastructure, and poverty, which can raise the likelihood of unfavourable pregnancy outcomes.<sup>11</sup>

The usefulness of well-integrated PMTCT interventions, including patient counselling, in preventing HIV mother-to-child transmission was highlighted in research.<sup>12</sup> However, the survey also showed that 34.8% of women reported worries about the results of HIV screening during pregnancy because they were afraid of receiving a positive result. It has been demonstrated that PMTCT programs that offer counselling, education, and the development of social support networks can allay anxieties related to a positive HIV test result.<sup>3</sup> Lack of knowledge of the disease reduces the use of PMTCT services in low-income countries.

An investigation into some of the factors contributing to the rising rate of HIV infection in children was carried out in Ethiopia. According to the researcher, incompetent healthcare providers affected the efficacy of PMTCT programs. Insufficient health facilities and the behaviors

of health workers have been obstacles to using these resources.<sup>14</sup> Low-quality maternity services, lack of drugs, and provider's attitude often affect the use of facilities.<sup>15</sup>

HIV-positive expectant women's attitudes toward healthcare providers and the availability of medical supplies and appliances determine whether to take up PMTCT.<sup>16</sup> Specific considerations, such as length of stay in the hospital, are even more important than these factors. In the Ivory Coast, it was deduced that the length of stay to be served led to the low rate of people using PMTCT services, lack of follow-up, and stigma surrounding the PMTCT program.<sup>17</sup> Research indicates that mothers are more adherent to PMTCT services, such as taking infant and maternal ART, when they deliver in health facilities, as opposed to those who do not. For pregnant HIV-positive women, professional delivery is essential due to the simultaneous risk of HIV transmission in the foetus and maternal death.<sup>18</sup>

## METHODS

### *Study design, site and population*

We conducted a cross-sectional study using exit interviews (post-ANC service) with pregnant women aged 15-45 from selected health facilities in Mombasa, County in Kenya between May 2021 to December 2021. Mombasa County has a population of 1,097,472. Among the healthcare workers, the county had 132 nurses, 52 doctors, and 93 clinical officers for every 100,000 people. The following categories apply to healthcare facilities available in the county: 58 public, 12 non-governmental organizations, 14 hospitals serving religions, and 237 private hospitals 19. Among Kenya's HIV infections, Mombasa has the greatest rate of mother-to-child transmission (9.1% vs. 8.5%). 19. Three health facilities in Mombasa County that offer PMTCT services were used for the study: coast general teaching & referral Hospital, the Port Reitz Sub County hospital, and the BOMU hospital. Women in Mombasa County who were HIV-positive made up the study's population.

### *Inclusion and exclusion criteria*

Inclusion criteria were; HIV-positive mothers who attended a six-week postnatal clinic, mothers who were at least 18 years old, and mothers who accepted and gave consent for the study. Mothers who did not consent to participate in the study were excluded.

### *Sample size estimation*

Sample size estimation was done using the formula by Fischer et al at a 95% confidence interval and prevalence of 50% because the exact proportion of Mombasa County youths who utilize reproductive health services is not well known.

$$n = Z^2 1 - a/2P(1 - P) d^2$$

Where n=the desired sample size, z=the value confidence level of 1.96 (95%), p=0.79 Proportion of paediatric disclosure (NASCOP, 2017), q=1-p and d=0.05 (the amount of discrepancy tolerated on q). Thus, the sample size was calculated as n= 267. The sample size was modified because the study's target population (690) was less than 10,000.

$$nf = n/(1 + \frac{n}{N})$$

Where nf = the required sample size when the population is less than 10,000, N=the estimate of the target population size (690). Thus, nf=193. Considering the 10% non-response rate, the new sample size is 212.

### **Sampling procedure**

The three top referral hospitals in the county Coast General Teaching and Referral Hospital, Port Reitz, and Bomu Hospital were chosen purposively. To sample individual respondents, proportionate sampling based on the target population was performed in each stratum.

A sampling frame was created, and a list of all postnatal mothers registered in the three hospitals for PMTCT was included. The subjects gave their informed consent after receiving a description of the study's mechanics.

### **Data collection techniques**

A structured pre-tested questionnaire was applied to participants who consented to the study drawn from all the study sites. The questionnaire was administered either in English or Kiswahili depending on the preference of each respondent.

There was consistent use of a standardized interview translation protocol, training procedures, and use of appropriate language to minimize interpersonal variation in data quality. Completed questionnaires were checked for completeness.

### **Data management and analysis**

Data entry was done in Epidata 3.1 data entry software. Using STATA version 14, quantitative data was analysed. Socio-demographic factors were described using descriptive statistics.

The association between the study variables was inferred using inferential statistics (t-test and ANOVA test). The dependent variable (Uptake) was tested using a chi-square test against the following independent variables. The predictive determinants of PMTCT uptake were identified using a multivariate logistic regression model, p value less than 0.05 was considered significant. The results of

the data analysis were presented in tables, graphs, and charts

## **RESULTS**

### **Socio-demographic characteristics of the participants**

The mean age of the mothers (years) was  $27.4 \pm 6.1$ . Most of the respondents 98 (47.3%) were married followed by single 56 (27.1%). Regarding employment status, 78 (37.7%) were housewives, 62 (30%) were self-employed and 40 (19.3) are in informal employment.

On matters religion, most 81 (39%) of them were Christians followed by 62 (30%) who were Muslims (Table 1).

**Table 1: Socio-demographic characteristics of the respondents (n=207).**

Variables	Category	N	%
<b>Marital status</b>	Single	56	27.1
	Married	98	47.3
	Divorced	1	0.5
	Separated	31	15
	Cohabiting	21	10.1
	Total	207	100
<b>Occupation</b>	Employed formal	27	13
	Employed informal	40	19.3
	Self-employed	62	30
	Housewife	78	37.7
	Total	207	100
<b>Education level</b>	None	31	15
	Primary	51	24.6
	Secondary	30	14.5
	College	59	28.5
	Madrassa	36	17.4
	Total	207	100
<b>Religion</b>	Muslim	62	30
	Christian	81	39
	Hindu	44	21.3
	None	7	3.4
	Declined	13	6.3
	Total	207	100

### **Level of uptake of PMTCT interventions among postnatal HIV-positive mothers**

Majority 176 (84.8%) of the respondents revealed that indeed their babies were exclusively breastfed while the rest 31 (15.2%) reported that they did not practice exclusive breast feeding.

Results showed that the majority 160 (77.3%) of the babies were given ARVs while the rest 47 (22.7%) were not given. Most of the respondent's 144 (69.6%) revealed that ARVs were given during clinic follow-up and 63 (30.4%) were not given (Table 2).

### Knowledge of who can be enrolled in PMTCT

Respondents were asked to indicate the kind of HIV mothers who can be enrolled in the PMTCT program. The (Figure 1) presents the number of times the respondents mentioned each option.

Most respondents (53.7%) knew all pregnant HIV-infected women, postnatal HIV-positive women, and their children should be enrolled in PMTCT, followed by all pregnant HIV-infected women (41.0%).

**Table 2: Level of uptake of PMTCT interventions among postnatal HIV-positive mothers.**

Variables	Category	Yes (%)	No (%)
The baby was exclusively breastfed	CGTRH	90 (43.3)	13 (6.3)
	PSCH	65 (31.4)	12 (5.8)
	BOMU Hospital	21 (10.1)	6 (2.9)
	Total	176 (84.8)	31 (15.2)
The baby was given ARVs	CGTRH	80 (38.6)	23 (11.1)
	PSCH	60 (29.0)	17 (8.2)
	BOMU Hospital	20 (9.7)	7 (3.4)
	Total	160 (77.3)	47 (22.7)
Given ARVs during clinic follow-up	CG47TRH	70 (33.8)	33 (15.9)
	PSCH	55 (26.6)	22 (10.6)
	BOMU Hospital	19 (9.2)	8 (3.9)
	Total	144 (69.6)	63 (30.4)
Health facility delivery	CGTRH	74 (35.7)	29 (14.0)
	PSCH	56 (27.1)	21 (10.1)
	BOMU Hospital	17 (8.2)	10 (4.8)
	Total	147 (71.1)	60 (28.9)

**Table 3: Knowledge of PMTCT methods.**

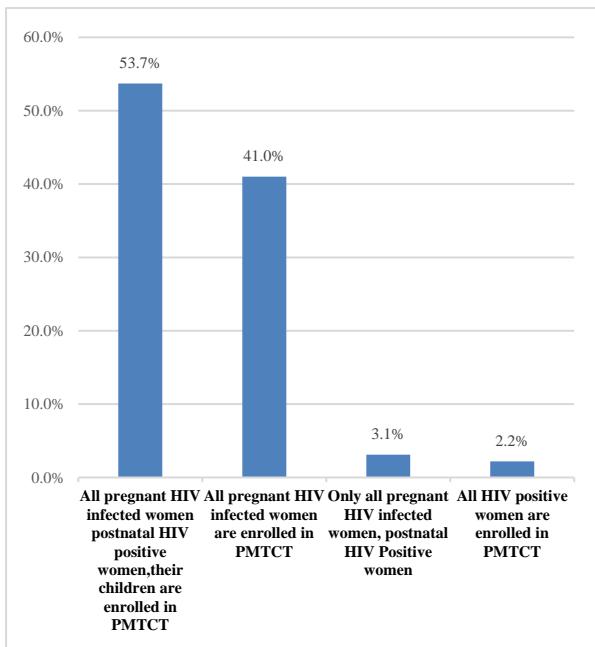
Variables	Category	Yes (%)	No (%)
ARVs for children	CGTRH	94 (45.4)	9 (4.3)
	PSCH	70 (33.8)	7 (3.4)
	BOMU Hospital	22 (10.6)	5 (2.4)
	Total	186 (89.9)	21 (10.1)
Early infant diagnosis of HIV	CGTRH	96 (46.4)	7 (3.4)
	PSCH	71 (34.3)	6 (2.9)
	BOMU Hospital	21 (10.1)	6 (2.9)
	Total	188 (90.8)	19 (9.2)
HIV counselling and testing	CGTRH	83 (40.1)	20 (9.7)
	PSCH	69 (33.3)	8 (3.9)
	BOMU Hospital	21 (10.1)	6 (2.9)
	Total	173 (83.5)	34 (16.5)
Modified infant feeding practice	CGTRH	83 (40.1)	20 (9.7)
	PSCH	60 (29.0)	17 (8.2)
	BOMU Hospital	17 (8.2)	10 (4.8)
	Total	160 (77.3)	17 (22.7)
Delivering in a health facility	CGTRH	90 (43.5)	13 (6.3)
	PSCH	65 (31.4)	12 (5.8)
	BOMU Hospital	21 (10.1)	6 (2.9)
	Total	176 (85)	31 (15)
An HIV-infected person taking ARVs during and after pregnancy	CGTRH	80 (38.6)	23 (11.1)
	PSCH	60 (29.0)	17 (8.2)
	BOMU Hospital	20 (9.7)	7 (3.4)
	Total	160 (77.3)	47 (22.7)

**Table 4: Knowledge of the PMTCT intervention.**

Variables	Category Awareness of intervention	Did not utilize PMTCT		Utilized PMTCT		df	$\chi^2$	P value
		N	%	N	%			
<b>HIV counselling and testing</b>	Yes	23	22.5	79	77.5	1	8.99	0.00
	No	16	50.0	16	50			
<b>An HIV-infected pregnant woman taking ARVs during and after pregnancy</b>	Yes	38	21.8	136	78.2	1	14.15	0.00
	No	16	55.2	13	44.8			
<b>Delivering in a health facility</b>	Yes	30	18.5	132	81.5	1	-	0.00
	No	15	88.2	2	11.8			
<b>Modified infant feeding practice</b>	Yes	39	21.1	146	78.9	1	29.27	0.00
	No	16	76.2	5	23.8			
<b>Early infant diagnosis of HIV</b>	Yes	37	20.1	147	79.9	1	-	0.00
	No	17	89.5	2	10.5			
<b>ARVs for children</b>	Yes	37	20.1	147	79.9	1	-	0.00
	No	17	89.5	2	10.5			

**Knowledge of when the vertical transmission of HIV occurs**

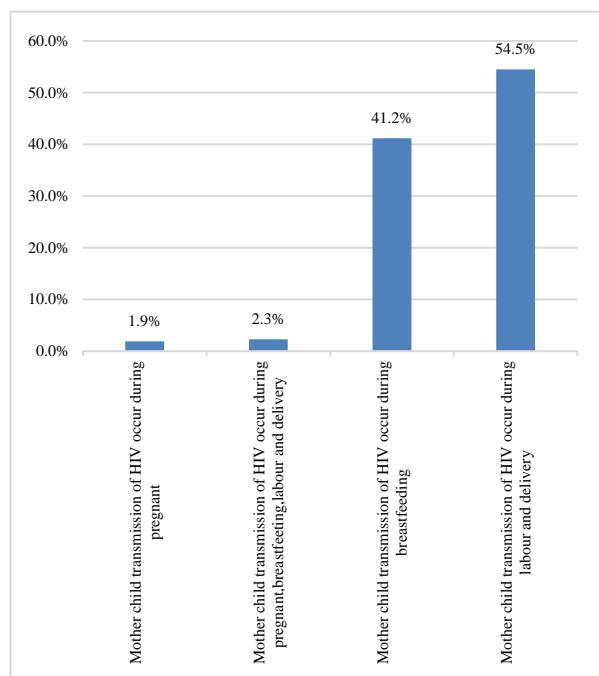
The (Figure 1) presents respondents' awareness of when vertical transmission of HIV could occur.



**Figure 1: Awareness of mothers who can be enrolled in PMTCT.**

Most respondents reported that vertical transmission is likely to occur during the labour process and delivery (54.5%), followed by during breastfeeding (41.2%). At 1.9%, respondents opined that vertical transmission occurred during the antenatal period. Though the study's respondents demonstrated noticeably high levels of awareness of mother-to-child transmission (54.5% and 41.2%), the remaining percentages (2.3% and 1.9%) are still crucial because they may be the primary source of

mother-to-child transmission in nursing children after six weeks of HIV-negative testing (Figure 2).



**Figure 2: Aware of when the mother-child transmission of HIV can occur.**

**Knowledge of PMTCT methods among the respondents**

In this study, among all of the respondents, 186 (89.9%) respondents had knowledge on ARVs for children. One-hundred and eighty-eight (90.8%) participants knew about early infant diagnosis of HIV while 173 (83.5%) had accurate knowledge of HIV counselling and testing. One hundred and sixty respondents (77.3%) knew Modified infant feeding practice and 176 (85%) were aware of the importance of delivering in a health facility. One hundred and sixty (77.3%) respondents were found

to have correct knowledge of HIV-infected persons taking ARVs during and after pregnancy (Table 3).

### **Knowledge of the PMTCT intervention**

The correlation between understanding of PMTCT techniques and adoption of PMTCT interventions is presented in (Table 4). Seventy-nine (77.5%) of the respondents who utilized PMTCT had correct knowledge of HIV counselling and testing which differed significantly when compared to 23 (22.5%) ( $\chi^2 = 8.99$ ,  $df=1$ ;  $p<0.05$ ). A higher percentage of HIV infected individuals who utilized PMTCT were found to have correct knowledge of taking ARVs during and after pregnancy 136 (78.2%) compared to 38 (21.8%) who did not ( $\chi^2=14.15$ ,  $df=1$ ;  $p<0.05$ ). Likewise, HIV infected women who utilized PMTCT interventions as compared to those who did not were found to have correct knowledge of delivering in health facility (132; 81.5% vs. 30; 18.5%;  $p<0.05$ ), modified infant feeding practice (146; 78.9%) vs. 39; 21.1%;  $p<0.05$ ), early infant diagnosis of HIV (147; 79.9%; vs. 37; 20.1%;  $p<0.05$ ) and ARVs for children (147; 79.9% vs. 37; 20.1%;  $p<0.05$ ).

## **DISCUSSION**

In this current study, we found that utilization of maternal and child MCH services was very high among HIV-positive participants including enrolment into care, taking ARVs, and delivering from a health facility. This is demonstrated by the high ANC attendance, positive HIV testing results at ANC, the fact that all deliveries occur in a medical institution, and the frequency of new-born follow-up visits. Other African studies have reported similar findings.<sup>21</sup> Given the efficacy of Antiretroviral Therapy ART in HIV infection control, and especially where treatment adherence is good, high program uptake can translate into a significant reduction in the burden of HIV infections in the pediatric population. Most of the women interviewed opined that they followed the instructions very seriously to protect the young from the disease. During the follow-up study, 89.0% of the women were given ARVs during follow-up clinic, and their babies were also given. This demonstrates that the postnatal HIV-positive women in the chosen Mombasa hospitals favourably embraced the PMTCT interventions. This is inconsistent with a study conducted in Abidjan, Côte d'Ivoire, which discovered that poor adoption of PMTCT interventions in a prenatal clinic was caused by underlying mistrust in healthcare institutions and skepticism toward test results.<sup>22</sup> Age positively correlates with the utilization rate of these treatments, according to a study by Merga, Woldemichael, and Dube 2016. Younger women are more likely to PMTCT services than older women. Additionally analyzed factors affecting the frequency of PMTCT uptake in Tanzania.<sup>23</sup> They asserted that the utilization in unmarried women is low, presumably due to a lack of support from male partners.

According to the study's findings, 54.5% of the respondents knew that mothers can transmit HIV to their unborn children and that all HIV-positive pregnant women, postpartum HIV-positive women, and their unborn children are required to participate in PMTCT. The current study finding was higher than the finding of studies done in Gahanna 25%, Tanzania 35.2%, South Africa 23.1%, and 30.1% in Uganda.<sup>24</sup> This finding is lower than the study conducted in a similar setting in Addis Ababa, Ethiopia 90.3%, Hawassa Referral Hospital, Ethiopia 90.1%, and Uganda 93%.<sup>25-27</sup> This variation of findings across various studies might be due to cross-cultural limitations of diagnostic tools reporting biases, and differences in socio-economic environments. In every instance, higher percentages of PMTCT uptake were linked to the understanding of the PMTCT approach. This is consistent with a study by, which discovered that providing well-integrated PMTCT services, including patient counselling, is an effective way to prevent HIV MTCT noted that mothers are more adherent to PMTCT services, such as taking infant and maternal ART when they deliver in health facilities, as opposed to those who do not.<sup>12,18</sup> Considering the dual risk of foetal infection with HIV and maternal death, skilled delivery is imperative for expectantly infected women. In the same breadth, Low-quality maternity services, lack of drugs, and provider's attitude often affect the use of facilities.<sup>15</sup> HIV-positive expectant women's attitudes toward healthcare providers and the availability of medical supplies and appliances determine whether to take up PMTCT.<sup>16</sup> Knowledge and Integration of FP and VCT, PMTCT, and ART Programs helps the mothers identify existing FP information and services as well as determine their desires and attitudes for family planning within the context of VCT, PMTCT, and ART. This integration in addition helps identify operational barriers, gaps, and constraints affecting the provision of family planning.<sup>28</sup> In this study delivering in health facilities, modified infant feeding practices, early infant diagnosis of HIV, and ARVs for children had statistically significant associated with knowledge.

### **Limitations**

The findings of this study could be affected by several limitations. The nature of data collection could be affected by nonresponse bias. Some mothers still have negative perceptions about HIV and AIDS and therefore were not free to give out information, but rather felt we were disturbing them. The study encountered a small percentage of non-response bias but was minimized by the recruitment of more subjects into the study.

## **CONCLUSION**

The uptake of PMTCT services among postnatal HIV-positive mothers in selected hospitals in Mombasa County was very high meaning that postnatal HIV-positive women embraced the PMTCT interventions. The respondents had adequate knowledge concerning PMTCT

services including interventions. It's important to raise awareness of how HIV infection can lead to issues such as intrapartum and postpartum difficulties in seropositive pregnant women. Early identification and treatment of HIV can reduce these risks.

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