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# Annals of Health Research

(The Journal of the Medical and Dental Consultants' Association of Nigeria, OOUTH, Sagamu, Nigeria)

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ORIGINAL RESEARCH

## Knowledge of Mother-To-Child Transmission of HIV Among Pregnant Women Attending a Health Centre in Addis Ababa

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### Abstract

**Background:** Mother-to-child transmission (MTCT) of HIV is the primary source of HIV infection in children younger than 15 years. The knowledge of pregnant women about MTCT and its prevention is essential in the control of MTCT of HIV.

**Objective:** To assess the knowledge of Mother-to-Child Transmission of HIV (MTCT) and the prevention of MTCT (PMTCT) of HIV among pregnant women attending the antenatal clinic at the Wereda 04 Health Center, Kolfe Keranio sub-city, Addis Ababa, Ethiopia.

**Methods:** This study used a cross-sectional design. It used systematic random sampling to select 231 participants from the clinic attendees. Data were collected using a semi-structured questionnaire. Binary logistic regression was used to determine the association between variables.

**Results:** About 78.1% and 74.6% of the participants knew MTCT and PMTCT of HIV, respectively. Close to half (43.5%) agreed that MTCT of HIV could occur through breastfeeding, 33.5% agreed it could be transmitted during pregnancy, and 23% agreed it could be transmitted during labour and delivery. Nearly 75% knew that MTCT of HIV is preventable, but only about half (47.9%) knew that MTCT is preventable through antiretroviral therapy (ART). The knowledge of pregnant women about MTCT and PMTCT was associated with place of residence as it was lower in rural women.

**Conclusions:** Some of the participants were not knowledgeable about MTCT and PMTCT of HIV. Effective health education is recommended for women of reproductive age to reduce the MTCT of HIV.

**Keywords:** Addis Ababa, HIV, Mother-To-Child Transmission, PMTCT, Pregnant women.

### Introduction

HIV/AIDS continues to be a global public health problem. So far, HIV has infected an estimated 85.6 million people and killed about 40.4 million people worldwide. [1] In 2022, an estimated 39 million people (20.8 million (53%) in eastern and

southern Africa) were living with HIV/AIDS. There were 1.3 million new HIV infections (500,000 in East and South Africa) and 630,000 HIV-related deaths (out of which 260,000 occurred in East and South Africa) globally. Globally, women and girls accounted for about 46% of the new HIV infections that occurred in

2022, and women and girls in sub-Saharan Africa accounted for 63%.<sup>[1]</sup>

Globally, 82% of pregnant women living with HIV had access to antiretroviral therapy (ART) to prevent the transmission of HIV to their children in 2022.<sup>[1]</sup> In Ethiopia, 88% of women who were HIV-positive received ART in 2022, and 86% of HIV-positive pregnant women received ART in the same year.<sup>[1]</sup> Despite the efforts made to reduce the impact of HIV/AIDS, it continued to affect children globally, regionally and nationally, resulting in an estimated 130,000 new paediatric infections worldwide, 58,000 in eastern and southern Africa and 2,000 in Ethiopia in the year 2022. It was also responsible for the mortality of about 84,000 children (aged 0-14 years) globally, 35,000 in eastern and southern Africa, and 1,500 in Ethiopia in the year 2022.<sup>[2]</sup> In Ethiopia, an estimated 610,000 people (350,000 women and 37,000 children) were living with HIV/AIDS in 2022. About 8,300 new cases (4,100 women and 2,000 children) occurred in the same year. In 2022, the estimated number of HIV-related deaths was 11,000 (5,100 in women and 1,100 in children) in Ethiopia.<sup>[1]</sup> The vertical transmission rate in Ethiopia in the year 2022 was 12.03%.<sup>[2]</sup>

One of the main routes of HIV transmission is MTCT, which accounts for over 90% of new HIV infections among children globally.<sup>[3]</sup> MTCT of HIV occurs during pregnancy, labour or delivery and through breastfeeding after delivery.<sup>[3]</sup> Without treatment, about 15-30% of babies born to HIV-infected mothers will be infected with HIV during pregnancy and delivery.<sup>[4]</sup> Moreover, 5-15% of children will be infected with HIV through breastfeeding.<sup>[4]</sup> According to WHO, the promotion and prevention of mother-to-child transmission (PMTCT) of HIV can be done in several ways, including primary prevention of HIV infection among women of childbearing age and prevention of unintended pregnancies among women living with HIV.

Others include the prevention of HIV transmission from a woman living with HIV to her infant through adequate access to HIV testing and counselling, initiation of lifelong antiretroviral therapy (ART) with support for adherence, retention and viral suppression for mothers living with HIV, safe delivery practices, optimal infant-feeding practices and access to postnatal antiretroviral (ARV) prophylaxis for infants.<sup>[3]</sup> Thus, without any intervention, transmission rates range from 15% to 45%.<sup>[3]</sup> This rate can be reduced to below 5% with effective interventions during pregnancy, labour, delivery and breastfeeding.<sup>[3]</sup>

According to a recent systematic study, the pooled prevalence of MTCT of HIV in Ethiopia was 9.93%.<sup>[5]</sup> WHO also reported a vertical transmission rate of 12.3% in Ethiopia in 2022.<sup>[2]</sup>

MTCT of HIV is the most common mode of transmission in children under the age of 15 years, which is vertically transmitted from HIV-positive pregnant women to their unborn babies. The knowledge of women about the transmission of HIV from mother to child and its prevention is essential in the reduction and elimination of MTCT of HIV. It can be assumed that women with adequate knowledge of MTCT of HIV and its prevention may be stimulated to seek and access PMTCT services. The level of knowledge varies across countries and even within the same country.<sup>[1, 6]</sup> A recent study among Indonesian reproductive-age women showed that 72% knew about MTCT.<sup>[7]</sup> In a cross-sectional study conducted among 460 pregnant women attending an antenatal clinic at the Vanga Hospital in the Democratic Republic of Congo, 34.4% knew about MTCT, and 10.1% knew about PMTCT.<sup>[8]</sup> The analysis of the Demographic and Health Survey (DHS) secondary data of eight African countries with the highest HIV prevalence (Equatorial Guinea, Malawi, Zambia, Mozambique, Namibia, Zimbabwe, South Africa and Lesotho) showed that the average

knowledge of reproductive-age women about MTCT was 57.89%; it ranged from 27.1% in Equatorial Guinea to 68.02% in Zimbabwe. [9] Another study involving 33 sub-Saharan African countries showed that 56.21% of respondents had correct knowledge about MTCT of HIV/AIDS and its prevention among reproductive-age women. [1] In contrast, a similar study revealed that 65.1% of Rwandan women of childbearing age had a good general knowledge of MTCT and its prevention. [10] Another study that analyzed the 2016 Ethiopian DHS reported that 41.1% of the women involved had an adequate understanding of MTCT of HIV, and it varied from region to region, ranging from 11.3% in Somalia to 66.8% in Addis Ababa. [6]

In addition, a study based on the DHS of 24 sub-Saharan African countries showed that the average knowledge of PMTCT among married women was 69.5%, ranging from 3.9% in Comoros to 75.4% in Zimbabwe. At the same time, that of Ethiopia was 45.3%. [11] A recent systematic review and meta-analysis also showed that PMTCT knowledge among Ethiopian women of reproductive-age groups was 62.15%, ranging from 17.% to 88.1%. [12] Nevertheless, several studies have indicated that the level of knowledge of women about MTCT of HIV and its prevention is associated with age, residence, education level, wealth, parity, and access to mass media such as TV and radio. [1, 6-9, 11, 13-15]

There are no recent published reports on pregnant women's knowledge of MTCT and its prevention in the study area, which may differ from other parts of Ethiopia. [6] The findings of this study are essential not only for guiding policymakers but also for informing local health centres and health bureaus so that they can take appropriate preventive measures suitable for their locality. This study aimed to assess the knowledge of MTCT of HIV and its prevention and the associated factors among pregnant women attending antenatal clinics at Woreda 04

Health Center of Kolfe Keranio sub-city, Addis Ababa.

## **Methods**

### *Study area*

The study was conducted at Woreda 04 Health Centre of Kolfe Keranio sub-city of Addis Ababa, Ethiopia. Addis Ababa is the capital city of Ethiopia, and the Kolfe Keranio sub-city is one of the 11 sub-cities in Addis Ababa. It is in the western part of Addis Ababa, and Woreda 04 Health Centre is in the southern part of the Kolfe Keranio sub-city.

### *Study design*

An institution-based, cross-sectional study was conducted to assess the knowledge of pregnant women about MTCT of HIV and PMTCT of HIV.

### *Target and study population*

The target population comprised all pregnant women who attended the antenatal clinic at Woreda 04 Health Center during the study period (April to May 2019). The study population consisted of all pregnant women who had attended the antenatal clinic during the study period, met the selection criteria, and consented to participate in this study.

### *Inclusion and exclusion criteria*

All pregnant women who attended the antenatal clinic (ANC) were included, regardless of their HIV status. Women who were in labour, those presenting as emergency cases, women who were to undergo caesarian section, women who had antepartum haemorrhage from 24 weeks of pregnancy and those who were comatose were excluded.

### *Sample size determination and sampling technique*

The required sample size was calculated using a single population proportion formula.

$$n = (Z_{\alpha/2})^2 P (1-P) / d^2$$

Where:

n = sample size required

Z = standard normal distribution taken as 1.96 at a 95% confidence level

P = 37.6% proportion [16]

D = margin of error taken as 5%

Thus,  $n = (1.96)^2 (0.376) (1-0.376) / (0.05)^2$

The initial calculated sample size was 361. Since the target population was less than 10000, the following correction formula was used to correct the sample size to 210.

$n_f$  = final sample size

$n_o$  = Initial sample size

N = study population

$$n_f = \frac{n_o}{1 + \frac{n_o}{N}} \quad n_f = \frac{361}{1 + \frac{361}{500}}$$

The non-response rate in this study was estimated to be 10%. Hence, the overall sample size was 231.

A systematic random sampling technique was used to select 231 pregnant women from the target population.

#### *Study variables*

Dependent variables included knowledge of MTCT of HIV and PMTCT of HIV. The independent variables included sociodemographic factors such as age, marital status, religion, ethnicity, place of residence and occupation.

#### *Data collection*

Data were collected using a structured questionnaire after obtaining informed written consent from the participants. The questionnaire was prepared in English, translated to *Amharic*, and then returned to English to check for consistency. Pretesting was done before data collection. Data was collected from each participant after they had been attended to at the clinic. Each participant was interviewed privately.

#### *Data analysis*

The quality of the filled questionnaires was checked, coding and entering into an Excel® sheet was done, and the data were exported to SPSS for analysis. Binary logistic regression was used to determine the association between independent and dependent variables. A P-value less than 0.05 was considered statistically significant at a 95% Confidence Interval.

#### *Ethical considerations*

The Ethical Review Committee of Ayer Tena Health Science and Business College approved this study. Before data collection, informed written consent was obtained from study participants, and confidentiality was maintained during the study.

## **Results**

#### *Sociodemographic characteristics of respondents*

A total of 231 pregnant women completed the questionnaire, giving a response rate of 100%. The sociodemographic features of the study participants are presented in Table I. The majority of the respondents were aged 21 – 30 years (69.7%), married (89.2%), urban dwellers (95.2%) and housewives (56.3%). About half (53.7%) of the respondents were Muslims. Most of the respondents (65.5%) had primary and secondary education. However, about 20% were not educated. The study participants were principally represented by the Gurage, Amhara Silte and Oromo ethnic groups.

#### *Knowledge of respondents about MTCT of HIV and its prevention*

The details of the respondents' knowledge about MTCT of HIV are described in Table II. More than four-fifths (85.1 %) of the respondents knew about MTCT of HIV and 78.1 % reported that they knew that an HIV-infected pregnant woman can transmit the virus to her unborn baby. Health facilities were the principal sources of MTCT

information for 74.9% of the respondents. Approximately 43.5 % and 33.5 % agreed that the risk of MTCT is high during breastfeeding and pregnancy, respectively. Almost three-quarters

(74.9%) of the participants knew about the prevention of mother-to-child transmission (PMTCT) of HIV.

**Table I: Sociodemographic characteristics of respondents**

<i>Variable</i>	<i>Categories</i>	<i>Frequency</i>	<i>Percentage</i>
Age (Years)	15-20	23	10.0
	21-25	91	39.4
	26-30	70	30.3
	31-35	35	15.2
	36-45	12	5.1
Religion	Orthodox	88	38.4
	Islam	123	53.7
	Protestant	17	7.4
	Catholic	1	0.4
Ethnicity	Oromo	39	16.9
	Amhara	53	22.9
	Gurage	68	29.4
	Tigre	5	2.2
	Silte	46	19.9
	Other	20	8.7
	Education level	Not educated	43
Primary school		91	40.1
Secondary school		60	26.4
College/University		30	13.2
Occupation	Unemployed	43	18.6
	Government worker	17	7.4
	Private company worker	24	10.4
	Housewife	130	56.3
	Self-employed	17	7.4
Marital status	Unmarried	21	9.1
	Married	206	89.2
	Divorced	4	1.7
Place of residence	Urban	219	95.2
	Rural	11	4.8

For 46% of the respondents, the source of information on PMTCT was the social media. Over half (53%) and close to half (43%) responded that MTCT of HIV can be prevented by modern drugs and vaccines, respectively. Two hundred and seventeen respondents responded to questions on how MTCT of HIV may be prevented: 41% and 47.9% opined that avoidance of breastfeeding and antiretroviral therapy,

respectively, were effective in the prevention of MTCT of HIV. The remaining 11.1% had yet to learn what could be done.

*Factors associated with the knowledge of MTCT and PMTCT of HIV*

The factors associated with the knowledge of MTCT and its prevention are depicted in Table III. Binary logistic regression showed that

mothers' knowledge of MTCT was related to their place of residence (AOR = 6.5; 95% CI: 1.768 -23.895). Urban-dwelling mothers were about seven times more likely to know about MTCT than rural mothers. Mothers' knowledge of

PMTCT was also associated with their places of residence (AOR = 5.734; 95% CI: 16.08 – 20.442). Similarly, urban mothers were about six times more likely to know about PMTCT than rural mothers.

**Table II: Knowledge of respondents about mother-to-child transmission of HIV and its prevention**

Questions	Responses	Frequency	Percentage
Do you know a pregnant woman with HIV can transmit the virus to her unborn baby?	Yes	178	78.1
	No	50	21.9
When do you think the risk of transmission of HIV is highest?	During pregnancy	54	33.5
	During delivery	37	23
	During breastfeeding	70	43.5
Have you heard about MTCT of HIV before?	Yes	188	85.1
	No	33	14.9
If yes, what is the source of your information?	Close relative	11	6.1
	Health center	134	74.9
	Social media	34	19
Who is eligible to undertake voluntary counselling and testing (VCT) and should be tested?	Pregnant women	22	9.6
	Women coming from the city	1	0.4
	Women ready to get married	25	11
	Everybody	180	78.9
Have you heard about preventing virus transmission from mother to child (PMTCT)?	Yes	159	74.6
	No	54	25.4
If yes, from where did you hear this information?	Friends	16	7.9
	Relatives	8	4.0
	Social media	93	46
	Coffee ceremonies	7	3.5
	Other	78	38.6
Which method can prevent the transmission of HIV from mother to child?	Modern drugs	93	53.4
	Vaccines	75	43.1
	Traditional drugs	6	3.4
What should HIV-positive pregnant women do to prevent transmission of HIV to their baby?	Avoid breastfeeding	89	41
	Take antiretroviral drug	104	47.9
	Don't know	24	11.1

## Discussion

This study assessed the knowledge of pregnant women about MTCT of HIV and its prevention and the factors associated with these. This study is of paramount importance since children are highly vulnerable to HIV/AIDS infection. In this

regard, identifying the depth of knowledge and taking action to close the existing gaps can result in decreased MCTC of HIV, thereby reducing child mortality and maternal morbidity associated with the disease. In this study, 78.1% of the respondents knew that HIV could be transmitted from an infected mother to her

unborn baby. This is similar to the finding of a study conducted among childbearing-age women in Rwanda, where 79.6% of the participants had good knowledge of MTCT of HIV. [10] It is also similar to a study conducted among 300 primigravid women in Nigeria, which

showed that 27% did not know about MTCT of HIV. [17] It is also similar to the findings in a study conducted among antenatal care attendees in a rural area in northwest Cameroon, where 79.3% of the pregnant women had good knowledge of MTCT. [18]

**Table III: Factors associated with knowledge of MTCT and PMTCT of HIV in binary logistic regression analysis**

Variable	Category	Knows about MTCT		cOR	95% CI	p-value
		Yes (%)	No (%)			
Residence	Urban	182 (86.7)	28 (13.3)	6.500	1.768-23.895	0.005
	Rural	5 (50)	5 (50)			
Variable	Category	Know about PMTCT		cOR	95% CI	p-value
		Yes (%)	No (%)			
Residence	Urban	154 (76.6)	47 (23.4)	5.74	16.08-20.442	0.007
	Rural	4 (36.4)	7 (63.6)			

cOR – Crude odds ratio CI – Confidence Interval

The level of MTCT knowledge found in the present study is higher than that in several parts of Ethiopia, including the Gurage zone (72.2%), [19] Assossa (57.5%), [20] Southern Ethiopia (60.7%), [21] Mecha district in Northwest Ethiopia (31.4%), [14] and Meket district in Northern Ethiopia (19%). [22] The differences could be attributed to differences in study time and remoteness of the study location, suggesting that places far away from the capital city of a country, where more information and numerous health facilities are usually concentrated, may encounter a shortage of information about MTCT of HIV. It is also higher than that of Indonesia (72%), [7] Vanga Hospital of Democratic Republic of Congo (30.4%), [8] and Aminu Kano Teaching Hospital in Nigeria (59%). [23] The differences in the level of knowledge might be due to varying levels of effort made to educate women on HIV transmission and prevention.

The level of knowledge in the present study is a little lower than that recorded by a study conducted in Gondar, Ethiopia, in which 88.5% of the pregnant women who participated in the study knew about MTCT of HIV. [24] However, this level of knowledge about MTCT of HIV is higher than the one reported in a study

conducted in southern Ethiopia, where 62.9% of pregnant women knew about MTCT of HIV. [21] The difference could be attributed to geographical factors. The current study was conducted in Addis Ababa, the capital city of Ethiopia, where access to up-to-date information and a variety of sources of information is better compared to southern Ethiopia. The difference may also be accounted for by study time since the study conducted in southern Ethiopia was done about seven years earlier than the current study. The level of knowledge about MTCT of HIV found in the current study is also higher than the one conducted in Pakistan, which showed that only 14.3% of pregnant women had full knowledge of MTCT. [25] Pakistan is predominantly a Muslim country, [26] where health education about sexuality and sexually transmitted infections, such as HIV, may not be popular for religious reasons.

The level of knowledge of pregnant women about MTCT in the present study may be inadequate, suggesting that health facilities, health bureaus and other responsible bodies are not very effective in educating women about vertical transmission of HIV. This might have



resulted in a considerably high prevalence of HIV infection and mortality among children.

In the present study, 74.6% of the participants knew that MTCT of HIV can be prevented. This rate is higher than the report in a study conducted among 416 pregnant women selected from four primary healthcare centres in Northeast Gojjam Zone, Amhara region, Ethiopia, in which 52% of the pregnant women had comprehensive knowledge of PMTCT of HIV. [15] It is also higher than that in a study conducted in Kombolcha town, Amhara region of Ethiopia, in which 61% of the pregnant women who participated in the study had adequate knowledge of PMTCT Option B+ of HIV care. [27] The differences could be attributed to geographical factors. However, the knowledge level about PMTCT in this study is less than that of a study reported from Gondar, Ethiopia, where 83.5% knew PMTCT of HIV. [24] It is also less than that of a study conducted in Hawassa, southern Ethiopia, where 82.3% of the pregnant women who participated in the study were knowledgeable about PMTCT of HIV. [28] These differences remain unexplained.

In the present study, 43.5% of the study participants opined that avoidance of breastfeeding could reduce MTCT of HIV, and this is a little lower than the figure reported in a study done in Macha district, northwest Ethiopia, where 52% of women of reproductive age who participated in the survey reported that abstinence from breastfeeding could reduce MTCT of HIV. [29]

In this study, 47.9% of the respondents reported that a pregnant woman can prevent MTCT of HIV with the use of antiretroviral drugs. This rate is lower than the findings in a study conducted in eastern Uganda, where 83% of pregnant women opined that ART during pregnancy reduces MTCT of HIV. [30] The reasons for this difference are unclear. The present study also shows that the

odds of good knowledge of MTCT of HIV and its prevention among pregnant women is higher among urban residents than in rural residents. This disparity in knowledge may be explained by the fact that women in urban areas have more access to health information from various media available in urban areas.

## Conclusion

Most (78.1%) of the respondents knew that HIV can be transmitted from infected mothers to their children. About a quarter did not know the PMTCT of HIV. The odds of knowledge of MTCT of HIV and its prevention are higher among urban women than rural women. Therefore, appropriate and effective intervention strategies are recommended to increase the level of knowledge, with a focus on rural residents, to reduce the transmission of HIV from mothers to children.

**Availability of data and materials:** The primary data on which this study was based can be obtained from the corresponding author upon a reasonable request.

**Acknowledgement:** The authors acknowledge the study participants.

**Authors' Contributions:** All the authors conceived and designed the study and participated in the literature review, data analysis and interpretation, drafting of the manuscript, revision of the draft for sound intellectual content, and approval of the final version.

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