

Knowledge about vertical transmission of HIV and associated factors among women living with HIV or AIDS attending antiretroviral therapy clinic, Western Ethiopia

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Abstract

Background: The United Nations Program on HIV or AIDS has committed to eliminating the vertical transmission of human immunodeficiency virus. However, significant number of newborn and children are acquiring HIV every year. Therefore, the aim of this study was to assess knowledge of mother on vertical transmission of HIV and associated factors among non-pregnant women receiving antiretroviral therapy in the West Wollega, Western Ethiopia.

Methods: A facility-based cross-sectional study design was used on a sample of 422 non-pregnant women attending antiretroviral therapy clinic in West Wollega from 26 February to 26 March 2019. Systematic sampling was used to select the study participants. Pretested and structured interviewer-administered questionnaires and telephone interview were used to collect the data. Multivariable logistic regression model was used to identify factors associated with the knowledge of mother on vertical transmission of HIV. Odds ratio along with 95% confidence interval were estimated to measure the strength of the association. Level of statistical significance was declared at p-value less than 0.05.

Result: Out of total participants, 94.1% (95% confidence interval: (91.7%, 96.2%)) of them were knowledgeable about vertical transmission of HIV. Urban resident (adjusted odds ratio: 2.36, 95% confidence interval: (1.27, 4.39)), primary school (adjusted odds ratio: 2.94, 95% confidence interval: (1.11, 7.83)), secondary school (adjusted odds ratio: 3.39, 95% confidence interval: (1.53, 7.55)), being on antiretroviral therapy for greater than 2 years (adjusted odds ratio: 2.67, 95% confidence interval: 1.02, 6.99), and having child living with HIV (adjusted odds ratio: 1.54, 95% confidence interval: (1.07, 3.83)) were significantly associated with the knowledge of mother on vertical transmission of HIV.

Conclusion: The study indicated that 5.9% of the women lack knowledge about vertical transmission of HIV. This knowledge associated with sociodemographic factors, such as residence, educational status, experiences of having child living with HIV, and being on antiretroviral therapy for greater than 2 years. Thus, interventions toward the elimination of new newborn HIV infections should consider these factors.

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Introduction

Globally, 36.9 million people were living with human immunodeficiency virus (HIV) in 2017. In the same year, 1.8 million adults and 1.6 million children were newly infected with HIV. In Sub-Saharan Africa, of the 19.6 million people living with HIV, 800,000 adults and children were newly infected with HIV.¹ Despite Ethiopian government efforts to control HIV epidemic, in 2016, 30,000 individuals were newly infected with HIV, of which 3800 were children.²⁻⁴

In 2017, the Joint United Nations Program on HIV or AIDS (UNAIDS) set the 90-90-90 global targets for the elimination of HIV/AIDS by 2030, whereby 90% of people know their status, 90% of people have access to treatment and 90% of people suppressed viral loads.^{3,5,6} Ethiopia has adopted the World Health Organization (WHO) four-pronged vertical transmission prevention strategies as a key entry point to HIV care for women, men and families.⁴ Though low antiretroviral therapy (ART) coverage was observed in Ethiopia, 399,000 (61%) people living with HIV were accessing treatment.^{1,5} In Ethiopia, 69% of pregnant women accessed ART which is lower than UNAIDS 2017 report.³

The expansion of ART services has transformed HIV or AIDS into a manageable chronic illness.⁴ This may increase fertility intention^{7,8} and unwanted pregnancy,^{7,9} which in turn lead to vertical transmission of HIV.^{4,10} Evidences showed that knowledge of mother about vertical transmission of HIV varies from 50% to 95%.^{4,11-13}

Previous studies among HIV positive women showed that age, residence, educational status,¹⁴⁻¹⁶ occupation status, disclosure of HIV status, duration on ART,¹⁵⁻¹⁸ income, number of parity and provider discussion about vertical transmission of HIV¹⁴⁻¹⁶ were factors associated with the knowledge of mother on vertical transmission of HIV among women living with HIV or AIDS.

To prevent vertical transmission and new incidence of HIV among newborns and children, mother's knowledge about vertical transmission of HIV prior to conception is crucial. However, there is limited evidence on the determinants of mother's knowledge about vertical transmission of HIV among non-pregnant women living with HIV receiving ART in Ethiopia. Therefore, the aim of this study was to assess knowledge of mother on vertical transmission of HIV and associated factors among non-pregnant women receiving ART in the West Wollega, Western Ethiopia.

Methods

Study setting, design and period

The study was conducted in the West Wollega, one of the Oromia regional state zones. The zone has 26 public and 1 non-governmental health institutions that provide ART and prevention of vertical transmission of HIV in addition to the other health services for the community. Of these, 6 are hospitals and the rest 21 are health centers. A total of 2852 people living with HIV (PLHIV) were on ART in West Wollega and 1542 of them were women. A facility-based cross-sectional study design was conducted from 26 February to 26 March 2019.

Sample size determination and study population

Sample size was determined using single population formula, calculated using statistical Epi info 7 Stat Calculator computer software program with assumptions of 95% CI with $Z = 1.96$, proportion of knowledgeable on mother-to-child transmission (MTCT) 0.5% and 80% power and 10% non-response ($n = 422$).

The health facilities found in the zone were first stratified into hospitals and health centers. From each stratum, three hospitals and five health centers were obtained by simple random sampling. The sample from each hospital and health center was allocated proportionally to the number of clients on ART at each selected health facility. A systematic sampling method was used to obtain 422 participants. A list of women who came to public health facilities in the last 1 month was obtained and listed to form the sampling frame. Sampling interval was calculated by dividing the number of women ($N = 912$) at the health facilities in the last 1 month for the total sample size ($n = 422$). The first participant, Number 3, was obtained by simple random sampling method (a lottery method) and the subsequent participants were obtained by every two interval.

Inclusion and exclusion criteria

All reproductive age women in West Wollega who were on ART for the last 6 months and had at least one visit to the selected health facilities during the study period were included, whereas women who were unable to communicate and less than 6 months on ART were excluded from the study.

Study variables

Outcome variable: Knowledge about vertical transmission of HIV is outcome variable (knowledgeable or unknowledgeable). Women were knowledgeable if the women knew at least one means of vertical transmission of HIV (during pregnancy, delivery, or breast feeding) and method of prevention (ART for the mother and for the child).

Explanatory variables: Age of mother, residence, educational status, number of children, duration since HIV diagnosed, duration on ART, health workers discuss vertical transmission of HIV, HIV disclosure, had HIV positive children and pregnancy after acquiring HIV.

Data collection tools

The questionnaires were adapted from Ethiopian Demographic and Health Survey (EDHS) 2011 and Ethiopian Federal Ministry of Health ART clinic intake and follow-up form.^{4,11} It had three parts: sociodemographic characteristics, HIV- or ART-related factors and knowledge of vertical transmission of HIV. The adapted questionnaire was modified and contextualized to fit the local situation and research objectives.

Data collection methods and quality control

The questionnaire was pretested on 5% of the sample in Nekemte Hospital, Nekemte Town, Oromia region. Then necessary corrections were made before actual data collection by removing and rephrasing unclear questions. Data collectors and supervisors were trained for 2 days about the objectives of the study, contents of tools and techniques of interview before the data collection. Pretested and structured interviewer-administered questionnaires and telephone interview were used to collect the data in ART clinic during exit time. The data were collected by eight trained diploma nurses, and four BSc degree holder nurses supervised the whole data collection process closely on regular basis.

Data processing and analysis

The data were coded, double entered into Epi data version 3.1, cleaned and exported to Statistical Package for Social Science (SPSS) version 20 for analysis. Multicollinearity test was carried out to see the correlation between independent variables using standard error and collinearity statistics (variance inflation factor > 10 and standard error > 2 were considered as suggestive of the existence of multicollinearity).

Descriptive analysis and summary statistics were computed to summarize the data. Data were analyzed using

binary logistic regression. Bivariable analyses were done to check for the associations between each independent variable and outcome variable. All variables with p-value of less than or equal to 0.25 in bivariable analysis were retained for multivariable model, and finally, variables with p-value of less than 0.05 were identified as statistically significant predictors of mother knowledge about vertical transmission of HIV. Odds ratio along with 95% CI were estimated to measure the strength of the association. Besides, the goodness of fit of model was checked using Hosmer–Lemeshow.

Ethical considerations

Ethical clearance was obtained from Haramaya University, College of Health and Medical Sciences, Institutional Health Research Ethics Review Committee (IHRERC/009/2019). A formal letter of permission and support was written to each hospitals and West Wollega health bureau from Haramaya University. Then West Wollega zone health bureau has written a cooperation letter to each health centers. More importantly, written informed consent was obtained from all study participants and health facilities head prior to data collection.

Results

Sociodemographic characteristics of the participants

A total of 422 participants were included in the study. Majority (61.6%) of study participants were found between the ages 18–29 years. The mean (\pm SD) age of participants was 29.13 (\pm 7.48) years, whereas the mean (\pm SD) age of the partners was 33.47 (\pm 9.06) years. More than half (56.9%) of the study participants were urban residents (Table 1).

Information on HIV or AIDS and treatment conditions of the participants

Regarding the duration of HIV diagnosis, two-third, 281 (66.6%), of the respondents stayed more than 2 years since HIV diagnosis and 244 (57.8%) of them were on ART for more than 2 years (Table 2).

Knowledge of mother on vertical transmission of HIV

Regarding the knowledge about vertical transmission of HIV, 397 (94.1%) of them heard about HIV transmission and of those, nearly three-fourth, 290 (73.0%), heard as it transmit during labor. Also, more than three-fourth, 333 (78.9%), heard as there were drugs that are used for the prevention of vertical transmission of HIV and 209

Table 1. Sociodemographic characteristics of women living with HIV or AIDS attending ART service in the West Wollega zone, Western Ethiopia, 2019.

| Characteristics | Category | Frequency | % |
|-----------------------|--------------------------|-----------|------|
| Age of women (years) | 18–29 | 260 | 61.6 |
| | 30–39 | 108 | 25.6 |
| | >40 | 54 | 12.8 |
| Ethnicity | Oromo | 315 | 74.6 |
| | Amhara | 90 | 21.3 |
| | Tigre | 8 | 1.9 |
| | Gurage | 9 | 2.1 |
| Religion | Orthodox | 110 | 26.1 |
| | Muslim | 97 | 23.0 |
| | Protestant | 199 | 42.2 |
| | Wakefata | 15 | 3.0 |
| | Other* | 1 | 0.2 |
| Educational status | Unable to read and write | 51 | 12.1 |
| | Able to read and write | 75 | 17.8 |
| | Primary (1–8) | 130 | 30.8 |
| | Secondary (9–10) | 47 | 11.1 |
| Occupation status | Student | 47 | 11.1 |
| | House wife | 182 | 43.1 |
| | Merchant | 56 | 13.3 |
| | Government employee | 89 | 21.1 |
| | Farmer | 27 | 6.4 |
| | Daily labor | 15 | 3.6 |
| | Others** | 6 | 1.4 |
| Monthly income (birr) | No income | 53 | 12.6 |
| | Do not know | 127 | 30.1 |
| | <350 | 4 | 0.9 |
| | 351–500 | 9 | 2.1 |
| | 500–999 | 18 | 4.3 |
| Residence | >1000 | 211 | 50.0 |
| | Urban | 240 | 56.9 |
| | Rural | 182 | 43.1 |

*Do not have religion, **Do not have job, private employee.

Table 2. Information on HIV or AIDS and treatment conditions of women living with HIV or AIDS attending ART service in the West Wollega zone, Western Ethiopia, 2019.

| Characteristics | Category | Frequency | % |
|--------------------------------------|----------|-----------|------|
| Duration since HIV diagnosis (years) | ≤2 | 141 | 33.4 |
| | >2 | 281 | 66.6 |
| Duration since on ART (years) | ≤2 | 178 | 42.2 |
| | >2 | 244 | 57.8 |
| Disclosed HIV to families? | Yes | 377 | 89.3 |
| | No | 45 | 10.7 |

(49.5%) perceived as the drugs actually reduce the transmission. Majority, 349 (82.7%), of the respondents heard the information about vertical transmission of HIV from counselors (Table 3).

Knowledge about vertical transmission of HIV among women living with HIV or AIDS on treatment

Out of total participants, 397 (94.1%) (95% CI: (91.7%, 96.2%)) of them had knowledge about vertical transmission of HIV and majority 290 (73.0%) of them heard as vertical transmission of HIV occurs during labor. Regarding the source of information, majority 349 (82.7%) heard from health care providers (Table 2).

Factors associated with the knowledge about vertical transmission of HIV

In bivariable logistic regression analyses, age, residence, educational status, number of children, duration since HIV diagnosis, duration on ART, provider discussion, HIV status of the children, HIV status disclosure, and pregnancy after HIV positive were significantly associated with the knowledge of women living with HIV.

In multivariable regression, women living in urban were nearly twofold (adjusted odds ratio (AOR): 2.36, 95% CI: (1.27, 4.39)) more likely to know about vertical transmission of HIV than those who were living in rural. Similarly, women who had attended primary were three times (AOR: 2.94, 95% CI: (1.11, 7.83)) and secondary school were also three times (AOR: 3.39, 95% CI: (1.53, 7.55)) more likely to know about vertical transmission of HIV than who did not attend formal education.

Respondents who were on ART for greater than 2 years were almost three times (AOR: 2.67, 95% CI: 1.02, 6.99)) more likely to know about vertical transmission of HIV than their counterparts. Participants who had children living with HIV were one and half times (AOR: 1.54, 95% CI: (1.07, 3.83)) more likely to know about vertical transmission of HIV than their counterparts (Table 4).

Discussion

The study showed relatively high proportion of women living with HIV or AIDS were knowledgeable about vertical transmission of HIV. More than 90, 397 (94.1%) of women were heard about vertical transmission of HIV and nearly three-fourth (73%) of them perceived as it may be transmitted during labor. The prevalence of mothers' knowledge about vertical transmission of HIV was higher than what was reported in South Africa (91.4%)¹⁹ and in the Northern Ethiopia (84.5%).¹⁴

Multivariable analysis revealed that women living in urban, who attended formal education, being on ART for greater than 2 years and having a child living with HIV were positively associated with the women's knowledge on vertical transmission of HIV.

Table 3. Knowledge of mother about vertical transmission of HIV among women living with HIV/AIDS attending ART service in the West Wollega zone, Western Ethiopia, 2019.

| Characteristics | Category | Frequency | % |
|--|-----------------------|-----------|------|
| Heard vertical transmission of HIV | Yes | 397 | 94.1 |
| | No | 25 | 5.9 |
| Time of vertical transmission of HIV | During pregnancy | 180 | 45.3 |
| | During labor | 290 | 73.0 |
| | During breastfeeding | 205 | 51.6 |
| Heard of drug prevent vertical transmission of HIV? | Yes | 333 | 78.9 |
| | No | 89 | 21.1 |
| Attitude toward drugs reduce vertical transmission of HIV | Yes | 209 | 49.5 |
| | No | 213 | 50.5 |
| Sources of information on vertical transmission of HIV | Mass media | 159 | 37.7 |
| | Health care providers | 349 | 82.7 |
| | Friends/peer | 143 | 33.9 |
| Did health workers discuss about vertical transmission of HIV? | Yes | 339 | 80.3 |
| | No | 83 | 19.7 |

Table 4. Factors associated with the knowledge about vertical transmission of HIV among women living with HIV or AIDS attending ART service in the West Wollega, Western Ethiopia, 2019.

| Variables | Category | Knowledge about vertical transmission of HIV | | COR (95% CI) | p-value | AOR (95% CI) | p-value |
|--|--------------|--|-----------|----------------------|---------|--------------------|---------|
| | | Yes (%) | No (%) | | | | |
| Age of mother (years) | 15–24 | 107 (97.3) | 3 (2.7) | 1.68 (8.07, 26.72)* | 0.202 | 0.29 (0.08, 1.23) | 0.672 |
| | 25–34 | 195 (93.8) | 13 (6.2) | 0.97 (0.61, 1.16) | 0.074 | 0.70 (0.29, 1.70) | 0.193 |
| | 35–49 | 95 (91.3) | 9 (8.7) | 1.00 | 1.00 | 1.00 | 1.00 |
| Residence | Urban | 231 (96.2) | 9 (3.8) | 9.86 (4.07, 13.37)** | 0.000 | 2.36 (1.27, 4.39)* | 0.001 |
| | Rural | 166 (91.2) | 16 (8.8) | 1.00 | 1.00 | 1.00 | 1.00 |
| Educational status | No education | 44 (86.3) | 7 (13.7) | 1.00 | .000 | 1.00 | 1.00 |
| | Primary | 238 (94.4) | 14 (5.6) | 4.32 (2.03, 6.54)** | .001 | 2.94 (1.11, 7.83)* | 0.018 |
| | ≥Secondary | 115 (96.6) | 4 (3.4) | 5.21 (3.06, 9.64)** | .000 | 3.39 (1.53, 7.55)* | 0.006 |
| No. of children | 0 | 77 (98.7) | 1 (1.3) | 1.00 | 1.00 | 1.00 | 1.00 |
| | ≥1 | 320 (93.0) | 24 (7.0) | 1.18 (1.85, 5.36)* | .018 | 1.28 (0.67, 2.49) | 0.142 |
| Duration since HIV diagnosed (years) | ≤2 | 137 (97.2) | 4 (3.8) | 1.00 | | 1.00 | 1.00 |
| | >2 | 260 (92.5) | 21 (7.5) | 2.18 (1.43, 3.33)* | 0.067 | 0.43 (0.15, 1.28) | 0.185 |
| Duration on ART | ≤2 | 122 (95.5) | 8 (4.5) | 1.00 | 1.00 | 1.00 | 1.00 |
| | >2 | 170 (93.0) | 17 (7.0) | 2.52 (1.69, 3.78)** | 0.000 | 2.67 (1.02, 6.99)* | 0.009 |
| Health workers discuss vertical transmission of HIV? | Yes | 336 (96.3) | 13 (3.7) | 1.64 (1.01, 2.67)* | | 1.32 (.57, 3.07) | 0.714 |
| | No | 61 (83.6) | 12 (16.4) | 1.00 | | 1.00 | 1.00 |
| HIV status disclosed | Yes | 355 (94.2) | 22 (5.8) | 1.42 (4.16, 24.35)* | 0.017 | 1.32 (0.57, 3.07) | 0.191 |
| | No | 42 (93.3) | 3 (6.7) | 1.00 | | 1.00 | 1.00 |
| Had children living with HIV | Yes | 40 (90.9) | 4 (9.1) | 1.00 | 0.008 | 1.54 (1.07, 3.83)* | 0.019 |
| | No | 357 (94.4) | 21 (5.6) | 4.36 (2.14, 8.90)* | 1.00 | 1.00 | 1.00 |
| Pregnancy after acquiring HIV | Yes | 120 (92.3) | 10 (7.7) | 1.63 (1.11, 2.40)* | 0.003 | 1.18 (0.62, 2.25) | 0.121 |
| | No | 277 (94.9) | 15 (3.1) | 1.00 | 1.00 | 1.00 | 1.00 |

Note: **p < 0.001, *p < 0.05.

For the respondents who live in urban settings, the odds of having knowledge about vertical transmission of HIV were two times higher than those who live in rural area. This finding is supported by study in the Sub-Saharan,

North and Northeast Ethiopia.^{14–16,20} Women who live in urban settings have good health-seeking behavior and might have better access to maternal health care services, such as antenatal care (ANC).^{21,22} The study done in

Northeast Ethiopia showed that ANC service utilization has positive significant association with the knowledge of the vertical transmission of HIV.²³ Another reason might be due to the inter-regional and rural–urban differentials in access to education and resources, including HIV and AIDS education.^{19,24}

Mothers who attended primary and secondary school had almost three times higher odds of knowledge about vertical transmission of HIV than those who did not attend. This matched to studies conducted in North and Northwest Ethiopia.^{14–16} This might be due to the fact that educated women may get knowledge related to vertical transmission of HIV through their formal education. However, women with better education status might have the ability to gain more knowledge related to vertical transmission of HIV through their day-to-day life experience as they might have better communication skills. Educated women might also have better access to mass media which has a positive impact on knowledge related to vertical transmission of HIV.

Mothers who were on ART for more than 2 years had higher odds of knowledge about vertical transmission of HIV than their counterparts. This might be attributed to the impact of prevention of mother-to-child transmission (PMTCT) program which one of its components is preventing HIV transmission from a woman living with HIV to her infant.²⁵ Thus, the longer the women attend ART service the higher probability to get knowledge about vertical transmission of HIV from their care providers through PMTCT.

The odds of knowledge about vertical transmission of HIV were higher among mothers who had child living with HIV than their counterparts.¹⁴ This may be because the mothers who had child living with HIV are more curious to learn how to prevent the transmission of HIV to their newborn in the prospective pregnancy. Study conducted in South Africa also suggested that mothers those with parity 0 had lower odds of knowledge about vertical transmission of HIV as compared to those higher parity.¹⁹

Strengths and limitations of the study

The study assessed an important topic and provided factual insights regarding factors affecting maternal knowledge about vertical transmissions of HIV; however, it is not without limitations. The study used interviewer-administered data collection technique which might result in a social desirability bias because of the sensitive nature of the issue. This might lead to under- or overestimating of the knowledge of mother on vertical transmission of HIV.

Conclusion

Knowledge about vertical transmission of HIV among non-pregnant women living with HIV was found to be relatively high. In this study, urban residence, attending formal education, having child living with HIV, and being on ART for

greater than 2 years were factors associated with the knowledge of women toward vertical transmission of HIV. Therefore, interventions targeting women from rural settings and those with no formal education may result in increased knowledge related to vertical transmission of HIV and help reduce the new incidence of HIV infection among newborns. Moreover, women who were on ART for less than 2 years and not given birth to HIV positive child should be given due attention in improving their knowledge about vertical transmissions of HIV and preventing the new incidence of HIV among newborn and children.

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Author contributions

B.B., N.A., G.E., H.B. and T.G. participated in the conception of the study, study design, analysis and drafting the article; G.M.A., T.B.R. and B.T.M. participated in data acquisition, study design, analysis and article writing. All authors read and approved the final version of the article.

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Availability of data and material

The datasets used for the analysis are available from the corresponding author on reasonable request.

Supplemental material

Supplemental material for this article is available online.

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