Knowledge of Mother-to-Child Transmission of HIV among Ethiopian Women aged 15-49: Trend Analysis from 2000-2016

Yemane Desta (✉ yemanetadesse@gmail.com)

Research article

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Abstract

Background Globally, mother-to-child transmission (MTCT) of HIV is the major route of pediatric HIV infection. In Ethiopia 110, 000 children aged 0 to 14 were living with HIV in 2014. However, this number has been significantly declined to 36,000 in 2018. Deaths of children due to AIDS has also fall down from 23, 000 in 2014 to 1800 in 2018. Even though improvements have been shown in the past 5 years, still the progress is much less slower than the needed. In this sense, improving maternal and child health, enhancing knowledge and awareness of women towards mitigating of MTCT are essential. Hence, the present study aimed to investigate knowledge of MTCT of HIV, associated factors and its trend among women in Ethiopia.

Methods This study included 15683 women obtained from 2016 Ethiopian Demographic and Health Survey (EDHS). Chi-square tests and binary logistic regressions were performed to investigate the association between risk factors and MTCT of HIV.

Results Higher education level (Odds Ratio (OR) =1.39, 95%CI=1.15-1.67; P<0.001), belonging to city administration and Harari region (OR =1.53, 95%CI= 1.23-1.90; P<0.001), being divorced or separated (OR =1.37, 95% CI= 1.19-1.58; P<0.001)), having a better wealth (OR =1.44, 95% CI= 1.24-1.68; P<0.001)), mass media exposure (OR =1.20, 95% CI= 1.12-1.29; P<0.001)) and having comprehensive HIV/AIDS knowledge (OR =1.69, 95% CI= 1.56-1.82; P<0.001) had a strong association with having sufficient knowledge of MTCT. While MTCT knowledge is low (57%) among Ethiopian women, the results show a significant (P<0.001) increase from 2.6% in 2000 to 57% in 2016. Similarly, women in 2016 are 50.40 times more likely to have MTCT of HIV knowledge compared to their counterparts in 2000.

Conclusions Taken together, the findings are of key importance to address knowledge on prevention of MTCT of HIV among women of child-bearing age which are targets of effective approaches for reducing MTCT of HIV.

Introduction

Since several decades HIV/AIDS has been a major human health challenges globally [1]. Studies have been revealed that there were 34.8 million people living with HIV worldwide in 2014 [2–4], and 36.9 in 2017 [4]. The prevalence is high in Sub-Saharan regions of Africa [5, 6]. This region continues to be the most seriously affected one by HIV/AIDS in the world [7]. In 2013, 35 million people have been living with HIV, out of them two third (20 million) were found in this region. Even though it represents 12 percent of the total population of the globe, its share in the HIV/AIDS infection is disproportionately high [8, 9]. Sub-Saharan region accounted for 71 % of the HIV infections [10, 11] and 74 % of all the people dying from AIDS related causes worldwide [8].

Women of reproductive age have been shown to be highly vulnerable to HIV/AIDS infection [12, 13]. This is reported to be the result of a combination of factors such as, biological, social, behavioral, cultural and economic [14, 15]. In Sub-Saharan African countries the lower socio-economic position of women exacerbates the risk of vulnerability to HIV/AIDS [14]. Due to the cultural drawbacks women are more likely to be uneducated and so unemployed; which leads to an increased number of impoverished women, economic inequality and dependence compared to men [16]. Besides, unequal power

relationships, which expose them to practice unsafe sex, also placed women at high risk of being contracted by HIV [15].

Globally, 9 % of new HIV infections are children contracted through MTCT of HIV making it the major contributor to the HIV/ADS pandemic. An estimated 3.1 million children were living with HIV and the new infections accounted for about 160,000 in 2016 [17]. Remarkable progress has been made to prevent mother-to-child transmission of HIV in the previous few years throughout the world. As part of this, the proportion of pregnant women living with HIV that has access to treatment for preventing transmission of the virus to their babies arose by 33 %, from 47 % in 2010 to 80 % in 2017 [4].

Even though the global new pediatric HIV infection have declined by 35 %, from 270,000 in 2010 to 180,000 in 2017, still it is the leading cause of mortality of children in Sub-Saharan African countries [4]. From the total of 25 million populations living with HIV in Sub-Saharan Africa, 2.9 million are children under the age of 15 [18, 19]. According to the 2008 report, the number of newly infected children was 430,000 [20]; majority was infected through vertical transmission from mother to their babies [18]. The risk of HIV transmission varies ranging from 5 % to 10 % during pregnancy, 10% to 15 % during delivery, and 5 % to 20 % through breastfeeding without any intervention [21]. Due to failure in implementation of designed strategies to halt MTCT of HIV remarkably, still there are numerous preventable newborn infections in Africa [22].

Ethiopia, one of the East African countries seriously affected by HIV/AIDS, was a home for more than 160, 000 and 110, 000 HIV infected, less than 15 years old children in 2013 [23] and 2014 [24] respectively. However, this number has been significantly declined to 36,000 in 2018 [25]. The number of deaths of children due to AIDS has also fall down from 23, 000 in 2014 [24] to 1800 in 2018 [25]. These recent remarkable improvements may be due to the good progress in implementation of prevention of MTCT of HIV services in Ethiopia [26]. However, there is still a remaining work as far as the transmission has no longer halted or minimized. Identifying and addressing gaps in the knowledge of MTCT of HIV may be crucial in this aspect. For this, the intervention on MTCT entail the use of women knowledge may be a potential corner stone based on which intervention strategies can be streamlined to achieving success in a shortest possible time.

So far there is no recent generalized national level report of the knowledge of women towards MTCT of HIV in Ethiopia even though few studies have been shown that pregnant women's knowledge towards MTCT of HIV in specific areas is lower [6, 27]. This implies the extent of knowledge on MTCT of HIV associated factors and its trend among women in Ethiopia are underexploited and not well addressed despite of the need of well validated, comprehensive and up-to-date reports. Hence, the aim of the present study is to address the knowledge on MTCT of HIV, associated factors and its trend among women in Ethiopia.

Materials And Methods

Data type and source

Ethiopia comprises nine geographical regions including Tigray, Affar, Amhara, Oromiya, Somali, Benishangul–Gumuz, Southern Nations Nationalities and Peoples (SNNP), Gambela, and Harari and two administrative cities, Addis Ababa and Dire Dawa. Sample of 2016 Ethiopian Demographic and Health Survey (EDHS) was taken to investigate determinant factors associated with knowledge of women towards MTCT of HIV infection from each of the aforementioned regions and administrative cities. Additional data from Ethiopian DHS of 2000, 2005 and 2011 has been also included to see the trend of knowledge of women towards MTCT in the country.

Data extraction

Four year survey data of 2000, 2005, 2011 and 2016 from EDHS data sets were downloaded in SPSS format after getting permission from DHS website (<http://www.dhsprogram.com>). From the detailed data sets and coding further data extraction and recoding was carried out. Social determinants and MTCT of HIV knowledge related indicator variables were extracted from women data sets. Data sets of socio-demographic characteristics and knowledge on MTCT of HIV of women respondents from the four EDHS clusters were merged accordingly for this analysis.

Measurement of variables

Dependent variables

Knowledge index of MTCT of HIV was measured from the answers to three questions (MTCT during pregnancy, during delivery, and through breastfeeding); then, the knowledge index were categorized as sufficient knowledge only if when the respondents answered all these three questions and coded number 1; whereas not sufficient knowledge if they answered one or two questions and coded 0.

Independent variables

The independent variables were taken from the survey included age, level of education, place of residence, marital status, religion, wealth index, occupation, media exposure and comprehensive HIV knowledge. The seven 5-year age groups 15–19, 20–24, 25–29, 30–34, 35–39, 40–44 and 45–49 listed in DHS data were re-organized into 3 age groups as 15–24, 25–34 and 35–49. Place of residence was taken in both rural and urban. Four ranks of education provided were: no education, primary education, secondary education, and higher education. Marital status including: never married, married, living together, widowed, divorced and not living together were re-categorized in to three groups as never married (group one), married/living together (group two) and Divorced/Separated/Widowed (group three).

Based on their development, geographical location and common features, regions were re-categorized into three larger sub divisions including; developed region such as Oromiya, Amhara, SNNPR and Tigray; Secondly, emerging region such as Somali, Affar, Benishangul Gumuz and Gambela; Capital city Addis Ababa, Dire Dawa city and Harari. The third sub division includes capital city Addis Ababa, Dire Dawa city and Harari region [28]. DHS grouped wealth index as poorest, poorer, middle, richer, and richest, were taken to compare the influence of wealth on MTCT knowledge of Ethiopian women. Occupation was also regrouped into four classifications: not working, agricultural (self-employed and employee), sales, services and others (services, professional/technical/managerial, clerical, household and domestic, skilled/unskilled manpower, armed force, others). Comprehensive HIV/AIDS knowledge was defined as (1) knowing HIV prevention methods, using condom and limiting sex partners to one uninfected faithful partner, (2) awareness on healthy looking people may have AIDS virus, and (3) able to reject at least two out of the three commonest local misconceptions- such as HIV virus can be transmitted through mosquito bites, a person can get AIDS virus by sharing meal with infected person, and infection by supernatural means. Comprehensive HIV/AIDS knowledge is a binary response variable coded 1 if women reported five correct responses and 0 otherwise. In order to measure media exposure of women, they were asked for frequency of habit of: (1) reading newspaper or magazine, (2) listening to radio and (3) watching television in the DHS data. Each of these questions are binary response variable coded 1 if women reported that they have a habit of reading newspaper or magazine, listen to radio, and watch television at least ones in shorter than a week and 0 otherwise. Then, these three variables are merged as mass media exposure which is binary response variable coded 1 if women reported three correct responses in three of the variables and 0 if not.

Statistical Analysis

Descriptive statistics was used to analyze socio-demographic characteristics of the respondents. Chi square test was carried out for comparison of the distribution of categorical characteristics with comprehensive knowledge and MTCT knowledge. Binary logistic regressions were performed to establish the relationships between independent variables and HIV knowledge levels of respondents. For binary regression analyses, we employed adjusted odds ratios (OR) at 95 % CI (p-value <0.05). Data were analyzed using SPSS, version 22 statistical software

Results

Distribution of socio- demographic characteristics among women (N = 15683)

Descriptive statistics was used to analyze demographic characteristics. Data (Table 1) indicate that 39.2 % were within the age range of 15–24 years. Almost half (47.8 %) had no formal education, about one-third (35.0 %) of the participants had completed primary education and 11.6 % had completed secondary level of education. Only 5.6 % had higher than secondary level of education. Majority (88.2 %) of the

respondents live in the four developed regions. The rest (5.0 % and 6.8 %) resides in the emerging and city administration and Harari region, respectively. About two-third of the participants (65.2 %) married, quarter of them were never married and 9.1 % of them were divorced, separated or widowed. With regard to their wealth status 45.5 % of the respondents were rich. Above one-third (34.7 %) and 19.0 % were poor and in the middle level of wealth index respectively. Almost half of the respondents (49.9 %) did not have formal work and 56.1 % were without media exposure and 69.7 % of the participants did not have comprehensive HIV and AIDS knowledge (Table 1).

Table 1 Distribution of socio- demographic characteristics among women (N = 15683)

Variables	Frequency (15683)	Percent (%)
Age		
15-24	6143	39.2
25-34	5302	33.8
35-49	4238	27.0
Types of Residence		
Rural	12207	77.8
Urban	3476	22.2
Educational status		
No education	7498	47.8
Primary	5490	35.0
secondary	1817	11.6
Higher	877	5.6
Region		
Emerging region)	792	5.0
Developed region	13832	88.2
City administration & Harari region	1059	6.8
Current Marital Status		
Never in Union	4036	25.7
Married/Living together	10223	65.2
Divorced/Separated/Widowed	1423	9.1
Wealth index		
Poorest	2633	16.8
Poorer	2809	17.9
Middle	2978	19.0
Richer	3100	19.8
Richest	4163	26.5
Respondent's Occupation		
Not working	7819	49.9
Agriculture	2498	15.9
Sales	3263	20.8
Services and Others	2102	13.4
Media Exposure		
No	8793	56.1
Yes	6890	43.9
Comprehensive HIV/AIDS knowledge		
No	10927	69.7
Yes	4756	30.3

Knowledge of women towards MTCT mechanisms of HIV

Figure 1 demonstrated level of knowledge of women on MTCT mechanisms in each year of survey by asking three questions. The proportion of the respondents who correctly answered the questions has been displayed in figure 1. 2000 survey indicated that 42.6 % of the respondents knew that HIV can be transmitted by breast feeding; however those women who knew HIV transmission can be occurred during

delivery and during pregnancy were 8.7 % and 24.9 %. In 2005 year of survey even though the knowledge of the respondents to the transmission of HIV by breast feeding is decreased to 33.3 %, those who correctly respond to the remaining questions; HIV can be transmitted during delivery and during pregnancy progressed to 29.4 % and 29 %. In the next two year of survey, 2011 and 2016, the correct answers of the participants towards all the three questions has increased dramatically as can be shown from the figure. The percentage of the women who correctly answered all questions is only 2.6 % in 2000. In 2005 year of survey this is scaled up to 25.0 %. Furthermore, in 2011 and 2016 survey years, this percentage has reached 54.2 and 57.0 %, respectively (Figure 1).

Figure 1 Knowledge of respondents on MTCT of HIV transmission among women aged 15–45

Associations of socio-demographic variables with MTCT of HIV knowledge of respondents

Associations of socio-demographic variables with MTCT of HIV knowledge was examined using Chi-square test. Results has been shown that all variables except age were significantly ($P<0.05$) associated with level of MTCT knowledge. Participants' age was not a risk factor ($\chi^2 = 2.858$, $P>0.05$) to women's knowledge of MTCT (Table 2).

Table 2 Pearson's correlation coefficients for the association between knowledge of MTCT with socio-demographic variables

Variables	MTCT knowledge		
	Sufficient knowledge (%)	Chi-square	P value
Age		2.858	0.24
15-24	3477 (38.9)		
25-34	3072 (34.4)		
35-49	2392 (26.8)		
Types of Residence		200.150	<0.001
Rural	6595 (73.8)		
Urban	2346 (26.2)		
Educational status		235.085	<0.001
No education	3867 (43.3)		
Primary	3256 (36.4)		
secondary	1184 (13.2)		
Higher	634 (7.1)		
Region		169.585	<0.001
Emerging region)	319 (3.6)		
Developed region	7876 (88.1)		
City administration and Harari region	747 (8.4)		
Current Marital Status		7.726	0.021
Never in Union	2311 (25.8)		
Married/Living together	5722 (64.5)		
Divorced/Separated/Widowed	859 (9.6)		
Wealth index		337.701	<0.001
Poorest	1212 (13.6)		
Poorer	1468 (16.4)		
Middle	1663 (8.6)		
Richer	1795 (20.1)		
Richest	2802 (31.3)		
Respondent's Occupation		59.918	<0.001
Not working	4266 (47.7)		
Agriculture	1526 (17.1)		
Sales	1841 (20.6)		
Services and Others	1308 (14.6)		
Media Exposure		230.309	<0.001
No	4546 (50.8)		
Yes	4395 (49.2)		
Comprehensive knowledge		404.519	<0.001
No	5657 (63.3)		
Yes	3284 (36.7)		

Associations of socio-demographic variables with MTCT of HIV knowledge of respondents using binary logistic regression analyses

Binary logistic regression analysis revealed that there was no statistically significant difference in knowledge of MTCT of HIV among women with respect to their age and geographical location. On the other hand, significantly higher knowledge of MTCT was observed in women attained primary (OR = 1.27, $P < 0.001$), secondary (OR = 1.23, $P = 0.002$) and higher (OR = 1.39, $P < 0.001$) educational levels than women with no education (Table 3). Moreover, knowledge of MTCT of HIV of respondents varied by region. As indicated in the data, women who live in predominantly emerging regions (Affar, Somali, Gambela and Beni-shangul) have less knowledge of MTCT of HIV compared to those who live in developed regions (Tigray, Oromiya and Amhara), or those who live in urban regions (Addis Ababa, Harari and Dire-Dawa) (Table 3). Marital status of respondents was significantly associated with knowledge on MTCT of HIV. Logistic regression analysis also showed that being married/living together (OR = 1.28, $P < 0.001$) and divorced/separated/widowed (OR = 1.37, $P < 0.001$) showed higher knowledge on MTCT of HIV compared to unmarried respondents (Table 3). With regard to women's wealth index, group of poorer (OR = 1.22, $P < 0.001$), middle (OR = 1.34, $P < 0.001$), richer (OR = 1.30, $P < 0.001$) and richest (OR = 1.5, $P < 0.001$) had higher knowledge on MTCT of HIV than the poorest. However, no significant association was found among occupation categories. Women who have an exposure to media and those who have sufficient comprehensive HIV and AIDS knowledge were more likely to have sufficient knowledge of MTCT of HIV (Table 3).

Table 3 Associations between socio-demographic variables and sufficient knowledge on MTCT of HIV using binary logistic regression analyses

Variables	MTCT Knowledge		
	OR	95 % CI	P
Age (Ref=15-24)			
25-34	1.07	0.98-1.18	0.135
35-49	1.05	0.95-1.17	0.365
Types of Residence (Ref=Rural)			
Urban	1.04	0.90-1.19	0.609
Educational status (Ref=No education)			
Primary	1.25	1.15-1.37	<0.001
Secondary	1.23	1.08-1.41	0.003
Higher	1.39	1.15-1.67	0.001
Region (Ref=Emerging region)			
Developed region	1.32	1.13-1.55	<0.001
City administration and Harari region	1.53	1.23-1.90	<0.001
Current Marital Status (Ref=Never in Union)			
Married/Living together	1.29	1.17-1.42	<0.001
Divorced/Separated/Widowed	1.37	1.19-1.58	<0.001
Wealth index (Ref=Poorest)			
Poorer	1.17	1.05-1.31	0.004
Middle	1.29	1.16-1.44	<0.001
Richer	1.27	1.13-1.42	<0.001
Richest	1.44	1.24-1.68	<0.001
Respondent's Occupation (Ref=Not working)			
Agriculture	0.99	0.89-1.09	0.784
Sales	1.06	0.97-1.16	0.178
Services and Others	1.02	0.92-1.14	0.661
Media Exposure (Ref=No)			
Yes	1.20	1.12-1.29	<0.001
Comprehensive HIV/AIDS knowledge (Ref=No)			
Yes	1.69	1.56-1.82	<0.001

OR- odds ratio, CI- confidence interval

Trends in knowledge of Women of age 15–49 on MTCT of HIV

Trend analysis of MTCT knowledge among Ethiopian women from 2000- 2016 survey data *between the age of 15–49* has been increased from 2.6 % to 25 %, then continued to 54.2% and finally reached 57% in 2000, 2005, 20011 and 2016, respectively (Figure 2).

Figure 2 Trend analysis of MTCT knowledge among Ethiopian women of age 15–49

Level of knowledge improvement on MTCT of HIV among Ethiopian women aged 15–49, 2000–2016

Level of MTCT knowledge showed a significant ($p < 0.001$) increase throughout the years of surveys from 2000 to 2016. Women in survey 2 (2005) are 12.64 times more likely to have MTCT knowledge compared to women in survey 1 (2000). Similarly, women interviewed in 2011 and 2016 are 45.02 and 50.40 times more likely to have MTCT of HIV knowledge compared to their counterparts in 2000, respectively (Table 4).

Table 4 Level of knowledge improvement on MTCT of HIV among Ethiopian women aged 15–49, 2000–2016

Variables	MTCT Knowledge			
	Number (%)	OR	95 % CI	P value
Year				
2000	394 (2.6)	1.00		
2005	3512 (25.0)	12.64	11.36-14.07	<0.001
2011	8955 (54.2)	45.02	40.55-49.98	<0.001
2016	8941 (57.0)	50.40	45.38-55.98	<0.001

OR- odds ratio, CI- confidence interval

Discussion

Previous studies demonstrated that measuring knowledge of MTCT of HIV is crucial to plan and implement prevention, care and support of women who are at risk of HIV infection. In this perspective our present study highlighted knowledge of women on MTCT of HIV, determinant factors related to these as well as its trend and knowledge improvement from 2000- 2016 year of survey among Ethiopian women. First we examined the effect of socio-demographic characteristics on women's knowledge of MTCT of HIV including educational attainment, current marital status, wealth index, region, media exposure and full HIV comprehensive knowledge accordingly.

Our findings indicated that almost in excess of half of the participants (57.0 %) were with sufficient knowledge on mother-to-child transmission of HIV. This proportion is much greater than the level of correct knowledge of women on MTCT of HIV (34.9 %) in Ethiopia reported in survey year of 2011 [28]. However, our data are comparable with study in Ethiopia that described approximate proportion of pregnant women's knowledge on prevention of MTCT of HIV [29]. Apart from Ethiopia, studies in Tanzania and Zambia in 2016 and 2009 respectively, have reported that the knowledge of mothers towards MTCT was lower than our findings (57.0 %) [30, 31].

Although our study found urban women to have an advantage in terms of knowledge on MTCT of HIV over their rural counterparts, their differences did not show any statistical significance. This proportional level of knowledge in the rural and urban settings may be attributed to various programs being broadcasted as well as the different health packages promoted by the Ethiopian government as well as other non-government organizations reaching even the distant rural areas. Similar result has been

reported from Addis Ababa (Ethiopia) that mothers' place of residence did not have any significant association ($P = 0.58$) with their knowledge on MTCT of HIV [32]. These findings also coincide with a study reported from Uganda where the level of MTCT knowledge did not show any significant difference between the mothers in the rural setting compared to those in the urban areas [33]. Whereas, a study among antenatal care attendees in northwest Cameroon showed urban women to have better knowledge on MTCT of HIV than their rural counterparts. For this, they reason out that rural and urban population differs in knowledge, readiness and ability to follow advice [34]. Similarly, other studies in Ethiopia also showed that knowledge of pregnant women towards MTCT of HIV showed variances between the rural and urban residents. Urban pregnant women were more likely to be knowledgeable when compared to those living in rural areas [27, 35]. However, these studies did not include nationally representative data since their work was in a specific area and only pregnant women as well. Thus, further research could be required using nationally representative data and relatively recently collected information.

Among the socio-demographic factors educational attainment had a positive association with sufficient knowledge on MTCT of HIV in women. Women who attended primary, secondary and higher education level were 1.25, 1.23 and 1.39 times more likely to have sufficient knowledge on MTCT of HIV compared to the illiterate women respectively. Hence, education plays a critical role in determining one's social status, by improving individual's way of seeking information. A similar result has been also reported by Asefa and Beyene that full knowledge on MTCT of HIV among antenatal care attending women in Southern Ethiopia was associated with their educational status [36]. Previous study has identified education can increase the knowledge of women towards MTCT [37]. In discrepancy to this, a varied evidence has been reported by Sama [34] and others, where there is no significant difference between primary school and below educational status of women with those who attended secondary and above with $P = 0.49$.

In the present study, women from relatively developed region and in city administration and Harari region being more likely to have sufficient knowledge of MTCT compared to those reside in emerging regions. This is consistent with similar studies conducted in city administrations and emerging region of Ethiopia that clearly showed the knowledge variations in these areas. For example, the study conducted by Jebessa and Teka in Addis Ababa (city administration) shows 89.8 % of respondents having knowledge of MTCT [32], whereas the result of a study conducted in Assosa town (emerging region) showed only 57.5 % of respondents had knowledge about MTCT of HIV [18]. Another study by Luba and others also found out that the women from emerging regions being less likely to have sufficient knowledge on MTCT of HIV compared to those reside in city administration and Harari region [28], which is in agreement with this study. This could be due to the long distance of the emerging region from the central government. This in turn limits access to infrastructures like roads, facilities, schools and health centers, as well as media coverage.

As Ethiopia has planned programs for the prevention of MTCT of HIV, there is a need to consider the potential barriers that these plans may face. In addressing these barriers, it is crucial that any differences between the remote areas and city administration settings are addressed since the larger proportion of

people in Ethiopia, as is in the other developing countries, resides in the rural areas. This study has revealed that there is remarkable difference in terms of the knowledge on MTCT of HIV of women that might be an obstacle to the success of implementation of PMTCT programs in remote areas as compared to city administrations. This may imply that the same preventive approaches may not be applied to both, the emerging region and city administrations.

This study also found current marital status and wealth index to be a significant predictor of MTCT knowledge of HIV in women. Participants who were experienced marriage or relationship, including those who were divorced, separated or widowed, had better knowledge on MTCT of HIV than those who have never been in relation. Here in this situation we noticed this could be because of the women's increased awareness on MTCT and other HIV related knowledge as they are engaged to sexual relations and may become more curious as they think of marriage or relation with spouse. In addition, their male partner might have been also contributed to increased level of knowledge on MTCT of HIV, as previously reported in different studies that spouse discussion during antenatal care follow-up has shown to significantly increase the knowledge towards MTCT of HIV of the women [35, 36].

In response of wealth index, higher wealth index had a positive association with sufficient knowledge on MTCT of HIV among women. This could be because the low level of knowledge on MTCT among the poor women might be due to financial problems and so less access to health services and health information related to MTCT of HIV. This is in line with the study from 2011 Ethiopian DHS data that women from the richest household were 1.85 times more likely to have sufficient knowledge towards MTCT compared to the poorest women [28].

Our results indicated that there is a positive relationship between media exposure and women's knowledge on MTCT of HIV as women with access to mass media (watching television, listening radio and reading newspaper at least once a week) were 1.20 times more likely to have sufficient knowledge of MTCT than those with no access. This finding is consistent with the study by Jung and others that described having an opportunity for mass media may determine individual's accessibility to HIV/AIDS related information and condom use and reduce the impact of socioeconomic status on health [38]. In line with this another study from Nigeria also reported media campaign has been successful in scaling up the level of knowledge of women about HIV/AIDS in the country [39]. So, mass media has to play its role through promotion of PMTCT services by addressing the illiterate and poor women to achieve elimination of MTCT.

It is also clearly shown that women's comprehensive HIV/AIDS knowledge is a positive factor for MTCT of HIV knowledge. Women who have comprehensive knowledge were 1.69 times more likely to have sufficient knowledge on MTCT of HIV compared to their counterparts. Other study also revealed similar findings that a positive association was reported between knowledge on MTCT of HIV and comprehensive knowledge on HIV among antenatal care followers in Assosa town, Ethiopia [6].

Subsequently, the trend in knowledge level of MTC of HIV from survey 2000 to 2011 was evaluated. The result in Table 4 demonstrated that the trend in knowledge of MTC of HIV increased dramatically from

survey 2000–2011 among women. From this event we suggest that interventions targeting women increased as effective campaigns have been launched by the government, institutions and civil society organizations in Ethiopia, including scaling-up ART and HIV counseling and testing services [40]. For instance, from 2006 to 2010, the number of PMTCT services providing health facilities has been grown 3 times, from 21.3 % to 61.9 % in Ethiopia [20]. This is a dramatic turning point that could be the groundwork for facilitating the effort to overcome the transmission of HIV from mothers to infants by providing access to HIV related educational services in Ethiopia.

Conclusion

The study highlighted that knowledge of women on MTCT of HIV is still low even though it has been dramatically increased during the recent few years in Ethiopia. This implies that the effort has to be exceeded more than this so as to achieve a remarkable reduction in MTCT of HIV. This might also signifies that other factors, beside mother's knowledge on MTCT of HIV, that attribute for the higher infant HIV prevalence has to be critically identified. The association of knowledge of women on MTCT of HIV with education, region, current marital status, wealth index, media exposure and comprehensive HIV/AIDS knowledge was significant. Lack of MTCT of HIV of illiterate women, those from emerging region, unmarried, with lower economic status, with lower media exposure and those with insufficient comprehensive HIV/AIDS knowledge suggests that specific and focused educational programs which can empower women to prevent MTCT of HIV is crucial. Successful intervention toward prevention of mother-to-child transmission would be required; particularly, women of reproductive age should have precise and up-to-date knowledge about HIV transmission, risk of transmission to babies, and possible prevention approaches so as to achieve the goal of eliminating new infection of children.

Abbreviation

EDHS: Ethiopian Demographic and Health Survey; HIV: Human Immunodeficiency Virus, MTCT: Mother-to-Child Transmission; OR: odds ratio; PMTCT: Prevention of Mother-to-Child transmission; SNNPRS: Southern Nations, Nationalities, and Peoples' Regional State; WHO: World Health Organization.

Declarations

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Authors' contributions

YTD conceptualization, design of study, methodology as well as writing manuscript. YTD and SAG carried out data analysis. EGA participated in revising the manuscript and providing consistent comments during

the write-up. All authors revised and approved the final version of the manuscript.

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Availability of data and materials

The datasets used during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

All authors declare that they have no competing interests.

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Figures

Figure 1

Figure 1 Knowledge of respondents on MTCT of HIV transmission among women aged 15-45

Figure 2

Figure 2 Trend analysis of MTCT knowledge among Ethiopian women of age 15-49