

# Knowledge and Determinants of Women's Knowledge on Vertical Transmission of HIV and AIDS in South Africa

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## Research

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# Abstract

## Background

HIV/AIDS is still one of the major public health concerns globally. It is one of the major contributory causes of deaths among women in the reproductive age (15-49 years) and has resulted in about 14 million orphaned children globally. Knowledge of Mother-to Child transmission is one of the strategies to fight against HIV. This study, therefore, sought to assess the knowledge and determinants of women's knowledge on vertical transmission of HIV and AIDS in their reproductive age in South Africa.

## Methods

Data were obtained from the South Africa Demographic and Health Survey (SADHS) 2016. Both descriptive (frequencies and percentages) and inferential analysis (binary logistic regression) were conducted and the statistical significance was set at  $p < 0.05$ .

## Results

The prevalence of knowledge of mother to child transmission of HIV and AIDS during pregnancy, delivery, breastfeeding and at least knowledge of one source are 87.0%, 81.1%, 80.3% and 91.4% respectively. Women with secondary [AOR=1.271, CI=1.04, 1.55] and higher [AOR=1.495, CI=1.18, 1.89], those in urban areas [AOR=1.153, CI=[1.07, 1.25], Limpopo [AOR=1.341, CI=1.16, 1.55], Gauteng [AOR=1.337, CI=[1.15, 1.55] and North west [AOR=1.410, CI=[1.22, 1.63], those who read newspaper at least once a week [AOR=1.136, CI=1.05, 1.23], and those who listen to radio less than once a week [AOR=1.163, CI=[1.02, 1.33] had higher odds of knowledge on mother to child transmission of HIV and AIDS. However, those with parity 0 [AOR=0.783, CI= [0.68, 0.90], poorest [AOR=0.837, CI=0.73, 0.96] had lower odds of knowledge of mother to child transmission of HIV and AIDS.

## Conclusion

The study has demonstrated that there is relatively high knowledge of mother to child transmission of HIV and AIDS in South Africa. The factors associated with the knowledge are educational level, wealth status, place of residence, the region of residence, exposure to mass media and parity. To further increase the knowledge, it is imperative to adopt various messages and target respondents in different part of SSA through the mass media channels. This should be done taking cognizant of the rural-urban variations and socio-economic status.

## Introduction

Since the onset of the HIV epidemic, AIDS is the primary cause of mortality among women in the reproductive age (15-49) and has resulted in about 14 million orphaned children globally (1). An estimated 150 000 children became newly infected with HIV in 2019 only (2). South Africa has a generalized epidemic and has an estimated 7.5 million persons living with HIV (PLHIV), the highest worldwide (3). Similar to other global trends, about 4.7 million of the PLHIV are women, and 69 000 of these infections occurred in women aged 15-24 in 2018 (4). An estimated 460,000 children were infected in 2018 (5) and mother-to-child transmission (MTCT) continuous to be the leading cause of HIV infection in younger children, especially those under five years. Without any interventions, HIV exposed children are at 20% to 40% risk of being infected with the virus (6). In 2016, the World Health Organization (WHO) endorsed strategies aimed at virtually eliminating MTCT by achieving zero new HIV infections in infants by 2020 (7). Although significant strides have been made in reducing MTCT in South Africa, HIV continues to be a leading cause of maternal and under-five deaths (8).

WHO outlined a four-pronged approach to eliminate paediatric HIV (7). The strategy seeks to prevent HIV infection among women in the reproductive age; preventing unintended pregnancy among women living with HIV; preventing HIV transmission from a woman living with HIV to her infants; and providing appropriate treatment, care and support to mothers living with HIV, their children and families (7). Many efforts have been made in establishing the infrastructure and programs for providing the services in the health system (8). However, the women who will utilize the service are a critical component for achieving the goal of virtual elimination of vertical transmission.

United Nations General Assembly Special Session on Drugs (UNGASS) made a clarion call for nations to develop strategic policies that will address the gender issues associated with HIV (1). This is essential because a single infection in a woman, especially those in the reproductive age posed a more significant challenge to many nations in their bid to eliminate MTCT. Policies that promote accurate knowledge sharing and awareness of HIV issues among women are, therefore warranted (9).

Accurate MTCT and PMTCT knowledge comprise the correct information on the modes of transmission, prevention strategies and the approaches of care for those infected (10). Knowledge of women in the reproductive age on these concepts is essential as it impacts behaviour change. Higher knowledge of HIV transmission has been cited as a significant determinant of adopting self-preserving attitudes such as increased perceived vulnerability and condom use and HIV testing (11). On the other hand, women who are ignorant of the modes of MTCT have reduced uptake of the PMTCT services that are available to them (12). Unfortunately, a gradual decline of accurate HIV knowledge from 31.5% to 26.8% in 2012 was reported in South Africa (13). We, therefore, aimed to determine the level of knowledge of South African women in their reproductive age on the modes of transmission of HIV from on mother-to-child and to determine the predictors of the comprehensive MTCT knowledge.

## Materials And Methods

### Source of data

The current study is a cross-sectional analysis of nationally representative data from the 2016 South African Demographic and Health Survey (SADHS). The primary purpose of the DHS was to provide up-to-date estimates of basic demographic and health indicators which include fertility levels, maternal and childhood mortality, immunization coverage, HIV testing and counselling, and physical and sexual violence against women. Another objective was to provide estimates of health and behaviour indicators in adults aged 15 and older.

The SADHS 2016 followed a stratified two-stage sampling design with a probability proportional to size sampling of PSUs at the first stage, and systematic sampling of residential dwelling units (DUs) at the second stage. Each province was stratified into an urban, farm, and traditional areas, yielding 26 sampling strata, from which 750 PSUs were selected. DUs within each PSU were listed, and this list served as a frame for sampling DUs. Data collection for the SADHS 2016 took place from 27 June 2016 to 4 November 2016. Data were collected using questionnaires administered by conducting face-to-face interviews. Details of the questionnaires sampling and data collection procedure have been published in the final report (14). Thus, a dataset was created from information obtained from these questionnaires. From the dataset, we included 7861 all women aged 15-49 who had complete information on all the variables of interest constituted our sample.

## **Study variables**

### **Outcome variables**

The main outcome variable for this study was knowledge of MTCT of HIV. Three main questions on the transmission of HIV from mother to child during pregnancy, delivery and breastfeeding were used to assess MTCT knowledge. Each of these questions had three responses: Yes, No, and Don't Know. Based on previous studies (15,16), No and Don't know were treated as No=0 and Yes=1. Afterwards, an index was created an index was generated for all the "yes" and "no" responses, with scores ranging from 0 to 3. A score of 0 was labelled as "No", and scores 1 to 3 as "Yes".

### **Independent Variables**

Based on previous studies (17–19) eleven independent variables were considered in the study. These were age (15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49), employment (not working, managerial, clerical, Agriculture, Home, Services, manual), marital status (Never married, married, Cohabiting, Widowed/Divorced/Separated), education (no education, primary, secondary, Higher), wealth (poorest, poorer, middle, Richer, Richest), and parity (0,1,2,3,4+). Region (Western Cape, Eastern Cape, Northern Cape, Free State, KwaZulu-Natal, Northwest, Gauteng, Mpumalanga, Limpopo), residence (urban, rural), exposure to mass media (Radio, TV and Newspaper) (Not at all, Less than once a week, At least once a week).

### **Statistical analyses**

The data were analyzed with STATA version 14.2 for Mac OS. The analysis was done in three steps where descriptive analysis of the background characteristics was done initially, followed by calculating the prevalence and proportions of knowledge of mother to child transmission of HIV and AIDS across the socio-demographic characteristics through a cross-tabulation (see Table 1). Finally, a multivariable logistic regression analysis was done to assess the factors associated with knowledge of mother to child transmission of HIV and AIDS. All frequency distributions were weighted while the survey command (svy) in Stata was used to adjust for the complex sampling structure of the data in the regression analyses. This also ensured allocation of the samples to different regions of the country and ensured the results generated are representative at the national and regional levels. Multicollinearity was checked using the variance inflation factor, and there was no evidence of multicollinearity among the variables (Mean VIF=1.25, Maximum VIF=1.50, Minimum VIF=1.02). All results of the logistic regression analyses were presented as adjusted odds ratios (AORs) at 95% confidence intervals (CIs).

### **Ethical consideration**

This study was based on analyses of secondary data set from the DHS program, which gave us permission for its use. The survey was approved by the Institutional Review Board (IRB) of ICF Macro International in the United States and the National Ethics Committee in the Federal Ministry of Health of South Africa. All participants in the survey gave their consent to participate.

## **Results**

### **Background characteristics and prevalence of knowledge of mother to child transmission of HIV and AIDS**

Table 1 presents the background characteristics of the study and the prevalence of knowledge of MTCT of HIV and AIDS. Seventeen percent (17.1%) of the respondents were aged 15-19, 62.9% were not working, 58.5% were never married, and 77.2% had secondary level of education. The study also showed that 21.2% are in the middle wealth quintile, 26.4% were from Gauteng region, and 67.4% are in urban centres. The results further indicate that 39.9%, 54.9% and 73.8% are respectively exposed to newspaper, radio and TV at least once a week. The prevalence of knowledge of mother to child transmission of HIV and AIDS during pregnancy, delivery, breastfeeding and at least one knowledge is 87.0%, 81.1%, 80.3% and 91.4% respectively (Table 1).

### **Multivariable results**

Table 2 shows the factors associated with knowledge of MTCT of HIV and AIDS. With education, it was found that those with secondary [AOR=1.271, CI=1.04,1.55] and higher [AOR=1.495, CI=1.18,1.89] levels of education had higher odds of knowledge of MTC of HIV and AIDS compared with those with no formal education. With a region of residence, those in Limpopo [AOR=1.341, CI=1.16,1.55], Gauteng [AOR=1.337, CI=[1.15,1.55] and North west [AOR=1.410, CI=[1.22,1.63] had higher odds of knowledge of mother to child transmission of HIV and AIDS compared with those in Northern cape.

With media exposure, the study further shows that those who read newspaper less than once a week [AOR=1.168, CI=[1.08,1.27], at least once a week [AOR=1.136, CI=1.05,1.23], and those who listen to the radio less than once a week [AOR=1.163, CI=[1.02,1.33] had higher odds of knowledge on MTCT of HIV and AIDS compared with those who are not exposed at all. However, those with parity 0 [AOR=0.783, CI= [0.68,0.90] and poorest women [AOR=0.837, CI=0.73,0.96] had lower odds of knowledge of MTCT of HIV and AIDS compared with those 4 or more and richest women respectively (Table 2).

## Discussion

South Africa is one of the countries with high HIV prevalence globally (20). This disproportionately affect more women and the possibility of these women passing it on to their unborn children are very high. Evidence also reveal that, HIV prevalence is low among people with high knowledge of HIV (21). Based on this, it is prudent to assess the associative effects of demographic factors on the knowledge of HIV transmission from mother to children. This study sought to assess the prevalence and determinants of knowledge on MTC of HIV and AIDS among women in South Africa. The prevalence of knowledge of mother to child transmission of HIV and AIDS during pregnancy, delivery, breastfeeding and at least one source of knowledge is 87.0%, 81.1%, 80.3% and 91.4% respectively. The study also found that education, wealth status, parity, region of residence, place of residence, and exposure to radio and newspaper are associated with knowledge on MTCT of HIV and AIDS. The prevalence on the knowledge of MTCT of HIV and AIDS is similar to what has been observed in Ethiopia by Malaju, and Alene (22) but higher than what was found to be 60% in Nigeria (23), and 50% in Tanzania (24) and more than 60% in Uganda (25).

The study found that those in high socio-economic status (high education and wealth) had higher odds of knowing MTCT of HIV and AIDS. This is similar to several previous studies (17,18,22,26,27). The plausible explanations to this finding can be viewed in several pathways. For example, educated women might be able to easily comprehend the health education they receive compared to uneducated women (27). Also, previous studies have espoused that higher socio-economic status is associated with easy access to healthcare including health information (26,28–30) Furthermore, women who have attained higher education are more likely to secure jobs with high wages and are able to afford various means to access health information (26)

Similar to previous studies, (17,19,27,31), place of residence and regional variations were observed in the knowledge of women on MTCT of HIV and AIDS. Women in urban areas are more likely to have knowledge compared to those in rural areas. This perhaps is due to the inter-regional and rural-urban differentials in access to education and resources including HIV and AIDS education (17,19,27). Liyeh et al. (2020) also noted that women in urban centres there is easy accessibility and availability of nearby health services and greater media exposure compared with rural areas.

Relatedly, the study also showed that exposure to mass media (radio and newspaper) were associated with a higher odd of MTCT of HIV and AIDS knowledge. This corroborates several previous studies (18,27,32,33). Mass media, especially, radio is a useful tool to convey health education messages in different languages to the intended audience (19). This can, therefore, be a valuable channel to tackle those with a low level of education (18,27).

Besides, it was observed that those with parity 0 had lower odds of knowledge of MTC of HIV and AIDS. The possible explanation to this is that women who had given birth before and attended either ANC or PNC are more likely to benefit from the health education the health providers give during these services (21) compared to those who have never accessed these services before. This is consistent with previous findings that ANC attendance is associated with higher odds of knowledge on mother to child transmission of HIV and AIDS (17,34). Yaya et al. (21) discussed that there is the possibility for women to attain information on HIV transmission as well as the predisposing factors. By this they can also seek professional care during ANC to prevent vertical transmission.

## Strength And Limitations

The major strength of this study is the use of the most recent nationally representative DHS data. The sample size was relatively large, that allowed the use of rigorous statistical analysis. Despite this, the DHS adopts a cross-sectional design which therefore precludes causal interpretations of the results. Finally, there is also the possibility of social desirability biases from the respondents.

## Conclusion

The study has demonstrated that there is relatively high knowledge of mother to child transmission of HIV in South Africa. The determinants are educational level, wealth status, place of residence, the region of residence, exposure to mass media and parity. To further increase the knowledge, it is imperative to adopt various messages and target respondents in various part of South Africa through the mass media channels especially radio. This should be done taking cognizance of the rural-urban variations and socio-economic differentials.

## Abbreviations

SADHS: South Africa Demographic and Health Survey; AOR: Adjusted Odds Ratio; CI: Confidence Interval; SDG: Sustainable Development Goal; WHO: World Health Organisation; SSA: sub-Saharan Africa; VIF: Variance Inflation Factor; MTCT: mother-to-child transmission; UNGASS: United Nations General Assembly Special Session on Drugs; Stats SA: Statistics South Africa

## Declarations

### Acknowledgment

We are grateful to Measure DHS for giving me access to the data.

### Authors' contributions

Conception and design of study: **EKMD and SAA**; analysis and/or interpretation of data: AS; drafting the manuscript: **SAA, EKMD, AS, VC and SY**; revising the manuscript critically for important intellectual content; **SAA, EKMD, AS, VC and SY have all** read and approved the final manuscript for submission.

### Funding

The study did not receive any funding.

### Availability of data and materials

Data is available on [https://dhsprogram.com/data/dataset/South-Africa\\_Standard-DHS\\_2016.cfm?flag=0](https://dhsprogram.com/data/dataset/South-Africa_Standard-DHS_2016.cfm?flag=0)

### Ethics approval and consent to participate

This study was based on analyses of secondary data set from the DHS program, which gave us permission for its use. The survey was approved by the Institutional Review Board (IRB) of ICF Macro International in the United States and the National Ethics Committee in the Federal Ministry of Health of South Africa. All participants in the survey gave their consent to participate.

### Consent for publication

Not applicable

### Competing interests

The author (s) declare that they have no competing interests.

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## References

1. United Nations. Political Declaration on HIV and AIDS: On the Fast-Track to Accelerate the Fight against HIV and to End the AIDS Epidemic by 2030. New York. 2016;56350(June):1–27.
2. UNAIDS. UNAIDS FACT SHEET. Global HIV Statistics. Ending the AIDS epidemic. Communications and Global Advocacy. 2020.
3. Kaiser Family Foundation. The Global HIV/AIDS Epidemic [Internet]. Global Health Policy Report. 2020 [cited 2020 Aug 28]. p. 1–10. Available from: [https://www.kff.org/global-health-policy/fact-sheet/the-global-hivaids-epidemic/#:~:text=Eswatini \(formerly known as Swaziland,25%25 between 2010 and 2019.](https://www.kff.org/global-health-policy/fact-sheet/the-global-hivaids-epidemic/#:~:text=Eswatini (formerly known as Swaziland,25%25 between 2010 and 2019.)
4. UNAIDS. South Africa [Internet]. Country Report-2018. 2020 [cited 2020 Aug 28]. p. 1–4. Available from: <https://www.unaids.org/en/regionscountries/countries/southafrica>
5. UNICEF. Children, HIV and AIDS [Internet]. Brochures. 2019 [cited 2020 Aug 29]. p. 1–3. Available from: <https://data.unicef.org/resources/children-hiv-and-aids-global-and-regional-snapshots-2019/>
6. Alemu Y., Habtewold T., Alemu S. Mother's knowledge on prevention of mother-to-child transmission of HIV, Ethiopia: A cross sectional study. *PLoS One*. 2018;13(9):1–8.
7. WHO. Global Guidance on Criteria and Processes for Validation: Elimination of Mother-to-Child Transmission of HIV and Syphilis [Internet]. Geneva: WHO Press; 2017. Available from: [https://www.google.com/search?q=elimination+of+mother-to-child+transmission+pdf&rlz=1C5CHF\\_enGH885GH885&oq=eliminating+of+mother&aqs=chrome.2.69i57j0l7.13150j1j15&sourceid=chrome&ie=UTF-8](https://www.google.com/search?q=elimination+of+mother-to-child+transmission+pdf&rlz=1C5CHF_enGH885GH885&oq=eliminating+of+mother&aqs=chrome.2.69i57j0l7.13150j1j15&sourceid=chrome&ie=UTF-8)
8. South African National Department of Health. Guideline for the Prevention of Mother to Child Transmission of Communicable Infections South African National Department of Health. South Africa Department of Health. Pretoria; 2019.

9. Yaya S, Bishwajit G, Danhouno G, Shah V, Ekholuenetale M. Trends and determinants of HIV/AIDS knowledge among women in Bangladesh. *BMC Public Health* [Internet]. 2016;16(1):1–9. Available from: <http://dx.doi.org/10.1186/s12889-016-3512-0>
10. De Wet N, Akinyemi J, Odimegwu C. How Much Do They Know? An Analysis of the Accuracy of HIV Knowledge among Youth Affected by HIV in South Africa. *J Int Assoc Provid AIDS Care*. 2019;18:1–7.
11. Ciampa PJ, Patricio R, Rothman RL, Vermund SH, Skinner SL, Audet CM. Comprehensive Knowledge of HIV among Women in Rural Mozambique: Development and Validation of the HIV Knowledge 27 Scale. *PLoS One*. 2012;7(10).
12. USAID. Report on Global AIDS epidemic [Internet]. New York; 2013. Available from: [https://pdf.usaid.gov/pdf\\_docs/pdacu659.pdf](https://pdf.usaid.gov/pdf_docs/pdacu659.pdf).
13. Zuma K, Shisana O, Rehle TM, Simbayi LC, Jooste S, Zungu N, et al. New insights into HIV epidemic in South Africa: Key findings from the National HIV Prevalence, Incidence and Behaviour Survey, 2012. *African J AIDS Res*. 2016;15(1):67–75.
14. National Department of Health (NDoH), Statistics South Africa (Stats SA), South African Medical Research Council (SAMRC), ICF. South Africa Demographic and Health Survey 2016. Vol. 4. Pretoria, South Africa and Rockville, Maryland, USA; 2016.
15. Darteh EKM, Doku DT, Esia-Donkoh K. Reproductive health decision making among Ghanaian women. *Reprod Health*. 2014;11(1):23.
16. Gavningen K, Furberg AS, Simonsen GS, Wilsgaard T. Early sexualbehaviour and Chlamydia trachomatis infection—a population based cross-sectional study on gender differences among adolescents in Norway. *BMC Infect Dis*. 2012;12(319).
17. Liyeh TM, Cherkose EA, Limenih MA, Yimer TS, Tebeje HD. Knowledge of prevention of mother to child transmission of HIV among women of reproductive age group and associated factors at Mecha district, Northwest Ethiopia. *BMC Res Notes*. 2020;13(1):1–6.
18. Luba TR, Feng Z, Gebremedhin SA, Erena AN, Nasser AM, Bishwajit G, et al. Knowledge about mother-to-child transmission of HIV, its prevention and associated factors among Ethiopian women. *J Glob H7ealth*. 2017;7(2):020414.
19. Agegnehu CD, Tesema GA. Effect of mass media on comprehensive knowledge of HIV/AIDS and its spatial distribution among reproductive-age women in Ethiopia: a spatial and multilevel analysis. *BMC Public Health*. 2020;20(1):1–12.
20. Shisana O, Rehle T, Simbayi LC, Zuma K, Jooste S, Zungu N, et al. South African national HIV prevalence, incidence and behaviour survey, 2012. Cape Town: HSRC Press; 2014.
21. Yaya S, Ghose B, Udenigwe O, Shah V, Hudani A, Ekholuenetale M. Knowledge and attitude of HIV/AIDS among women in Nigeria: a cross-sectional study. *Eur J Public Health*. 2019;29(1):111–7.
22. Malaju MT, Alene GD. Determinant factors of pregnant mothers' knowledge on mother to child transmission of HIV and its prevention in Gondar town, North West Ethiopia. *BMC Pregnancy Childbirth*. 2012;12(1):73.
23. Lamina MA. A survey of awareness and knowledge of mother-to-child transmission of HIV in pregnant women attending Olabisi Onabanjo University Teaching Hospital, Sagamu, Nigeria. *Open J Obstet Gynecol*. 2012;2(98):105.
24. Wangwe PJT, Nyasinde M, Charles DSK. Counselling at primary health facilities and level of knowledge of antenatal attendees and their attitude on prevention of mother to child transmission of HIV in Dar-es salaam, Tanzania. *African Heal Sci*. 2013;13(4):914–9.
25. Byamugisha R, Tumwine JK, Ndeezi G, Karamagi CA, Tylleskär T. Attitudes to routine HIV counselling and testing, and knowledge about prevention of mother to child transmission of HIV in eastern Uganda: a cross-sectional survey among antenatal attendees. *J Int AIDS Soc*. 2010;13(1):52.
26. Vo Hoang L, Nguyen SAH, Tran Minh H, Tran Nhu P, Nguyen HT, Affarah WS, et al. Trends and changes in the knowledge of mother-to-child transmission means of HIV among Vietnamese women aged 15–49 years and its associated factors: findings from the Multiple Indicator Cluster Surveys, 2000–2014. *AIDS Care*. 2020;32(4):445–51.
27. Haile ZT, Teweldeberhan AK, Chertok IR. Correlates of women's knowledge of mother-to-child transmission of HIV and its prevention in Tanzania: a population-based study. *AIDS Care*. 2016;28(1):70–8.
28. Oljira L, Berhane Y, Worku A. Assessment of comprehensive HIV/AIDS knowledge level among inschool adolescents in eastern Ethiopia. *J Int AIDS Soc*. 2013;16:17349.
29. Pomey Hihat, H., Khalifa, M., Lebel, P., Neron, A. & Dumez, V. MP. <Patient partnership in quality improvement of healthcare services-1.pdf>. *Patient Exp J* [Internet]. 2015;2(1(6)). Available from: <http://pxjournal.org/journal/vol2/iss1/6>
30. Uthman OA, Kayode GA, Adekanmbi VT. Individual and contextual socio-economic determinants of knowledge of the ABC approach of preventing the sexual transmission of HIV in Nigeria: A multilevel analysis. *Sex Health*. 2013;10(6):522–529.
31. Peltzer K, Matseke G, Mzolo T, Majaja M. Determinants of knowledge of HIV status in South Africa: results from a population-based HIV survey. *BMC Public Health*. 2009;9(1):174.
32. Fakolade R, Adebayo SB, Anyanti J, Ankomah A. The impact of exposure to mass media campaigns and social support on levels and trends of HIV-related stigma and discrimination in Nigeria: tools for enhancing effective HIV prevention programmes. *J Biosoc Sci*. 2010;42(3):395–407.
33. Kuhlmann AKS, Kraft JM, Galavotti C, Creek TL, Mooki M, Ntuny R. Radio role models for the prevention of mother-to-child transmission of HIV and HIV testing among pregnant women in Botswana. *Health Promot Int*. 2008;23(3):260–8.
34. Abajobir AA, Zeleke AB. Knowledge, attitude, practice and factors associated with prevention of mother-to-child transmission of HIV/AIDS among pregnant mothers attending antenatal clinic in Hawassa referral hospital, South Ethiopia. *J AIDS Clin Res*. 2013;4(6):2–7.

## Tables

**Table 1: Background characteristics and prevalence of knowledge of Mother-to-Child Transmission of HIV and AIDS**

	Weighted Sample		During Pregnancy (%)	During Delivery (%)	During Breastfeeding (%)	At least one (%)
<b>Prevalence</b>			87.01	81.10	80.3	91.4
<b>Age</b>	n	%				
15-19	1343	17.1	80.68	72.6	85.1	85.08
20-24	1312	16.7	87.13	81.2	92.0	92.03
25-29	1337	17.0	89.82	82.8	93.8	93.79
30-34	1221	15.5	89.92	84.0	94.8	94.79
35-39	986	12.5	86.18	81.2	91.4	91.39
40-44	850	10.8	88.01	80.7	91.1	91.12
45-49	813	10.3	88.21	79.9	92.2	92.17
<b>Employment</b>						
Not working	4943	62.9	85.93	79.46	79.79	90.08
Managerial	625	8.0	92.35	86.20	81.12	96.73
Clerical	510	6.5	87.06	84.95	79.21	92.67
Agricultural	88	1.1	92.68	89.86	88.20	96.51
Home	386	4.9	86.57	81.11	82.29	92.03
Services	579	7.4	86.93	81.33	79.15	92.85
Manual	730	9.3	89.26	83.92	82.25	92.88
<b>Marital status</b>						
Never married	4600	58.5	85.60	78.77	79.46	90.20
Married	1830	23.3	89.17	85.12	81.64	93.59
Cohabitation	995	12.7	88.91	83.24	81.60	91.88
Widow/Divorced/Separated	435	5.5	88.39	83.88	79.71	93.85
<b>Education</b>						
No education	152	1.9	81.03	74.19	75.06	85.88
Primary	704	9.0	83.08	77.24	77.57	86.21
Secondary	6072	77.2	87.04	80.65	80.43	91.46
Higher	934	11.9	90.74	88.02	81.98	95.87
<b>Wealth</b>						
Poorest	1523	19.4	83.19	76.52	78.67	87.56
Poorer	1569	20.0	86.15	79.68	81.08	90.85
Middle	1666	21.2	85.61	80.99	79.49	90.65
Richer	1660	21.1	89.88	84.14	82.22	93.15
Richest	1444	18.4	90.27	84.11	79.65	94.94
<b>Parity</b>						
0	2197	28.0	82.52	72.15	75.08	87.67
1	1902	24.2	89.32	83.42	82.30	93.23
2	1825	23.2	89.67	86.93	83.65	94.07
3	1092	13.9	87.46	83.09	80.99	91.61
4 and above	845	10.8	87.13	83.97	80.80	90.99
<b>Region</b>						
Western cape	903	11.5	86.33	78.27	65.12	92.02

Eastern Cape	907	11.5	77.92	71.17	73.23	85.62
Northern Cape	155	2.0	82.71	71.89	78.01	89.02
Free state	420	5.3	87.85	81.65	81.06	90.97
Kwazulu-Natal	1484	18.9	88.80	87.05	84.97	91.22
Northwest	551	7.0	91.24	79.16	80.52	95.55
Gauteng	2078	26.4	92.00	88.68	88.64	95.04
Mpumalanga	633	8.1	79.25	70.05	71.25	84.12
Limpopo	731	9.3	85.25	75.96	81.84	91.80
<b>Residence</b>						
Urban	5295	67.4	89.16	84.01	81.71	93.22
Rural	2566	32.6	82.56	75.10	77.24	87.66
<b>Reading Newspaper/Magazine</b>						
Not at all	2772	35.3	83.78	77.16	78.68	88.16
Less than once a week	1952	24.8	88.91	82.71	81.76	92.89
At least once a week	3137	39.9	88.68	83.57	80.71	93.35
<b>Radio</b>						
Not at all	2321	29.5	84.96	78.41	78.56	88.91
Less than once a week	1224	15.6	87.81	81.78	81.38	92.10
At least once a week	4317	54.9	87.88	82.35	80.85	92.55
<b>TV</b>						
Not at all	1331	16.9	83.92	80.67	81.37	88.29
Less than once a week	732	9.3	91.83	84.93	83.42	94.86
At least once a week	5798	73.8	87.11	80.71	79.60	91.68

Table 2: Logistic regression model showing the association between background characteristics and knowledge of Mother-to-Child Transmission of HIV and AIDS



Variables	Model 1	Model 2	Model 3	Model 4
	AOR[95%CI]	AOR[95%CI]	AOR[95%CI]	AOR[95%CI]
<b>Age</b>				
15-19	0.940	0.821**	0.863*	0.922
	[0.81,1.09]	[0.71,0.95]	[0.75,1.00]	[0.79,1.08]
20-24	1.075	0.974	1.055	1.133
	[0.94,1.23]	[0.85,1.11]	[0.92,1.20]	[0.98,1.31]
25-29	1.057	1.028	1.042	1.080
	[0.93,1.20]	[0.91,1.16]	[0.92,1.18]	[0.95,1.23]
30-34	1.053	1.096	1.069	1.107
	[0.93,1.19]	[0.97,1.24]	[0.95,1.20]	[0.97,1.26]
35-39	0.941	0.981	1.005	0.965
	[0.83,1.07]	[0.87,1.11]	[0.89,1.13]	[0.85,1.10]
40-44	0.966	0.980	0.975	0.949
	[0.85,1.09]	[0.87,1.11]	[0.86,1.10]	[0.83,1.08]
45-49	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
<b>Employment</b>				
Not working	0.907	0.834	0.831	0.842
	[0.72,1.15]	[0.66,1.06]	[0.66,1.05]	[0.65,1.08]
Managerial	0.970	0.788	0.809	0.941
	[0.74,1.26]	[0.60,1.03]	[0.62,1.05]	[0.70,1.26]
Clerical	0.830	0.827	0.758*	0.787
	[0.64,1.08]	[0.63,1.08]	[0.58,0.99]	[0.59,1.05]
Home	0.880	0.804	0.864	0.845
	[0.67,1.15]	[0.61,1.06]	[0.66,1.13]	[0.63,1.12]
Services	0.857	0.776	0.748*	0.877
	[0.66,1.11]	[0.60,1.01]	[0.58,0.97]	[0.66,1.16]
Manual	0.996	0.835	0.840	0.919
	[0.78,1.28]	[0.65,1.07]	[0.66,1.08]	[0.70,1.20]
Agricultural	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
<b>Marital status</b>				
Never married	0.946	0.942	1.040	0.895
	[0.83,1.08]	[0.83,1.07]	[0.91,1.18]	[0.78,1.03]
Married	0.951	0.981	1.034	0.905
	[0.83,1.09]	[0.86,1.12]	[0.91,1.18]	[0.78,1.05]
Cohabitation	0.987	1.005	1.033	0.923
	[0.85,1.14]	[0.87,1.16]	[0.89,1.19]	[0.79,1.08]
Widow/Divorced/Separated	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
<b>Education</b>				
No education	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
Primary	1.13	1.26*	1.18	1.09
	[0.91,1.39]	[1.02,1.57]	[0.95,1.46]	[0.88,1.35]

Secondary	1.24*	1.41**	1.27*	1.27*
	[1.01,1.51]	[1.15,1.74]	[1.04,1.56]	[1.04,1.55]
Higher	1.320*	1.641***	1.325*	1.495***
	[1.05,1.66]	[1.30,2.07]	[1.05,1.67]	[1.18,1.89]
<b>Wealth</b>				
Poorest	0.840**	0.835**	0.930	0.837*
	[0.74,0.96]	[0.73,0.95]	[0.82,1.06]	[0.73,0.96]
Poorer	0.853**	0.872*	0.985	0.873*
	[0.76,0.96]	[0.77,0.98]	[0.88,1.11]	[0.77,0.99]
Middle	0.856**	0.934	0.975	0.885*
	[0.77,0.95]	[0.84,1.04]	[0.88,1.09]	[0.79,1.00]
Richer	0.986	1.032	1.122*	0.975
	[0.89,1.10]	[0.93,1.14]	[1.01,1.24]	[0.87,1.09]
Richest	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
<b>Parity</b>				
0	0.771***	0.708***	0.848*	0.783***
	[0.67,0.88]	[0.62,0.81]	[0.74,0.97]	[0.68,0.90]
1	0.930	0.883*	0.979	0.913
	[0.82,1.05]	[0.78,0.99]	[0.87,1.10]	[0.80,1.04]
2	0.952	1.014	1.004	0.964
	[0.85,1.07]	[0.91,1.13]	[0.90,1.12]	[0.86,1.09]
3	0.932	0.970	1.033	0.963
	[0.83,1.05]	[0.86,1.09]	[0.92,1.16]	[0.85,1.09]
4 and above	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
<b>Region</b>				
Western Cape	1.045	1.060	0.639***	1.017
	[0.90,1.21]	[0.92,1.22]	[0.55,0.74]	[0.87,1.18]
Eastern Cape	0.911	1.015	0.913	0.924
	[0.80,1.03]	[0.89,1.15]	[0.80,1.04]	[0.81,1.06]
Northern Cape	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
Free State	1.188*	1.249***	1.074	1.048
	[1.04,1.36]	[1.10,1.43]	[0.94,1.22]	[0.91,1.20]
KwaZulu-Natal	1.228***	1.594***	1.226**	1.090
	[1.09,1.39]	[1.41,1.80]	[1.08,1.38]	[0.96,1.24]
North West	1.427***	1.320***	1.148*	1.410***
	[1.25,1.63]	[1.16,1.50]	[1.01,1.31]	[1.22,1.63]
Gauteng	1.403***	1.636***	1.443***	1.337***
	[1.22,1.61]	[1.43,1.87]	[1.26,1.65]	[1.15,1.55]
Mpumalanga	0.967	1.000	0.875*	0.899
	[0.85,1.10]	[0.88,1.14]	[0.77,0.99]	[0.79,1.03]
Limpopo	1.276***	1.327***	1.284***	1.341***

	[1.12,1.46]	[1.16,1.52]	[1.12,1.47]	[1.16,1.55]
<b>Residence</b>				
Urban	1.145 <sup>***</sup>	1.171 <sup>***</sup>	1.144 <sup>***</sup>	1.153 <sup>***</sup>
	[1.06,1.24]	[1.09,1.26]	[1.06,1.23]	[1.07,1.25]
Rural	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
<b>Newspaper</b>				
Not at all	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
Less than once a week	1.167 <sup>***</sup>	1.179 <sup>***</sup>	1.107 <sup>**</sup>	1.168 <sup>***</sup>
	[1.08,1.26]	[1.09,1.27]	[1.02,1.20]	[1.08,1.27]
At least once a week	1.116 <sup>**</sup>	1.130 <sup>**</sup>	1.089 <sup>*</sup>	1.136 <sup>**</sup>
	[1.03,1.21]	[1.05,1.22]	[1.01,1.18]	[1.05,1.23]
<b>Radio</b>				
Not at all	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
Less than once a week	1.003	1.038	1.076	1.051
	[0.91,1.10]	[0.95,1.14]	[0.98,1.18]	[0.95,1.16]
At least once a week	1.018	1.050	1.070	1.069
	[0.95,1.10]	[0.98,1.13]	[1.00,1.15]	[0.99,1.15]
<b>Radio</b>				
Not at all	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>	<b>Ref</b>
Less than once a week	1.205 <sup>**</sup>	0.936	0.931	1.163 <sup>*</sup>
	[1.06,1.37]	[0.83,1.06]	[0.82,1.05]	[1.02,1.33]
At least once a week	0.982	0.837 <sup>***</sup>	0.877 <sup>**</sup>	0.965
	[0.90,1.08]	[0.76,0.92]	[0.80,0.96]	[0.88,1.06]
<i>N</i>	7861	7861	7861	7861

Model1: Adjusted odds ratio for determinants of knowledge on Mother to child transmission of HIV transmission during pregnancy

Model2: Adjusted odds ratio for determinants of knowledge on Mother to child transmission of HIV transmission during birth

Model3: Adjusted odds ratio for determinants of knowledge on Mother to child transmission of HIV transmission during breastfeeding

Model4: Adjusted odds ratio for determinants of knowledge on Mother to child transmission of HIV transmission (at least one)

Exponentiated coefficients; 95% confidence intervals in brackets

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Ref=reference category