

ORIGINAL ARTICLE**Acceptance of HIV Counseling and Testing among Antenatal Clinic Attendees in Southern Ethiopia****Rahel Gizaw¹, Samson Gebremdhin^{2*}****OPEN ACCESS**

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ABSTRACT

BACKGROUND: Counseling and testing for Human Immunodeficiency Virus (HIV) (HCT) during antenatal care (ANC) is a critical entry point for the prevention of mother-to-child transmission (PMTCT) of HIV. However, in Ethiopia limited evidence exists regarding the extent of acceptance of the service. The study aimed to assess the level and factors associated with acceptance of HCT in Hawassa city, Southern Ethiopia.

METHODS: Cross-sectional study was conducted in four public health facilities found in the city. Five hundred and four ANC clients were selected using multistage sampling technique. Data were collected via interviewer administered questionnaire and analyzed using multivariable binary logistic regression analysis. The outputs are presented using adjusted odds ratio (AOR) with 95% confidence interval (CI).

RESULTS: The vast majority, 84.1% (95% CI: 80.6-87.2%), of the respondents accepted the HCT. Acceptance was positively associated with being married [AOR=5.60 (95% CI: 1.87-16.50)], having two or more ANC visits [4.93 (95% CI: 2.40-10.07)], history of prior HIV testing [4.23 (95% CI: 1.90-9.74)], having good knowledge about MTCT [4.91 (95% CI: 2.07-11.6)] and PMTCT [6.22 (95% CI: 2.87-13.50)] and having no fear of stigma and discrimination [3.32 (95% CI: 1.57-7.02)].

CONCLUSION: Acceptance of HCT can be further improved by enhancing the knowledge of mother about PMTCT and combating stigma and discrimination.

KEYWORDS: HIV testing acceptance, antenatal care, stigma and discrimination, prevention of mother-to-child transmission of HIV, Hawassa, Ethiopia.

INTRODUCTION

The global Human Immunodeficiency Virus (HIV) pandemic continues to expand, with an estimated 2.1 million people becoming infected and 1.5 million dying each year. As of 2013, there were approximately 35 million people living with HIV/AIDS (PLWHA). With 24.7 million PLWHA, Sub-Saharan Africa is the most affected

region (1). In Ethiopia, in 2013 approximately 800,000 people were living with HIV/AIDS (2). Worldwide, every year 240,000 children became newly infected with HIV (3). Mother-to-child transmission is the most common mode of transmission in children (3). Without any intervention, 20-50% of infants born to HIV positive mothers would be infected; whereas, by properly implementing prevention of mother-to-child transmission (PMTCT), the risk can be reduced to less than 2% (4). However, in 2009 worldwide only 53% of HIV-infected pregnant women utilized PMTCT service, resulting in approximately 370,000 new infant infections (5).

Routine HIV counseling and testing (HCT) during pregnancy has become an essential element of HIV prevention, treatment and care programs in many sub-Saharan Africa countries (6). Identification of maternal infection early in pregnancy through HCT is a critical entry-point for PMTCT and helps to prevent sexual transmission of HIV (7). HCT is also essential for provision of care and support to PLWHA. Integration of HIV testing into the routine ANC service has increased the accessibility and cost-effectiveness of the PMTCT service (8).

According to the national guideline of Ethiopia, pregnant women on ANC are routinely offered HCT as part of the standard care with the right to refuse testing. The strategy follows provider-initiated counseling and testing on the basis of the 'opt-out' approach. Pre-test information is provided through individual or group counseling and clients are offered a rapid on-site HIV testing with same-day results. Post-test counseling is provided in consideration of the test-results (9,10).

Low acceptance of HIV testing is a major challenge for the expansion of PMTCT service. According to an international survey, in developing countries the acceptance rates of HIV testing by pregnant women vary between 33% and 95% (11). While some countries have recorded high acceptance rates, others have recorded the opposite. In Ethiopia limited evidence exists regarding the acceptance HCT during pregnancy. Despite the efforts of the government, the national coverage PMTCT in country remained persistently low (12). According to the 2013 report of the

Ministry of Health of Ethiopia, out of the total estimated number of HIV positive pregnant women, less than two-thirds (61%) received antiretroviral therapy for PMTCT (13).

Hence, the purpose of the study is to assess the level and factor associated with acceptance of HIV testing, among ANC attending pregnant women in Hawassa city, Southern Ethiopia.

METHODS

Study setting: The study was conducted from November 2013 to April 2014 in Hawassa city – the capital of Southern Nation Nationalities and Peoples (SNNP) region, Ethiopia. Hawassa is located to 275 kms South of Addis Ababa. It has a total population of 328,284 with male to female ratio of 1.06. As of 2013, the city had 2 public hospitals, 7 health centers and 14 health posts.

Study design: This institution based cross-sectional, quantitative study was conducted from November 2013 to April 2014.

Sample size: The sample size of the study was determined as 511 using single population proportion formula with the assumption of 72.0% expected level of acceptance (14), 95% confidence level, 5% margin of error, design effect of 1.5, and non-response rate of 10%. Post-hoc power calculation was made to check the adequacy of the sample size for identifying the factors association with acceptance of HCT.

Sampling procedure: Two governmental hospitals and seven health centers offer ANC, HCT and PMTCT in the city. According to health institution type, three health centers and one hospital were selected randomly for the study. The sample size was proportionally allocated to the selected health institution based on their client flow rate in the preceding 6 months of the study. Systematic random sampling technique was used to select study participants from each of the health institutions.

Data collection procedures: Data were collected using interviewer administered pre-tested questionnaire prepared in Amharic language. Data collectors were four trained diploma holder nurses. Further, two health officers were deployed

as supervisors. Data collection was carried out at the health intuitions after the respondents completed their ANC examination. The collected information includes: socio-demographic characteristics, knowledge about HIV transmission and PMTCT and various questions related to the constructs of the Health Belief Model (HBM). The Health Belief Model (HBM) is one of the most frequently used conceptual models to explain adoption of health-related behaviors, including uptake of health services. The model suggests individual's engagement in a health behavior is affected by six domains namely; perceived susceptibility to the health problem, perceived severity of the health problem, perceived barriers to and benefits of the action, self-efficacy to successfully perform the behavior and the cue to action that triggers the behavior. Distal variables including socio-demographic characteristics that may modify health-related behaviors indirectly through the six constructs (15). In the current study multiple questions for each of the six constructs were developed based on review of relevant literature. Further, various socio-demographic characteristics were considered as modifying variables.

Knowledge of HIV transmission, maternal-to-child transmission (MTCT) of HIV and

PMTCT were assessed using multiple questions and ultimately dichotomized into 'poor' and 'good' using the mean score as a cutoff point. Such approaches were applied because validated and widely accepted classifications are not available for the parameters.

Data analysis: Data were entered in to Epi-Info software and exported to SPSS version 20.0 for analysis. Frequency distribution and measures of central tendency and dispersion were used to describe the data. Factors associated with acceptance of HCT were identified using binary logistic regression and the outputs are presented using crude (COR) and adjusted (AOR) odds ratio with the respective 95% confidence interval (CI). Factors that had p-value less than 0.25 in the bivariate analysis were considered as candidate variables for the multivariable models. Variables were entered into two different – distal and proximate – regression models: the distal model included socio-demographic and other modifying variables like knowledge about HIV transmission, MTCT and PMTCT; and the proximate factors encompassed constructs of HBM. The goodness-of-fit of the model was assessed using Hosmer-Lemeshow test. The conceptual framework of the study is summarized below (Figure 1).

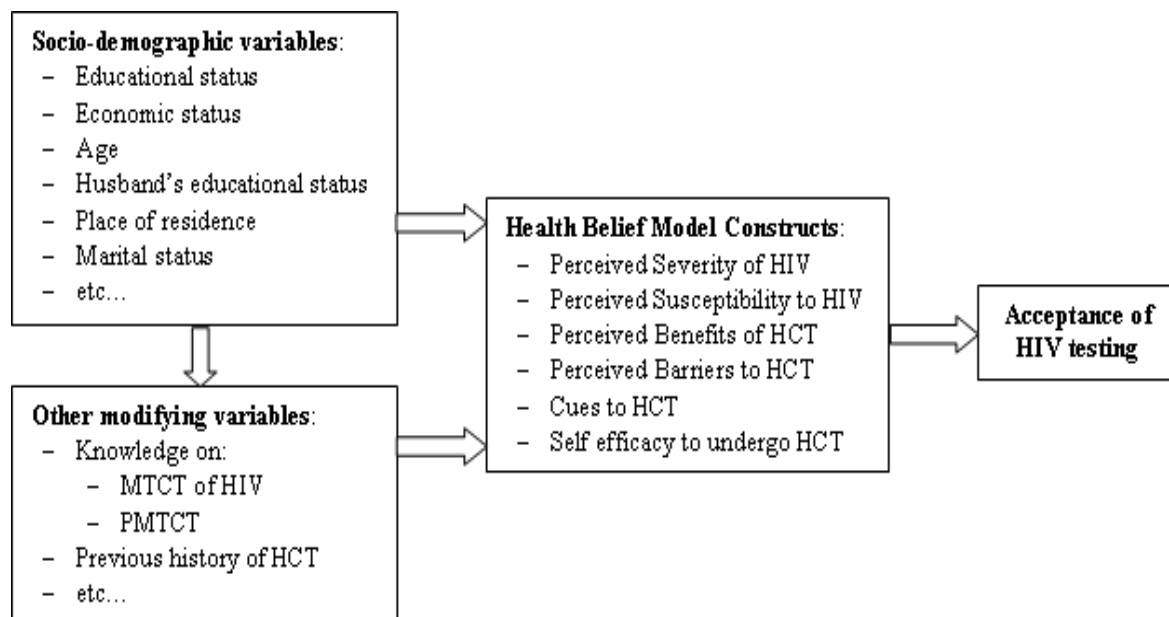


Figure 1: Conceptual framework of the study

Quality assurance: To assure the quality of the data, pretesting was done on 25 pregnant mothers before the actual data collection. This gave a chance to make modifications to questions which were found to be ambiguous to the respondents. Two day training was given both to the data collectors and the supervisors. The overall activity of the data collection was supervised by one of the principal investigators and two other supervisors. On each data collection day, random 10% sample of the collected data were reviewed by the principal investigator for completeness and consistency; accordingly appropriate feedback was given to the data collectors.

Ethical considerations: Ethical clearance was obtained from the Institutional Review Board (IRB) of Hawassa University College of Medicine and Health Sciences and data were collected after taking informed written consent from the study participants.

RESULTS

Socio-demographic characteristics: Out of the total 511 women approached 504 were willing to take part in the study making the response rate 98.6%. Approximately four-in-five (80.6%) of the study participants were urban residents. About half (52.8%) were between 15-24 years of age and the mean age (\pm SD) was 24.0 (\pm 3.4) years. The vast majority of the respondents (92.5%) were married. Regarding educational status, 62.3% of the respondents and 85.6% of their partners had secondary or above level of education, respectively. About 58.3% of the participants were housewives and a quarter (24.2%) earns less than 1,000 Ethiopian Birr (equivalent to 44 US dollar) per month (Table 1).

Table 1: Socio-demographic characteristics of pregnant women attending ANC in Hawassa city public health facilities, SNNP Region, 2014.

Socio-demographic variables (n=504)	Frequency	%
Age in years		
15-24	266	52.8
25-29	180	35.7
30-45	58	11.5
Place of residence		
Urban	406	80.6
Rural	98	19.4
Educational status		
Not able to read or write	56	11.1
Informal education	70	13.9
Grade 1-6	64	12.7
Grade 7-12	256	50.8
Higher education	58	11.5
Occupation		
House wife	294	58.3
Petty trade	102	20.2
Employee	51	10.1
Student	36	7.1
Other	21	4.2
Income (birr/month)		
<1000	122	24.2
1000-2000	108	21.4
>2000	83	16.5
Not sure/don't know	191	37.9
Marital status		
Currently married	466	92.5
Not ever married	33	6.5
Others	5	1.0
Parity		
One	239	47.4
Two	170	33.7
Three	80	15.9
Four or more	15	3.0
Number of ANC visits		
One	187	37.1
Two and above	317	62.9

HIV testing acceptance and reported reasons for opt out:

From the total of 504 pregnant woman participated in this study, 84.1% (95% CI: 79.1-89.1%) accepted the counseling and underwent the HIV testing. Among the acceptors, the commonly forwarded reasons for testing were: to protect the baby from HIV (80.9%), to know my HIV status (61.6%) and to protect my partner from HIV (8.5%). On the other hand, the most frequent reasons forwarded for declining the test were: fear of lack of confidentiality (38.8%); fear of being HIV positive (25.0%), uncertainty about husband's reaction (18.8%), fear of stigma and discrimination (18.8%) and underestimating the susceptibility to HIV (10.0%).

Factor associated with HIV testing acceptance:

Twenty-six variables were considered for the bivariable analysis. The variables were: socio-demographic characteristics (respondent's age, religion, ethnicity, place of residence, educational status, occupation, income, husband's educational status, marital status and parity); perceived barriers to HCT (fears of husband's reaction, stigma and discrimination and lack of confidentiality by health professionals); perceived severity of HIV; perceived benefits of HCT (significance of the test for future life, reducing the transmission of HIV in the community and preventing transmission to partner); perceived susceptibility to HIV; perceived self-efficacy for undergoing the testing; cues to action (heard about the benefit of HCT from mass-media or family members/neighbors during the pregnancy, frequency of ANC visits); and other modifying variables (prior history of HCT; knowledge about mode of HIV transmission, MTCT of HIV and PMTCT).

In the bivariable analyses, twenty variables had *P*-value less than 0.25 hence considered as candidate variables for the multivariable analysis. The six variables excluded were: religion, ethnicity, perceived severity of HIV, perceived susceptibility to HIV, perceived benefit of HCT for prevention of HIV transmission in the community and fear of lack of confidentiality by health professionals.

In the distal and proximate multivariable models, seven variables (age, marital status, frequency of ANC visits, previous history of HIV testing, knowledge about MTCT, knowledge about PMTCT, and fear of stigma and discrimination) demonstrated significantly associated with acceptance of HIV testing.

In the distal model, women older than 30 years of age had 86% reduced odds of accepting HIV testing as compared to women younger than 25 years (AOR= 0.14, 95% CI= 0.03, 0.62). The odds of accepting HIV testing was 5.6 times higher in married women than their counterparts (AOR= 5.60, 95% CI= 1.87, 16.50). Women who had two or more ANC visits in the current pregnancy had 4.9 times increased odds of accepting the testing than those who attended ANC only once (AOR= 4.93, 95% CI= 2.40, 10.07). The odds were also 4.2 times higher in those women who had prior HIV testing (AOR= 4.23, 95% CI= 1.90, 9.74). Similarly, women with good knowledge about MTCT and PMTCT had higher odds of accepting the testing.

In the proximate model, respondent who did not fear of facing stigma and discrimination had 3.3 times increased odds of accepting HIV testing than their counterparts (AOR= 3.32, 95%CI= 1.57, 7.02) (Table 2).

Table 2: Output of bivariate and multivariable logistic regression analyses for identifying factors associated with acceptance of HIV testing among ANC attendants in Hawassa city public health facilities, 2014.

Variables	HIV testing		COR (95%CI)	AOR (95% CI)
	Yes	No		
Respondent's age (years)				
15-24	215	51	1	1
25-29	158	22	1.70 (0.99-2.93)	0.60 (0.25-1.46)
30-45	51	7	1.73 (0.74-4.03)	0.14 (0.03-0.62)*
Place of residence				
Urban	351	55	2.19 (1.28-3.73)*	1.16 (0.52-2.61)
Rural	73	25	1	1
Educational status				
Not able to read and write	41	15	1	
Able to read or write/both	51	19	0.98 (0.44-2.17)	0.88 (0.25-3.08)
Grade 1-6	51	13	1.43(0.61-3.35)	1.56 (0.43-5.75)
Grade 7-12	231	25	3.38(1.64-6.95)*	1.67 (0.52-5.34)
Higher education	50	8	2.29(0.88-5.93)	1.87 (0.31-11.28)
Occupation				
House wife	243	51	1	1
Small Scale trade	92	10	1.93(0.94-3.96)	1.37 (0.49-3.82)
Student	26	10	0.55 (0.25-1.20)	0.45 (0.13-2.17)
Government and NGO employee	47	4	2.47 (0.85-7.15)	1.19 (0.21-6.72)
Others	16	5	0.67 (0.23-1.92)	1.59 (0.31-8.15)
Income (birr/month)				
<1000	95	27	1	1
1000-2000	96	12	2.27 (1.09-4.75)*	1.26 (0.46-3.70)
>2000	78	5	4.43 (1.63-12.05)*	2.30 (0.53-9.93)
Not sure	155	36	1.22 (0.70-2.14)	1.60 (0.67-3.83)
Husband education				
Not able to read or write	16	3	1	1
Informal education	15	15	0.19 (0.04-0.78)*	0.35 (0.04-2.83)
Grade 1-6	18	7	0.48 (0.11-2.18)	0.37 (0.04-3.42)
Grade 7-12	251	38	1.24 (0.34-4.45)	0.65 (0.10-4.47)
Higher education	124	17	1.37 (0.36-5.19)	0.58 (0.07-4.69)
Marital status				
Married	415	51	26.22(11.75-58.49)*	5.60 (1.87-16.50)*
Others	9	29	1	1
Parity				
One	181	58	1	
Two	155	15	3.31 (1.80-6.07)*	1.08 (0.41-2.83)
Three or above	88	7	4.03 (1.77-9.19)*	2.84 (0.73-10.00)
Number of ANC visits				
One	128	59	1	1
Two or above	296	21	6.50 (3.79-11.14)*	4.93 (2.40-10.07)*
Previous history of HCT				
Yes	356	36	6.40 (3.84-10.67)*	4.23 (1.90-9.74)*
No	68	44	1	1
Knowledge about Mode of HIV transmission				
Poor	254	55	1	1
Good	170	25	1.47 (0.88-2.45)	0.56 (0.25-1.28)

Table 2 continued...

Knowledge about MTCT of HIV				
Poor	222	67	1	
Good	202	13	4.69 (2.51-8.75)*	4.91 (2.07-11.6)*
Knowledge about PMTCT of HIV				
Poor	101	63	1	
Good	323	17	11.85 (6.63-21.18)*	6.22 (2.87-13.50)*
Fear of husband's reaction				
Yes	314	41	2.71 (1.66-4.43)*	0.98 (0.41-2.33)
No	110	39	1	
Fear of stigma and discrimination				
Yes	109	49	1	
No	315	31	4.57 (2.77-7.53)*	3.32 (1.57-7.02)*
Heard about the benefit of HCT from mass-medias				
Yes	168	21	1.84 (1.08-3.15)*	0.70 (0.29-1.70)
No	256	59	1	1
Heard about the benefit of HCT from family members/neighbors				
Yes	127	13	2.20 (1.17-4.13)*	1.40 (0.57-3.45)
No	297	67	1	1
knowing oneself HIV status is beneficial for future life				
Yes	342	49	2.64 (1.58-4.39)*	0.72 (0.30-1.74)
No	82	31	1	1
Fear of HIV transmission to the partner				
Yes	305	51	1.46 (0.88-2.41)	0.91 (0.40-2.07)
No	119	29	1	1
Perceived self efficacy for HCT				
Yes	136	33	0.67 (0.41-1.10)	0.79 (0.37-1.69)
No	288	47	1	1

* Statistically significant association at *p*-value of 0.05

DISCUSSION

The proportion of HIV testing acceptance among ANC attendants was found to be 84%. The figure is more or less comparable to earlier studies conducted in Ethiopia: 82.5% in Gondar town, Northwest Ethiopia (16), 74.4% in Arba Minch town, Southern Ethiopia (17), and 72.0% in East Gojam Zone, Northwestern Ethiopia (14). Studies conducted elsewhere in Africa reported assorted figures: 97.0% in Uganda (18), 96.3% in Southwest Nigeria (19), 77.2% in Dar-es-Salaam, Tanzania (20) and 60% in Upper West Region of Ghana (21). A multicenter study that included 13 studies from developing countries also reported that the median overall acceptability of HIV testing was 69% and ranged from 33 to 95% (11). The variation across studies is likely to be

due to differences in underlying socio-demographic modifying variables.

In the current study, the most frequently forwarded reasons for opting out the test were fear of lack of confidentiality; fear of being positive; uncertainty about husband's reaction and fear of stigma and discrimination. The aforementioned reasons were very similar to what had been reported in two studies conducted in Gondar town (16) and East Gojam (14), Ethiopia.

This study had shown a negative relationship between maternal age and acceptance of HIV testing. As compared to women aged 15-24 years, women older than 30 years had 86% reduced odds of accepting HIV testing. Studies conducted in Ethiopia (16), Cameroon (22), and Tanzania (20) reported parallel findings. The negative

association between age and acceptance of HIV testing could be due to the reason that older women may have less perceived risk of HIV hence they may not consider testing relevant to them.

The study found that being married was positively associated with HIV testing uptake. Married women had 6 times increased odds of accepting testing than their counterparts. Similar findings were reported by studies conducted in Dire Dawa (23) and Addis Ababa (24) cities, Ethiopia. Married women may perceive themselves as less susceptible to HIV consequently they might be less likely to opt out the test.

In this study, frequency of ANC follow up was a positive predictor of acceptance of testing. Women who had two or more antenatal visits had 5 times increased odds of accepting HIV testing. Similarly, in the study conducted in Burkina Faso (25) and Gondar, Ethiopia (16), acceptance was twice higher in women who had two or more visits. Other two studies conducted in Ethiopia concluded the same (23,24). Women with more frequent ANC visits are likely to have better information on MTCT, PMTCT, and the benefit of HIV testing, which may translate into higher acceptance for the test.

In this study, previous HIV test was found to be a significant predictor of acceptance of HIV test. Women who had a negative previous test may accept subsequent tests as they may have little fear of getting positive test results. Women who accepted previous tests may also have health beliefs that promote further testing. In this regard, earlier studies reported mixed findings. In studies conducted in Ghana (26) and South Africa (27) women who had been tested before were found to be more likely to decline for subsequent test. Conversely, studies from Uganda (28,29) and Ethiopia (14,24) found positive association. The inconsistency in results may reflect women's varying underlying beliefs about the need of having repeated tests.

This study revealed that the odds of acceptance of HIV testing were 3 times higher for those who do not fear of facing HIV related social stigma and discrimination. Studies witnessed fear of stigma and discrimination is among the major

barriers of HIV testing. A study conducted in Debre Markos town, Northwestern Ethiopia found that women with perceived barrier were five times more likely to reject HIV testing and, fear of stigma and discrimination was identified as one of the major constructs of perceived barrier (30). A systematic review of qualitative studies also suggested that fear of stigma is a dominant deterring factor for uptake of HIV testing in many settings of sub-Saharan Africa (31). Similarly, a qualitative study conducted in Gaborone, Botswana identified stigma as the major impediment to women's participation in the PMTCT program (32).

Our results suggest that pregnant women who had good knowledge of PMTCT and MTCT of HIV were more likely to undergo HIV testing as compared to their counterparts. A systematic review also concluded that women's willingness to be tested for HIV during pregnancy is clearly influenced by their knowledge about HIV/AIDS and MTCT of HIV (33). Women with good knowledge of PMTCT and MTCT are likely to have good perceived benefit of the test, which may in turn lead to better uptake of the service.

The findings should be interpreted in consideration of the strengths and limitations of the study. The study considered multiple independent variables that may affect acceptance for HIV testing. Further, the variables of the study were selected and data were analyzed based on well established conceptual framework – the Health Belief Model. On the other hand, as the study is cross-sectional causal claims are likely to be weak. The study was also limited to public health facilities and this may compromise its generalizability to the entire pregnant women in the city. Further, due to lack of published evidence on the intra-cluster correlation for HCT, design effect was not precisely computed and assumed to be 1.5, this might have reduced the adequacy of the sample size of the study.

In general the study concluded that the majority of the respondents (84%) accepted the HIV testing. Acceptance was significantly higher among married women, women who had two or more ANC visit, women with good knowledge of MTCT and PMTCT, and those who had previous

HIV testing. Conversely, older age and perceived fear of stigma and discrimination were negatively associated with HIV testing. Acceptance of HIV counseling and testing can further be improved through raising the women's knowledge of PMTCT and by combating stigma and discrimination.

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REFERENCES

1. World Health Organization. HIV/AIDS fact sheet. Available from: <http://www.who.int/mediacentre/factsheets/fs360/en/> (2014). Accessed June 07 2015.
2. UNAIDS. HIV and AIDS estimates (2013). Available from: <http://www.unaids.org/en/regionscountries/countries/ethiopia> (2013). Accessed June 07 2015.
3. AIDS.gov. Global HIV/AIDS overview. Available from: <https://www.aids.gov/federal-resources/around-the-world/global-aids-overview/> (2014). Accessed June 04 2015.
4. McIntyre J. Prevention of mother-to-child transmission of HIV: treatment options. *Expert Rev Anti Infect Ther.* 2005; 3(6): 971.
5. WHO, UNAIDS, UNICEF. Scaling up priority HIV/AIDS interventions in the health sector: progress report. Geneva: WHO Press; 2010.
6. Baiden F, Baiden R, Williams J, Akweongo P, Clerk C, Debuur C, et al. Review of zntenatal-linked voluntary counseling and HIV testing in sub-Saharan Africa: Lessons and options for Ghana. *Ghana Med J.* 2005; 39(1): 8-13.
7. Rutenberg N. HIV voluntary counseling and testing: an essential component in preventing mother-to-child transmission of HIV Washington, D.C.: Population Council; 2003.
8. World Health Organization. Service delivery approaches to HIV testing and counselling (HTC): a strategic htc programme framework. Geneva: WHO Press; 2012.
9. Federal HIV/AIDS prevention and control office [Ethiopia]. Guidelines for prevention of mother-to-child transmission of HIV In Ethiopia. Addis Ababa: Federal Ministry of Health; 2007.
10. Federal HIV/AIDS prevention and control office [Ethiopia]. Guidelines for HIV counselling and testing in Ethiopia Addis Ababa: Federal Ministry of Health; 2007.
11. Cartoux M, Meda N, Van de Perre P, Newell ML, de Vincenzi I, Dabis F. Acceptability of voluntary HIV testing by pregnant women in developing countries: an international survey. Ghent International Working Group on Mother-to-Child Transmission of HIV. *AIDS.* 1998; 12(18): 2489-93.
12. Nigatu T, Woldegebriel Y. Analysis of the prevention of mother-to-child transmission (PMTCT) service utilization in Ethiopia: 2006-2010. *Reprod Health.* 2011; 8: 6.
13. Federal Minstry of Health [Ethiopia]. Health and Health Related Indicators: 2012/13, 2014. Available from: <http://www.dktethiopia.org/sites/default/files/PublicationFiles/Health%20and%20Health%20Related%20Indicators%202005%20E.C.pdf>.
14. Addisu B, Abebe G. Factors affecting acceptance of HIV counseling and testing among Antenatal Care attendants: with emphasis on role of male partners at East Gojjam zone, Ethiopia. *International Journal of Scientific and Engineering Research.* 2012; 3(4): 1-7.
15. Glanz K, Rlimer BK, Viswanath K, eds. *Health behavior and health education: Theory, research, and practice.* 4th ed. Jossey-Bass: San Francisco, CA; 2008.
16. Malaju MT, Alene GD. Assessment of utilization of provider-initiated HIV testing and counseling as an intervention for prevention of mother to child transmission of HIV and associated factors among pregnant women in Gondar town, North West Ethiopia. *BMC Public Health.* 2012; 12: 226.
17. Haddis M, Jerene D. Awareness of antenatal care clients on Mother-to-childtransmission

- (MTCT) of HIV infection and its prevention in Arba Minch *Ethiop J Health Dev* 2006; 20(1): 55-57.
18. Homsy J, Kalamya JN, Obonyo J, Ojwang J, Mugumya R, Opio C, *et al.* Routine intrapartum HIV counseling and testing for prevention of mother-to-child transmission of HIV in a rural Ugandan hospital. *J Acquir Immune Defic Syndr.* 2006; 42(2): 149-54.
 19. Olugbenga-Bello AI, Oladele EA, Adeomi AA, Ajala A. Perception about HIV testing among women attending antenatal clinics at Primary Health Centres in Osogbo, Southwest, Nigeria. *J AIDS and HIV Research.* 2012; 4(4): 105-112.
 20. Westheimer EF, Urassa W, Msamanga G, Baylin A, Wei R, Aboud S, *et al.* Acceptance of HIV testing among pregnant women in Dar-es-Salaam, Tanzania. *J Acquir Immune Defic Syndr.* 2004; 37(1): 1197-205.
 21. Nyuzaghl J, Ohene S, Odoi-Agyarko K. Acceptability of routine offer of HIV Testing (opt-out approach) among pregnant women in the Wa municipality. *Ghana Med J.* 2011; 45(1): 10-5.
 22. Kongnyuy EJ, Mbu ER, Mbopi-Keou FX, Fomulu N, Nana PN, Tebeu PM, *et al.* Acceptability of intrapartum HIV counselling and testing in Cameroon. *BMC Pregnancy Childbirth.* 2009; 9: 9.
 23. Demissie A, Deribew A, Abera M. Determinants of acceptance of voluntary HIV testing among antenatal clinic attendees at Dil Chora Hospital, Dire Dawa, East Ethiopia. *Ethiop J Health Dev* 2009; 23(2): 141-147.
 24. Worku G, Enquselassie F. Factors determining acceptance of voluntary HIV counseling and testing among pregnant women attending antenatal clinic at army hospitals in Addis Ababa. *Ethiop Med J.* 2007; 45(1): 1-8.
 25. Sarker M, Sanou A, Snow R, Ganame J, Gondos A. Determinants of HIV counselling and testing participation in a Prevention of Mother-to-Child Transmission programme in rural Burkina Faso. *Trop Med Int Health.* 2007; 12(12): 1475-1483.
 26. Holmes CN, PO Preko PO, Bolds R, Baidoo J, Jolly PE. Acceptance of Voluntary Counselling, Testing and Treatment for HIV Among Pregnant Women in Kumasi, Ghana. *Ghana Med J.* 2008 42 (1): 8-15.
 27. Peltzer K, Mlambo G, Phaweni K. Factors determining prenatal HIV testing for prevention of mother to child transmission of HIV in Mpumalanga, South Africa. *AIDS Behav.* 2010; 14(5): 1115-23.
 28. Dahl V, Mellhammar L, Bajunirwe F, Bjorkman P. Acceptance of HIV testing among women attending antenatal care in south-western Uganda: risk factors and reasons for test refusal. *AIDS Care.* 2008; 20(6): 746-52.
 29. Matovu JK, Gray RH, Makumbi F, Wawer MJ, Serwadda D, Kigozi G, *et al.* Voluntary HIV counseling and testing acceptance, sexual risk behavior and HIV incidence in Rakai, Uganda. *AIDS.* 2005; 19(5): 503-11.
 30. Moges Z, Amberbir A. Factors Associated with Readiness to VCT Service Utilization among Pregnant Women Attending Antenatal Clinics in Northwestern Ethiopia: A Health Belief Model Approach. *Ethiop J Health Sci.* 2012; 21 Suppl 1: 107-15.
 31. Musheke M, Ntalasha H, Gari S, Mckenzie O, Bond V, Adriane Martin-Hilber A, Merten S. A systematic review of qualitative findings on factors enabling and deterring uptake of HIV testing in Sub-Saharan Africa. *BMC Public Health* 2013; 13:220.
 32. Kebaabetswe PM. Barriers to participation in the prevention of mother-to-child HIV transmission program in Gaborone, Botswana a qualitative approach. *AIDS Care.* 2007; 19(3): 355-60.
 33. Ben-Natan M, Hazanov Y. Women's willingness to be tested for human immunodeficiency virus during pregnancy: A review. *World J Virol* 2015; 4(3): 245-254.