

**ORIGINAL ARTICLE****FACTORS ASSOCIATED WITH READINESS TO VCT SERVICE UTILIZATION AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINICS IN NORTHWESTERN ETHIOPIA: A HEALTH BELIEF MODEL APPROACH**Zinash Moges<sup>1</sup>, Alemayehu Amberbir<sup>2</sup>**ABSTRACT**

**BACKGROUND:** *One of the consequences of Human Immunodeficiency Virus infection in women is the transmission of the virus to their children. Voluntary counseling and testing is an entry point for prevention of mother to child transmission). This study therefore, investigated readiness to Voluntary counseling and testing service utilization and associated factors among pregnant women attending antenatal care clinics using a health belief model.*

**METHODS:** *Health institution based cross-sectional study supplemented with qualitative method was conducted at Debremarkos town from February 15 to March 25, 2008. A total of 418 Antenatal care clients were interviewed. In addition four focus group discussion and five in-depth interviews were performed.*

**RESULTS:** *Out of 418 pregnant women 254(60.8%) had heard of, Voluntary counseling and testing of these 141 (55.5%) were not ready to use. R Voluntary counseling and testing eadiness of women to utilize Voluntary counseling and testing was significantly associated with knowledge on mother to child transmission, gravidity, gestational age, occupation and educational status. Most women 161 (63.4%) had low perceived susceptibility to HIV and 199(78.3%) had high perceived barrier to Voluntary counseling and testing. The qualitative result showed spouse's disapproval, fear of blood drawing and knowing HIV status, stigma and discrimination were mentioned as barriers. Among the HBM constructs, perceived susceptibility, benefit, barrier and self efficacy were important predictors of women's readiness to. Voluntary counseling and testing*

**CONCLUSION:** *This study showed pregnant women's readiness to utilize is l Voluntary counseling and testing ow. It is useful hence, to implement Information Education Communication/Behavioral Change Communication strategies to increase readiness. The use of behavioral model will likely assist the intervention.*

**KEY WORDS:** *Antenatal care, VCT, MTCT, Ethiopia, Northwest Ethiopia*

**INTRODUCTION**

Acquired Immune Deficiency Syndrome (AIDS) epidemic knocks decades of countries' national development and it can also devastate families and communities worldwide (1). In 2007 about 33.2 million people were living with HIV worldwide, of these 15.4 million were women and 2.5 million were children under 15 years (2). Sub-Saharan Africa is the most seriously affected region, with AIDS remaining the leading cause of death. Unlike other regions, the majority of people living with

HIV in Sub-Saharan Africa, 61% are women. Nearly 90% of all HIV-positive children and over 85% of HIV-infected pregnant women live in the region (2, 3). Ethiopia is one of the countries hardest hit by the epidemic. In 2007, the national adult HIV prevalence was reported to be 2.1 % and 977,394 Ethiopians (41%males, 59%females) were living with HIV/AIDS (4). The major mode of HIV transmission is heterosexual which accounts for 87% of infections and it is estimated that about 10% of infections occur due to vertical transmission (5).

<sup>1</sup>Health Promotion and Disease Prevention officer, Federal Ministry of Health, Addis Ababa, Ethiopia.

<sup>2</sup>Research Fellow, Division of Epidemiology and Public Health, University of Nottingham, Nottingham, UK and School of Public Health, Addis Ababa University, Addis Ababa, Ethiopia.

Corresponding author: Zinash Moges, Email: [zinii2006@yahoo.com](mailto:zinii2006@yahoo.com)

The risk of MTCT can be reduced significantly if a woman is supplied with antiretroviral drugs. However before this measure, the mother must be aware of her HIV-positive status (1). Although PMTCT interventions reduce the risk of MTCT of HIV by almost half, the majority of pregnant women and newborns lack access to the services. In 2005 a surveys conducted in more than 70 low- and middle-income countries reported that only 10% of pregnant women had received HIV test (6).

Due to low PMTCT program uptake, in Ethiopia vertical virus transmission from mother to child accounts for more than 90% of pediatric AIDS. In 2007, about 75,420 HIV-positive pregnant women were anticipated and estimated number of annual HIV positive births was 14,146 (4). The ANC settings and HIV testing before delivery are major opportunities for prenatal HIV prevention (7). Missed opportunity for prenatal HIV prevention contributes to more than half of the cases of HIV infections. Therefore VCT strategy forms the heart of all HIV/AIDS prevention and control efforts in the world (8, 9).

However, several studies confirmed that utilization of antenatal VCT by pregnant women is low (6, 10, 11). Moreover willingness of women to utilize antenatal VCT is influenced by various factors such as women's educational status (10, 12-16), perceived benefit of VCT, risk perception and perceived self efficacy to use VCT (17-19). Other studies also stated that perceived barriers to VCT like social stigma, lack of male partner support and fear of knowing HIV status were found to be associated factors (15, 20, 21).

Thus this study is guided by tested behavioral model specifically generated information about readiness of pregnant women to utilize antenatal VCT service and identified associated factors. Therefore it helps to improve service utilization and strengthen preventive efforts to mitigate the spread of HIV to infants in the Ethiopian context.

## METHODS AND MATERIALS

A health institution based cross sectional study employing both quantitative and qualitative methods was conducted using the health belief model. The study was carried out from February 15 – March 25, 2008 in Debremarkos town, the capital of East Gojam Zone in Amhara Regional State. Pregnant women attending ANC clinics in Debremarkos hospital and health center who had not utilized VCT during pregnancy were interviewed.

The sample size was determined to be 418, using single population proportion formulae considering the proportion of pregnant women attending ANC who were aware of mother to child transmission of HIV is found to be 55% (22), margin of error was 5%, at 95% confidence interval

and a non response rate of 10% was added. Accordingly those pregnant women attending ANC clinics in Debremarkos hospital and health centers within the intended study period were interviewed until the sample size was attained. For the qualitative study, four FGDs among pregnant women and five in-depth interviews with health professionals who were working in ANC and PMTCT department was conducted.

The quantitative data was collected by trained nurses using a pretested instrument. The instrument included socio-demographic characteristics, knowledge on HIV/AIDS (6 questions), MTCT (4 questions) and VCT (7 questions). One was assigned for correct answer and the score was calculated. Respondents were categorized as having good knowledge and poor knowledge based on the mean score (Good: > mean score). In addition, a set of items with a response options of five point likert scale ranging from strongly disagree (1 point) to strongly agree (5 point) were used to measure constructs of the HBM which were: perceived susceptibility (5 items), perceived severity (5 items), perceived benefit (5 items), perceived barriers (5 items), self-efficacy (3 items) and cues to action (9 items). Similarly the outcome variable which is readiness to VCT was measured using three items regarding the client's perceived preparedness to VCT. Then the variables were categorized as 'low' and 'high' after computing the mean score of responses (High: > mean score). After quantitative data collection, four FGDs each with eight participants were conducted among ANC clients and five in-depth interviews were carried out with service providers in ANC and PMTCT departments.

Data were entered into a computer using SPSS 12.0.1 version statistical software. Internal consistency reliability estimate of cronbach's alpha was computed and the value for each construct was >0.70 (23). Mean scores of responses to a number of items were computed and used to categorize (dichotomize) the variables. Descriptive statistics, logistic regression and odds ratio with 95% confidence interval were used to report the findings. The qualitative data were analyzed thematically and presented in harmony with the quantitative finding.

The study was approved by the Institutional Ethics Review Committee of Jimma University. Informed consent was taken from each participants and information were provided when found a misconception.

**RESULTS**

A total of 418 pregnant women attending ANC clinics were included in the study. Out of the total 250 (59.8%) respondents were urban dwellers and the mean age of the study subjects was 27 years

with a standard deviation of  $\pm 5.8$  years. Married women accounted 382 (91.4%). Most 235 (56.2%) had 2 to 4 pregnancies. Majority of the respondents 233(55.7%) were in second trimester of current pregnancy. Regarding occupation and education, 260(62.2%) were house wife and 195(46.7%) were unable to read and write (Table 1).

**Table 1.** Socio-demographic characteristics of pregnant women attending antenatal care clinics, Debremarkos Town, Amara Region, North West Ethiopia, 2008.

Socio-demographic variables		Frequency (n=418)	percentage
Age (years)	16-20	64	15.3
	21-25	121	28.9
	26-30	126	30.1
	31-35	70	16.7
	>35	37	8.9
Residence	Urban	250	59.8
	Rural	168	40.2
Marital Status	Married	382	91.4
	Single	23	5.5
	Divorced	13	3.1
Religion	Orthodox Christian	407	97.4
	Muslim	5	1.2
	Protestant	6	1.4
Ethnicity	Amhara	408	97.6
	Gurage	8	1.9
	Oromo	1	0.2
	Other*	1	0.2
Education	Unable to read and write	195	46.7
	Read and write / no formal education	24	5.7
	Grade 1-6	41	9.8
	Grade 7-8	30	7.2
	Grade 9-12	80	19.1
	Grade 12+	48	11.5
Occupation	Government employee	57	3.6
	Private employee	32	7.7
	House wife	260	62.2
	Daily laborer	14	3.3
	Housemaid/ servant	11	2.6
	Merchant	29	6.9
	Others**	15	3.6
Gravidity	Primigravida	119	28.5
	2-4	235	56.2
	>4	64	15.3
Gestational age	First trimester	42	10.0
	Second trimester	233	55.7
	Third trimester	143	34.2

\* Agaw, Tigree, \*\* Farmer

All the study subjects had heard of HIV/AIDS and 394(94.3%) had good reported knowledge. The majority of the respondents 254(60.8%) had heard of VCT, of these 142(55.9%) had good knowledge regarding VCT. Most of them 189(74.4%) also

reported that they had got information about VCT from health institutions. The majority of respondents had good knowledge on HIV/AIDS and VCT but a considerable number of respondents had poor knowledge on MTCT (Table 2).

**Table.2.** Knowledge on HIV/AIDS, MTCT and VCT among Pregnant Women Attending ANC Clinics, Debremarkos Town, Amhara Region, North West Ethiopia, 2008.

Variables	Frequency	percent
Knowledge on HIV/AIDS (N=418)		
Good	394	94.3
Poor	24	5.7
Knowledge on MTCT (N=418)		
Good	177	42.3
Poor	241	57.7
Knowledge on VCT (N=254)		
Good	142	55.9
Poor	112	44.1

As indicated in table 3, 141 (55.5%) respondents reported that they were not ready to use VCT service during pregnancy. In the qualitative result also most pregnant women explained that pregnancy is not the appropriate time for HIV testing. One participant claimed:

*"Hearing the presence of HIV virus in your blood would just complicate your life during pregnancy thus to prevent transmission of the virus to my baby I prefer to have HIV testing before pregnancy."*

About 169 (66.5%) pregnant women had high perceived severity of HIV/AIDS and the majority of study subjects 161 (63.4%) had low perceived susceptibility to it. Most of the focus group discussants explained that high susceptibility to HIV is ascribed to individuals who have multiple

sexual partners and young. Majority of them also claimed that they are not at risk of having HIV infection due to confidence on self and husband's faithfulness. The result of this study showed that 173 (68.1%) pregnant women had high perceived benefit of VCT with a mean of  $3.385 \pm 0.88$ . High perceived barrier was identified in 199 (78.3%) of pregnant women with an overall mean of  $3.664 \pm 0.819$  (Table 3).

Fear of blood drawing and receiving HIV positive test results, stigma and discrimination were

mentioned by the majority of the focus group discussants. Husband's disapproval was the other reason which was mentioned by the participants during the discussion. One participant said:

*"If I consult my husband to go for HIV test he may think that I am suspecting him and this may cause quarrel and even divorce."*

One counselor also described that most women hesitate to decide to be tested because they don't want to be looked differently by other people. The counselor explained that:

*"One pregnant lady asked me to tell her test result at her home or through phone because she thought that others could know her result just by observing her emotional status while going out of the counseling room."*

The logistic regression analysis revealed educational status and occupation of the study subject, knowledge on MTCT, gravidity and gestational age were significantly associated with women's readiness to utilize VCT service (Table 4). Among the health belief model constructs, perceived susceptibility to HIV, perceived benefit of VCT, and perceived barrier to VCT and self efficacy to VCT were found to be independent significant predictors of readiness to VCT (Table 5).

**Table 3.** Level of Readiness to VCT and Perceptions Towards HIV and VCT among Pregnant Women Attending Antenatal Care Clinics, Debremarkos Town, Amhara Region, North West Ethiopia, 2008 (N=254).

Variables	Frequency	Percent	Mean	Standard Deviation
Readiness To VCT				
Ready	113	44.5	2.787	0.982
Not ready	141	55.5		
Perceived susceptibility				
High	93	36.6	2.632	0.783
Low	161	63.4		
Perceived Severity				
High	169	66.5	3.462	0.878
Low	85	33.5		
Perceived threat				
High	111	43.7	2.994	0.646
Low	143	56.3		
Perceived benefit				
High	173	68.1	3.385	0.88
Low	81	31.9		
Perceived barrier				
High	199	78.3	3.664	0.819
Low	55	21.7		
Perceived self efficacy				
High	166	65.4	3.377	1.09
Low	88	34.6		
Cues to action				
High	119	46.9	2.906	0.894
Low	135	53.1		

## DISCUSSION

In this study 113 (44.5%) subjects reported that they were ready to utilize VCT during pregnancy. This is much lower when compared with the finding of several studies in which more than 75% of respondents expressed that they would be willing to accept VCT (13, 14, 18, 24-26). The qualitative result also revealed that majority of pregnant women were not ready to undergo HIV testing during pregnancy and they agreed that pregnancy is not the appropriate time for this process because they thought that hearing HIV positive test result would complicate their life. The same reason was stated by a study conducted in Tanzania (19).

Out of the total study subjects 177 (42.3%) were found to have good Knowledge on MTCT which is lower than the score (69%) and (71.6%) observed in Botswana (27) and in Adama (21) respectively. This may be due to deprivation of information about MTCT in the study area, since the PMTCT intervention was started recently about three years ago. A greater proportion of pregnant women 241 (57.7%) had poor knowledge on MTCT. This finding coincides with the results of several studies

conducted in different areas which identified poor knowledge on MTCT among pregnant women (11, 12, 28-32).

Pregnant women who had good knowledge on MTCT were two times more likely to be ready to VCT when compared with those who had poor knowledge. This finding is in line with other studies and further signals for the need for health education on MTCT (33). Women's education was the other factor which has influence on their readiness. Pregnant women who attended secondary school were more likely to be ready to VCT than those who cannot read and write. Previously conducted studies also demonstrated that educational status is an important factor for willingness to accept VCT (12-14, 16, 33, 34). The findings of this study as well as another one (34) affirmed that the occupational status of the woman was found to be important factor of their readiness. Government and private employed pregnant women were eight and four times more likely to be ready when compared with the housewives respectively. This may be due to employed women had more exposure to information about VCT at their work site while house- wives stay most of their time at home.

**Table 4.** Women's Readiness to VCT Service Utilization Versus Sociodemographic and Knowledge Variables. Debremarkos Town, Amhara Region, North West Ethiopia, 2008 (N=254)

variables	Readiness		OR(95%CI)	
	Ready N (%)	Not ready N (%)	unadjusted	Adjusted
<b>Education</b>				
Not read & write**	45(59.2)	31(40.8)	1	1
Read & write	6(60)	4(40)	0.9(0.25,3.72)	2.0(0.19,7.42)
Grade1-6	11(47.8)	12(52.2)	1.6(0.62,4.04)	1.1(0.27,1.93)
Grade7-8	13(56.5)	10(43.5)	1.1(0.44,2.87)	1.3(0.18,6.03)
Grade9-12	30(39)	47(61)	2.7(1.19,4.35)*	2.9(1.02,6.38)*
>Grade12	8(17.8)	37(82.2)	6.7(2.76,15.36)*	6.1(2.15,18.22)*
<b>Occupation</b>				
Government employed	9(16.4)	46(83.6)	6.4(2.92,14.09)*	7.5(3.16,17.94)*
Privet employed	7(31.8)	15(68.2)	2.7(1.03,6.99)*	3.6(1.23,10.73)*
House wife**	79(55.6)	60(43.4)	1	1
Daily laborer	2(40)	3(60)	1.9(0.31,11.6)	2.0(0.29,13.99)
House maid	4(57.1)	3(42.9)	0.0(0.00)	0.0(0.00)
Merchant	9(47.4)	10(52.6)	1.4(0.35,3.64)	1.1(0.411,3.18)
Other	3(42.9)	4(57.1)	1.7(0.36,7.75)	1.8(0.33,10.06)
<b>Gravidity</b>				
Primigravida	46(58.8)	35 (43.2)	0.4(0.25,0.76)*	0.3(0.13, 0.53)*
2-4**	53(36.3)	93(63.7)	1	1
>4	14 (51.9)	13(48.1)	0.5(0.23,1.21)	0.9(0.36,2.19)
<b>Gestational age</b>				
1 <sup>st</sup> trimester	17(63)	10(37)	0.3(0.15,1.21)*	0.3(0.12,0.83)*
2 <sup>nd</sup> trimester**	52(39.9)	89(63.1)	1	1
3 <sup>rd</sup> trimester	44(51.2)	42(48.8)	0.6(0.32,0.96)*	0.6(0.34,1.18)
<b>Knowledge on MTCT</b>				
Good	54(37)	92(63)	2.1(1.24,3.4)*	1.9(1.002,3.39)*
Poor**	59(54.6)	49(45.4)	1	1
<b>Knowledge on VCT</b>				
Good**	91(41.7)	127(58.3)	1	1
Poor	22(61.1)	14(38.9)	0.5(0.22,0.94)*	0.4(0.36,2.001)

\*Significant at  $\alpha < 0.05$ , \*\* Reference category,

Our study showed that 161 (63.4%) participants had low perceived susceptibility to HIV. Other studies conducted in different countries also indicated that a considerable proportion of pregnant women perceived themselves as not susceptible to HIV/AIDS (13, 19, 21, 25, 30). From the qualitative result also most women reported that they are not susceptible to HIV because they are married to a faithful husband and they trust their spouses. Similar reason was given by pregnant women who refused the test in Hong Kong (12).

In this study, pregnant women who had high perceived susceptibility were three times more likely to be ready to undergo the test when compared with those having low perceived susceptibility. This is in line with the findings of studies in Zambia (17), Hong Kong (12) and Zimbabwe (35). Pregnant women who had low perceived benefit were 95% less likely to be ready than those with high perceived benefit. Other

studies also showed that acceptance of VCT appear to depend on the understanding of its usefulness (18, 24). Perceived barrier to VCT utilization was high in 199 (78.3%) of respondents. Fear of knowing HIV status, fear of blood drawing, fear of stigma and discrimination were the main barriers identified from the qualitative result. Most of the mentioned barriers especially stigma and discrimination were also identified in previously done studies in different countries (20, 24, 29, 34, 36).

The influence of male partner was also another major barrier identified in the qualitative part of this study. Both the FGD and in-depth interview participants claimed that husband's approval is essential for a woman to use VCT service. Several studies also assessed the influence of husband to be one factor related with willingness of pregnant women to use VCT (14, 18, 25, 26, 39, 35).

**Table 5.** Women's Readiness to VCT Service Utilization Versus Behavioral Factors Debreworkos Town, Amhara Region, North West Ethiopia, 2008 (N=254)

Theoretical variables	Readiness		OR(95%CI)	
	Ready N (%)	Not ready N (%)	unadjusted	Adjusted
Perceived susceptibility				
High	30(32.3)	63(67.7)	1.76(1.45,3.49)*	2.84(1.11,7.242)*
Low**	83(51.6)	78(48.4)	1	1
Perceived benefit				
High**	65(32.7)	134(67.3)	1	1
Low	48(87.3)	7(12.7)	0.071(0.03,0.17)*	0.055(0.016,0.19)*
Perceived barrier				
High**	97(56.1)	76(43.9)	1	1
Low	16(19.8)	65(80.2)	5.185(2.78,9.68)*	4.65(1.59,13.56)*
Self-efficacy				
High**	28(16.9)	138(83.1)	1	1
Low	85(96.6)	3(3.4)	0.007(0.002,0.02)*	0.01(0.003,0.036)*
Cues to action				
High	37(31.13)	82(68.4)	0.35(0.209,0.59)*	1.074(0.44,2.65)
Low**	76(56.3)	59(43.7)	1	1

\* Significant at  $\alpha < 0.05$ , \*\* Reference category,

The logistic regression analysis showed that among the constructs of HBM; Perceived susceptibility, Perceived benefit, Perceived barrier and Self-efficacy were significant predictors of women's readiness. A similar study guided by HBM conducted in Tanzania also reported that perceived susceptibility, perceived barrier and perceived self efficacy were significantly associated with willingness of pregnant women to accept VCT (19). In conclusion the findings of the study revealed that less than half of study subjects were ready to utilize VCT which was lower than those reported in other studies done in different countries. Therefore to improve the service utilization by facilitating women's readiness, it is essential to address associated factors through innovative IEC/BCC strategies, encouraging couple counseling and testing, providing intensive and continued education and promoting women education. The use of behavioral approach would benefit such intervention. Moreover further studies should be conducted taking various settings.

#### ACKNOWLEDGEMENTS

This study was carried out with the financial assistance of Jimma University. We are very much grateful to the study subjects, data collectors and supervisors who supported in the data collection process. The East Gojam Zonal and District Health Bureaus, Debreworkos Hospital and Health center deserve due thanks for their cooperation.

#### REFERENCES

1. AVERT organization. AIDS and HIV information from AIDS around the world. Last Updated. September 13, 2007.
2. UNAIDS. AIDS epidemic update: special report on HIV/AIDS Switzerland, Geneva. December, 2007; 3-15.
3. Newell Marie-Louise. Mortality of infected and uninfected infants born to HIV infected mothers in Africa: A pooled analysis. *Lancet*, 2004; 344:1236-1243.
4. FHAPCO. Guidelines for Prevention of Mother-to-Child Transmission of HIV in Ethiopia. 2007.
5. UNAIDS. AIDS epidemic update: special report on HIV/AIDS. Switzerland, Geneva. December, 2006; 20.
6. WHO, UNAIDS and UNICEF towards universal access: scaling up priority HIV/AIDS interventions in the health sector: progress report, Switzerland. April, 2007.
7. Viki Peter Kai-lih L and Keeneth D. Missed opportunity for prenatal transmission among HIV exposed infants born 1996-2000, pediatric spectrum of HIV disease cohort: *Pediatric*. May, 2003; 111(5):1186-1195.
8. WHO. HIV prevention in the African region: A strategy for renewal and acceleration. June, 2006; 4.
9. Okone NK, Katabira ET, Jitta J. Prevalence and factors associated with utilization of voluntary HIV counseling and testing services among pregnant women in Lira district. *Antivir. The*, r8 (Suppl.1). 2003; abstract no. 1191.

10. Charles AS Karamagi., James K Tumwine, Thorkild Tylleskar and Kristian Heggenhougen. Antenatal HIV testing in rural eastern Uganda: incomplete rollout of the prevention of mother-to-child transmission of HIV programmes. *BioMed Central (BMC) Int. Health and Hum Right.* 2003; Vol, 11.
11. USAID & AED LINKAGE. Prevention of mother to child transmission: baseline survey, Addis Ababa, Ethiopia, 2004; 15-43.
12. C. F. HO and A. Y. Loke. Pregnant women's decisions on antenatal HIV screening in Hong Kong. *AIDS Care.* 2003; 5(6), 821-827.
13. EE Ekanem and A Gbadegesin. Voluntary Counseling and Testing for Human Immunodeficiency Virus: A Study on Acceptability by Nigerian Women Attending Antenatal Clinics. *African Journal of Reproductive Health.* 2004; 8(2):91-100.
14. Francis Bajunirwe & Michael Muzoora. Barriers to the implementation of programs for the prevention of mother-to-child transmission of HIV: A cross-sectional survey in rural and urban Uganda. *AIDS Research and Therapy.* 2005; vol.2.
15. Salvatore Pignatelli, Jacques Simporé, Virginio Pietra, et al. Factors predicting uptake of voluntary counseling and testing in a real-life setting in a mother-and-child center in Ouagadougou, Burkina Faso. *Tropical Medicine & International Health.* 2006; 11(3):350-357.
16. M. Fabiani, A. Cawthorne, B. Nattabi, E. O. Ayella, M. Ogwang, & S. Declich, et al. Investigating factors associated with uptake of HIV voluntary counseling and testing among pregnant women living in North Uganda. *AIDS Care.* 2007;19(6):733-739.
17. Thierman, Sara Chi, Benjamin H. Individual-Level Predictors for HIV Testing Among Antenatal Attendees in Lusaka, Zambia. *The American journal of medical science.* 2006; 332(1), 13-17.
18. Frank Baiden, P. Remes, R. Baiden. Voluntary counseling and HIV testing for pregnant women in the Kassena-Nankana district of northern Ghana. *AIDS Care.* July, 2005; 17(5):648-657.
19. M. M. DE PAOLI, R. Manongi & K.I. Klepp. Factors influencing acceptability of voluntary counseling and HIV-testing among pregnant women in Northern Tanzania. *AIDS Care.* 2004; 16(4): 411-425.
20. P. M. Kebaabetswe. Barriers to participation in the prevention of mother-to-child HIV transmission program in Gaborone, Botswana; a qualitative approach. *AIDS Care.* 2007; 19(3):355-360.
21. Addisu C. Determinants of voluntary counseling and HIV testing among pregnant women in Adama Town. 4th IAS Conference on HIV Pathogenesis, Treatment and Prevention. 2008; Abstract no. CDC004.
22. Mesfin Haddis and Degu Jerene. Awareness of antenatal clients on mother to child transmission of HIV infection and its prevention in Arbaminch. *Ethiopian Journal of Health Development.* 2006; 20(1):55-57.
23. Joseph A. Gliem and Rosemary R. Gliem. Midwest Research to Practice Conference in Adult, Continuing, and Community Education. 2003.
24. Okonkwo KC, Reich K, Alabi AI, Umeike N, Nachman SA. Evaluation of awareness, attitudes and beliefs of pregnant Nigerian women toward voluntary counseling and testing for HIV. *AIDS Patient Care STDS.* 2007; 21(4):252-60.
25. Rogers A, Meundi A, Amma A. et al. HIV-related knowledge, attitudes, perceived benefits, and risks of HIV testing among pregnant women in rural Southern India. *AIDS Patient Care STDS.* Nov, 2006; 20(11), 803-11.
26. Ekabua JE, Oyo-Ita AE, Ogaji DS, Omuemu VO. KAP of HIV prevention and screening among pregnant women attending specialist antenatal clinics in Calabar, Nigeria. *Niger J Med.* Oct-Dec, 2006;15(4),409-12.
27. Creek T, Ntuny R, Mazhari I, et, al. Knowledge, Attitude and Practices regarding Prevention of MTCT of HIV (PMTCT) among Antenatal and Postnatal women-Botswana, .*Int Conf AIDS.* Bangkok, Thailand. Jul 11-16, 2004; 15(C11122).
28. MOH and Social Services. Third Medium term Plan (MTP-III). The National Strategic Plan on HIV/AIDS (2004-2009). 2004.
29. Karl Peltzer, Thabang Mosala, Olive Shisana, Ayanda Nqueko, and Nolwandle Mngqundaniso ,et al. Barriers to Prevention of HIV Transmission from Mother to Child in a resource poor setting in the Eastern Cape, South Africa. *African Journal of Reproductive Health.* April, 2007; 11(1):57-66.
30. Choi Fung and Alice Yuen Loke. HIV/AIDS knowledge and risk behavior in Hong Kong Chinese pregnant women. *Journal of Advanced Nursing.* 2003;43(3):238-245
31. Igwegbe AO and Ilika AL. Knowledge and perceptions of HIV/AIDS and mother to child transmission among antenatal mothers at Nnamdi Azikiwe University Teaching hospital, Nnewi, Niger. *J Clin Pract.* Dec, 2005;8(2):97-101.
32. Kominami M, Kawata K, Ali M, Meena H, Ushijima H. Factors determining prenatal

- HIV testing for prevention of mother to child transmission in Dar Es Salaam, Tanzania. *Pediatric Int. Apr*, 2007; 49(2):286-92.
33. Worku G, Enquesselassie 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. Jan*, 2007; 45(1): 1-8.
34. Dinh Thu, Thu-H, Detels, Roger, Nguyen and Mai Anhl. Factors associated with declining HIV testing and failure to return for results among pregnant women in Vietnam. *AIDS. July*, 2005; 19(11):1234-1236.
35. Martin-Herz SP, Shetty AK, Bassett MT, et al. Perceived risks and benefits of HIV testing, and predictors of acceptance of HIV counseling and testing among pregnant women in Zimbabwe. *Int. J STD AIDS. Dec*, 2006; 17(12): 835.
36. Perez F, Zvandaziva C, Engelsmann B, Dabis F. Acceptability of routine HIV testing ("opt-out") in antenatal services in two rural districts of Zimbabwe. *J Acquir Immune Defic Syndr. Apr*, 2006;(4).: 514-20.