Original article

Determinants of acceptance of voluntary HIV testing among antenatal clinic attendees at Dil Chora Hospital, Dire Dawa, East Ethiopia

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Abstract

Back ground: Voluntary Counseling and Testing (VCT) is one of the best interventions to reduce mother to child transmission of HIV. Despite the proven benefits of VCT, many women are not willing to have HIV testing.

Objective: The objective of this study was to identify factors that determine the acceptance of voluntary HIV testing among pregnant women attending antenatal care at Dil Chora Hospital in Dire Dawa.

Method: The study employed unmatched case control study which was conducted from August 20 to September 10, 2006. The study population consisted of 234 antenatal care followers. Cases were antenatal care followers who were counseled and tested for HIV in the current pregnancy. Controls were antenatal care followers who were counseled but not tested for HIV in the current pregnancy. Data were collected by trained enumerators using structured questionnaire. Univariate and multivariate analysis was carried out using SPSS version 12.0.1 software.

Results: The majority (79.5%) of respondents (97.4% of cases and 60.5% of controls) had good knowledge on HIV, mother to child transmission and VCT. Marital status; knowledge about HIV, mother to child transmission and VCT; attitude towards VCT; antenatal care follow up and perceived benefits of VCT were independent predictors of acceptance of voluntary HIV testing.

Conclusion: Knowledge on MTCT and VCT, positive attitude towards VCT, antenatal care follow-up were predictors of acceptance of VCT. During the VCT session, health professionals should focus on knowledge, attitude, and benefits of VCT. [*Ethiop. J. Health Dev.* 2009;23(2):141-147]

Introduction

In the developing countries, the effect of the HIV epidemic has a drastic effect in the lives of millions of children. Globally, at least a quarter of newborns infected with HIV die before the age of one, up to 60% die before reaching their second birthday, and more than 80% of these deaths occur in Sub Saharan Africa (1). Recently, child mortality has fallen in some countries as a result of improved health care (2-4).

Children could be exposed to HIV infection in various ways such as through contact with HIV infected blood products or un-sterilized equipments, intravenous drug use or unprotected sex (1). However, Mother to Child Transmission (MTCT) of HIV accounts for the vast majority of children who are infected with HIV, where one third of them may be infected during pregnancy, two thirds at delivery and in populations where breastfeeding is the norm, breast feeding accounts for one third of cases of MTCT (5-6). In the absence of intervention, the probability of an HIV-positive woman's baby becoming infected ranges from 15% in industrialized countries and 25% to 35% in developing countries (2).

For many years, little was known about preventing the transmission of HIV infection from a mother to her child. Recently, however many advances have been made in developing effective and affordable interventions to reduce mother to child transmission of HIV (7). The most effective intervention to reduce transmission from mother to child depends on awareness of women on their HIV status, which in turn depends upon the availability of information and voluntary counseling services. Voluntary Counseling and Testing (VCT) of HIV would therefore, enable mothers to determine their sero-status before PMTCT intervention is carried out. The risk of transmission on HIV from an infected mother to her neonate could be reduced by 50% by giving antiretroviral drugs during pregnancy and labor as well as by avoiding breast feeding. VCT also can help those pregnant women who tested negative to understand and maintain safe behavior to avoid future infection (2).

Despite the proven benefits of VCT, acceptability is variable. While some countries have recorded high acceptance rates, others have recorded very lower rates (8). Studies have shown that individual factors such as knowledge and attitude of mothers about HIV and MTCT, socio-economic factors as well as factors associated with delivery of the service (availability, confidentiality) could affect the acceptance of voluntary HIV testing by pregnant women (9). Research on this area is scarce in Ethiopia. The objective of this study was to identify factors that determine acceptance of voluntary HIV testing among pregnant women attending antenatal care, at Dil Chora hospital in Dire Dawa, east Ethiopia.

Methods

The study was conducted at Dil Chora Hospital in Dire Dawa from August 20 to September 10, 2006. The hospital provides different services including VCT services to residents of the town and the surrounding

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community. The hospital is one of the four initial pilot sites selected to initiate Prevention of Mother to Child Transmission of HIV (PMTCT) service in the country. Since 2004 the hospital has been providing PMTCT services in the city. PMTCT service is provided for pregnant women attending antenatal care at the Maternal and Child Health Care Unit free of charge. According to Ministry of Health report, Dire Dawa was one of the highly affected urban areas by HIV/AIDS (10). This was the major reason to select the area to undertake this study.

The study employed unmatched case-control study. The study population consisted of antenatal care followers who were counseled for HIV testing in the current pregnancy. Cases were antenatal care followers who were counseled and tested for HIV in the current pregnancy prior to and during the study period. Antenatal care followers who were counseled but not tested for HIV in the current pregnancy prior to and during the study period were considered as control group. Pregnant women who didn't have HIV counseling or who had received VCT elsewhere were excluded from the study.
Sample size was calculated using WINPEPI-for-Windows (Program for Epidemiologist) computer program (11). The following parameters were used to calculate sample size: 95% confidence interval, 80% power, proportion of controls who have knowledge about MTCT of HIV of 41.8% (12), case to control ration of 1:1, Odds Ratio being detected between the two groups of 2.1(12). This gave a total sample size of 234 (117 cases and 117 controls). Cases and controls were identified from records of the clients and by interview. After indentifying one case, the next immediate control was selected for interview. This procedure had continued throughout the data collection period until the required sample size was obtained.

Data were collected by trained diploma holder nurses using structured and pre-tested Amharic version questionnaire. Pretest was done in 5% of the sample in the same hospital. The questionnaire was adopted from Demographic Health Survey (DHS, 2006). The content of the questionnaire included: socio-demographic variables; proximate determinants such as knowledge, attitude and practice about VCT and PMTCT; and acceptance of VCT and HIV testing. Before data collection, ethical clearance was obtained from Jimma University ethical review board. The aim of the study was explained to the respondents and verbal consent was obtained. To assure confidentiality, interview was conducted privately (in the absence of any person around). The right of the respondent not to participate or withdraw from the study was respected.

The collected data were entered into a computer, edited and cleaned and analyzed using SPSS version 12.01 computer statistical package. Descriptive statistics was done to describe the socio-demographic variable, the knowledge and attitude of the respondents. Bivariate analysis was done to see the association between socio-demographic variables and proximate determinants with acceptance of voluntary HIV testing. In the first model, the association between socio-demographic variables and voluntary HIV testing was assessed. In the second model, the effect of proximate determinants on acceptance of voluntary HIV testing was assessed. In the final model, variables which were significantly associated with voluntary HIV testing were entered into the stepwise logistic regression model to identify the independent predictors of HIV testing.

In this study, the following operational definitions were used:

Acceptors of voluntary HIV test - Pregnant women who had HIV counseling and testing in the current pregnancy.
Non-acceptors of voluntary HIV testing: - Pregnant women who had HIV counseling and refused to undertake the test during the current pregnancy.

Knowledge:- Knowledge was measured by the participants' responses to 10 knowledge related questions related to HIV/MTCT and VCT. Correct responses were given a value of "1" and incorrect responses were given "0". The sum was computed and the mean was used as a cut-off point. Respondents who had scored above the mean were considered as having good knowledge. Respondents who scored below the mean were labeled as having poor knowledge.

Attitude:- Attitude was measured by respondents' response to Likert scale attitude related questions. If the respondent agreed to a positive statement, a score of "1" was given. If the respondent disagreed or had no response, a value of "0" was given. Respondents who scored above the mean were regarded as having a positive attitude. Respondents who had scored below the mean were regarded as having negative attitude.

Perceived benefit- Respondents who believed that voluntary HIV testing was beneficial were labeled as having positive perception.

Results

A total of 234 pregnant women were included in the study with a response rate of 100%. Among those, 117 of them were cases and the rest 117 were control groups.

The majority of cases as well as controls were in the age group between 20 and 29 years and the mean age was 25.2 years for cases and 26.3 for controls. Most of the participants were Amhara (44.4%) and Oromo (30.8%) by ethnicity. Moslem (46.2%) and orthodox Christians (39.7%) were the predominant religions. Large proportions of the respondents (98.3% of cases and 71.8% of controls) were married. The majority of them

(70.9% of cases and 65.0% of controls) were above elementary educational level (Table 1).

One hundred eighty six (79.5%) of the study participants (97.4% of cases and 60.5% of controls) had good knowledge about HIV, MTCT and VCT. About 88 (58.3%) of cases and 63 (41.7%) of controls mentioned that antiretroviral drugs could prevent MTCT of HIV. Fifty nine percent of cases and forty one percent of controls knew that avoidance of breast feeding could prevent mother to child transmission of HIV. About 94.9% of cases and 36.8% of controls had a positive attitude towards VCT.

Table 1: **Socio-demographic characteristics of women attending antenatal care clinic, at Dil Chora Hospital, Dire Dawa (n=234), September, 2006**

Socio-demographic variables	Cases(n=117)	Controls(n=117)	Total (234)
	Number (%)	Number (%)	Number (%)
Age in years			
19 years and less	12 (10.3)	4 (3.4)	16 (6.8)
20-29	76 (64.9)	74 (63.2)	150 (64.1)
30-39	29 (24.8)	39 (33.4)	68 (29.1)
Ethnicity			
Amhara	48 (41.0)	56 (47.8)	104 (44.5)
Oromo	31 (26.5)	41 (35.0)	72 (30.8)
Gurage	24 (20.5)	11 (9.6)	35 (14.9)
Somali	6 (5.1)	6 (5.1)	12 (5.1)
Tigre	8 (6.9)	3 (2.5)	11 (4.7)
Religion			
Orthodox	52 (44.5)	56 (47.8)	108 (46.1)
Muslim	43 (36.8)	50 (42.7)	93 (39.7)
Protestant	19 (16.2)	7 (6.0)	26 (11.1)
Catholic	3 (2.5)	4 (3.5)	5 (2.1)
Educational status			
Elementary and below	34 (29.1)	41 (35)	75 (32.0)
Above Elementary	83 (70.9)	76 (65)	159 (68)
Monthly income(Birr)			
<=450	65 (55.5)	90 (76.9)	155 (66.2)
>450	52 (44.5)	27 (23.1)	79 (33.8)
Occupation			
Employed	29 (24.8)	7 (5.9)	36 (15.4)
Non-employed	88 (75.2)	110 (94.1)	198 (84.6)
Marital status			
Married	115 (98.3)	84 (71.8)	199 (85.0)
Not married	2 (1.7)	33 (29.2)	35 (15.0)
Family Size			
1-4	92 (78.7)	86 (73.5)	178 (76.1)
5-8	22 (18.8)	26 (22.2)	48 (20.5)
9 and above	3 (2.5)	5 (4.3)	8 (3.4)

Association of socio-demographic variables and voluntary HIV testing was assessed. Older age groups (>= 30 years) were 78% less likely to accept voluntary HIV testing as compared to the younger ones (=< 19 years), OR= 0.24 (95% CI: 0.07, 0.82). Married women were more likely to accept voluntary HIV testing than single ones, OR=22.5 (95% CI: 5.23, 96.0). After controlling the effects of other socio-demographic variables, married women were 19 times more likely to be tested than the single ones, OR=19.5 (95% CI: 4.25, 89.3). Individuals with higher income were more likely to have HIV testing as compared to individuals with lower income, OR=2.67 (95% CI: 1.50, 4.68). However, when controlled for other socio-demographic variables, income didn't retain its statistical significance.

Employment was significantly associated with acceptance of voluntary HIV testing, OR=5.2 (95% CI: 2.1, 12.4). After controlling the effect of other socio-economic variables, employed women were 4 times more likely to be tested than unemployed women, OR=4.2 (95% CI:1.4,11.8). Other variables like ethnicity, religion, educational status, and family size were not associated with acceptance of voluntary HIV testing (Table 2).

The effects of intermediate variables such as knowledge, attitude, Antenatal Care (ANC) follow up, perceived risks to HIV/AIDS; perceived benefits of VCT were assessed. Mothers who had good knowledge on HIV, MTCT and VCT were 23 times more likely to be tested than those who had poor knowledge, OR=23.7 (95% CI:

7.1, 79.3). Similarly, acceptance of HIV testing was higher among those who had positive attitude towards VCT than those who had negative attitude, OR=31.8 (95% CI: 12.9, 78.5). Women who attended two or more ANC follow up were 2.7 times more likely to be tested than those who had less than two visits, OR=2.78 (1.46,5.17). Respondents who perceived that HIV testing was beneficial were about 9 times more likely to be tested as compared to those who didn't perceived the test be beneficial, OR=8.9 (95% CI:4.1,19.3). After controlling the effect of other proximate determinants, knowledge, attitude, ANC follow up and perceived benefits of VCT retained their statistical significance (Table 3).

Table 2: **The effect of socio-demographic factors on HIV testing among pregnant women attending antenatal care clinic at Dil Chora Hospital, Dire Dawa (n=234), September, 2006.**

Socio-demographic variables	VCT acceptor (cases)	VCT non-acceptor (controls)	Crude OR (95%CI)	Adjusted OR (95% CI)
Age				
19 and less	12 (10.3)	4 (3.4)	1	1
20-29	76 (64.9)	74 (63.2)	0.35 (0.1,1.2)	0.24 (0.04,1.27)
30 and above	29 (24.8)	39 (33.4)	0.24 (0.07,0.82)	0.18 (0.034,1.01)
Marital status				
Not married	2 (5.7)	33 (94.3)	1	1
Married	115 (57.8)	84 (42.2)	22.5 (5.23,96.0)	19.5 (4.25,89.3)
Ethnicity				
Oromo	48 (41.0)	56 (47.8)	1	1
Amhara	31 (26.5)	41 (35.0)	1.13 (0.63,2.01)	0.55 (0.18,1.67)
Somali	24 (20.5)	11 (9.6)	1.3 (0.38,4.49)	1.08 (0.25,4.5)
Gurage	6 (5.1)	6 (5.1)	2.88 (1.23,6.77)	1.59 (0.59,4.3)
Tigre	8 (6.9)	3 (2.5)	3.5 (0.86,14.4))	1.59 (0.24,10.6)
Religion				
Muslim	52 (44.5)	56 (47.8)	1	1
Christian	65 (55.5)	61 (52.2)	1.14 (0.68,1.9)	0.85 (0.35,2.1)
Income				
<450	65 (55.5)	90 (76.9)	1	1
=>450	52 (44.5)	27 (23.1)	2.67 (1.5,4.68)	1.26 (0.63,2.48)
Educational status				
Illiterate	34 (29.1)	41 (35)	1	1
Literate	83 (70.9)	76 (65)	1.3 (0.75,2.28)	1.48 (0.72,3.1)
Occupation				
Not employed	29 (24.8)	7 (5.9)	1	1
Employed	88 (75.2)	110 (94.1)	5.2 (2.1,12.4)	4.2 (1.4,11.8)
Family size				
<5	92 (78.6)	86 (73.5)	1	1
=>5	25 (21.4)	31 (26.5)	0.76 (0.4,1.3)	1.9 (0.69,5.6)

In the final model, variables which showed significant association in the two models were included. From all the variables, Knowledge on HIV/AIDS, MTCT and VCT; attitude towards VCT; marital status; and attendance of ANC follow up and perception of mothers on the benefits of VCT were found to be independent predictors of acceptance of voluntary HIV testing. As shown on table 4, women who had good knowledge were about 10 times more likely to be tested for HIV than those who had poor knowledge, OR=9.8 (95% CI: 2.3,40.3). Similarly, mothers who had positive attitude towards VCT were 9 times more likely to accept voluntary HIV testing than those who had negative attitudes, OR=9.4 (95% CI: 3.3,26.7). Women who had 2 or more ANC visits were 2.5 times more likely to be tested for HIV, OR=2.5 (95% CI: 1.98,6.5). Married women were also 21 times more likely to accept voluntary HIV testing than the unmarried ones, OR=21.0 (95% CI: 4.3, 103). Similarly, respondents who had positive perception on the benefits of VCT were about 6 times more likely to accept HIV testing than those who had negative perception, OR=6.5 (95% CI: 1.5,17.0) (Table 4).

Table3: **Proximate determinants of voluntary HIV testing among pregnant women attending antenatal care clinic at Dil Chora Hospital, Dire Dawa (n=234), September, 2006.**

Intermediate variables	Cases	Controls	Crude OR (95%CI)	Adjusted OR (95% CI)
Knowledge				
Poor	3 (2.6)	45 (39.5)	1	1
Good	114 (97.4)	72 (60.5)	23.7 (7.1,79.3)	15.6 (13, 66.2)
Attitude				
Negative	6 (5.1)	74 (63.2)	1	1
Positive	111 (94.9)	43 (36.8)	31.8 (12.9,78.5)	15.3 (5.2,45.4)
ANC follow up				
Less than two	78 (66.7)	99 (84.6)	1	1
Two and above	39 (33.3)	18 (15.4)	2.78 (1.46,5.17)	2.5 (1.98,6.5)
Prior HIV testing				
No	77 (65.8)	110 (94.0)	1	1
Yes	40 (34.2)	7 (6.0)	8.16 (3.5,19.2)	2.8 (1.78,4.30)
Partners' reaction to the test				
Will not agree	11 (9.4)	93 (79.5)	1	1
Will agree	106 (90.6)	24 (20.5)	2.4 (1.29,7.63)	1.8 (0.31,2.7)
Perceived risk of HIV				
Negative	80 (68.4)	83 (70.9)	1	1
Positive	37 (31.6)	34 (29.1)	1.1 (0.64,1.9)	0.49 (0.2,1.18)
Perceived Benefits				
Negative	9 (7.7)	50 (42.7)	1	1
Positive	108 (92.3)	67 (57.3)	8.9 (4.1,19,3)	4.8 (1.79,12.9)

Table 4: **Independent determinants of voluntary HIV testing among pregnant women attending antenatal care clinic at Dil Chora Hospital, Dire Dawa (n=234), September, 2006.**

Variable	VCT acceptors (cases)	VCT non-acceptor (controls)	Crude OR (95%CI)	Adjusted OR (95% CI)
Knowledge				
Poor	3 (2.6)	45 (39.5)	1	1
Good	114 (97.4)	72 (61.5)	23.7 (7.1,79.3)	9.8 (2.3,40.3)
Attitude				
Negative	6 (5.1)	74 (63.2)	1	1
Positive	111 (94.9)	43 (36.8)	31.8 (12.9,78.5)	9.4 (3.3,26.7)
ANC follow up				
Less than 2	78 (66.7)	99 (84.6)	1	1
2 and above	39 (33.3)	18 (15.4)	2.78 (1.46,5.17)	2.5 (1.98,6.5)
Marital status				
Not married	2 (1.7)	33 (28.2)	1	1
Married	115 (98.3)	84 (71.8)	22.5 (5.23.96)	21 (4.3,103.0)
Perceived Benefits				
Negative	9 (7.7)	50 (42.7)	1	1
Positive	108 (92.3)	67 (57.3)	8.9 (4.1,19.3)	6.5 (1.5,17.0)

Discussion

As voluntary counseling and testing services are being available for the prevention of MTCT of HIV in the developing countries, there is a need to consider potential determinants of acceptance of HIV testing among pregnant women. So far, there have been few studies on the determinants of acceptance of HIV testing among pregnant women in Ethiopia.

This study attempted to explore the factors that affected acceptance of HIV among pregnant women. The study showed that 186 (79.5%) of the participants had good knowledge about HIV, MTCT, and VCT. This finding is higher than the knowledge score (69%) observed among pregnant women in Botswana (13), but is similar to the finding reported from a study in Uganda, where 80% of the mothers have a good knowledge of MTCT and VCT (14).

Among the socio-demographic variables, marital status was significantly associated with acceptance of HIV testing. Married women were more likely to undergo HIV testing than unmarried ones. A similar finding was reported from a study conducted among pregnant mothers in Addis Ababa (15). However, in our study, the effect of marriage on the outcome variable is less precise due to small sample size. Married women might feel more protected by their marriage and perceived

themselves to be at lower risk. In contrast, studies from Tanzania and Uganda indicated that single women were more likely to be tested than married ones (14, 16). Employed women were more likely to be tested for HIV as compared to unemployed ones. This is in line with a finding from a study from Vietnam (17). This study also revealed that income was associated with acceptance of HIV testing. Women who had higher income were more likely to be tested as compared to women who had lower income. Studies from Rwanda and Ethiopia also showed higher acceptance rate of HIV testing among women with higher income than their counter parts (14, 15). However, when adjusted for other variables, income didn't retain its significance. The possible explanation for the association between income and occupation with acceptance of VCT would be that those women who had better income could have a better access to health institutes, which in turn, could offer them for opportunities to access health information including MTCT, PMTCT, and VCT, which can ultimately influence their decision for HIV testing.

Though higher rate of acceptability of voluntary HIV testing was observed among educated mothers, the finding was not statistically significant when adjusted for other variables. A study conducted among pregnant women in Vietnam found similar finding (17). A study from Uganda had found that those with higher education were more likely to accept VCT than those with lower education (14). On the contrary, a Nigerian study showed that higher level of education was associated with decreased acceptance of HIV testing (18).

This study showed that women who had previous HIV testing were 8 times more likely to be tested than those women who had no prior HIV testing. However, when adjusted for other variables, prior HIV testing had lost its statistical significance. Other studies have also indicated that women who have been tested for HIV in the past were less likely to refuse HIV testing in their current pregnancies as compared to women who had no prior HIV testing (19, 20). On the other hand, a study in Uganda had shown no association between previous HIV testing and acceptance of HIV testing in the current pregnancy (11). The possible explanation for the association between previous testing and VCT acceptance could be the possible changes in sexual behaviors among the women after knowing their sero-status. This was proved by studies which assessed behavioral changes following VCT (21).

Among the proximate determinants, knowledge on HIV/AIDS, MTCT and VCT; attitude towards VCT; antenatal care follow up and perceived benefits of VCT were significantly associated with acceptance of HIV testing. This fact had been proved by different studies from different countries (14, 16). This association could be explained by the fact that mothers with good knowledge could be more aware of the benefits of the test and the treatment options that decrease MTCT of HIV infection.

Significant association was observed between attitude of the mothers towards VCT and acceptance of HIV testing. A similar finding was reported from a study in Zimbabwe (22).

Antenatal care follow up was significantly associated with acceptance of HIV testing. Women who have attended two or more antenatal follow ups were 2.5 times more likely to be tested than those who had less visits. This is consistent with a study conducted in Addis Ababa (14). The reason for this association could be better exposure of the mothers to information on MTCT, PMTCT, and VCT, due to their frequent ANC visits, which in turn influences their decision to take the test. Number of pregnancies is not associated with acceptance of VCT, which is in line with other Studies (15).

A significant association was found between perceived benefits of HIV testing and acceptance of VCT. This finding was consistent with other studies (14, 22). The concept of the health belief model could explain the association of perceived benefits of VCT and VCT acceptance. According to this model, positive perceived benefits of some practices like VCT could lead to positive actions, such as testing for HIV. On the contrast, a disparity between the perception of the benefits of VCT and acceptance of HIV testing was observed in some studies. A study in Uganda revealed that despite a good perception towards the benefits of VCT by most participants, the number of those who actually tested was much lower (14).

Low risk perception of acquiring HIV was observed among 30.3% of the respondents in our study. This finding was in line with other findings in Addis Ababa and Dire Dawa where risk perception among pregnant women was reported to be 34% and 24.8% respectively (15). Lower risk perception rate (18.4%) was observed among pregnant women in Nigeria (18). Perceived risk of getting HIV was not found to be associated with acceptance of HIV testing. A similar finding was reported from a study conducted in Ethiopia (15). This could be due to the lower risk perception observed among the majority of the study subjects.

An association was observed between the subjects' perception of their partners' reaction to the test and acceptance of HIV testing. Women who perceived that their partners would support their being tested for HIV were more likely to accept the test than their counter parts. Similar finding was reported from a study conducted among pregnant women in rural and urban Uganda where women whose husbands would approve of the test were six times more likely to be tested as compared to those who thought their husbands would not approve (14). This association may be due to the

women's need of the consent of their partners in most societies as male partners are the primary decision makers in most issues including VCT (24). Other studies conducted in India (23) and Kenya (24) obtained similar findings. Some studies have shown that women who have been tested for HIV without partners' consent have suffered domestic violence (25).

In conclusion, marital status, knowledge, perceived benefits of HIV testing, and attitude were the independent predictors of HIV testing. To bring sustainable behavioral change, the Dire Dawa Health office and Health workers should provide Behavioral Change Communication (BCC) about VCT, PMTCT and the benefit of VCT to the antenatal care attendees.

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