Factors Associated with HIV Counseling and Testing among Males and Females in Ethiopia: Evidence from Ethiopian Demographic and Health Survey Data

Molla Godif[1], Huruy Assefa[2*], Mussie Alemayehu[2] and Wondowosen Terefe[2]

[1]Addis Ababa Health Bureau, Addis Ababa, Ethiopia

[2]Department of Public Health, College of Health Sciences, Mekelle University, Ethiopia

*Corresponding author: Huruy Assefa, Department of Public Health, College of Health Sciences, Mekelle University, PO.Box, 1871 Mekelle, Ethiopia, Tel: 251914728565; E-mail: huruyame@yahoo.com

Abstract

Background: HIV counseling and testing is one of the key strategies in the HIV/AIDS prevention and control programs in Ethiopia. However utilization of this service is very low. The aim of the study was to assess and compare factors associated with HIV counseling and testing service utilization among Ethiopian males and females.

Methods: The study utilized data from the Ethiopian Demographic and Health Survey (EDHS) 2011, which was a cross-sectional survey conducted on a nationally representative sample. Using cluster sampling, 14110 males aged 15-59 years and 16,834 females aged 15-49 were selected from all the 9 administrative regions and 2 administrative cities of Ethiopia. Descriptive analysis was done and chi-square test was used to test the association of each independent variable with the dependent variable. Multivariable logistic regression was used to identify potential factors associated with HIV testing service utilization.

Results: Generally, 42.5% male and 41.9% female participants had ever been tested and counseled for HIV at least once. Education level, wealth index, area of residence, knowledge about HIV/AIDS and having no stigmatizing attitudes toward people living with HIV/AIDS were found to be strongly and positively associated with HIV testing service utilization in both male and female genders. HIV test rate was higher among younger men and women (aged ≤ 34 years), rich in income, urban residents, exposed to mass media and those of educated secondary and above.

Conclusions: HIV testing service utilization among male and females in Ethiopia is low. HIV/AIDS-related stigma, HIV related knowledge, place of residence, educational level, marital status, wealth index, and media exposure were major factors affecting HIV testing service utilization among males and females in the country.

Keywords: HIV; Counseling and testing; Males; Females; Ethiopia

Abbreviations

HIV: Human Immunodeficiency Virus; EDHS: Ethiopian Demographic and Health Survey; AIDS: Acquired Immune Deficiency Syndrome; EAs: Enumeration Areas; DHS: Demographic and Health Survey; VIF: Variance Inflection Factor; SNNP: South Nations and Nationalities People; ANC: Antenatal Care; COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; CI: Confidence Interval; NGO: Non-Governmental Organizations; OR: Odds Ratio

Introduction

HIV testing and counseling uptake has improved, many people living with HIV in low- and middle-income countries still do not know their HIV status, undercutting efforts to reduce onward transmission and refer those testing HIV-positive to appropriate care and treatment; an estimated 7.5 million people are eligible for treatment but are not accessing antiretroviral therapy because they are unaware of their HIV serostatus [1]. According to 10 recent national population-based surveys in sub-Saharan Africa, the median percentage of people living with HIV who know their HIV status is below 40% [2] and a recent survey data from sub-Saharan Africa showed that only 15% of young women aged 15-24 years old and 10% of young men have been tested and know their HIV status [3].

Ethiopia is among the countries most affected by the HIV epidemic. Approximately 1.2 million Ethiopians were living with HIV/AIDS in 2010 [4]. Ethiopia represents a stable, low-level, generalized epidemic with marked regional variations driven by most-at-risk populations (MARPs) [5]. People living in peri-urban and small market towns, as well as young women, are the most at risk segments of the population [6].

Ethiopia is one of the few sub-Saharan countries showing a decline of more than 25% in new HIV infections [5]. Among age groups women aged 20-24 (44%) and men aged 25-29 (46%) are the most likely to have ever been tested for HIV and received their test results [7]. Overall about six in every ten Ethiopians (61% of women and 59% of men) have never been tested for HIV [7].

The contextual factors contributing for HIV counseling and testing service utilization are expected to be different and evidence shows that it is caused by the interaction of multiple factors. This state's detailed analysis of individual socio-demographic, socio-economic, and individual knowledge and practices and others factors are important. HIV counseling and testing is one of the key strategies in the HIV/AIDS prevention and control programs in Ethiopia but little is known

about the factors influencing HIV counseling and testing service utilization. Therefore the purpose of this study is to assess and compare factors associated with HIV counseling and testing service utilization among Ethiopian males and females.

Materials and Methods

This cross sectional study design was based on 2011 EDHS data of both males and females aged 15-49 which included all the 9 regional states and 2 administrative cities of Ethiopia. Administratively, each of the 9 regional states and 2 administrative cities were divided into zones and each zone into lower administrative units called woredas. Each woreda was then further subdivided into the lowest administrative unit, called kebele.

The 2011 EDHS sample was selected using a stratified, two-stage cluster design and enumeration areas (EAs) were the sampling units for the first stage. The 2011 EDHS sample included 624 EAs, 187 in urban areas and 437 in rural areas. Households comprised the second stage of sampling. A complete listing of households was carried out in each of the 624 selected EAs from September 2010 through January 2011. Maps were drawn for each of the clusters and all private households were listed. A representative sample of 17,817 households was selected for the 2011 EDHS survey. All women aged 15-49 and all men aged 15-59 who were either permanent residents of the selected households or visitors who stayed in the household the night before the survey were eligible to be interviewed. A total of 16,834 women aged 15-49 and 14,110 men aged 15-59 representative sample was collected [7].

The 2011 EDHS used three questionnaires: the Household Questionnaire, the Woman's questionnaire and the Man's questionnaire. These questionnaires were adapted from model survey instruments developed for the MEASURE DHS project to reflect the population and health issues relevant to Ethiopia. Issues were identified at a series of meetings with the various stakeholders. In addition the English questionnaires were translated into three major languages: Amharic, Oromiffa, and Tigrigna [7].

Central Statistics Agency staffs and a variety of experts from government ministries, NGOs, and donor organizations participated in a three-week pretest training and fieldwork conducted from 20th September to 8th October 2010. Fifty-five participants were trained to administer paper questionnaires. Main training of interviewers, editors and supervisors was conducted from 24th November to 23th December 2010 [7].

The outcome variable was HIV counseling and testing service utilization and measured by asking the question: 'Have you ever tested for HIV?'

Operational definitions

Substance use: Referred to the respondent's status of chat chewing, alcohol drinking and cigarette smoking.

HIV/AIDS-related knowledge: It was derived form 7 HIV related questions which consists prevention and misconceptions about transmission.

Low knowledge: Answered questions correctly three or below.

Medium knowledge: Answered 4-5 questions correctly.

Comprehensive knowledge: Answered 6-7 questions correctly.

HIV related risk: It was used as an independent variable based on 4 questions of HIV related risks.

Risk: If exposed at least one of the indicators.

HIV related stigma: It was referred to the respondent's attitude towards HIV suspected and developed from 4 questions of HIV related stigma.

No stigma: If not experienced to any of the stigma indicators.

Low stigma: If experienced 1 of the stigma indicators.

Medium stigma: If experienced 2 stigma indicators.

High stigma: If experienced 3-4 stigma indicators.

Data analysis

Data were analyzed using STATA version11. Descriptive analysis was done using frequencies and percentages for all categorical variables. The results were presented in tables. Chi-square test was used to test the association of each independent variable with the dependent/ outcome variable. In the bivariate logistic regression analysis, level of significance of the association between the dependent and each independent variable was considered at P-value less than or equals to 0.05 for the predictors to proceed to the next level of analysis. In the multivariable logistic regression analysis, step wise logistic regression model development technique was employed to develop the final main-effect model for the dependent variable at p-value less than or equals to 0.05.

Multi-collinearity between predictors was checked using variance inflation factors (Multi-collinearity exist if VIF>10). Interaction and confounding effects of variables was also checked. Finally model goodness of fit was checked using Hosmor and lemshow goodness of fit and prediction power of the model was checked using ROC curve.

Ethical considerations

To undertake the study, permission was obtained from the Ethical Review Committee of Mekelle University; College of Health Sciences and official letter were sent to EDHS to get the data.

Results

Socio demographic characteristics of respondents

A total of 14,110 males aged 15-59 and 16,834 females aged 15-49 were enrolled in the study. From the total respondents 5,991(42.4%) males and 6,915 (41.9%) females had ever been tested and counseled for HIV.

About two third of males (64.6%) and three fourth of females (73.5%) were within the younger age group (15-34) years. More than half (50.5%) of males and three in seven (46.2%) of females within the age group 25-34 years had ever been tested for HIV. Seven in ten of males (70.1%) and two third of females (67.7%) were from the rural area. Among the urban respondents about six in ten (60.2%) of males and around two third (65.9%) of females had ever been tested for HIV (Table 1).

More than half 53.9%, 59.6% and 59.8% of males from Tigray, Addis Ababa and Dire Dawa had ever tested and counseled for HIV. Less than six in ten females from Tigray (59.5%) and more than six in

ten females from Addis Ababa (66%) and Dire Dawa (64.9%) had ever been tested and counseled for HIV. Regarding educational level, less than half (47.3%) of male respondents had primary education. Among those secondary and above educated, about two third (64.9%) of males and more than three forth (74.8%) of females had ever been tested and counseled for HIV. About (49.6%) of males and (49.3%) of females were categorized as rich. Among the rich persons, more than half (54.8%) of males and (58.5%) of females had ever been tested for HIV/AIDS (Table 1).

From the orthodox respondents, more than half males (50.7%) and females (53.5%) had ever been tested and counseled for HIV. Majority (91.5%) of male respondents and more than half (51.2%) of female respondents had job (Table 1).

Characteristics	Male			Female		
Age group	N (%)	Ever tested (%)	p-value	N (%)	Ever tested (%)	p-value
15-24	5,162 (36.6)	1,940 (37.56)	<0.001	6,852 (41.5)	2,881 (42.0)	<0.001
25-34	3,956 (28.0)	1,998 (50.5)		5,279 (32.0)	2,436 (46.2)	
35-49	3,749 (26.6)	1,621 (43.2)		4,370 (26.5)	1,598 (36.6)	
50-59	1,242 (8.8)	432 (34.8)				
Region						
Tigray	1384 (9.8)	746 (53.9)	<0.001	1,726 (10.5)	1,027 (59.5)	<0.001
Afar	1000 (7.1)	294 (29.4)		1,291 (7.8)	307 (23.8)	
Amhara	1965 (13.9)	801 (40.8)		2,087 (12.7)	709 (34.0)	
Oromia	2060 (14.6)	693 (33.6)		2,130 (12.9)	755 (35.5)	
Somalia	715 (5.1)	123 (17.2)		913 (5.5)	92 (10.1)	
Benishangul gumuz	1138 (8.1)	458 (40.3)		1,258 (7.6)	451 (35.9)	
SNNP	1699 (12.0)	702 (41.3)		2,034 (12.3)	675 (33.2)	
Gambela	940 (6.7)	431 (45.9)		1,129 (6.8)	410 (36.3)	
Harari	972 (6.9)	409 (42.1)		1,099 (6.7)	631 (57.4)	
Addis Ababa	1318 (9.3)	785 (59.6)		1,740 (10.5)	1,148 (66.0)	
Dire Dawa	918 (6.5)	549 (59.8)		1,094 (6.6)	710 (64.90)	
Residence						
Urban	4215 (29.9)	2,536 (60.2)	<0.001	5,325 (32.3)	3,508 (66.0)	<0.001
Rural	9894 (70.1)	3,455 (34.9)		11,176 (67.7)	3,407 (30.5)	
Education level						
No education	4449(31.5)	1,166 (26.2)	<0.001	8,270 (50.1)	2,299 (27.8)	<0.001
Primary	6670 (47.3)	2,884 (43.2)		5,852 (35.5)	2,836 (48.5)	
2nd and above	2990 (21.2)	1,941 (64.9)		2,379 (14.4)	1,780 (74.8)	
Wealth/index						
Poor	4,956 (35.1)	1,347 (27.2)	<0.001	4,956 (35.1)	1,391 (22.8)	<0.001
Middle	2,154 (15.3)	812 (37.7)		2,266 (13.7)	769 (33.9)	
Rich	6,999 (49.6)	3,832 (54.8)		8,128 (49.3)	4,755 (58.5)	
Religion						
Orthodox	6125 (43.4)	3,108 (50.7)	<0.001	6,992 (42.4)	3,738 (53.5)	<0.001
Protestant	2216 (15.7)	876 (39.5)		2,933 (17.8)	977 (33.3)	

Muslim	5315 (37.7)	1,854 (34.9)		6,162 (37.4)	2,112 (34.3)	
Others	450 (3.2)	153 (28.9)		406 (2.5)	85 (20.9)	
Marital status						
Single	5653 (40.1)	2,290 (40.5)	<0.001	4,413 (26.7)	1,825 (41.4)	<0.001
Married	7929 (56.2)	3,422 (43.2)		10,191 (61.8)	4,149 (40.7)	
Separated	527 (3.7)	279 (52.9)		1,897 (11.5)	941 (49.6)	
Having job						
No	1193 (8.53)	419 (35.1)	<0.001	7,984 (48.84)	2,826 (35.4)	<0.001
Yes	12788 (91.47)	5,517 (43.1)		8,364 (51.16)	4,012 (48.0)	
Wife's age						
<24	2,178 (15.44)	1,063 (48.8)	<0.001	NA	NA	<0.001
25-34	3,359 (23.81)	1,457 (43.4)				
35-44	1,825 (12.94)	718 (39.3)				
>45	6,747 (47.82)	2,753 (40.8)				
Husband's age						
15-24			<0.001	616 (3.7)	249 (40.4)	<0.001
25-34				3,356 (20.3)	1,547 (46.1)	
34-44				3,271 (19.8)	1,372 (41.9)	
>45				9,258 (56.1)	3,747 (40.5)	
Husbands education						
No education	NA	NA	<0.001	6,060 (50.2)	1,695 (28.0)	<0.001
Primary	NA	NA		4,081 (33.8)	1,963 (48.1)	
Secondary and above	NA	NA		1,924 (16.0)	1,423 (74.0)	
**NA: Not Applicable; N: Number of respondents						

Table 1: HIV Counseling and Testing Service Utilization in relation to Socio demographic Characteristics of Male and Female in Ethiopia.

HIV related knowledge and stigma status of respondents

Concerning HIV/AIDS related knowledge of respondents, more than fifty percent (50.9%) of males and about 43.7% of females were with high knowledge on HIV/AIDS. Only 43.5% of males and 35.4% of females were with comprehensive knowledge on HIV/AIDS. Among respondents with comprehensive knowledge of HIV, more than half (56.5%) of males and about two third (64.6%) of females had ever been tested for HIV (Table 2).

Regarding HIV related stigma, 43.4% of males and 40.7% females had no HIV related stigma. But only 13.8% of males and 23.3% females had high HIV related stigma towards HIV suspected people. Among those respondents with no HIV related stigma about 56.6% of males 59.3% of females had ever been tested (Table 2).

Variables	Male			Female		
Knowledge level	N (%)	Ever tested (%)	p-value	N (%)	Ever tested (%)	p-value
Low	2,492 (17.9)	598 (24.0)	<0.001	6,130 (38.6)	1,572 (25.6)	<0.001
High	7,083 (50.9)	2,941 (41.5)		6,937 (43.7)	3,523 (50.8)	

Comprehensive	4,340 (31.2)	2,452 (56.5)		2,817 (17.7)	1,820 (64.6)	
HIV stigma						
No stigma	4,139 (29.7)	2,344 (56.6)	<0.001	5,387 (33.9)	3,193 (59.3)	<0.001
Low stigma	4,600 (33.1)	2,151 (46.8)		6,187 (39.0)	2,734 (44.2)	
Medium Stigma	3,251 (23.4)	1,047 (32.2)		3,352 (21.1)	833 (24.9)	
High stigma	1,925 (13.8)	449 (23.3)		958 (6.0)	155 (16.2)	

Table 2: HIV Counseling and Testing Service Utilization in relation to HIV related knowledge and stigma among Males and Females in Ethiopia.

Exposures and risks status of respondents

Regarding HIV risk status more than fifty percent (52%) of male respondents and only 39.4% of female respondents were at risk of HIV/AIDS. Among respondents with HIV risk about 48.0% of males and 48.4% of females had ever been tested and counseled for HIV. About 52.4% of males and 62.5% of females had only one sexual partner. Among respondents with no sex partner about 41.6% of males and 39.4% of females had ever been tested for HIV. About the variable knowing where place of HIV test, majority (82.9%) of males and 70.8% of females knew a place where to get HIV test. About 51.9% of males and 61.51% of females know place of HIV testing (Table 3).

Regarding mass media exposure, majority of males (82.5%) and less than half (45.2%) of females were exposed. Among those exposed to mass media, half (50.8%) of males and about six in ten (58.9%) of females had ever been tested for HIV. About three forth males (74.7%) and less than half (46.9%) of females were exposed to substance use. Among those respondents exposed to substance use only 44% of males and 48% of females had been ever tested for HIV (Table 3).

Variables	Male			Female		
	N (%)	Ever tested (%)	p-value	N (%)	Ever tested (%)	p-value
HIV risk						
No risk	6,770 (48.0)	2,468 (36.5)	<0.001	10,005 (60.6)	3,773 (37.7)	<0.001
Risk	7,339 (52.0)	3,523 (48.0)		6,496 (39.4)	3,142 (48.4)	
Circumcision						
No	1097 (7.8)	352 (32.1)	<0.001			
Yes	13003 (92.2)	5,636 (43.3)				
Ever heard AIDS						
No	190 (1.4)	0 (0.00)	<0.001	610 (3.7)	0 (0.0)	<0.001
Yes	13915 (98.7)	5,991 (43.1)		15,884 (96.3)	6,915 (43.5)	
Know place of test						
No	2369 (17.3)	0 (0.0)	<0.001	4,639 (29.2)	0(0.0)	<0.001
Yes	11543 (83.0)	5,991 (51.9)		11,242 (70.8)	6,915 (61.5)	
Number of partners						
No partner	6180 (43.8)	2,569 (41.6)	<0.001	6,103 (37.0)	2,403 (39.4)	<0.001
Only one	7385 (52.4)	3,285 (44.5)		10,307 (62.5)	4,464 (43.3)	
More than one	535 (3.8)	135 (25.2)		73 (0.4)	46 (63.0)	
Media exposure						
No	5,114 (36.3)	1,430 (27.9)	<0.001	9,032 (54.8)	2,522 (27.9)	<0.001
Yes	8,982 (63.7)	4,558 (50.7)		7,455 (45.2)	4,387 (58.8)	
Substance use						

No	3,562 (25.3)	1,317 (37.0)	<0.001	8,763 (53.1)	3,199 (36.5)	<0.001
yes	10,542 (74.7)	4,673 (44.3)		7,730 (46.9)	3,715 (48.1)	
Ever paid for sex						
No	8,928 (90.4)	4,000 (44.8)	<0.001			
yes	952 (9.6)	599 (62.9)				
ANC Visit						
No	NA	NA		4,293 (55.4)	854 (19.9)	<0.001

Table 3: HIV Counseling and Testing Service Utilization in relation to HIV related risks and exposures among Males and Females in Ethiopia, EDHS 2011.

The factors associated with HIV counseling and testing

In the bivariate logistic regression analysis the factors found to be significantly associated with HIV counseling and testing service utilization at p value less than or equals to 0.05 in both male and female genders were age of respondent, region, area of residence, educational level, religion, wealth index, marital status, occupation, mass media exposure, substance use, HIV related knowledge, HIV related risk behavior, HIV related stigma and number of sex partners. In addition wife's age among males and husband education, husband age and ANC visit among females were significantly associated with HIV counseling and testing in the bivariate logistic analysis (Table 4).

Variables significantly associated with HIV testing at binary logistic regression were entered into multivariable logistic regression analysis using stepwise regression model. The factors significantly and independently associated with HIV testing service utilization in both male and female groups were age of respondent, region , area of residence, educational level, religion, wealth index, marital status occupation, mass media exposure, HIV related knowledge and HIV related stigma (Table 4).

Males within the age group of 25-34 years were 1.43 times more likely to be tested and counseled for HIV than the age group of 15-24 years [AOR=1.43, CI (1.28, 1.61)] and males aged from 35-49 years old were 1.15 times more likely to be tested and counseled for HIV than the age group of 15-24 years [AOR=1.15, CI (1.01, 1.33)]. Similarly after controlling the other variables, a female gender within age group 25-34 was 24% less likely to be tested and counseled for HIV as compared to 15-24 years old [AOR=0.76, CI (0.68, 0.85)] (Table 4).

Regarding the region of participants after controlling the other variables a male being from Afar, Amahara, Oromia, Somalia, Bennishangul gumuz, SNNP, Gambela, Harari, Diredawa and Addis Ababa was less likely to be tested and counseled for HIV by 55% [AOR=0.45, CI (0.37, 0.56)], 23% [AOR=0.77, CI (0.66, 0.89)), 62% [AOR=0.38, CI (0.32, 0.44)], 78%[AOR=0.22, CI (0.17,0.29)], 28% [AOR=0.72, CI (0.60, 0.87)], 32% [AOR=0.68, CI (0.57, 0.81)), 42% [AOR=0.58, CI (0.48, 0.71)], 68% [AOR=0.32, CI (0.26, 0.39)], 25% [AOR=0.75, CI (0.61, 0.93)) and 29% [AOR=0.71, CI (0.58, 0.87)] as compared to a male gender being from Tigray region, respectively (Table 4).

Similarly among females after controlling the other variables, female gender being from Afar, Amahara, Oromia, Somalia, Bennishangul gumuz, SNNP, Gambela, Harari and Diredawa was less likely to be tested and counseled by 67% [AOR=0.33, CI (0.27, 0.41)],

60% (AOR=0.40, CI (0.35, 0.47)], 62% (AOR=0.38, CI (0.32, 0.45)], 90% (AOR=0.10, CI (0.08, 0.13), 52% (AOR=0.48, CI (0.40, 0.58)], 50% [AOR=0.50, CI (0.42, 0.59)], 49% (AOR=0.51, CI (0.42, 0.62)], 53% (AOR=0.47, CI (0.39, 0.58)] and 58% [AOR=0.42, CI (0.35, 0.49)] as compared to a female gender being from Tigray region (Table 4).

The other significant variable was type of residence and after adjusting the other variables, males coming from the rural area were by 14% less likely to be tested and counseled for HIV as compared to a male coming from urban area [AOR=0.86, CI (0.77, 0.96)]. In female gender, a female gender being from rural area was by 43% less likely to be tested and counseled for HIV as compared to a female gender coming from the urban area [AOR=0.57: CI (0.51, 0.65)] (Table 4).

Educational level was the other statistically and independently significant variable with the dependent variable. Male gender with no education was by 65% less likely to be tested and counseled for HIV as compared to male gender with education level of secondary and above [AOR=0.35, CI (0.30, 0.39)] and males with primary education was by 36% less likely to be tested and counseled for HIV as compared to male gender with secondary and above education [AOR=0.64, CI (0.58, 0.71)]. Females with no education and primary was less likely to be tested and counseled for HIV by 73% [AOR=0.27, CI (0.24, 0.32)] and 45% [AOR=0.55, CI (0.48, 0.62)] as compared to a female with secondary and above education, respectively (Table 4).

Regarding wealth index after controlling the other variables, a male with poor and middle in wealth index was less likely to be tested and counseled for HIV by 42% [AOR=0.58, CI (0.53, 0.64)] and 17% [AOR=0.83, CI (0.74, 0.94)] as compared to the rich males, respectively. Similarly, females with poor and middle wealth index was less likely to be tested and counseled for HIV by 51% [AOR=0.49, CI (0.44, 0.55)] and 28% [AOR=0.72, CI (0.64, 0.82)] as compared to the rich females, respectively (Table 4).

Religion was also the other associated factor with the dependent variable, male Protestants and Muslims were less likely to be tested and counseled for HIV by 24% [AOR=0.76, CI (0.66, 0.86)] and 13% [AOR=0.87 CI (0.79, 0.98)] as compared to a male Orthodox in religion, respectively. Female Protestant was less likely to be tested for HIV by 34% [AOR= 0.66 CI (0.58, 0.75)) as compared to male Orthodox, respectively (Table 4).

Married and separated males were 1.67 times [AOR=1.67, CI (1.49, 1.88)] and 1.90 times [AOR=1.90, CI (1.54, 2.35)] more likely to be tested and counseled for HIV as compared to single males, respectively. Similarly married and separated/divorced females were

3.2 times [AOR=3.2, CI (2.86, 3.58)] and 3.24 times [AOR=3.24, CI (2.79, 3.76)] more likely to be tested as compared to single females, respectively (Table 4).

Exposure of media was statistically and independently associated with the dependent variable. Males without exposure of mass media was less likely to be tested and counseled for HIV by 30% [AOR=0.70, CI (0.64, 0.77)] as compared to males exposed to mass media. Similarly females without exposure of mass media was less likely to be tested and counseled HIV by 29% [AOR=0.71, CI (0.65, 0.77)] as compared to females exposed to mass media (Table 4).

Males with low and high HIV related knowledge were less likely to be tested and counseled for HIV by 49% [AOR=0.51, CI (0.45, 0.57)] and 27% [AOR=0.73, CI (0.68, 0.80)] as compared to males with comprehensive knowledge of HIV, respectively. Similarly in females after adjusting the other variables, a female gender with low and high knowledge of HIV was less likely to be tested and counseled for HIV by 60% [AOR=0.40 CI (0.42, 0.54)] and 17% [AOR=0.83 CI (0.74, 0.92] as compared to a female with comprehensive knowledge of HIV respectively (Table 4).

In addition to the above variables, HIV related stigma was statistically and independently significant variable with HIV testing and counseling. Males with low, medium and high HIV related stigma were less likely to be tested and counseled for HIV by 15% [AOR=0.85, CI (0.78, 0.94), 23% [AOR=0.67, CI (0.60, 0.75) and 50% [AOR=0.50, CI (0.44, 0.58)] as compared to males with no HIV stigma, respectively. Similarly females with low, medium and high HIV related stigma were less likely to be tested and counseled for HIV by 24% [AOR=0.76, CI (0.69, 0.83)], 48% [AOR=0.52, CI (0.47, 0.59)] and by 63% [AOR=0.37, CI (0.30, 0.45)] as compared to females with no HIV related stigma, respectively (Table 4).

Characteristics	Male		Female	
	COR (95% CI)	AOR (95%CI)	COR (95% CI)	AOR (95% CI)
Age group				
15-24	1	1	1	1
25-34	1.69 (0.56, 1.84)	1.43 (1.28, 1.61)	1.18 (1.09, 1.26)	1.10 (0.99, 1.22)
35-49	1.26 (1.16, 1.38)	1.15(1.00, 1.31)	0.79 (0.73, 0.86)	0.76 (0.68, 0.85)
50-59	0.89 (0.78, 1.01)	0.92 (0.78, 1.09)	NA	NA
Region				
Tigray	1	1	1	1
Afar	0.36 (0.30, 0.42)	0.45 (0.37, 0.56)	0.21 (0.18, 0.25)	0.33 (0.27, 0.41)
Amhara	0.59 (0.51, 0.68)	0.77 (0.66, 0.89)	0.35 (0.31, 0.40)	0.40 (0.35, 0.47)
Oromia	0.43 (0.38, 0.50)	0.38 (0.32, 0.44)	0.37 (0.33, 0.43)	0.38 (0.32, 0.45)
Somalia	0.18 (0.14, 0.22)	0.22 (0.17, 0.29)	0.08 (0.06, 0 .10)	0.10 (0.08, 0.13)
Benishangul Gumuz	0.58 (0.49, 0.68)	0.72 (0.60, 0.87)	0.38 (0.33, 0.44)	0.48 (0.40, 0.58)
SNNP	0.60 (0.52, 0.69)	0.68 (0.57, 0.81)	0.34 (0.29, 0.39)	0.50 (0.42, 0.59)
Gambela	0.72 (0.61, 0.86)	0.58 (0.48, 0.71)	0.39 (0.33, 0.45)	0.51 (0.42, 0.62)
Harari	0.62 (0.53, 0.73)	0.32 (0.26, 0.39)	0.92 (0.79, 1.06)	0.47 (0.39, 0.58)
Dire Dawa	1.25 (1.08, 1.47)	0.75 (0.61, 0.93)	1.32 (1.15, 1.52)	0.42 (0.35, 0.49)
Addis Ababa	1.27 (1.07, 1.51)	0.71 (0.58, 0.87)	1.26 (1.08, 1.47)	0.85 (0.69, 1.04)
Place of residence				
Urban	1	1	1	1
rural	0.36 (0.33, 0.38)	0.86 (0.77, 0.96)	0.23 (0.21, 0.24)	0.57 (0.51, 0.65)***
Education level				
No education	0.19 (0.17, 0.21)	0.35 (0.30, 0.39)	0.13 (0.12, 0.14)	0.27 (0.24, 0.32)
primary	0.41 (0.38, 0.45)	0.64 (0.58, 0.71)	0.32 (0.28, 0.35)	0.55 (0.48, 0.62)
Secondary and above	1	1	1	1

Wealth index				
Poor	0.31 (0.29, 0.33)	0.58 (.53, 0.64)	0.21 (0.19, 0.23)	0.49 (0.44, 0.55)
Middle	0.50 (0.45, 0.55)	0.83 (0.74, 0.94)	0.36 (0.33, 0.40)	0.72 (0.64, 0.82)
Rich	1	1	1	1
Religion				
Orthodox	1	1		1
Protestant	0.64 (0.58, 0.70)	0.76 (0.66, 0.86)	0.43 (0.41, 0.49)	0.69 (0.61, 0.79)
Muslim	0.52 (0.48, 0.56)	0.87 (0.79, 0.97)	0.45 (0 .43, 0.50)	1.04 (0.94, 1.16)
Others	0.50 (0 .40, 0.61)	0.81 (0.64, 1.03)	0.23 (0.09, 0.20)	0.47 (0.35, 0.62)
Marital status				
Single	1	1	1	
Married	1.12 (1.04, 1.19)	1.67 (1.49, 1.88)	0.97 (0.91, 1.05)	3.20 (2.86, 3.58)
separated	1.65 (1.38, 1.98)	1.90 (1.54, 2.35)	1.39 (1.25 , 1.55)	3.24 (2.79, 3.76)
Job status				
No	0.71(0.63, 0.81)	0.65(0.56, 0.75)	0.59(0.56, 0.63)	0.80(0.74, 0.86)
yes	1	1	1	1
HIV knowledge				
Low	0.24 (0.22, 0.27)	0.51 (0.45, 0.57)	0.19 (0.17, 0.21)	0.48 (0.42, 0.54)
High	0.55 (0.51, 0.59)	0.73 (0.68, 0.80)	0.57 (0.52, 0.62)	0.83 (0.74, 0.92)
Comprehensive	1	1	1	1
HIV risk level				
No risk	0.62(0.58, 0.66)		1.01(0.89, 1.16)	
Risk	1			
HIV stigma level				
No stigma	1	1	1	1
Low stigma	0.67 (0.62, 0.73)	0.85 (0.78, 0.94)	0.54 (0 .51, 0.59)	0.76 (0.69, 0.83)
Medium stigma	0.36 (0.33, 0.40)	0.67 (0.60, 0.75)	0.23 (0.21, 0.25)	0.52 (0.47, 0.59)
High stigma	0.23 (0.21, 0.26)	0.50 (0.44, 0.58)	0.13 (0.11, 0.16)	0.37 (0.30, 0.45)
Media exposure				
No	0.38 (0.35, 0.41)	0.70 (0.64, 0.77)	0.27 (0.25, 0.29)	0.71 (0.65, 0.77)
Yes	1			
Number of sex partners				
No partner	2.11 (1.72, 2.57)			
Only one	2.37 (1.94 , 2.90)			
More than 1	1			
Wife's age				

<24	1			
25-34	0.80 (0.72, 0.90)			
35-44	0.68 (0.60, 0.77)			
>45	0.72 (0.66, 0 .80)			
Husband's education				
No education	NA	NA	0.14 (0.12, 0.15)	
primary	NA	NA	0.33 (0.29, 0 .37)	
Secondary and above	NA	NA	1	
ANC visit				
No	NA	NA	0.13 (0 .12,0.15)	
Yes	NA	NA	1	

Table 4: Factors Associated with HIV Testing Service Utilization among Male and Female Genders in Ethiopia, using EDHS 2011.

Discussion

Although the prevalence of testing and counseling HIV was higher as compared to the previous reports of EDHS 2005 [8], the coverage is still below 50% in both male and female genders. Age, residence, region, religion, educational level, wealth index, marital status, occupation status, mass media exposure, HIV related knowledge and HIV-related stigma were found to be the most important determinants of HIV counseling and testing service utilization among males and females in Ethiopia.

In this study, age was found to be significant predictors of HIV counseling and testing service utilization in both males and females. In both genders, age group between 25-34 years was more likely to use HIV testing service utilization than the age group 15-24 years. In female gender, age group between 35-49 years was less likely to be tested HIV as compared to age group 15-24 years. This was in line with the studies conducted in Ethiopia, Uganda, rural Zimbabwe, South Africa and Kenya [8-12]. This could be due to mostly this age group are supposed to be married and begin to have their own sexual partner and particularly in females the high prevalence of pregnancy rate is high within the age group. Additionally females within this age group have relatively high sexual desire [4]. Whereas older females have relatively less opportunity to gets access of HIV testing services.

Both males and females of Afar, Amahara, Oromia, Somalia, Bennishangul gumuz, SNNP, Gambela, Harari and Diredawa were less likely to be tested and counseled for HIV as compared to males and females of Tigray. And males of Addis Ababa were less likely to be tested and counseled for HIV as compared to males of Tigray. This might be comparatively the prevalence of HIV/AIDS is high in Tigray region. So that people are conscious to know about their HIV status. In addition as institutional delivery service utilization among women in this region is high, the PIHCT service might enhances the testing uptake in both sexes especially among females [13].

In this study both males and females from the rural area were less likely to be tested and counseled for HIV as compared to the urban residents. This finding was also in agreement with studies conducted in Zimbabwe and South Africa [9,14]. This might be because the rural people perceived themselves to have no risk of HIV infection, the prevalence of HIV is less in the rural area as compared to the urban and there is less access of health facility and awareness of HIV testing in rural areas.

Unmarried males were less likely to be tested and counseled for HIV as compared to married males. Studies conducted in Kenya [15], Mozambique [16] and Zimbabwe [13] were in agreement with this result. One possible reason for the significant association could be those unmarried/single might perceived that HIV/AIDS is only transmitted by sexual intercourse and those married once have the opportunity of testing during marriage and as partner involvement during ANC visit. But this study was in contrast with the studies conducted in Ethiopia [17]. Among females, marital status was not found to be significantly associated with HIV testing. However a study conducted in Zimbabwe reported that never-married women have higher odds of accepting HIV testing when it is offered [14]. This could be females in Zimbabwe and Ethiopia might have different socioeconomic and cultural characteristics. Additionally the study period might influence the association.

Protestant and Muslim males and females were less likely to be tested and counseled for HIV as compared to orthodox males and females in religion. This was in agreement with the studies conducted in Ethiopia [8] and Zimbabwe [14]. This could be due to the religion influence in which individuals health seeking behavior is different according to their beliefs and lower HIV testing and counseling numbers be linked to geography that is low HIV prevalence in certain regions.

In both genders being secondary and above in education were more likely to tested and counseled for HIV as compared to those uneducated counter parts. This study was in line with the studies conducted in Ethiopia which found that having higher educational status was associated with ever being tested for HIV in both men and women [18,19] and other studies conducted in South Africa [9] and Kenya [15]. The possible reason could be due to education is more likely to increase awareness and understanding of health related information as well as confidence in interacting with health care providers. Education also influences knowledge about which types of health care services to use, as well as when and how to use them. In

addition those more educated people have better health seeking behavior as compared to the illiterate people.

Studies conducted in Ethiopia [9], rural Uganda [11], Zambia [20,21], a cohort study in Zimbabwe [22] and Mozambique [23], were in line with this study that a male gender with poor and middle in wealth index was less likely to be counseled and tested for HIV as compared to a rich male gender. Similarly females with poor and middle wealth index were less likely to be tested and counseled HIV as compared to females with rich wealth index. This association could be as a result of those who were rich might have the probability to get a health service access easily and to choose a health service which is comfortable to them.

Another very important predictor of HIV testing and counseling in both genders was mass media exposure. Those who were not exposed to mass media were less likely to be tested for HIV. This study is in line with the study conducted in Zimbabwe [14]. This could be those people who were exposed to mass media might have the probability to know the benefits of early HIV counseling and testing, where and how HIV counseling and testing is given and their awareness towards HIV related knowledge and stigma become improved.

The present study also reported that both male and female genders that had low knowledge about HIV/AIDS were less likely to be tested and counseled for HIV as compared to those who had comprehensive knowledge of HIV/AIDS. This finding is also in line with the studies conducted in Ethiopia [8], Uganda [24] and Nigeria [25]. The possible reason could be those who had better knowledge or comprehensive knowledge about HIV/AIDS might have the probability to know how HIV/AIDS is transmitted, the prevention mechanism and the benefit of HIV testing.

Regarding HIV related stigma, studies conducted in Humara, Ethiopia, and other SSA studies which found having no stigmatizing attitudes toward people living with HIV/AIDS was found to be strongly and positively associated with HIV counseling and testing service utilization in both urban and rural part [20,26-29]. This association could be as a result of those with high HIV related stigma might have thought if HIV test is performed and the test result could be positive they considered that they would be stigmatized by the society. Therefore they prefer to hide themselves from knowing their HIV status.

In addition to the significant contribution of our findings for testing and counseling HIV, the study has limitations. The information in the survey was self-reported, so to some extent under-reporting of socially unacceptable behaviors and attitudes (such as stigma) and over reporting of socially desirable behaviors were likely. Representation of the whole county is the strength of this study and it is possible to generalize the findings for the country in both genders.

Conclusion

This study found that HIV testing service utilization among male and females in Ethiopia is low. HIV/AIDS-related stigma, HIV related knowledge, place of residence, educational level, marital status, wealth index, and media exposure were major factors affecting HIV testing service utilization among males and females in the country.

Recommendation

Adult education on HIV testing should be expanded and strengthened to increase awareness on HIV/AIDS. Mass media should be addressed and strengthen particularly to the rural part of the country. So that clients can be easily aware about the importance of HIV testing. Awareness creation on HIV counseling and testing service utilization should focus on avoiding stigmatizing and discriminatory behaviors, so that clients can develop positive attitudes towards people living with HIV/AIDS.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

MG designed the study, performed the statistical analysis and participated in drafting the manuscript. HA participated in the study design, implementation of the study, and drafted the manuscript. MA and WT participated in the study design, implementation of the study, and participated in drafting the manuscript. All authors contributed to the data analysis, read and approved the final manuscript.

Acknowledgements

References

1. Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, et al. (2011) Prevention of HIV-1 infection with early antiretroviral therapy. N Engl J Med 365: 493-505.

2. WHO, UNICEF, UNAIDS (2011) A guide on indicators for the monitoring and reporting on the health sector response to HIV/AIDS. Geneva.

3. WHO (2011) Prevention and treatment of HIV and other sexually transmitted infections among men who have sex with men and transgender people. Recommendations for a public health approach. Geneva.

4. Federal Democratic Republic of Ethiopia (2012) Country Progress Report on HIV/AIDS Response. Ethiopia.

5. UNAIDS (2010) UNAIDS report on the global AIDS epidemic. Geneva.

6. WHO, UNAIDS, UNICEF (2011) Global HIV/AIDS Response-Epidemic update and health sector progress towards Universal Access-Progress report.

7. Central Statistical Agency (Ethiopia), Macro ORC (2012) Ethiopia Demographic and Health Survey 2011. Addis Ababa, Ethiopia.

8. Leta TH, Sandøy IF, Fylkesnes K (2012) Factors affecting voluntary HIV counselling and testing among men in Ethiopia: a cross-sectional survey. BMC Public Health 12: 438.

9. MacPhail C, Pettifor A, Moyo W, Rees H (2009) Factors associated with HIV testing among sexually active South African youth aged 15–24 years, AIDS Care: 456-467.

10. Odhiambo FB, Kikuvi G, Omolo J, Wanzala P (2012) Factors Associated With Uptake of Voluntary Counseling and Testing Services among Boda Boda Operators in Ndhiwa Constituency, Western Kenya. Afr J Health Sci 21: 133-142.

11. Bwambale FM, Ssali SN, Byaruhanga S, Kalyango JN, Karamagi CA (2008) Voluntary HIV counselling and testing among men in rural western Uganda: implications for HIV prevention. BMC Public Health 8: 263.

12. Sherr L, Lopman B, Kakowa M, Dube S, Chawira G, et al. (2007): Voluntary counseling and testing: uptake, impact on sexual behavior, and HIV incidence in a rural Zimbabwean cohort. AIDS 21: 851-860.

13. Ethiopian Society of Population (2005) Studies Maternal Health Care Seeking Behavior in Ethiopia. In-depth Analysis of the Ethiopian Demographic and Health Survey.

14. Agha S1 (2012) Factors associated with HIV testing and condom use in Mozambique: implications for programs. Reprod Health 9: 20.

15. Ziraba AK, Madise NJ, Kimani JK, Oti S, Mgomella G, et al. (2011) Determinants for HIV testing and counselling in Nairobi urban informal settlements. BMC Public Health 11: 663.

16. Yahaya LA, Jimoh AA, Balogun OR (2010) Factors hindering acceptance of HIV/AIDS voluntary counseling and testing (VCT) among youth in Kwara State, Nigeria. Afr J Reprod Health 14: 159-164.

17. HAPCO, World Bank (2008) HIV/AIDS in Ethiopia: an epidemiological synthesis.

18. Admassu M, Fitaw Y (2006) Factors affecting acceptance of VCT among different professional and community groups in North and South Gondar Administrative zones, North West Ethiopia. Ethiop J Health Dev 20: 24-31.

19. Habte D, Deyessa N, Davey G (2006) Assessment of the utilization of pre-marital HIV testing services and determinants of VCT in Addis Ababa. Ethiop J Health Dev 20: 18-23.

20. Matovu JK, Gray RH, Makumbi F, Wawer MJ, Serwadda D, et al. (2005) Voluntary HIV counseling and testing acceptance, sexual risk behavior and HIV incidence in Rakai, Uganda. AIDS 19: 503-511.

21. Fylkesnes K, Siziya S (2004) A randomized trial on acceptability of voluntary HIV counselling and testing. Trop Med Int Health 9: 566-572.

22. Glick P, Sahn DE (2005) Changes in HIV/AIDS knowledge and testing behavior in Africa: How much and for whom? Cornell University Center for Food and Nutrition Program working, pp: 173.

23. Fylkesnes K, Haworth A, Rosensvärd C, Kwapa PM (1999) HIV counselling and testing: overemphasizing high acceptance rates a threat to confidentiality and the right not to know. AIDS 13: 2469-2474.

24. Gage AJ, Ali D (2005) Factors associated with self-reported HIV testing among men in Uganda. AIDS Care 17: 153-165.

25. Iliyasu Z, Abubakar IS, Kabir M, Aliyu MH (2006) Knowledge of HIV/AIDS and attitude towards voluntary counseling and testing among adults. J Natl Med Assoc 98: 1917-1922.

26. Reilley B, Hiwot ZG, Mesure J (2004) Acceptability and utilization of services for voluntary counseling [corrected] and testing and sexually transmitted infections in Kahsey Abera Hospital, Humera, Tigray, Ethiopia. Ethiop Med J 42: 173-177.

27. Sherr L, Lopman B, Kakowa M, Dube S, Chawira G, et al. (2007) Voluntary counselling and testing: uptake, impact on sexual behaviour, and HIV incidence in a rural Zimbabwean cohort. AIDS 21: 851-860.

28. Genberg BL, Kawichai S, Chingono A, Sendah M, Chariyalertsak S, et al. (2008) Assessing HIV/AIDS stigma and discrimination in developing countries. AIDS Behav 12: 772-780.

29. Matovu JK, Makumbi FE (2007) Expanding access to voluntary HIV counseling and testing in sub-Saharan Africa: alternative approaches for improving uptake, 2001-2007. Trop Med Int Health 12: 1315-1322.