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Original Research Article

Magnitude of HIV testing and socio demographic factors associated with it among adults age 15-49 years in Ethiopia

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ABSTRACT

Background: Survey data in Sub-Saharan African countries in the 2005 to 2010 period showed that only 10% men and 15% women aged 15 to 24 years were aware of their human-immunodeficiency virus (HIV) status. This study aims to assess: magnitude of HIV testing, and socio demographic factors associated with it among adults age 15-49 years.
Methods: Demographic and health surveys in 2016, in Ethiopia were analyzed in SPSS, using multivariate logistic regression. We used HIV testing as the outcome variable using the recommended definition by Ethiopia demographic and health survey (EDHS) 2016. Descriptive statistics were employed to show the distribution of socio-demographic characteristics.
Results: Of the total sample of 27289 of men and women 15-49 years at the time of survey, 19.4% (n=5295) have been tested for HIV in the past 12 months and received the results of the last test. Men and women in the 15-19 age group 9.952 (AOR 9.95295% CI 6.156-16.091) and men and women age 15-49 years in urban areas (AOR 34.040; 95% CI: 21.028-55.105) were found significant predictors of HIV testing.
Conclusions: HIV testing among adults age 15-49 years in Ethiopia was low. Age and place of residence were found significant predictors of HIV testing there remain a high proportion of undiagnosed HIV-infected persons and for the Ethiopian government there is a need for innovative strategies aimed at increasing HIV-testing, particularly for rural areas and those beyond adolescent age.

Keywords: HIV testing, EDHS, Socio demographic, Ethiopia

INTRODUCTION

Survey data in sub-Saharan African countries in the 2005 to 2010 period showed that only 10% men and 15% women aged 15 to 24 years were aware of their human-immunodeficiency virus (HIV) status.[1]

About 30% of people living with HIV in the European Union (EU) are not aware of their serum status.[2] In this framework it is clear that HIV testing, early diagnosis and access to treatment are key to tackling the HIV/AIDS epidemic.[3] Later HIV diagnosis in rural areas suggests that rural persons are less likely to have an HIV test during the early, generally-asymptomatic years of infection, and indicates a need for strategies to increase HIV testing in rural populations.[4]

Ethiopia has also been implementing HIV voluntary counselling and testing (VCT) as a key strategy in its effort to prevent and control HIV/AIDS in the country. However, the utilization of VCT service among males, females, adults and people living in rural areas of the country is still low.[5,6]

Understanding the magnitude and socio demographic factors affecting HIV testing helps policy makers in an effort to design effective strategies toward preventing and control of HIV/AIDS including improving the coverage of HIV testing in general public and among specific groups of population.

In Ethiopia information on factors determining HIV testing among men and women age 15-49 years is not sufficiently available at national level.

The current study aimed at identifying socio demographic factors preventing men and women aged 15-49 years from HIV testing.

METHODS

Study areas

The survey was conducted in nine regional states and two city administrations of Ethiopia.

Study design

The study was a population-based crossectional study.

Study period

Data collection took place from 18 January 2016 to 27 June 2016.

Inclusion and exclusions criteria

All women age 15-49 and all men age 15-59 who were either permanent residents of the selected households or visitors who stayed in the household the night before the survey and who consented to HIV testing were eligible to be interviewed were selected for the study.

Sample size calculation

Further details on sampling size can be found in the demographic and health survey (DHS) manual.7.

Sampling technique

The sampling frame used for the 2016 EDHS is the Ethiopia population and housing census (PHC), which was conducted in 2007 by the Ethiopia.

The 2016 EDHS sample was stratified and selected in two stages. Each region was stratified into urban and rural areas, yielding 21 sampling strata. Samples of EAs were selected independently in each stratum in two stages. Implicit stratification and proportional allocation were achieved at each of the lower administrative levels by sorting the sampling frame within each sampling stratum before sample selection.

According to administrative units in different levels, and by using a probability proportional to size selection at the first stage of sampling.

In the first stage, a total of 645 EAs (202 in urban areas and 443 in rural areas) were selected with probability proportional to EA size (based on the 2007 PHC) and with independent selection in each sampling stratum. A household listing operation was carried out in all of the selected EAs from September 2015 to December 2015.

The resulting lists of households served as a sampling frame for the selection of households in the second stage. Some of the selected EAs were large, consisting of more than 300 households. To minimize the task of household listing, each large EA selected for the 2016 EDHS was segmented. Only one segment was selected for the survey with probability proportional to segment size. Household listing was conducted only in the selected segment; that is, a 2016 EDHS cluster is either an EA or a segment of an EA.

In the second stage of selection, a fixed number of 28 households per cluster were selected with an equal probability systematic selection from the newly created household listing.

Data source, sampling and data collection

The data for this study was extracted from the 2016 EDHS. The 2016 EDHS is the fourth and most recent in the DHS series in Ethiopia.[13] The survey was conducted in nine regional states and two city administrations of Ethiopia.[13] Samples were collected for HIV testing in the laboratory from women age 15-49 and men age 15-59 who consented to testing.[13]

A total of 16,583 eligible women and 11,606 eligible men between 15 and 49 years were approached to be interviewed. A response rate of 95% was observed with 15,683 women completing the interviews and response rate 86% among 11,606 men interviewed. The interviews included several standard questionnaires recording information ranging from basic socio-demographic information to detailed bio-medical information. Our analysis included all men and women age 15-49 years which resulted in a total weighted sample of 27,289.

Outcome variable

According to EDHS all men and women age 15-49 years asked whether they have been tested for HIV in the past 12 months and received the results of the last test (1 if they have been tested for HIV in the past 12 months and received the results of last test, 0 otherwise).

Co-variates

The basic socio-demographic variables were selected based on their availability in the dataset The included basic

socio-demographic factors are highest education level (categorized as "no education", "primary", "secondary ", "more than secondary") and working status in the past 12 months ("not working" or "working and occupation status ("not working", "non-agriculture" and "agriculture"), marital status ("never married", "currently married", "living together", "divorced/separated" and "widowed") age ("15–19 years", "20–24 years", "25–29 years" 30–34 years" "35–39 years" "40–45 years" and "45–49 years") and mothers exposure to mass media ("no" or "yes").

Number of living children ("1", "1-2", "3-4" and "5+"), literacy ("cannot read at all", "can read part/whole sentence" and "other"). Household factors included household wealth index (categorized as "poorest", "poorer", "middle", "richer" and "richest").

The household wealth index was calculated using scores based on household assets with analyses conducted by the National Population Commission and Inner City Fund (ICF) International based on a methodology developed from previous DHSs.[8,9] Community level factors recorded were the place of residence ("rural" or "urban") and geographical region.

The geographical regions were grouped into nine regional states of Ethiopia: namely Afar, Amhara, Benishangul-Gumuz, Gambella, Harari, Oromia, Somali, Southern Nations Nationalities and Peoples' Region (SNNP), and Tigray, and two city administrations named Addis Ababa and Dire Dawa.[7]

Statistical analysis

Sampling weights provided with the EDHS dataset were used during analysis. Further details on sample weights can be found in the EDHS report.[7]

Descriptive statistics were employed to show the distribution of background characteristics. We used logistic regression model to determine the true association between HIV testing and basic socio-demographic factors. Both unadjusted and adjusted odds ratios (ORs) were reported with 95% confidence intervals (95% CI). Besides, diagnostic tests were done, particularly goodness of fit of the model by the Hosmer and Lemeshow test; (where p value of 1.000 was found). The Cronbach's alpha result of the variables is 0.0.900. The Nagelkerke R Square shows that about 72. 7% of the variation in the outcome variable (HIV testing) is explained by this logistic model. The overall accuracy of this model to predict subjects that have HIV testing (with a predicted probability of 0.5 or greater) is 89.1%. All analyses were performed using statistical software SPSS (version 16.0).

Ethics approval

This study is a secondary analysis of publicly available dataset where permission was obtained through registering with the DHS website and therefore no ethics approval was required.

RESULTS

Baseline characteristics

Of the total sample of 27289 of men and women 15-49 years at the time of survey, 19.4% (n=5295) have HIV testing.

As summarized in Table 1, majority (57.5%) of the respondents were female and a predominant percentage of the men and women 15-49 years lived in rural areas (78.8%), respondents in the regions of Oromiya were (37.1%) and Amhara (24.3%). 32.1% of men and women 15-49 years reported not working in the past 12 months at the time of survey, and 39.2% did not have any formal education. In addition to education status, around 45.9% of men and women 15-49 years reported having poor literacy skills and could not read at all.

Table 1: Individual, household and community level characteristics of men and women 15-49 years, Ethiopia 2016.

Socio-demographic factors	N (%)
Sex	
Male	11606 (42.5)
Female	15683 (57.5)
Wealth index	
Lowest	4472 (16.4)
Second	4927 (18.1)
Middle	5224 (19.1)
Fourth	5566 (20.4)
Highest	7098 (26.0)
Residence	
Urban	5779 (21.2)
Rural	21509 (78.8)

Continued.

Socio-demographic factors	N (%)
Age category (in years)	
15-19	5953 (21.8)
20-24	4645 (17.0)
25-29	4934 (18.1)
30-34	3980 (14.6)
35-39	3318 (12.2)
40-44	2496 (9.1)
45-49	1961 (7.2)
Religion	
Orthodox	11946 (43.8)
Working status (past 12 months)	
Working	18518 (67.9)
Marital status	
Married	16059 (58.9)
Literacy	
Cannot read at all	12530 (45.9)
Number of living children	
0	10843 (39.7)
1-2	5972 (21.9)
3-4	4834 (17.7)
>5	5640 (20.7
Frequency of reading newspaper	
Yes	1703 (6.2)
No	25586 (93.8)
Frequency of listening to the radio	
Yes	5919 (21.7)
No	21370 (78.3)
Frequency of watching TV	
Yes	4938 (18.1)
No	22351 (81.9)
Region	
Tigray	1837 (6.7)
Afar	210 (0.8)
Amhara	6628 (24.3)
Oromiya	10110 (37.1)
Somali	760 (2.8)
Benishangul-Gumuz	278 (1.0)
SNNPR	5659 (20.7)
Gambela	79 (0.3)
Harari	67 (0.2)
Addis Ababa	1503 (5.5)
Dire Dawa	156 (0.6)
Occupation	
Not working	8746 (32.0)
Non-agriculture	7669 (28.1)
Agriculture	10874 (39.8)
Educational status	
No education	10701 (39.2)
Primary	11098 (40.7)
Secondary	3602 (13.2)
More than secondary	1887 (6.9)
N	27289

Table 2: Unadjusted and adjusted odds ratio for HIV testing in Ethiopia 2016.

Variable	Unadjusted		Adjusted	
	OR	P value	OR	P value
Age	0.189 (0.180-0.199)	0.000	9.952 (6.156-16.091)	0.000
Residence				
Urban	16.338 (15.21-17.54)	0.000	34.040 (21.028-55.105)	0.000
Rural	1.00			
Region				
Tigray	0.979 (0.730-1.312)	0.886	not retained in model	
Afar	0.799 (0.719-0.888)	0.000	not retained in model	
Amhara	0. 021 (0.018-0.024)	0.000	not retained in model	
Wealth quintile				
Lowest	0.821 (0.75-0.89)	0.000	not retained in model	
Second	1.00			
Marital status				
Never married	0.103 (0.096-0.110)	0.000	not retained in model	
Married	1.00			
Number of living children	0.020 (0.016-0.024)	0.000	0.000 (0.000-3.949)	0.955

Backward stepwise model with dichotomous outcome of (0=no HIV testing; 1=HIV testing), CI=confidence intervals

Table 3: Socio demographic characteristics of men and women age 15-49 years according to according to HIV testing, Ethiopia 2016.

	Wealth quintile (%)		Residence (%)		Number of living children (%)		Region (%)				Age (%)		Marital status (%)	
	Lowe-st	Seco-nd	Urb-an	Rura-l	0	1-2	Tigra-y	Afa-r	Amh-ara	Oro-mia	15-19	20-24	Neve-r marrie d	Marr-ied
Overall (n=27289)	4472 (16.4)	4927 (18.1)	5779 (21.2)	21509 (78.8)	10843 (39.7)	5972 (21.9)	1837 (6.7)	210. (0.8)	6628 (24.3)	10110 (37.1)	5953 (21.8)	4645 (17.0)	8918 (32.7)	16059 (58.9)
HIV testing yes (n-5295)	2633 (49.7)	2662 (50.3)	3476 (65.6)	1819 (34.4)	5185 (97.9)	110 (2.1)	1129 (21.3)	128 (2.4)	3714 (70.1)	324 (6.1)	3381 (63.9)	1914 (36.1)	4036 (76.2)	1259 (23.8)
No (n-21994)	1839 (8.3)	2265 (10.3	2303 (10.5)	19690 (89.5)	5658 (25.7)	5862 (26.7)	708 (3.2)	82 (0.4)	2914 (13.3)	9786 (44.5)	2572 (11.7)	2731 12.4)	4882 (22.2)	14800 (67.3)

Majorities (39.8%) of the respondent's occupation were agriculture, 28.1% were non agriculture employee in addition, and 43.8% of the respondents were orthodox religion followers. Overall 21.8% of men and women were between 15 and 19 years of age.

Most men and women 15-49 years (58.9%) reported as currently married at the time of the survey. Of the total, only 16.4% were in lowest wealth quintile and 26.0% were in the highest wealth quintile.

In terms of the number of living children, about 39.7% of men and women 15-49 years reported to have one living children and 20.7% had more than 5 number of living children during survey.

Regarding exposure to mass media, 6.2% read newsletter, 18.1% watch to TV and 21.7% listen to radio.

Bi-variable analysis

An increase in one-year in age (COR=0.189; 95% CI: 0 180–0.199) were less likely to have HIV testing.

Odds of having HIV testing among men and women age 15-49 years in urban areas were 16.338 (COR=16.338; 95% CI: 15.214–17.545) times higher than rural areas.

Men and women age 15-49 years in afar are 0.799 (COR=0.799; 95% CI: 0.719–0.888) times less likely to have HIV testing chat than Tigray region of Ethiopia.

Men and women age 15-49 years in Amhara are 0.021 (COR=0.021; 95% CI: 0.018–0.024) times less likely to have HIV testing than Tigray region of Ethiopia.

Men and women age 15-49 years in poorest category are 0.821 (COR=0.821; 95% CI: 0.756–0.891) less likely to have HIV testing than poorer categories.

Men and women age 15-49 years who were never married 0.103 (COR=0.103; 95% CI: 0.096–0.110) less likely to have HIV testing than married.

An increase in one number of living children 0.020 (COR=0.020; 95% CI: 0.016–0.024) were less likely to have HIV testing.

Multivariable analysis

residence they live had significant association with men and women 15-49 years living in urban areas were 34.040 times higher odds of having HIV testing (AOR=34.040; 95% CI: 21.028–55.105) compared to men and women 15-49 years who had live in rural areas.

Demographically, since age is a quantitative numerical variable, an increase in one-year in age has 9.952 (AOR=9.95295% CI 6.156–16.091) times decrease in odds of having HIV testing.

DISCUSSION

The main objectives of this study were to identity socio demographic factors associated with HIV testing among adults age 15-49 years in Ethiopia.

Of the total sample of 27289 of men and women 15-49 years at the time of survey, 19.4% (n=5295) have been tested for HIV in the past 12 months and received the results of the last test which is higher compared to 5% ,7% and lower compared to 60.1% ,62% ,50% ,62% 76% 50% 33 % respectively.[10-18]

This may reflect methodological differences between the present study and other studies. It is, however, worth noting that this study applied different sampling and data collection methods which may account for the differences in findings.

HIV testing and residence

This study demonstrated that residence they live had significant association with men and women 15-49 years living in urban areas were 34.040 times higher odds of having HIV testing (AOR=34.040; 95% CI: 21.028–55.105) compared to men and women 15-49 years who had live in rural areas. Our finding is similar compared to previous studies.[10,19-23]

The reason for this may be better availability and accessibility of HIV testing facilities in urban settings.[24] Rural residence is associated with lower uptake of HIV testing.[4,25,26] Prior studies have described effective models for delivering high-quality HIV care in rural settings.[6-11]

Persons diagnosed at a later stage of HIV infection experience worse outcomes than persons diagnosed early and may unknowingly transmit infection to others.[27]

Similar findings have also been reported that women who live in urban areas were more likely to get tested for HIV compared with rural women elsewhere.[11,28]

Urban areas offer greater access to HCT services and thereby increased communication about HIV compared with rural areas. Ethiopia should make HIV testing facilities and services more accessible to the rural community.

HIV testing and age

In this study an increase in one-year in age has 9.952 (AOR=9.952; 95% CI 6.156–16.091) times decrease in odds of having HIV testing which is contrarily with women aged 20-24 years had increased odds of getting tested for HIV as compared with women aged 15-19 years, with previous studies and older adults have more lifetime exposure to the possibility of being tested.[11,19,29-32] This study finding is similar compared to previous studies.[10,25]

This could be that older adults may have already experienced feeling of isolation due to illness or loss of someone they know who died of HIV.[33]

Older people may have less knowledge of HIV and are less likely to protect themselves than younger people. Older people are less likely than younger people to discuss their sexual health with the doctors. In addition, significantly fewer participants aged 50 years or older accepted HIV testing when it was offered by a health care provider, compared to younger participants.[34]

Also consistent with our findings are studies that showed older adults are more likely than younger adults to be diagnosed with HIV later in the disease course.[35] Research also has suggested that older adults view HIV as a disease experienced primarily by young adults.[36] This perception may contribute to older adults' lower likelihood of receiving testing and lower perceptions of HIV risk.

This study has several limitations. We relied on self-report of HIV testing. The use of self-reported data may have introduced social desirability bias and thereby affected the reported findings and to reduce respondents' problem of recall of prior HIV testing we include those tested for HIV in the past 12 months.

Limitations

This survey was subject to many of the same limitations found in other cross sectional surveys. Finally, no casual inferences should be drawn from a cross sectional study such as this.

CONCLUSION

HIV testing among adults age 15-49 years in Ethiopia was low. Age and place of residence were found significant predictors of HIV testing. There remain a high proportion of undiagnosed HIV-infected persons and for the Ethiopian government there is a need for innovative strategies aimed at increasing HIV-testing, particularly for rural areas and those beyond adolescent age.

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