HIV/AIDS awareness and testing practices among adolescents in eastern Ethiopia

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Abstract

OBJECTIVE To examine HIV/AIDS awareness, HIV testing practices and associated factors among adolescents in two eastern Ethiopian communities.

METHODS Community-based, cross-sectional study among 2010 adolescents aged 10–19 years. Participants were asked about their awareness of HIV/AIDS and HIV testing practices, and whether they had ever been tested for HIV. Regression models were applied to identify the factors of statistical significance at *P*-value < 0.05.

RESULTS Of 90% were aware of HIV/AIDS, but only a quarter had ever been tested for HIV. Rural adolescents were less aware of HIV than urban adolescents (AOR = 0.16; 95% CI: 0.05, 0.58), and in-school adolescents had more knowledge about HIV/AIDS than that out-of-school adolescents (AOR = 2.79; 95% CI: 1.88, 4.15). Factors associated with lower uptake of HIV testing were male sex (AOR = 0.74; 95% CI; 0.58, 0.91) and being from a rural area (AOR = 0.16; 95% CI: 0.07, 0.36). Factors associated with higher uptake of HIV testing were being in school (AOR = 1.66; 95% CI: 1.16, 2.38), using the Internet (AOR = 1.52; 95% CI: 1.01, 2.28), and ever visiting a health facility (AOR = 1.54; 95% CI: 1.21, 1.96).

CONCLUSIONS Awareness of HIV/AIDS was high, whereas HIV testing was rare. HIV awareness programs for adolescents should target rural and out-of-school adolescents. Programmes to increase HIV testing implemented in these and similar communities should focus on male and rural adolescents.

keywords HIV, AIDS, HIV testing, sexually transmitted infection, adolescents, out-of-school

Introduction

Today, approximately 2.1 million adolescents are living with HIV globally and nearly 15% of all new HIV infections are among adolescents [1]. Furthermore, this segment of the population is also disproportionately affected by other sexually transmitted infections (STIs) compared with the general population [2], and access to sexual and reproductive health information and services is essential for this age group [3]. Despite the need for this information as well as protection from HIV infection and other reproductive health risks, age and socioeconomic status limit adolescents from accessing information and services in many settings [3,4]. Some adolescents experiment with sexuality and drug use. As millions of adolescents who are becoming sexually active live in countries with a high burden of HIV, adolescence provides a window of opportunity to intervene early [5]. Prior to risky behaviours becoming entrenched, comprehensive data are crucial in shaping accurate HIV-related messages and services [6].

Socioeconomic and structural problems such as poverty, poor education and gendered decision-making power can increase the risk of HIV infection [7]. Although risk awareness is important for HIV protection, this alone is insufficient to adequately address HIV/AIDS challenges [8]. A positive attitude towards knowledge about HIV could be associated with other factors such as education status, social strata and gender, which could assist in planning and improving sexual and reproductive public health policies [9].

Coverage of HIV testing and counselling is low among adolescents globally [10]. With a decreasing age of first sexual encounter in Africa, many adolescents contract

other STIs such as gonorrhoea, Chlamydia and syphilis, potentially increasing the acquisition and transmissibility of HIV [2]. Moreover, adolescents' lack of knowledge of STI symptoms and modes of transmission exacerbate these health challenges [11]. Only a few studies have examined these issues in Ethiopia [12,13]. Therefore, the aim of this exploratory study was to assess HIV/AIDS awareness and testing practices among adolescents 10–19 years of age in eastern Ethiopia.

Methods

Study design and setting

This community-based cross-sectional study was conducted in the Kersa (rural) and Harar (urban) Health Demographic Surveillance System (HDSS) sites in eastern Ethiopia from 1 February 2016 to 30 March 2016. The Kersa HDSS is comprised of 12 *kebeles* (sub-districts; the smallest administrative units) and has been under surveillance since its establishment in 2007 [9]. The Harar HDSS is comprised of six *kebeles* and has been under surveillance since its establishment in 2011. This study considered only adolescents residing in these surveillance sites, who may not be representative of the larger regional or national population of adolescents.

Study population

Adolescents aged 10–19 years were included in the study if they had lived in the study area for the prior six months. Those who were not willing to participate, seriously ill or whose parents refused to give consent were excluded from the study. Furthermore, adolescents who were not available to meet after five home visits were excluded from the study.

Sample size and sampling procedures

Of 2424 adolescents were included in the sampling frame. Six *kebeles* from Harar and 12 *kebeles* from Kersa HDSS were included in the survey. Households with adolescents were listed as the sampling frame, and a random selection of the households with adolescents was performed to ensure community representativeness. When there were two or more adolescents in one household, one was randomly selected for interview. *Kebele* name, cluster (village name), household identification (unique ID), household head names and GPS coordinates were used to identify and locate selected households.

Data collection techniques

Data were collected using a comprehensive questionnaire developed by the African Research Implementation Science and Education (ARISE) Network and largely based on the Global School-Based Health Survey. This questionnaire consisted of comprehensive variables including diet, exercise, mental health, substance use, sexual health, violence and socio-demographics. Questions were prepared in English and translated into Amharic and Oromo for data collection. The interviews were conducted by a data collector of the same sex as the interviewee.

Quality control

Pre-testing was conducted among 5% of the sample size in sub-districts not included in the study. Based on the pre-test findings, some changes were made to the content, language and format of the questionnaire to improve cultural appropriateness and clarity. Data collectors were carefully selected and trained thoroughly. Moreover, data collection was closely monitored daily by trained supervisors. Only supervisors who had a minimum of a bachelor's degree in public health or nursing and experience in supervision of fieldwork were recruited. They were responsible for the overall process of data collection. The questionnaire was checked daily for completeness and consistency. In the event of missing or inconsistent information, the questionnaires were returned to the interviewer, who revisited the household and corrected the misinformation. If significant inconsistencies were observed, necessary measures were taken to resolve the data collection issue. Data were entered in duplicate to minimize typographical errors, then coded, cleaned and further explored before analysis.

Outcome variables

HIV awareness was assessed by asking the participants whether they had heard about HIV/AIDS (yes/no). HIV testing practice was assessed by asking participants whether they had ever undergone HIV testing (yes/no) and whether they had heard of a simple test for HIV (yes/no): "People can take a simple test to find out whether they have HIV. Have you heard about this?"

Independent variables

Socio-demographic characteristics used for the analysis of risk factors were age, sex, religion, place of residence, schooling status, educational status, occupation, paternal

education, family size, engagement in paid work, relationship with parents, sexual experience, adolescent use of social media and visiting a health facility.

Data management and analysis

Data collected for this study were stored at the Haramaya University College of Health and Medical Sciences. The investigators and clerks were responsible for data storage and confidentiality of both electronic and paper forms. Only investigators and data clerks were approved to access the data. The investigators prepared a standard coding guide, data entry and detailed computer editing specifications. Data were entered into EpiData software version 3.02. SPSS (Statistical Package for the Social Sciences) version 20. Each data clerk rechecked approximately 5% of the data.

To describe the data, descriptive analyses such as frequency distributions, measures of central tendency and dispersion were performed. First, the normality assumption was checked for the main outcome variables and if the variable failed to meet the required assumptions, a logarithmic transformation was undertaken. Associations between the socio-demographic and health status characteristics were assessed using odds ratios (ORs) to estimate the magnitude of the association. Logistic regression models were used to identify factors that were associated with the outcome variables. Factors that were significant at P-value < 0.25 in the bivariate analysis were included in the multivariable model. P-values less than 0.05 were considered statistically significant [14].

Statistically significant factors were included in the final multivariate model of the logistic regression. Multicollinearity was also assessed using variance inflation factor (VIF). If the VIF was greater than 10, there was judged to be multicollinearity among the predictor variables. The goodness of fit for the model was assessed using the Hosmer–Lemeshow test.

Ethical considerations

Ethical clearance was obtained from the Haramaya University College of Health and Medical Sciences Ethical Clearance Committee. As per Ethiopian ethics guidelines, adolescents are considered minors until the age of 18 years, and therefore, parental consent is required. Parents or guardians were first asked for consent and then adolescents were approached for their consent. For those aged 19 years, parental consent was not required, but to keep uniformity across data collection, we followed the same consent procedures. If the parent did not consent, the adolescent was considered a non-responder. Once the study was explained and consent obtained, adolescents were invited to complete the interview. Participants were assured that their information would be kept confidential, personal information would not be used in the report, and that discontinuation of the interview would not have any influence on any aspects of their personal activities. There was no compensation for participating in the study.

Results

Socio-demographic characteristics

A total of 2010 adolescents were included in the study. Nearly, two-thirds of adolescents were aged 10–13 years (61.2%) and approximately half (51.1%) were male. More adolescents were in the lowest wealth index than in other wealth groups: 657 (32.7%) were in the lowest wealth index, with 68.7% of rural adolescents and 0.3% of urban in this group. The majority of respondents (74.2%) were living with both parents (Table 1).

HIV/AIDS awareness and HIV testing practices

Nearly 90% (1808) of respondents had heard about HIV, whereas 39.5% (794) had heard about diseases other than HIV/AIDS that could be transmitted by sexual intercourse. Of these, 78% knew that pain during urination was a potential symptom of the infections. Nearly three-quarters (72%) had heard that HIV infection could be identified by a simple test. Only 25% (504) of adolescents had ever been tested for HIV. HIV testing was 55.4% among women and 46.6% for men (Table 2).

Factors associated with HIV/AIDS awareness

In multivariate analyses, HIV/AIDS awareness increased with age: those who were 14–16 (adjusted odds ratio (AOR) = 4.5; 95% CI; 1.40, 14.80) and 17–19 (AOR = 3.54; 95% CI; 2.10–6.30) had more awareness of HIV/AIDS than those who were 10–13. Adolescents who lived in a rural area were less likely to know about HIV/AIDS (AOR = 0.16; 95% CI; 0.05–0.58) than urban adolescents, and those who were in chool were more likely to be aware of HIV/AIDS than those who were out of school (AOR = 2.79; 95 % CI; 1.88–4.15) (Table 3).

Factors associated with HIV testing

The final multivariate model indicated that rural adolescents were less likely to be tested for HIV than urban adolescents (AOR = 0.16; 95% CI; 0.07–0.36). As

Table 1 Socio-demographic characteristics of the adolescents in Harar and Kersa (2016)

Variables	Urban (n = 1059) Number (%)	Rural (n = 952) Number (%)	Total Number (%)
Age (years)			
Early adolescents (10–13)	562 (53.1%)	667 (70.1%)	1229 (61.2%)
Middle adolescents (14–16)	341 (32.2%)	202 (21.2%)	543 (27%)
Late adolescents (17–19)	156 (14.7%)	83 (8.7%)	238 (11.8%)
Sex of the adolescents			
Male	500 (47.2%)	528 (55.5%)	1028 (51.1%)
Female	559 (52.8%)	423 (44.5%)	982 (48.9%)
Household Wealth index			
Lowest	4 (0.3%)	653 (68.7%)	657 (32.7%)
Second	32 (3%)	233 (24.5%)	265 (13.2%)
Middle	222 (21%)	52 (5.5%)	274 (13.6%)
Fourth	396 (37.4%)	13 (1.4%)	409 (20.3%)
Highest	405 (38.2%)	0 (0%)	405 (20.1%)
Adolescent School attendance			
In-school	1001 (94.5%)	540 (56.8%)	1541 (76.7%)
Out-of-school	58 (5.5%)	411 (43.2%)	469 (23.3%)
Grade for in school			
Primary grade 1–4	237 (23.7%)	404 (74.8%)	641 (41.6%)
Primary grade 5–7	415 (41.5%)	112 (20.7%)	527 (34.2%)
Secondary grade 1–4	198 (19.8%)	21 (3.9%)	219 (14.2%)
Secondary grade 5–6	105 (10.5%)	3 (0.6%)	108 (7%)
Technical/vocational	21 (2.1%)	0 (0.00)	21 (1.8%)
University/technical	25 (2.5%)	0 (0.00)	25 (1.6%)
Level of education for out of school			
None	17 (29.3%)	268 (65.2%)	285 (60.8%)
Primary grade 1–4	8 (13.8%)	105 (25.5%)	113 (24.1%)
Primary grade 5–8	19 (32.8%)	32 (7.8%)	51 (10.9%)
Secondary grade 9–10	12 (20.7%)	6 (1.5%)	18 (3.8%)
Secondary grade 11–12	2 (3.5%)	0	2 (0.4%)
Engagement in paid work			
Yes	169 (16%)	201 (21.1%)	370 (18.4%)
No	890 (84%)	750 (78.9%)	1640 (81.6%)
Parental vital status			
Both alive	868 (83.7%)	839 (88.2%)	1707 (84.7%)
Mother only alive	133 (12.8%)	67 (7%)	200 (10%)
Father only alive	27 (2.6%)	31 (3.3%)	58 (2.9%)
Both not alive	22 (2.1%)	12 (1.3%)	34 (1.7%)
Don't know	9 (0.9%)	2 (0.2%)	11 (0.5%)
Currently living with			
Both mother and father	676 (63.8%)	815 (85.7%)	1491 (74.2%)
Mother alone	204 (19.3%)	79 (8.3%)	283 (14.1%)
Father alone	24 (2.3%)	29 (3%)	53 (2.6%)
With male guardian	28 (2.6%)	10 (1.1%)	38 (1.9%)
With female guardian alone	85 (8%)	5 (0.5%)	90 (4.5%)
By my self	14 (1.3%)	6 (0.6%)	20 (1%)
Other	28 (2.6%)	7 (0.7%)	35 (1.7%)
Paternal educational status			
None	63 (9.1%)	591 (78%)	654 (45%)
Primary	196 (28.2%)	137 (18.1%)	333 (22.9%)
Secondary	282 (40.6%)	27 (3.6%)	309 (21.3%)
Higher education	153 (22.1%)	3 (0.4%)	156 (10.7%)

Table 1 (*Continued*)

Variables	Urban (n = 1059) Number (%)	Rural (n = 952) Number (%)	Total Number (%)
Occupation of father/male guardian			
Farmer	43 (5.8%)	725 (85.3%)	768 (48.2%)
Merchant	172 (23.1%)	13 (1.5%)	185 (11.6%)
Teacher	13 (1.7%)	4 (0.5%)	17 (1.1%)
Other government worker	245 (32.9%)	14 (1.6%)	259 (16.2%)
Other	221 (29.7%)	2 (0.2%)	223 (14%)
Don't know	51 (6.8%)	92 (10.8%)	143 (9%)
Age of father/male guardian			
25–34	45 (4.3%)	10 (1.1%)	55 (2.7%)
35–44	289 (27.3%)	224 (23.6%)	513 (25.5%)
45–64	650 (61.4%)	443 (46.6%)	1093 (54.4%)
65+	75 (7.1%)	274 (28.8%)	349 (17.4%)
Use of water purification means			
Yes	277 (26.2%)	158 (16.6%)	435 (21.6%)
No	778 (73.5%)	751 (79%)	1529 (76.1%)
Don't know	4 (0.4%)	42 (4.4%)	46 (2.3%)

Table 2 Knowledge about signs and symptoms of STIs among adolescents who were aware of other sexually transmitted infection in eastern Ethiopia, 2016 (n = 794)

	Knowledge	
Sign symptom of STI	Yes (%)	No (%)
Discharge from genitalia	584 (73.6%)	210 (26.4%)
Pain during urination	619 (78%)	175 (22%)
Ulcer	543 (68.4%)	251 (31.6%)
Other	48 (6%)	746 (94%)

expected, testing practices increased with age: those aged 14–16 years (AOR = 3.10; 95% CI: 2.39–4.02) and 17–19 years (AOR = 6.02; 95% CI; 4.19–8.65) were more likely to have been tested. Men were less likely to pursue HIV testing than women (AOR = 0.74; 95% CI: 0.58–0.91), and those in school were more likely to have been tested than those out of school (AOR, 1.66; 95% CI: 1.16–2.38). Those using the Internet (AOR, 1.52; 95% CI: 1.01, 2.28), who had had sexual intercourse (AOR = 2.37; 95% CI: 1.44–3.91) or had visited a health facility (AOR = 1.54; 95% CI: 1.21–1.96) were more likely to have been tested for HIV than their counterparts (Table 4).

Discussion

Study findings showed that 90% of adolescents in these eastern Ethiopian communities were aware of HIV infection, 72% knew that HIV status can be determined by a simple blood test, and 25% had ever been tested for HIV. Age, family wealth status and urban/rural residence were associated with HIV/AIDS awareness. Age, family wealth status, place of residence and schooling status were associated with HIV testing.

The percentage of adolescents with HIV/AIDS awareness confirms findings of a study in north-western Ethiopia [12], which found an overall level of awareness of 99% among adolescents. Moreover, our result regarding knowledge that HIV status can be determined by a simple test was slightly lower than the result from the study north-western Ethiopia where 96% of adolescents knew that HIV could be identified by a simple blood test [12].

This study revealed that 39.5% of adolescents had information about STIs other than HIV/AIDS. This percentage is lower than in the north-western Ethiopian study, which found that 62% of adolescents were informed about STIs other than HIV/AIDS [12]. One probable reason for lower awareness in our study could be the study setting, as the latter study was conducted among only in-school adolescents who may be more likely to receive sexual and reproductive health information than out-of-school adolescents. In addition, it is possible that intervention programs focused on HIV/AIDS may overlook other STIs.

One-quarter of adolescents in our study had been tested for HIV. Similar rates were observed among adolescents in eastern and southern Africa [5] where 29% of adolescents were tested for HIV. These findings suggest that preventive awareness should be predicated by a coordinating environment that supports peers and allows

Table 3 Factors associated with HIV knowledge among adolescents in Kersa and Harar (2016)

Variables	Informed of HIV/AIDS		Total	Crude odds ratio (95%CI)	Adjusted odds ratio (95% CI)
	Yes	No			
Age in years					
10–13	1051	178	1229	1	1
14–16	522	21	543	**4.2 (2.6–6.7)**	**4.50 (1.40–14.80)**
17–19	235	3	238	**13.2 (4.2–41.8)**	**3.54 (2.10–6.30)**
Sex					
Male	931	97	1028	0.87 (0.65–1.1)	1.14 (0.78–1.65)
Female	877	105	982	1	1
Family size					
<4	571	30	601	**2.65 (1.77–3.95)**	1.11 (0.61–2.04)
>=4	1237	172	1409	1	1
School attendance					
In-school	1443	98	1541	**4.20 (3.1–5.7)**	**2.79 (1.88–4.15)**
Out-of-school	365	104	469	1	1
Engagement in paid work					
Yes	342	28	370	0.69 (0.46–1.05)	1.4 (0.81–2.40)
No	1466	174	1640	1	1
Wealth index					
Lowest	522	145	657	1	1
Second	225	40	265	1.46 (0.99–2.14)	1.06 (0.67–1.69)
Middle	257	17	274	**3.9 (2.30–6.60)**	0.64 (0.29–1.44)
Fourth	404	5	409	**20.8 (8.48–51.5)**	2.16 (0.46–10)
Highest	400	5	405	**20.7 (8.39–50.9)**	1.44 (0.25–8.17)
Residence					
Urban	1041	17	1059	1	1
Rural	766	185	951	**0.07 (0.04–0.11)**	**0.16 (0.05–0.58)**
Use of internet for health information					
Yes	133	5	138	**3.2 (1.3–7.7)**	0.57 (0.14–2.32)
No	1675	197	1872	1	1

Bold numbers indicate statistically significant associations with $p < 0.05$.

adolescents to make responsible choices about their lives [15].

Older adolescents were more likely to be aware of HIV and to be tested for HIV. This finding is in line with a study conducted in Brazil where younger adolescents were less knowledgeable about HIV than older ones [9]. For adolescents, the probability of knowledge about HIV increases with age, which may related to more opportunities for testing for middle- and later-aged adolescents.

Adolescents living in urban areas were more likely to have knowledge about HIV and to be tested for HV than adolescents living in rural areas. These findings are supported by a previous study conducted in Ethiopia that showed that residing in an urban area was associated with increased awareness of HIV and contributed to a higher number of adolescents being tested for HIV [16].

Out-of-school adolescents were less likely to have knowledge of HIV and to be tested for HIV than in-school adolescents. Out-of-school adolescents should be encouraged to seek sexual and reproductive health services and educational programs should be designed for the continuity of their education. The education sector should implement pragmatic strategies to address the educational needs of out-of-school adolescents, potentially contributing to the improvement of information about HIV/AIDS. These adolescents require strategies that should connect with their communities or workplaces. Strategies for school retention could also be considered as they provide health benefits as well as educational gains. Hence, in Ethiopia, school health programs should be further strengthened by incorporating an HIV information package to educate in-school adolescents, while instituting community-based programs to connect with out-of-school adolescents.

Limitations of this research include inherent difficulties in collecting sensitive information from adolescents, including information about sexually transmitted infections and HIV. Interviewer administered surveys were

Table 4 Factors associated with HIV testing among adolescents in Harar and Kersa (2017)

Variables	Tested for HIV		Total	COR (95%CI)	AOR (95%CI)
	Yes	No			
Age in years					
10–13	165	1064	1229	1	1
14–16	202	341	543	**3.82 (3.01, 4.85)**	**3.10 (2.39–4.02)**
17–19	137	101	238	**8.75 (6.45, 11.87)**	**6.02 (4.19–8.65)**
Sex					
Male	225	803	1028	**0.71 (0.58–0.87)**	**0.74 (0.58–0.91)**
Female	279	703	982	1	1
Family size					
<4	193	408	601	**1.67 (1.35–2.07)**	0.94 (0.73–1.23)
>=4	311	1098	1409	1	1
School attendance					
In-school	427	1114	1114	**1.95 (1.49–2.55)**	**1.66 (1.16–2.38)**
Out-of-school	77	392	392	1	1
Wealth index					
Lowest	79	578	657	1	1
Second	46	219	265	**1.54 (1.04–2.28)**	1.30 (0.84–2.10)
Middle	94	180	274	**3.82 (2.71–5.38)**	1.75 (0.98–3.15)
Fourth	141	268	409	**3.85 (2.82–5.26)**	1.32 (0.71–2.45)
Highest	144	261	405	**4.04 (2.96–5.51)**	1.12 (0.59–2.12)
Residence					
Urban	376	683	1059	1	1
Rural	128	823	951	**0.28 (0.23–0.35)**	**0.16 (0.07–0.36)**
Use of Internet					
Yes	74	64	138	**3.88 (2.73–5.51)**	**1.52 (1.01–2.28)**
No	430	1442	1872	1	1
Ever had sex					
Yes	60	40	100	**4.95 (3.27–7.49)**	**2.37 (1.44–3.91)**
No	444	1466	1910	1	1
Ever drunk alcohol					
Yes	95	53	148	**6.37 (4.47–9.07)**	**2.36 (1.57–3.56)**
No	409	1453	1862	1	1
Health facility visit					
Yes	203	402	605	**1.90 (1.53–2.34)**	**1.54 (1.21–1.96)**
No	301	1104	1404	1	1

Bold numbers indicate statistically significant associations with $p < 0.05$.

used to collect information on a range of topics in the present study. To improve collection of sensitive topics, alternative methods (e.g. audio assisted self-interview – ACASI, verbal response cards, etc.) should be explored in future research. Another limitation is that the use of a questionnaire that was not validated prior to implementation. However, this questionnaire was mainly derived from the Global School-Based Health Survey, which has been extensively validated and widely used. Furthermore, detailed pilot testing of the questionnaire was undertaken at both sites. Additionally, a more "mixed methods" approach may have captured more complex factors related to HIV testing uptake but was not feasible in this study. Lastly, the results may not be generalizable at the regional or national level since only these two communities were surveyed.

Conclusion

This study found that among adolescents in these eastern Ethiopian communities, HIV/AIDS awareness was high, while HIV testing practices were low. Targeted HIV intervention programs should address early age, out-of-school and rural adolescents in these and similar communities. Moreover, HIV/AIDS intervention programs should place special emphasis on out-of-school

adolescents, especially those who have lower levels of educational attainment. Potential intervention methods could include mass media and facility-based health programs, as well as web-based awareness strategies. In addition, provider-initiated HIV counselling and testing should target adolescent populations when they visit health facilities for other services.

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