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Stigma Against People with HIV/AIDS in Rural Ethiopia, 2005 to 2011: Signs and Predictors of Improvement

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Abstract This study sought to determine trends in and factors associated with stigma against people with HIV/AIDS in Ethiopia. Rural data from the 2005 and 2011 Demographic and Health Surveys were analyzed. HIV testing rates among males increased dramatically from 2005 to 2011 (8–35 %). Among females, testing rates dropped 10 % during the same period. HIV knowledge was associated with stigma, shown by a negative correlation in both data waves, but groups with higher knowledge tended to have lower stigma. Lower levels of knowledge were uniformly associated with higher levels of stigma, but higher levels of knowledge, combined with higher levels of education, were associated with lower levels of stigma in a multiplicative way. Improvements in knowledge can serve as an important intermediate process to behavior change. The found interaction suggests improvements in either education or knowledge can reduce stigma, and when both are improved, stigma reduction will be more dramatic.

Resumen Este estudio trata de determinar las tendencias y los factores asociados con la estigmatización de las personas con el VIH/SIDA en Etiopía. Datos de aéreas rurales obtenidos de las Encuestas Demográfica y de Salud del 2005 y 2011 fueron analizados para este estudio. Las tasas de pruebas de VIH entre hombres aumentó drásticamente entre el 2005 y el 2011 (8–35 %). Entre las mujeres, las tasas de pruebas del VIH tuvieron un descenso del 10 % en el mismo período. El conocimiento sobre el VIH se asoció con el estigma, que se muestra por una correlación negativa entre ambas ondas de datos, los grupos con mayor conocimiento tienden a tener menor estigma. Los niveles más bajos de conocimiento se asociaron de manera uniforme con mayores niveles de estigma y los niveles más altos de conocimiento, combinado con los niveles más altos de educación, se asociaron con menores niveles de estigma en un manera multiplicativa. Las mejorías en los conocimientos sobre el VIH pueden servir como un intermediario importante del proceso para el cambio de comportamiento. La interacción encontrada sugiere que mejoras en la educación o el conocimiento puede reducir el estigma, y cuando ambos se mejoran, la reducción del estigma será más dramática.

Keywords Stigma · Knowledge · HIV/AIDS · Rural · Ethiopia

Introduction

Stigmatization of "others" is evident across cultures and societies. Goffman [1] conceptualized stigma as "the attribute that is deeply discrediting within a particular social interaction" (p. 3) that signifies the discrepancy between social expectations and reality—what happens when an individual's social identity falls short of the social expectations [2]. In Goffman's theory, stigmatized people have spoiled identity because of social rejection. People are

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traced or marked, set apart, and linked to undesirable characteristics; a rationale is constructed for devaluing, rejecting, and excluding [3]. AIDS-related stigma, with and without discrimination, has highly damaging consequences. It limits the impact of public health interventions through delays in testing and poor treatment adherence, and it deters timely support and care [4–11]. The foundation of HIV/AIDS stigma is that the virus is associated with multiple sexual partners, and having multiple partners is considered a form of infidelity [12, 13] or promiscuity [14] in many cultures. Scholars have identified stigma as a key element of the "hidden epidemic" in the fight against HIV/AIDS [15, 16].

Stigma affects HIV testing and efforts to prevent mother-to-child transmission of HIV [17, 18], which has been documented in Ethiopia [19]. These are two important entry points for treatment and care, and in many developing countries the slow uptake of HIV testing has been attributed to stigma [15]. A number of studies link stigma with lack of HIV testing and ART use [6, 9].

The Rural Ethiopian Context

In Ethiopia, prevalence of HIV/AIDS among adults 15–49 years is 1.5 %, with approximately 800,000 people currently living with HIV, and about 1 million AIDS orphans [19]. Although there has been a recent expansion of services pertaining to testing, prevention of mother-to-child transmission, and antiretroviral treatment, only 36 % of adult women and 38 % of adult men have ever been tested for HIV [19, 20].

Research also shows negative attitudes toward people living with HIV/AIDS are still high in Ethiopia. One study conducted in a rural community revealed the prevalence of negative attitudes toward people living with HIV was as high as 86 % [21]. Another study conducted in Jimma University Specialized Hospital in southwest Ethiopia showed 86 % of HIV-infected persons reported being stigmatized in one way or another [22]. Results from the 2005 and 2011 Ethiopian Demographic and Health Surveys (DHS) also support these findings [19, 23]. As in other countries, HIV/AIDS-related stigma and discrimination in Ethiopia might serve as significant barriers influencing care-seeking and HIV-testing behaviors.

Though there is a paucity of research in rural Ethiopia in comparison to urban areas, existing data paint a rather grim picture. Access to clinics and hospitals for treatment and care is much more limited in rural areas, compounded by large travel distances without adequate public transportation systems.

The relatively higher prevalence of HIV in urban areas in Ethiopia (7.7 %), as compared to rural areas (0.9 %; 24), likely reflects the migration of HIV-positive persons toward urban areas that tend to have better access to treatment and care. Studies show, however, while urban centers like Addis Ababa have shown relative stability in HIV prevalence, the situation in rural parts of the country appears to be getting worse [25].

Transmission of HIV in rural areas tends to follow the movement of soldiers, merchants, commercial sex workers, and students back to their rural communities from extended stays in urban areas [26]. Co-infections appear to be four times greater in rural areas [27], and testing rates are also significantly lower than in urban areas [28]. One likely explanation is rural residents' lack of access to clinics (because of distance to clinics and a lack of transportation), where testing can be done more easily. Lower rates of testing may also be attributed, in part, to higher levels of stigma. Given the lack of research in rural regions of Ethiopia, we focus specifically on this population, which currently comprises approximately 80 % of the population.

The purpose of the current study is twofold: (1) to determine factors associated with stigma against people living with HIV/AIDS in Ethiopia and (2) to delineate trends in stigma over a 6-year period from 2005 to 2011. A better understanding of factors related to stigma and barriers to stigma reduction will provide insight for future interventions to properly target the segments of the Ethiopian population where stigma has remained stagnant.

Methods

This study uses data from the 2005 and 2011 Ethiopian DHS. Data for the 2005 survey were collected between April and August 2005. Data for the 2011 survey were collected between December 2010 and June 2011. DHS are nationally representative household surveys conducted by ICF Macro/MEASURE DHS on behalf of National Ministries of Health, with support from the United States Agency for International Development (USAID). DHS measure population and health indicators at the national (urban and rural) and regional levels. Data are publicly available to those requesting access.

2005 DHS Sampling Procedure

Regions in Ethiopia are divided into zones, and zones into administrative units called Weredas. Each Wereda is further divided into the lowest administrative unit, called Kebele. Each Kebele is then subdivided into census enumeration areas (EAs). The sample for the 2005 DHS was selected using a two-stage stratified sampling process. In the first stage, 540 clusters were selected from the list of EAs from the 1994 Population and Housing Census. Fieldwork was successfully completed in 535 of the 540

clusters. In the second stage, 24–32 households were selected systematically from each cluster for the survey sample. A representative sample of 20,103 was selected.

2011 DHS Sampling Procedure

The 2007 Population and Housing Census, conducted by the Central Statistical Agency, provided the sampling frame from which the 2011 EDHS sample was drawn. The sample was selected using a stratified, two-stage cluster design, and EAs were the sampling units for the first stage. The 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. A representative sample of 30,625 households was selected.

For both 2005 and 2011, the survey administered the Women's Questionnaire to all eligible women 15–49 years old in the sampled households. The Men's Questionnaire was administered to all eligible men 15–49 years old in every other sampled household. We downloaded the DHS dataset from www.measuredhs.com and analyzed data using Stata 10.

Measures

In addition to key socio-demographic data, we created several scales using items asked in the original DHS surveys to assess knowledge of mother-to-child transmission of HIV/AIDS, comprehensive knowledge of HIV/AIDS, stigma against people living with HIV/AIDS, and HIV testing experience.

Knowledge of Mother-to-Child Transmission

Three items were used to measure knowledge about mother-to-child transmission of HIV. These items were yes/no questions asking whether HIV is transmitted from mother-to-child during pregnancy, during delivery, and during breastfeeding. Correct responses were assigned a score of 1 and incorrect responses a score of 0. Scores ranged from 0 to 3. Reliability was $\alpha = 0.77$.

Comprehensive Knowledge of HIV/AIDS

Comprehensive knowledge of HIV/AIDS was measured using seven items asking about the mode of HIV transmission, prevention methods against HIV infection, and common misconceptions about HIV/AIDS. Correct responses were assigned a score of 1 and incorrect responses a score of 0. Scores ranged from 0 to 7. Reliability was $\alpha = 0.64$.

Stigma Against People with HIV/AIDS

Stigma against those living with HIV/AIDS was measured using four items with yes/no responses. Items asked the participant's willingness to care for a family member with HIV/AIDS, whether he/she would buy fresh vegetables from a shop keeper who was HIV-positive, whether a female teacher with HIV who is not sick should be allowed to continue teaching, and whether the participant would disclose his/her HIV status to a family member. Affirmative responses were assigned a score of 0, and negative responses a score of 1. The score on these four items were summed to obtain a total stigma score ($\alpha = 0.43$). A higher scale score is indicative of a greater level of stigma. It should be noted the low reliability of the stigma measure is indicative of high levels of measurement error, thus attenuating effects. To the extent significant relationships are found, it indicates more robust measures would have enhanced overall effects.

Statistical Analyses

Descriptive statistics for mean differences were calculated using *t* tests and analysis of variance (ANOVA). Multivariate linear regression analyses were computed to assess the independent effect of each variable on stigma; interaction effects with time were also assessed.

Results

Socio-Demographic Characteristics

Only data from rural participants were included in the analysis. As shown in Table 1, there was an oversampling of female participants in both the 2005 and 2011 datasets; they accounted for 68.7 and 53.1 % of the samples, respectively. In both datasets, literacy was significantly higher among males than among females; for example, in each dataset, there were 20 % more females than males who had not received any education. In both datasets, females were also significantly younger than males.

HIV Testing, Knowledge and Stigma Scores

Testing Behavior

In 2005, only 8 % of males had ever been tested for HIV, whereas the corresponding figure for females was close to 60 %. By 2011, the disparity in testing by gender had reversed: close to 35 % of males had been tested, whereas the corresponding figure among females was 30 %. Furthermore, increase in testing rates among men ($\chi^2 = 1{,}125$,

Table 1 Socio-demographic characteristics of rural respondents in 2005 and 2011 Ethiopia DHS

Variables	2005 EDHS ($n = 14{,}052$)			2011 EDHS ($n = 21{,}080$)		
	Male ($n = 4{,}405$) %	Female ($n = 9{,}647$) %	χ^2 or t, p value	Male ($n = 9{,}894$) %	Female ($n = 11{,}186$) %	χ^2 or t, p value
Wealth index						
Poorest	27.49	28.25	$\chi^2 = 11$, $p = 0.03$	27.90	32.17	$\chi^2 = 53$, $p < 0.001$
Poorer	21.07	21.27		21.06	21.21	
Middle	19.50	20.80		21.54	19.92	
Richer	19.86	19.17		22.49	20.42	
Richest	12.08	10.51		7.01	6.29	
Educational status						
No education	52.01	76.68	$\chi^2 = 914$, $p < 0.001$	41.63	63.78	$\chi^2 = 11$, $p < 0.001$
Primary	37.00	19.85		50.49	33.09	
Secondary	10.37	3.21		5.00	2.21	
Higher	0.61	0.26		2.88	0.92	
Living with partner						
Not cohabitating	61.70	71.90	$\chi^2 = 146$, $p < 0.001$	61.58	69.57	$\chi^2 = 149$, $p < 0.001$
Cohabitating	38.30	28.10		38.42	30.43	
Ever tested for HIV						
No	91.94	39.36	$\chi^2 = 35$, $p < 0.001$	65.08	69.45	$\chi^2 = 56$, $p < 0.001$
Yes	8.06	60.26		34.92	30.46	
Mean (SD) age	30.90 (11.87)	28.34 (9.49)	t = 187, $p < 0.001$	30.79 (11.86)	28.15 (9.46)	t = 321, $p < 0.001$
Mean (SD) score knowledge of mother to child transmission of HIV	2.14 (1.14)	1.92 (1.26)	t = 70, $p < 0.001$	2.05 (1.11)	2.00 (1.19)	t = 11, $p < 0.01$
Mean (SD) score comprehensive knowledge of HIV/AIDS	5.03 (1.72)	3.90 (1.94)	t = 993, $p < 0.001$	5.15 (1.60)	4.08 (1.90)	t = 1,870, $p < 0.001$
Mean (SD) score stigma against people living with HIV/AIDS	1.85 (1.10)	2.20 (1.11)	t = 651, $p < 0.001$	1.50 (1.06)	1.97 (1.10)	t = 953, $p < 0.001$

There were statistically significant differences among all the corresponding variables in 2005 and 2011 DHSs

$p < 0.001$) from 2005 to 2011 and a decrease among women ($\chi^2 = 1{,}904$, $p < 0.001$) were statistically significant.

HIV Knowledge

Males scored higher on knowledge about mother-to-child transmission of HIV in 2005 (2.14 ± 1.14) as compared to women (1.92 ± 1.26). In 2011, men's knowledge about mother-to-child transmission (2.05 ± 1.11) was still higher than women's knowledge (2.00 ± 1.19). These differences were statistically significant in both years ($p < 0.01$). Men also scored higher on comprehensive knowledge of HIV as compared to women in both 2005 (5.03 ± 1.72) and 2011 (5.15 ± 1.60), with significant statistical differences at both times ($p < 0.001$).

Stigma Scores

Stigma scores were higher for females than males both in 2005 (2.20 ± 1.11 vs. 1.85 ± 1.10) and 2011 (1.97 ± 1.10 vs. 1.50 ± 1.06). The differences in mean stigma scores were statistically significant in both data waves ($p < 0.001$; see Table 1).

Correlations Among Socio-Demographic Characteristics and Psychosocial Variables

Pearson correlation analysis was done among socio-demographic characteristics (female gender, age, cohabitation status, wealth and educational status) and psychosocial variables (HIV testing history, mother-to-child transmission of HIV knowledge, comprehensive knowledge of HIV, and stigma against people with HIV). Table 2 shows the results for both the 2005 (below the diagonal) and 2011 (above the diagonal) datasets.

Given the large sample size, all correlations were significant. In the 2005 data, gender (female more than male), age, cohabitating status (those living with someone), and having been tested for HIV were positively associated with

Table 2 Correlations among socio-demographic and psychosocial variables for 2005 and 2011 Ethiopia DHS

	Variables	1	2	3	4	5	6	7	8	9
1	Female	1.00	-0.12^{***}	-0.05^{***}	-0.22^{***}	0.08^{***}	-0.05^{***}	-0.02^{**}	-0.29^{***}	0.21^{***}
2	Age	-0.12^{***}	1.00	-0.06^{***}	-0.32^{***}	0.51^{***}	-0.02^{**}	-0.03^{***}	-0.07^{***}	0.04^{***}
3	Wealth	-0.02^{*}	-0.06^{***}	1.00	0.28^{***}	-0.09^{***}	0.21^{***}	0.11^{***}	0.24^{***}	-0.18^{***}
4	Education	-0.25^{***}	-0.29^{***}	0.30^{***}	1.00	-0.32^{***}	0.23^{***}	0.17^{***}	0.36^{***}	-0.28^{***}
5	Cohabitating	0.10^{***}	0.44^{***}	-0.06^{***}	-0.31^{***}	1.00	-0.002	-0.05^{***}	-0.15^{***}	0.10^{***}
6	Ever tested for HIV	0.49^{***}	-0.07^{***}	-0.05^{***}	-0.16^{***}	0.06^{***}	1.00	0.14^{***}	0.26^{***}	-0.21^{***}
7	HIV MTCT knowledge	-0.09^{***}	-0.03^{**}	0.17^{***}	0.21^{***}	-0.04^{***}	0.03^{**}	1.00	0.29^{***}	-0.19^{***}
8	HIV Comp. knowledge	-0.27^{***}	-0.08^{***}	0.28^{***}	0.36^{***}	-0.13^{***}	-0.10^{***}	0.39^{***}	1.00	-0.36^{***}
9	Stigma	0.23^{***}	0.04^{***}	-0.16^{***}	-0.29^{***}	0.10^{***}	0.10^{***}	-0.23^{***}	-0.37^{***}	1.00

Correlations below the diagonal are for the 2005 EDHS and those above the diagonal are for the 2011 EDHS

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 3 Linear regression on the predictors of stigma against people living with HIV/AIDS in rural Ethiopia

Variables	2005 EDHS		2011 EDHS	
	Crude β (standardized)	Adjusted β (standardized)	Crude β (standardized)	Adjusted β (standardized)
Female	0.23^{***}	0.10^{***}	0.21^{***}	0.11^{***}
Age	0.04^{***}	-0.04^{**}	0.04^{***}	-0.02^{*}
Wealth	-0.16^{***}	-0.02^{*}	-0.18^{***}	-0.06^{***}
Educational level	-0.29^{***}	-0.14^{***}	-0.28^{***}	-0.12^{***}
Cohabitating	0.10^{***}	0.02	0.10^{***}	0.02^{**}
Ever tested for HIV	0.10^{***}	-0.02	-0.21^{***}	-0.10^{***}
Knowledge of MTCT of HIV	-0.23^{***}	-0.07^{***}	-0.19^{***}	-0.08^{***}
Comprehensive knowledge of HIV	-0.37^{***}	-0.28^{***}	-0.36^{***}	-0.23^{***}

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

stigma. Wealth, education, higher knowledge about mother-to-child transmission, and higher comprehensive HIV knowledge were negatively associated with stigma. A similar pattern was observed in the 2011 dataset. The only difference was that, while HIV testing was positively associated with stigma in 2005, this association was negative in 2011.

Multivariate Linear Regression Analysis

Table 3 shows the results of both crude and adjusted linear regression analyses (with standardized betas), using stigma as the dependent variable in both 2005 and 2011. Females had significantly higher stigma scores than did males in both 2005 and 2011, as did younger respondents in comparison to older respondents. Wealth and education level were negatively associated with stigma in both data waves. Cohabitation was not significantly associated with stigma in 2005, but the relationship was significant in 2011 (likely because of the larger sample size, given the magnitude of the relationship was the same in both data waves.)

HIV testing was not associated with stigma scores in 2005, but it was negatively associated with stigma scores in 2011. Knowledge about mother-to-child transmission was negatively associated with stigma in both 2005 and 2011. Finally, comprehensive knowledge was negatively associated with stigma in both 2005 and 2011. In the 2005 DHS, the linear adjusted multivariate model explained 20 % of the variance. The 2011 multivariate model explained 19 % of the variance (Table 3).

Interaction Effects

Beyond the main effects reported above, we also investigated interaction effects—between demographic indicators and psychosocial variables (knowledge). Interaction effects were investigated following procedures outlined by Aiken and West (1991), which plot the association between the independent variable and the dependent variable at three

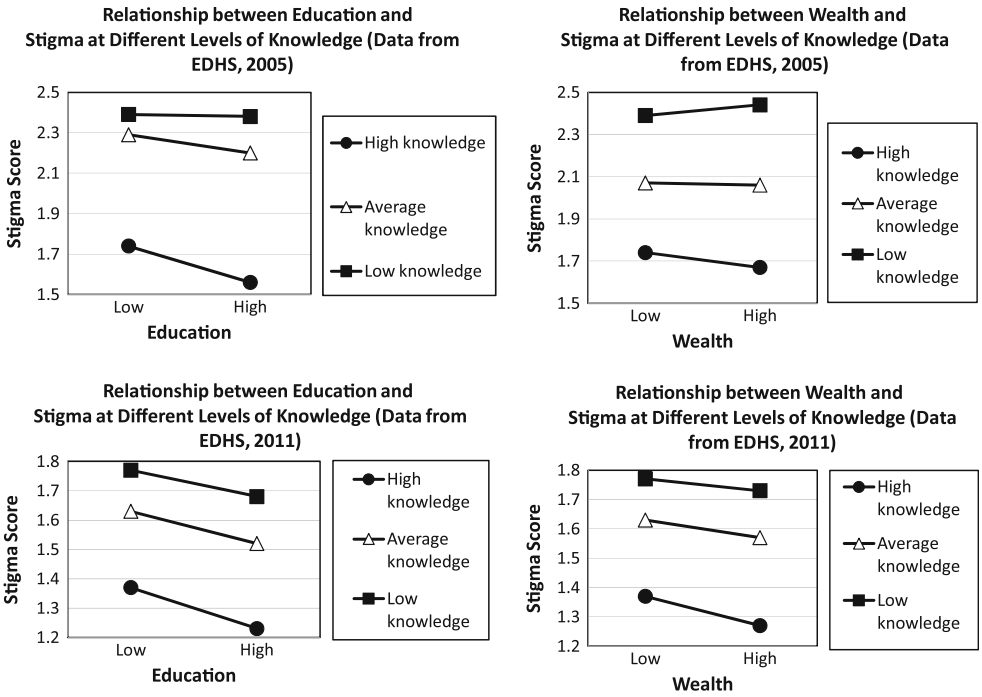

Fig. 1 Interaction analysis for the effect of education and wealth at different levels of comprehensive knowledge of HIV in rural Ethiopia

levels of the moderator: 1 standard deviation below the mean (the "low" value of the moderator), at the mean ("medium" value), and 1 standard deviation above the mean ("high" value). In the 2005 EDHS, when comprehensive knowledge was low, education and stigma were not correlated with each other. When comprehensive knowledge was medium or high, the association between comprehensive knowledge and stigma was negative ($\beta = -0.09$, $p < 0.001$ and $\beta = -0.18$, $p < 0.001$, respectively). In the same year, when comprehensive knowledge was low, wealth and stigma were positively associated with each other ($\beta = 0.05$, $p < 0.01$), but this association was negative at higher levels of comprehensive knowledge ($\beta = -0.07$, $p < 0.001$).

In the 2011 EDHS, both higher education level and higher wealth status were significantly associated with lower stigma at all levels of comprehensive knowledge ($p < 0.001$) (see Fig. 1).

Discussion

Our analyses indicate testing rates among males in rural Ethiopia have seen dramatic increases from 2005 to 2011, rising to 35 % from 8 %. Among females, testing rates dropped 30 % during the same period.

The fact that knowledge about HIV was associated with stigma is shown in a number of ways. Not only was the negative correlation between the two variables significant in both data waves, but groups with higher levels of knowledge (e.g., males or those with higher levels of education) tended to have lower stigma levels. This is, indeed, good news for health interventions, for it signifies that if individuals' knowledge about HIV can be improved, then their stigma toward people living with HIV can be reduced.

The drop in HIV testing among women could be a result of two factors. First, in 2005 (but not in 2010), because of a quirk in the methodology, women were asked the question about prior testing only if they came from homes in which men were sampled. This appears to have inflated the number of women who reported prior testing. Second, in order to assure representativeness among all regions, sample weighting was altered in four regions (Afar, Somali, Benshangul Gumuz, and Gambela), and sample sizes were increased in all of these [19, 23]. These regions also face significant challenges in terms of human resources and access to health services as compared to other regions. This change in sample sizes for these regions may account for the drop in testing rates observed among women.

The gender difference seen in HIV testing could largely be due to the fact that women are tested when they receive antenatal care as part of the Ethiopian prenatal standard of care. The Ethiopian government recently started testing women through an opt-out approach as part of family planning and maternal, newborn, and child health services [29]. However, research from the region shows men are reluctant to come to clinics with female partners in order to be tested [30–32]. This cultural norm of family planning and reproductive services being considered a female domain likely contributes to a lack of a captive male audience for HIV testing.

In the hierarchy of behavior change—to improve prevention through safer-sex practices, for example—health promotion efforts often relegate change in knowledge to a lower priority status. The common refrain one hears is that, despite better knowledge about a host of harmful practices, people still continue to engage in high-risk behaviors. This is often taken to mean knowledge improvement efforts fall short of the more meaningful goal, to change behaviors themselves. In our view, and as displayed by data in this paper, this belief is disempowering to HIV-prevention efforts.

First, data in this paper indicate improvements in knowledge can serve as an important intermediate process to behavior change. Knowledge can be thought of as a necessary (though perhaps insufficient) condition for behavior change. Having the requisite knowledge may not be enough to propel people to change, but without it, change is less likely to be durable [33]. Second, improvements in knowledge resulting in improvements in behavior may not happen contemporaneously, but could still matter in the long-term; people often hold their better knowledge in abeyance, to be used at a later, and more appropriate time [34]. It would be incorrect, for example, to judge the effectiveness of a campaign promoting knowledge about how to administer cardiopulmonary resuscitation (CPR) solely on the basis of whether people who gained knowledge actually used it.

The beneficial effects of enhanced knowledge are also displayed in the interaction patterns we observed between knowledge and education. We should clarify that, by knowledge, we refer to people's ability to delineate factors that transmit HIV infection—from mother to child, from one person to another through sexual contact, etc. This is to be differentiated from education, which refers to the number of years of formal education received by the respondent. The two items are correlated, as shown in Table 2, but they, nevertheless, tap into distinct constructs.

Lower levels of knowledge were uniformly associated with higher levels of stigma, but higher levels of knowledge, combined with higher levels of education, were associated with lower levels of stigma in a multiplicative way. This suggests improvements in either education or knowledge can reduce stigma and that, when both are improved, the drop in stigma will be much more dramatic. A similar pattern was found in the relationship between knowledge and stigma at different levels of wealth: higher levels of wealth, combined with higher levels of knowledge, were associated with significantly lower levels of stigma.

The unexpected finding of the relationship between stigma and HIV testing intrigues us. In 2005, the association between prior testing for HIV and stigma was positive, whereas this relationship was negative in 2011. One explanation for this lies in understanding who was tested in the two data waves. In 2005, overall testing was significantly lower among males than among females (8 % of males, but 60 % of females). Males, on the whole, tended to have lower levels of stigma than females. Hence, the positive association between HIV testing and stigma may be indicative that the tested population comprised many more female respondents. By 2011, testing rates among males were similar to testing rates among females (roughly one-third), and the association between stigma and testing was negative, as has been observed elsewhere [35–38]. Nevertheless, this is a finding that warrants further investigation in future studies.

Limitations

The primary limitation of this paper is its reliance on cross-sectional data, which limits our ability to draw causal inferences. Even though results are based on two nationally representative data waves spanning 6 years, they are cross-sectional in nature, and hence the causal ordering among the key variables—knowledge, HIV testing, and stigma—is speculative. Nevertheless, findings reported here are in line with other studies, which gives us some confidence that the underlying pattern of findings likely has external validity.

Another limitation pertains to the self-reported nature of the data. It may well be the case that those who are knowledgeable, wealthier, and better educated also know it is socially undesirable to admit to harboring stigmatizing attitudes. They may also be better able to recognize questions tapping into the stigma construct. These are questions worthy of future studies.

Finally, some relationships very small in magnitude, such as the correlation between being female and wealth and the standardized betas for age, are significant. This is likely due to the very large sample sizes. The public health significance of these observed relationships may not be very meaningful because of the large sample and the low magnitude of the effect size.

Conclusions

Findings reported in this study show room for optimism. HIV/AIDS-related stigma appears to be declining rapidly in rural Ethiopia, among both men and women. This is especially intriguing considering HIV stigma tends to be higher in rural areas. There are likely many reasons for this trend, including the increasing availability of antiretroviral treatment in many parts of the country. As more HIV-infected persons can lead normal lives because of medication availability, fears and social stigma surrounding AIDS will also likely decline, as has been seen in other parts of Africa [38]. This means national policies to

provide widespread access to treatment needs to be continued. When people see HIV can be managed with proper treatment, they are less likely to be afraid of testing and also less likely to harbor stigmatizing attitudes. Findings also indicate knowledge about HIV is critical, and efforts to promote knowledge need to be continued in Ethiopia.

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