

Determinants of HIV Testing Among Men Living in Rural Areas: Evidence from Ethiopian Population-Based Household Survey, 2016.

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Research article

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Abstract

Background: Ethiopia is one of the high-burden HIV Country with low HIV test uptake. Although HIV is more prevalent among women in Sub-Saharan countries, HIV testing among men is equally important to end the HIV epidemic.

Objective: To investigate the prevalence and determinants of HIV testing among rural men using Ethiopian Demographic and Health Survey (EDHS) 2016 data.

Method: This study used EDHS 2016 data. The sample size for this study was 10,187 rural men. Descriptive statistics analysis to know sample distribution and bivariable and multivariable logistic regression to identify associated factors with rural men's HIV testing status. All analyses were performed using the complex sample analysis procedure of the SPSS version 20.0 to account for the multistage sampling.

Result: Overall, 40.3% of rural men were ever been tested for HIV. In the multivariable analysis, Being aged, 31-44 [Adjusted Odds Ratio (AOR:) 1.12; 95% CI: 1.01-1.42], living in developed regions (AOR: 1.43; 95% CI: 1.09-1.88), engaged in non-agricultural sector (AOR: 1.27; 95% CI: 1.05-1.52), being Muslim (AOR: 2.07; 95% CI: 1.67-2.67), and having comprehensive knowledge about HIV (AOR: 1.31; 95% CI: 1.12-1.54) were positively associated with HIV testing. In the contrary, belonging to medium (AOR: 0.56; 95% CI: 0.47-0.67) and rich (AOR: 0.67; 95% CI: 0.56-0.80) wealth status, attending primary (AOR: 0.21; 95% CI: 0.16-0.28) and secondary (AOR: 0.31; 95% CI: 0.25-0.35) education, having first sexual debut at age of ≤ 17 (AOR: 0.26; 95% CI: 0.19-0.93), perceived stigma towards HIV patients (AOR: 0.67; 95% CI: 0.47-0.93) and have not health insurance coverage (AOR: 0.54; 95% CI: 0.42-0.69) were negatively associated with HIV testing among rural men.

Conclusion: HIV testing of rural men was very low. Socio-economic and other push factors like comprehensive knowledge about HIV, Perceived stigma towards HIV patients, and having health insurance coverage were found the determinant of testing among rural men. The Ethiopian government with its stakeholders should focus on rural men who least likely to get HIV testing. The Awareness building program about HIV and HIV testing should be initiated to encourage rural men to visit health facilities and take the test.

Introduction

After tremendous effort and investment, HIV remains a global health burden ; it affects 34-35.5 millions of peoples worldwide (1). The greater burden of HIV is borne by the sub-Saharan African region which is residence for only 12% share of the world population, but harbors 66.6% of PLWH and 70% of newly infected cases (1–4, 19). The prevalence of HIV in Ethiopia was estimated to be 0.9–1.1% (5–6). Among the PLWHs, 0.6% were woman and 1.2% were men and about 0.4% are in rural areas(4). HIV testing helps to know the HIV status of an individual for the aim of prevention, care, and treatment(5). HIV testing is the core strategy of HIV prevention and care strategies(6). HIV testing helps individuals to know their HIV

serostatus, which in turn, helps them to seek preventive and curative care (1). Even if countries initiate different policies and programs to expand HIV testing, due to a shortage of supply-side facilities, high test-related costs, lack of awareness in the community, and high level of stigma and discrimination, they cannot reach their target (1, 8). Given the high importance of testing and identifying people living with HIV in achieving the ambitious 90-90-90 goals set out by UNAIDS, which stipulates 90% of PLHIV to know their status, 90% of PLHIV who know their status to be on treatment, and 90% of PLHIV on treatment to be virally suppressed(8). The basic idea behind this 90-90-90 goal is that if the more people are aware of their HIV serostatus, they can reduce HIV transmission and thereby HIV-related morbidity and mortality can also be reduced by up-taking timely and proper treatment and precautions. Although, according to 2014 Ethiopian SPA result, with recognition of variations across region, residence and quality of service, about 45% of private health facilities, 94% of health centers, and 98% of hospitals provided HCT service (9); only 67% of Ethiopians knew their HIV/AIDS serostatus(10).

By commitment of different stakeholders, the provision and accessibility of HIV tests increase rapidly all over the world including Sub-Saharan African countries, but the number of tested peoples is still not up to the required level.. Around 25% of the world population in 2017 does not know their HIV status and 9.4 million people living with HIV (PLWH) were not aware about their serostatus and only about 17% of men were tested(12–14).

Since men are often the household head and play the role of major decision-maker (11), their utilization of HIV test might have a greater role in increasing HIV testing among both men and women (11),(13). Due to lack of awareness, men who have HIV continue to be engaged in unsafe sexual practices, which in turn, increases the risk of women's for HIV. More often than not, PLWH who are unaware of their serostatus do not seek healthcare until the disease become worse (11). This delay in seeking care, especially testing for HIV, inflates the magnitude of mortality and morbidity related to HIV (11). National surveys of Ethiopia show that there is higher awareness about HIV/AIDS and interest to test but their comprehensive knowledge was still low (5).Therefore, to battle the spread of HIV/AIDS, was launched a separate HIV/AIDS policy, this gives high attention to voluntary HIV testing and counseling in 1998. (14). And it has been committing for 2020 global 90–90–90 HIV prevention targets. (2),(8). Health sector transformation plan II(HSTP II)also targets to decrease new HIV infection by 50% by reducing incidence from 0.03–0.01% in 2020 and ending HIV from being a public health problem by 2030(4).All these efforts translated in, the reduction in country's HIV prevalence between 2000 and 2017(3,(15) but the trend has been reversed and the prevalence of HIV has risen by 10% since 2008(2).

Studies conducted in different countries on up taking of HIV testing indicate that men's age(5)-(7),13,15–18), Education status (7–8, 13, 15, 18–19), region of residence(18), Marital status (7, 13, 15–18, 20), employment status(20), occupation(15–18),wealth status of the family(7–8, 13, 15, 18, 21), sex experience(5), number of life time sex partner(9, 15, 18), condom usage(15, 18), age at first sex (18), perceiver risk of HIV(17), level of knowledge about HIV(17), stigma(17) and having insurance coverage were association with HIV testing.

However, to date, in Ethiopia, rural men are not easily accessible like rural men for quality and accessible HIV services; But, there is no study that has investigate the predictors of HIV testing among rural men. Therefore, This study aimed to investigate factors associated with lifetime HIV testing among men in Ethiopia using a nationally representative sample.

Methods

Data

We used a population-based cross-sectional, nationally representative 2016 Ethiopian demographic health survey (EDHS). Data was collected through a two-stage stratified cluster sampling technique from January 18, 2016, to June 27, 2016. Each region in the EDHS stratified into urban and rural areas, yielded 21 sampling strata. In the first stage, a total of 645 enumeration areas (202 in urban areas and 443 in rural areas) were independently selected based on the 2007 Ethiopia population and housing census. In the second stage, a fixed number of 28 households per cluster were selected with an equal probability systematic selection from the newly created household listing. The survey covered a total of 17,067 households and 14,795 individual men were occupied and successfully interviewed 16650 and 12,688 respondents with 98% and 95% response rate, respectively (21).

All men aged 15 to 59 years and who were either permanent residents of the selected households or stayed in the selected household the night before the survey were eligible for the study. From the total survey, 8822 rural residence men drawn for the analysis (21).

Study variables

Outcome variable: The outcome variable was ever having HIV testing among rural men. It was measured based on responses to the survey question asked of sexually active rural men "Have you ever been tested for HIV?" the response was No and Yes.

Independent variables: This study excluded two important variables that are ever heard about AIDS and STI from the model due to about above 97% of respondents were committed. Therefore, included independent variables were age (< 30, 31–44, and > 45), wealth status (poor, medium, and rich), region (emerging and developed)¹, Marital status (single and married), level of education (no education, primary and secondary or above), occupation (non-agriculture and agriculture), religion (protestant or others, orthodox and Muslim), health insurance coverage (no and yes), age at first sex (< 17, 18–24 and > 25), comprehensive knowledge for HIV is a composite variable computed from 7 variables which measures knowledge of respondent about HIV and categorized into two (≤ 4 = limited and > 4 = enough) and perceived stigma towards HIV patients, it is also composite variable constructed by using 4 independent variables and computed to a categorical variable(0 = No and $> = 1$ = Yes).

Statistical analysis

Descriptive statistics were computed for each independent variable and were presented in terms of frequency and percentage. Chi-square tests were carried out to assess whether the categories of the variables differ in respect of the outcome variable. Bivariable logistic regression analysis was done to assess the crude association variables and to select candidate variables at p-value 0.25, 95% CI. Multivariable logistic regression was carried out to identify independent variables significantly associated with the dependent variable at p-value < 0.05, 95% CI. Multi-collinearity predictor variables with variance inflation factor less than ten was checked before multivariable logistic regression analysis was performed. The goodness of fit of the final model was tested by Hosmer-Lemeshow statistic. Complex survey sampling analysis technique was used for the complex nature of the survey. All analyses were performed using SPSS version 20(22).

Ethical approval and consent to participate

The 2016 EDHS protocol was reviewed and approved by the National Ethics Review Committee of the Federal Democratic Republic of Ethiopia, Ministry of Science and Technology, and the Institutional Review Board of ICF International.

Result

Socio-demographic and other characteristics of respondents

A total of 10,187 rural men were included in the analysis. The mean age of the respondents was 31 with $SD \pm 12$. Table 1 shows the majority of 41.4% of rural residence categorized under poorer quartile and half of the respondents (51.2%) attend primary education followed by one-third (35.6%) of the respondents with no education. About 95.7% of respondents lived in developed regions. More than half (57.8%) of the participants were married. Among respondents, 41.6% were Orthodox Christian followed by Muslim (33.9%) and protestant or others (24.6%). And, about four-fifths (79.2%) of participants were engaged in the agriculture sector.

Table 1
Socio-demographic characteristics of rural men EDHS, 2016 (N = 10,187)

Variable	Frequency	%
Age (in years)		
< 30	5550	54.5%
31–44	2953	29.0%
> 45	1684	16.5%
Wealth Index		
Poor	4217	41.4%
Medium	2407	23.6%
Rich	3563	35.0%
Educational Status		
No Education	3623	35.6%
Primary Education	5215	51.2%
Secondary or Above	1349	13.2%
Region		
Emerging	441	4.3%
Developed	9746	95.7%
Marital status		
Single	4300	42.2%
Married	5887	57.8%
Occupation		
Non-Agricultural	2123	20.8%
Agricultural	8064	79.2%
Religion		
Protestant or others	2503	24.6%
Orthodox	4234	41.6%
Muslim	3450	33.9%
Age at first sex		
Not had sex	3079	30.2%

Variable	Frequency	%
<=17	1603	15.7%
18–24	4467	43.9%
> 25	1039	10.2%
Comprehensive knowledge for HIV		
Limited	6733	67.8%
Enough	3197	32.2%
perceived discriminatory attitude towards HIV patients		
No	773	7.8%
Yes	9157	92.2%
covered by Health Insurance		
No	9497	93.2%
Yes	690	6.8%

Forty four percent of respondents had first sex at the age of 18–24 and 67.8% of participants had not comprehensive knowledge about HIV. The majority of the respondents (92.2%) perceived there was a discriminatory attitude towards HIV patients.

Magnitude of HIV testing among rural men

Among rural men, about 40.3% (95% CI: 37.8%-42.8%) were ever been tested for HIV. The proportion of HIV test differed by age. Table 2 shows that 19.3% of the a rural men in the youngest age group (< 30 years old) had ever been tested HIV, while 13.9% among the middle age group (31–44 years old) and 7.1% in the oldest age group (≥ 45) ($p < 0.001$) had ever been tested. Rural men who belonged to rich wealth quintiles tested in higher numbers (17.8%) in comparison to the men from poor (13.3%) and medium (9.2%) wealth quintiles ($p < 0.001$). The proportion of HIV tests among rural men with no education was 12.7% lower compared to primary (18.9%) and higher compared to secondary and above (8.7%) ($p < 0.001$). About 39.2% and 1.1% of respondents from developed and emerged regions ever been tested for HIV, respectively ($p < 0.001$). Regarding marital status and religion, more than a quarter (27.6%) of married men were tested for HIV and one-fifth (20.4%) and one-tenth (10.1%) of Orthodox Christian and Muslim were ever tested for HIV, respectively ($p < 0.001$).

Table 2
 Characteristics of the Participant by HIV testing status, EDHS 2016 (N=???)

Ever been tested for HIV		P-Value	
No	Yes		
n(%)	n(%)		
Age (in years)		< 0.001	
< 30	3586(35.2)	1964(19.3)	
31–44	1539(15.1)	1414(13.9)	
≥ 45	960(9.4)	724(7.1)	
Wealth Index		< 0.001	
Poor	2863(28.1)	1354(13.3)	
Medium	1475(14.5)	932(9.2)	
Rich	1747(17.1)	1816(17.8)	
Educational Status		< 0.001	
No Education	2327(22.8)	1296(12.7)	
Primary Education	3294(32.3)	1921(18.9)	
Secondary or Above	465(4.6)	884(8.7)	
Region		< 0.001	
Emerging	332(3.3)	109(1.1)	
Developed	5753(56.4)	3993(39.2)	
Marital status		< 0.001	
Single	3006(29.5)	1293(12.6)	< 0.001
Married	3079(30.2)	2809(27.6)	
Occupation		0.097	
Non-Agricultural	1209(11.9)	914(9.0)	
Agricultural	4877(47.8)	3187(31.3)	
Religion		< 0.001	
Protestant or others	1504(14.8)	999(9.8)	

Ever been tested for HIV		P-Value
No	Yes	
n(%)	n(%)	
Orthodox	2161(21.2)	2073(20.4)
Muslim	2421(23.7)	1029(10.1)
Age at first sex		< 0.001
Not had sex	2387(23.4)	692(6.8)
<=17	877(8.6)	725(7.1)
18–24	2243(22.0)	2224(21.8)
>25	578(5.7)	461(4.6)
Comprehensive knowledge for HIV		< 0.001
Limited	3755(37.8)	2978(30.0)
Sufficient	2073(20.9)	1123(11.3)
Perceived discriminatory attitude towards HIV patients		0.021
No	526(5.3)	246(2.5)
Yes	5302(53.4)	3855(38.8)
Covered by Health Insurance		< 0.001
No	5792(56.8)	3704(36.4)
Yes	293(2.9)	398(3.9)

Respondents who had their first sex at 18–24 years of age had ever tested in higher numbers (21.8%) than respondents who had their first sex at other ages ($p < 0.001$). Among participants, those had limited comprehensive knowledge about HIV higher test rate with 30.0% than those had satisfactory knowledge of 11.3% ($p < 0.001$). Those who perceived discriminatory attitudes towards HIV patients were tested in higher numbers (38.8%) than those who did not (2.5%) ($p < 0.001$).

Determinants of rural men HIV testing

Table 3 shows the results from the bivariable logistic regression analysis between covariates and HIV testing. The results show that age, wealth status, education status, region of residence, marital status, religion, age at first sex, comprehensive knowledge about HIV, perceived discriminatory attitude towards

HIV patients, and coverage of health insurance by had a significant association with HIV testing among rural men in Ethiopia.

The odds of being tested for HIV among rural men who were aged 31–44 years were 1.12 [Adjusted Odds Ratio (AOR): 1.12; 95% Confidence Interval (CI): 1.01, 1.42] times higher than those who were aged \geq 45 years. Rural men who were rich and medium wealth status had 44.0% (AOR: 0.56; 95% CI: 0.47, 0.67) and 33.0% (AOR: 0.67; 95% CI: 0.56, 0.67) respectively, lower odds of being tested for HIV compared to their poor counterparts. Rural men who attend primary and secondary education were less likely to be tested for HIV (AOR 0.21; (95% CI; 0.16, 0.28)) and (AOR: 0.31; 95% CI: 0.25, 0.35) respectively less likely than those had no education. Rural men, those living in the developed region 1.43 times more likely to be tested for HIV than those were living in the emerging region (AOR: 1.43; 95% CI: 1.09, 1.88). The odds of being tested HIV among rural men who engaged in the nonagricultural sector 1.27 times greater than those were engaged in the agricultural sector (AOR: 1.27; 95% CI: 1.05, 1.52). Being Muslim among rural men had a higher probability of HIV testing than Protestants or others; (AOR: 2.07; 95% CI: 1.67, 2.67). Among rural men, those who had first sex at age > 17 were less likely to be tested HIV than those ever had no sex experience (AOR: 0.26; 95% CI: 0.19, 0.36). Rural men who had comprehensive knowledge about HIV were 1.31 times more likely to test HIV than those who had limited knowledge on HIV (AOR: 1.31; 95% CI: 1.12, 1.54).

Table 3
Determinants of rural men HIV testing, EDHS 2016

Variable	COR (95% CI)	p-Value	AOR (95% CI)	p-Value
Age				
< 30	0.73(0.62–0.86)	0.001	1.15(0.94–1.43)	0.173
31–44	1.22(1.04–1.43)	0.015	1.12(1.01–1.42)*	0.037
> 45	1.00		1	
Wealth Index				
Poor	1			
Medium	0.46(0.38–0.53)	0.001	0.56(0.47–0.67)*	0.001
Rich	0.61(0.51–0.72)	0.001	0.67(0.56–0.80)*	0.001
Educational Status				
No Education	1		1	
Primary Education	0.29(0.23–0.37)	0.001	0.21(0.16–0.28)*	0.001
Secondary or Above	0.31(0.25–0.37)	0.001	0.31(0.25–0.35)*	0.001
Region				
Emerging	1		1	
Developed	2.12(1.70–2.65)	0.001	1.43(1.09–1.88)*	0.010
Marital status				
Single	1		1	
Married	0.47(0.40–0.55)	0.001	0.79(0.60–1.04)	0.090
Occupation				
Non-Agricultural	1.16(0.97–1.37)	0.097	1.27(1.05–1.52)*	0.011
Agricultural	1		1	

*P-value < 0.05, 95% CI *COR: Crude Odds Ratio AOR: Adjusted Odds Ratio

Variable	COR (95% CI)	p-Value	AOR (95% CI)	p-Value
Religion				
Protestant or others	1			
Orthodox	1.56(1.21–2.01)	0.001	1.29(0.99–1.67)	0.520
Muslim	2.26(1.79–2.88)	0.001	2.07(1.67–2.67)*	0.001
Age at first sex				
Not had sex	1		1	
<=17	0.36(0.29–0.45)	0.001	0.26(0.19–0.36)*	0.001
18–24	1.03(0.79–1.36)	0.794	1.07(0.81–1.39)	0.643
> 25	1.24(1.01–1.53)	0.042	1.14(0.92–1.41)	0.242
Comprehensive knowledge for HIV				
Limited	1		1	
Sufficient	1.46(1.26–1.70)	0.001	1.31(1.12–1.54)*	0.001
Perceived discriminatory attitude towards HIV patients				
NO	1		1	
Yes	0.65(0.44–0.94)	0.020	0.67(0.47–0.93)	0.019
Covered by Health Insurance				
No	0.47(0.44–0.94)	0.001	0.54(0.42–0.69)*	0.001
Yes	1		1	
*P-value < 0.05, 95% CI *COR: Crude Odds Ratio AOR: Adjusted Odds Ratio				

Those rural men who perceived there were discriminatory attitudes towards HIV patients and those who had no health insurance coverage were 34% and 46% less likely to be tested for HIV odds of (AOR 0.67; (95% CI; 0.47, 0.93)) and (AOR 0.54; (95% CI; 0.42, 0.69)), respectively.

Discussion

Despite the availability of free HIV testing services and mass mobilization and awareness campaigns, HIV testing up-take was low among rural men in Ethiopia, where only 40.3% of rural men were ever tested for HIV. Although the service was delivered freely and is easily accessible by the people, it was far less than 90-90-90 global targets. However, this rate was higher than other sub-Saharan countries, e.g., Nigeria, South Africa, and Ghana indicated the tested amount was ranged from 14% – 22.6% (2, 12, 17). The HIV testing rate was lower than the national rate of 67% (10). The difference might be happened due to the lack of commitment of the government to close the gap by availing the service in rural areas. Ethiopian government working hard on the issue by launching a separate HIV/AIDS policy from national health policy and by providing the service on almost health facilities of the nation but, due to most health facilities concentrating in urban areas cannot it has also to minimize the gap with the national average yet.

This study showed that being a young age had higher odds of being tested for HIV. This is in line with studies conducted in Burkina Faso, Rwanda, and Cambodia (1, 12, 18). The reason for this may be due to the fact that most young and adults aged might have early sexual relationships, inconsistency, use of condoms, and multiple sexual partnerships. However, the result was not consistent with studies conducted in South Africa, Uganda, Kenya, and Malawi(8, 17). The difference may be due to the difference of policy, program, and commitment of the government, for example, integrated voluntary counseling and testing (VCT) was been implemented in Ethiopia.

This study showed that rural men who attended primary and secondary education were less likely to be tested for HIV. This finding is consistent with the findings from studies conducted in Democratic Republic of Congo, Rwanda and Congo Kinshasa(1) but not consistent with many studies conducted in 29 African countries, sub-Saharan countries, Malawi, Cambodia, Uganda and Nigeria(1–2, 22,–16, 19–20). It is expected that people with higher education would have higher use of HIV testing services, but the study results were contrary to that expectation. This difference may happen due to the perception of educated persons living in the rural area that they do not need the test because they are aware of HIV and they can deal with it.

Higher wealth status was found associated with higher odds of being tested for HIV. The result contradicted with findings from studies conducted in Burkina Faso(11), Zimbabwe and Lesotho(1), Nigeria(5), and Cambodia(16). This might be due to fear of stigma and fear of loss of their prestige by society if they were positive.

This study identified that rural men who were lived in the developed region of Ethiopia had higher odds of being tested HIV than emerging regions. This is due to developed nation health and educational infrastructures were more advanced than their counterparts. It makes the residence to have a higher service seeking behavior and easily accesses the service.

This study identified that rural men engaged in the nonagricultural economic sector were more likely than agricultural engaged counterparts to be tested HIV. The result was in line with a study conducted in Cambodia(16). This might be due to the non-agricultural sector engaged segment of the population will have better school attendance and exposure to media. Based on the finding of this study, rural men Muslim followers tested HIV higher than protestant or others. The finding was in line with a study conducted in Malawi (18) but different from the study from Nigeria(17). The discrepancy might be due to unlike other Muslim-dominated countries, here in Ethiopia, they are easily attending modern education and awareness creation which gives them freedom of choice, and they are not marginalized from any Scio-economic activities. This may be encouraged to take HIV test.

Rural men who were < 17 years old at a time of first sex debut had less intension to test HIV than those not had sex debut. This may be due to lack of awareness about the test and HIV, fear to test due to their age because sex at this age is prohibited by the community. This result was the opposite of the Malawi result. This might be due to Malawi culture does allow early sexual debut and that makes them free to decide to test.

Having comprehensive knowledge about HIV would be the key to take a testing decision, but men's knowledge did not extend from 50%(5–6). This study indicated that rural men who had comprehensive knowledge about HIV had a higher probability of being tested HIV than those had not. The result was consistent with studies conducted in Burkina Faso and Nigeria(12, 19). This might be due to every time knowledge makes everyone rational, which helps decision-makers to make better choices. Society's stigmatic attitude will protect individuals from testing HIV.

This study also shows that rural men who were perceived there are discriminatory attitudes towards HIV-positive peoples were less likely to be tested. This is might be due to a fear of societal marginalization and exclusion from participating in socio-economic activities if they have got HIV. The result was consistent with the study conducted in Nigeria, Uganda, Senegal, Burkina Faso, Kenya, Malawi, and Uganda,(3), (7–8),(20–21). This study indicated rural men who had health insurance coverage were more likely to be tested HIV than their counterparts. It was in line with Malawi's study(18). This may be because, even if HIV testing was free, having health insurance packages increases confidence or fear of medical expenses and health-seeking behavior. And mostly those have the insurance coverage attending school better and fast adopters for new services and programs.

Conclusion

This study showed that the prevalence of HIV testing among rural men was very limited despite a higher commitment of different stakeholders and a wide range of service availability and accessibility. This study indicates socio-economic and motivational factors like comprehensive knowledge about HIV and perception of discriminatory attitudes towards HIV patients are important factors for the up-taking of HIV test. Thus the concerned bodies could be strategic and design their plan with the consideration of the above important variables to improve the test quantity and achieve the universal target of 90-90-90.

Declarations

Data Availability

The data used to support the findings of this study are included within the article.

Ethical Approval

Ethical clearance for the survey was provided by the EHNRI Review Board, the National Research Ethics Review Committee (NRERC) at the Ministry Of Science And Technology, the Institutional Review Board of ICF International, and the CDC.

Conflicts of Interest

The authors declare that they have no competing interests.

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