

HIV Testing and Knowledge among Young Women in Rwanda: An Analysis of 2019-2020 Rwanda Demographic and Health Survey

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ABSTRACT

Background: HIV testing remains an important means to fight against HIV infection. However, many infected persons are unaware of their HIV infection. In Rwanda, HIV testing among young women decreased from 59% to 55% between 2015 and 2020. This study evaluated the influence of HIV-related knowledge on HIV testing uptake among young women in Rwanda.

Methods: This study analyzed the 2019/20 Rwanda Demographic and Health Survey (RDHS) data for 5,732 women aged 15-24 years. Summary statistics, bivariate and multivariate logistic regression analyses were performed to assess the relationship between HIV testing and HIV-related knowledge.

Results: HIV testing among young women was 55.1% and the majority (81.3%) of them knew that a healthy looking person can have HIV. After controlling for confounders, young women who had medium (OR=0.854; 95% CI: 0.756-0.964, P=0.011) and low (OR=0.357; 95% CI: 0.269-0.474, P<0.001) HIV-related knowledge were about 15% and 64% less likely to be tested for HIV respectively compared to those with a high HIV knowledge. Further, young women aged 20-24, who completed secondary education, and experienced high exposure to media were seven times, 78.9% and 48% more likely to test for HIV than those aged 15-19, with no education and low exposure to media respectively. Those from rural were about 20% less likely to test for HIV than those from urban areas.

Conclusion: Interventions aimed to boost HIV testing among young women in Rwanda should focus on improvement of HIV-related knowledge especially among adolescent with low education level from rural area.

Keywords: HIV, HIV testing, HIV-related knowledge, young women, Rwanda

INTRODUCTION

Human Immunodeficiency Virus (HIV) is the virus that attacks the body's immune system and makes the body vulnerable to secondary infections and opportunistic diseases. Regardless of the major progresses done in HIV treatment, HIV infection remains an important and complex worldwide health and development problem. In 2020, there were around 38.0 million HIV positive people worldwide, 1.5

million persons freshly infected with HIV infections, AIDS-related deaths were 680 000 individuals and about 4.1 million people unaware of their HIV positive status among 10.2 million people who were not on treatment[1]. In 2014, the goals to end epidemic of AIDS by 2030 were established including 90% of HIV positive persons to be aware of their HIV positive status by 2020, 90% of HIV positive persons to be on treatment, and 90% of HIV positive persons

to reduce their viral levels (90-90-90), with the goal of reaching 95-95-95 by 2030 [2]. Despite global advancements made in various facets of HIV response, young females remain excessively affected by HIV infections comparing with male of the similar age cluster and older women. According to recent report, globally, there were around 260 000 new HIV infection amongst adolescents and young females; this number were excessive in comparison with the 2025 target which is 50,000. The majority(83%) of these infections happened in SSA, where teenage and young females were 25% of HIV, even though they represented 10% of the whole residents [1]. Among several means, HIV testing has remained at the front position to fight and end HIV/AIDS; it is a unique opportunity for persons identified with HIV to begin lifesaving treatment as soon as possible. HIV positive persons have to be aware of their HIV positive status so that to receive healthcare they need to live well, fruitful lives and limit the possibility of HIV spreading. In addition, early detection plus treatment are linked to a lower risk of infection spreading to others [3], good outcome to ART, and decrease complication and mortality[4], and finally to achieve global targets 95% of HIV positive people to be aware of their HIV positive status by 2030 [2]. Although women aged 15-24 years have great possibility of high risk of getting HIV infection, its testing remains a problem among them especially for those who live in developing countries [5] and their knowledge about HIV is also still low[6]. Various studies have showed that Knowledge about HIV is important factor in HIV testing. Various studies have showed the impact of HIV related knowledge of HIV testing [7-10].

In Rwanda, from 2005 up to 2020, the prevalence of HIV infection stayed unchanging at 3%in Rwanda [11]. In 2019, the statistics revealed women were more affected by HIV and the prevalence was 3.7% among females and 2.2% among males. It was 0.8% in females age from 15

to 19 years and 1.8% among females aged from 20 to 24 years compared to the adolescent and males peers which were 0.4% and 0.6% respectively[12]. Rwanda adopted new changes in HIV prevention and management [13]; regardless of these important changes made, HIV testing remains low among young women and unexpectedly reduced from 59% in 2015 to 55% in 2020 [11]. Relationship between HIV testing and knowledge about HIV is not currently well known. It is imperative to conduct the present research to evaluate the role of HIV-related knowledge in influencing HIV testing uptake in young women in Rwanda. The importance of conducting this study is that research findings are useful in recommending new strategies to increase testing for HIV among young women in Rwanda.

MATERIALS & METHODS

Study data and sample

Cross- sectional retrospective based on 2019-2020 RDHS data is the study design used in the current research. The 2019/2020 RDHS is the nationwide recent survey which providing data on HIV testing. It was conducted from November 9, 2019 to July 20, 2020 by NISR in partnership with the MOH; the data collection took long period due to pandemic of COVID-19. During the 2019-2020 RDHS, the sample technique used was for the fourth RPHC, this one was conducted in 2012 by the NISR. The whole list of 16,716 enumeration areas (EAs) that comprised the entire country was used as sampling frame in 2019-2020 RDHS. That sampling frame used the whole list of enumeration areas (EAs) that comprising the entire country. This one was provided by the NISR, which was implementing organization of the RDHS. The 2019-20 RDHS was done in two-phase and with the purpose to permit estimations of main indicators at the nationwide level as well as for urban and rural zones. The first phase was about choosing groups (clusters) containing of EAs as defined in the 2012 RPHC. At this stage 500 groups were

chosen (112 in urban zones and 388 in rural zones). The next stage (second one) comprised systematic sampling of homes. The list of homes was done in all chosen EAs between June and August 2019, and homes to be involved in the survey were randomly chosen from the homes lists. 26 homes were selected from every sample group and a sample size of 13,000 homes where chosen countrywide (in 500 groups selected). Where finally, a total number of 14,634 women of aged between 15 and 49 years were chosen including 5732 young women as sample of 2019/2020 RDHS[11]. In the course of 2019/2020 RDHS data collection, 5 questionnaires were used including the Woman's Questionnaire. The last one was used to gather basic socio-demographic economic, and health indicators from suitable females aged between 15 and 24 years including data on HIV testing among young women. From the 2019-2020 RDHS women data set, a new data set data set of young females was created. This new data of young women aged 15-24 years including HIV related knowledge and potential confounding variables was extracted from women's data set.

Study setting

The study covered the whole Rwanda country (all 4 Provinces and Kigali City). Rwanda is a landlocked East African country, Kigali being the country's capital. Rwanda has 26,338 square kilometers and population of around 12 million. Agriculture is the country's principal industry. The country has four provinces (Northern, Southern, Eastern and Western provinces), Kigali City and 30 districts. Rwanda is surrounded by 4 countries namely Uganda in North, Burundi in South, Tanzania in Eastern, the Democratic Republic of Congo in West.

Study variables and measurement

Dependent variable: the outcome variable for this study was: "ever been tested for HIV"; it was evaluated from responses given on the question asked to women from Women's questionnaire in 2015/2020

RDHS: "Have you been tested for HIV?". The dependent variable was binary as responses were either "Yes" or "No".

Potential confounding variables: Based on previous studies [7, 8, 14], this study considered the young woman's exposure to media, level of education, residence, and age as potential confounders.

While the 2019/2020 RDHS classification for age, education and residence was kept, the media expose and knowledge about HIV were recoded. Media exposure was recoded into media exposure index. Exposure to media index was computed from these 2019/20 RDHS related variables: "frequency of reading newspaper or magazine", "frequency of listening to radio", and "frequency of watching television". Each of these variable was coded 0 for 'not at all', 1 for 'less than one time a week', and 2 for 'at least one time a week' frequency. These variables were used to calculate total "media exposure score", which range from 0 to 6. The "media exposure index" was categorized into three categories: "0=No exposure", "1 – 3=low exposure" and ">=4= high exposure" [15]. Concerning Knowledge about HIV, the knowledge index was calculated used six questions connected to HIV transmission and prevention. The questions were: : *Reduce risk of getting HIV: always use condoms during sex?*, *Reduce risk of getting HIV: have 1 sex partner only, who has no other partners?*, *A healthy looking person can have HIV?*, *Can get HIV from mosquito bites?*, *Can get HIV by sharing food with person who has AIDS?*, *Can HIV be transmitted from a mother to her baby during pregnancy?*[11]. The total scores considered as low (1-3), medium (4-5) and high (6) [16].

Ethical consideration: This study used secondary data from RDHS 2019/20 for which NISR secured ethical approval[11]. DHS Program provided the women's data to be used and authorization to use its data in this study. This is a globally accepted standard survey and the identity of the

participants is not revealed in the datasets. The researcher made no effort to identify participants and protected confidentiality of the participants.

Statistical Analysis

Analysis of data was performed with statistical software STATA (version 15.0). Distributions of frequencies provided summary of the data, and proportions were determined. To evaluate the relationship, Chi-square test was computed to evaluate relationships between outcome variable (ever been tested for HIV) and HIV related knowledge. The association with p-value < 0.05 was deliberated statistically significant. Finally, multivariable logistic regression was fitted to determine effect of HIV-related knowledge on HIV testing among young women; 95% confidence interval was used to measure significance of the correlation between HIV testing and all potential factors.

RESULTS

Characteristics of respondents

The results based on the 5732 respondents showed that majority (57.71%) of them were aged 15-19 years and lived in rural areas (75.10 %). Majority (52.11%) had low exposure to media, and only 43.98% had high knowledge about HIV. (Table 1). The results in Table 2, show that the majority of young women identified correct response to the question of whether “*One can get HIV by sharing food with person who has AIDS*” (91.59%). Among all the six questions about HIV-related knowledge, five questions had high proportion of above 80%. Only the question about whether HIV can be transmitted from a mother to her baby during pregnancy had 74.9% correct response.

Table 1: Respondent characteristics (n= 5,732)

Variables	Categories	n	%
Socio-demographic			
Age in 5-year groups	15-19 years	3,308	57.71
	20-24 years	2,424	42.29
Residence	Urban	1,427	24.90
	Rural	4,305	75.10
Education	No education	76	1.33
	Primary	2,830	49.37
	Secondary	2,703	47.16
	Higher	123	2.15
Media exposure index	No exposure(0)	778	13.57
	Low exposure (1-3)	2,987	52.11
	High exposure(>=4)	1,967	34.32
Ever been tested for HIV	No	2,569	44.82
	Yes	3,163	55.18

Table2. Knowledge of study respondents about HIV transmission and prevention in Rwanda (n=5732)

Variables	Frequency (%)	Ever HI tested (%)
Knowledge Indicator (correct response)		
Reduce risk of getting HIV: always use condoms during sex (Yes)	5,173 (90.25)	2,939(56.81)
Reduce risk of getting HIV: have 1 sex partner only, who has no other partners (Yes)	5,023 (87.63)	2,840 (56.54)
A healthy looking person can have HIV (Yes)	4,661(81.32)	2,719 (58.34)
Can get HIV from mosquito bites(No)	5,103 (89.03)	2,877 (56.38)
Can get HIV by sharing food with person who has AIDS (No)	5,250 (91.59)	2,971(56.59)
Can HIV be transmitted from a mother to her baby during pregnancy(Yes)	4,287 (74.79)	2,378(55.47)

Effect of HIV-related knowledge on HIV testing among young women

In addition to frequency distributions, this study performed a series of chi-square tests of association of HIV testing among young

women with HIV-related knowledge index, as well as with each of the potential confounding factors. Table 3 shows frequency and percentages distribution according to HIV testing status and the test

p-values. The results showed that there was statistically significant relationship between HIV testing among young women and their HIV knowledge at 5% level of significance.

Subsequently, a multivariate binary logistic regression model was fitted to data to control for the effect of the confounding factors on the influence between HIV-related knowledge and the outcome variable and determine the intensity and direction of such relationship. The results in Table 4 showed that those who had medium and low HIV-related knowledge were associated with 15% and 64% lower odds of HIV testing (OR=0.854; 95% CI: 0.756-0.964,

and OR=0.357; 95% CI: 0.269-0.474) respectively compared to those with high HIV-knowledge.

The odds of HIV testing were significantly higher among those aged 20-24(OR= 7.549; 95% CI: 6.638- 8.586), who completed secondary education (OR=1.789; 95% CI: 1.056-3.028), who experienced high media exposure (OR= 1.480; 95% CI: 1.207-1.814) than those aged 15-19, with no education and low exposure to media. Unlike, young women from rural (OR=0.798, 95% CI: 0.690-0.923) compared to those who lived in urban areas showed less likelihood to HIV testing.

Table 3: Bivariate analysis of HIV testing and knowledge about HIV among young women in Rwanda

Variables	Categories	Ever been tested for HIV				P-value
		No		Yes		
		Frequency	%	Frequency	%	
Knowledge index	High	1,007	39.94	1,514	60.06	<0.001
	Medium	1,329	46.15	1,551	53.85	
	Low	233	70.39	98	29.61	
Age group	15-19 years	2,095	63.33	1,213	36.67	<0.001
	20-24 years	474	19.55	1,950	80.45	
Residence	Urban	523	36.65	904	63.35	<0.001
	Rural	2,046	47.53	2,259	52.47	
Education	No education	37	48.68	39	51.32	<0.001
	Primary	1,446	51.10	1,384	48.90	
	Secondary	1,059	39.18	1,644	60.82	
	Higher	27	21.95	96	78.05	
Media exposure index	No exposure	413	53.08	365	46.92	<0.001
	Low exposure	1,391	46.57	1,596	53.43	
	High exposure	765	38.89	1,202	61.11	

Table 4: Multiple logistic regression model of HIV testing and knowledge about HIV among young women in Rwanda (n=5732)

Tested for HIV		Odds Ratio	P> z	95% CI limits	
Variable	Category			Lower	Upper
Knowledge index	High	1			
	Medium	0.854	0.011	0.756	0.964
	Low	0.357	<0.001	0.269	0.474
Age group	15-19 years	1			
	20-24 years	7.549	<0.001	6.638	8.586
Residence	Urban				
	Rural	0.798	0.002	0.690	0.923
Education	No education	1			
	Primary	1.138	0.625	0.676	1.918
	Secondary	1.789	0.030	1.056	3.028
	Higher	1.169	0.659	0.584	2.338
Media exposure index	No exposure	1			
	Low exposure	1.108	0.270	0.923	1.330
	High exposure	1.480	<0.001	1.207	1.814

DISCUSSION

The aim of the study is to evaluate the role of HIV-related knowledge in influencing HIV testing uptake in young women in Rwanda. In fact, during this period between 2015-2020, testing for HIV among Rwandan young females decreased. The

knowledge of effect of knowledge about HIV is required to improve HIV testing among young women. The present study analyzed the 2019/20 RDHS data for 5732 Rwandan young women.

The findings showed that young women who had high knowledge index were more

likely to test for HIV than those who had low knowledge and medium index. This is in line with other research studies done in Senegal and Zambia [7-10, 17]. This might be due to that young women who had high knowledge index had comprehensive knowledge about HIV including HIV transmission, prevention and understand the benefit of knowing their HIV status. These generate to them the commitment for testing for HIV.

Both HIV testing and knowledge about HIV were influenced by other variables including age, education, residence and exposure to media.

Age between 20-24 years showed to be linked with HIV testing. Young females between 20-24 years were more likely to test for HIV than to those aged between 15-19 years. The significant role of age has been reported in several studies [18-21]. At this age group, Rwandan young women completed secondary school and acquired necessary knowledge about HIV. At this age group, young women also engage in relationship and marriage and recognized importance of HIV testing before marriage; these increase their commitment for HIV testing for pre-nuptial purposes and as couple and antenatal visit during pregnancy.

The present study also found that young females lived in rural regions had 20% lower odds of testing for HIV compare to those lived in urban areas. This finding was in agreement with others studies done [15, 21, 22]. This could be due to that urban areas offer great accessibility of HIV testing services; in urban areas there are many health facilities including private and government facilities which provide the HIV testing. Young women from urban areas also experienced high exposure to media. These increase accessibility to test for HIV among urban young females.

Secondary education had positive influence on HIV testing among young females. It is in agreement with a previous study done [5, 15, 21, 23]. This may be because secondary education level provides great knowledge and enhance awareness about Sexual and

Reproductive Health and Rights (SRHR) including HIV testing among young females. They also empower young women about taking decisions about using healthcare services including HIV testing.

The odds of testing for HIV increased amongst young females who have high media exposure index in this study. This result was validated by other studies done in SSA, in Kenya, Nigeria countries [24]. This is because high exposure to media disclosure information about sexual and reproductive health and STIs/HIV prevention and transmission to young females, this increases together knowledge about HIV and it generates commitment to test for HIV.

CONCLUSION

There is a significant influence of HIV-related knowledge on HIV testing uptake among young women in Rwanda even after accounting for important confounding factors.

Interventions aimed to boost HIV testing among young female in Rwanda should focus on improvement of HIV-related knowledge especially among adolescent with low education level from rural area through increased accessibility to media and sustained enrollment in secondary education.

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