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Factors Influencing Low Uptake of HIV Counselling and Testing Services among Females Aged Between 15 To 24 Years in Nyarugenge District, Kigali, Rwanda

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Abstract: **Background: HIV counselling and testing (HCT) is crucial for HIV epidemic control, as knowledge of HIV-positive status facilitates treatment initiation. The Rwanda Population-based HIV Impact Assessment reported that only 70% of adolescent girls and young women (AGYW) knew their HIV status. This study examined factors associated with HCT uptake among females aged 15–24 years in Nyarugenge district, Kigali. Methods: Data were randomly collected from 296 AGYW on demographics, HIV testing history, knowledge, and risk behaviors. Odds ratios for ever being tested for HIV were computed using STATA 17. Results: Among participants, 61.8% had ever tested for HIV; 65.9% tested in the past 12 months. Secondary or higher education [aOR=2.2; 95% CI:1.1–4.6], awareness of sexual transmission [aOR=8.2; 95% CI:1.3–50.4], and receiving HIV information from healthcare providers [aOR=4.1; 95% CI:2.1–8.1] increased testing likelihood. Students were less likely to test compared to employed peers [aOR=2.4; 95% CI:1.1–5.3]. Conclusion: HIV testing uptake remains suboptimal among AGYW. Targeted education and enhanced healthcare provider communication in schools are recommended to improve testing rates.**

Keywords: **Adolescent, Young women, Voluntary Counseling and Testing, Determinants, Age-disparate sex.**

1. INTRODUCTION

HIV remains a major global public health threat since the identification of the Human Immunodeficiency Virus (HIV) in the early 1980s (Gallo & Montagnier, 2003). As of 2020, UNAIDS reported approximately 38.4 million people living with HIV worldwide, with women and girls constituting 53% of this population (UNAIDS, 2022). Adolescent girls and young women (AGYW) aged 15 to 24 years face disproportionately higher risks of acquiring HIV, estimated to be 2 to 16 times greater than their male peers (Center for Strategic and International Studies, 2021). For instance, in 2015, Swaziland recorded an HIV prevalence as high as 16.7% among AGYW (UNAIDS, 2016). This vulnerability stems from multiple factors, including limited access to education and economic opportunities, unequal access to sexual and reproductive health services, and social determinants exacerbated by the COVID-19 pandemic (Center for Strategic and International Studies, 2021).

In Sub-Saharan Africa, HIV testing uptake remains inconsistent. A Ugandan study among university AGYW found only 19% had used HIV self-testing kits (STK), despite over 93% expressing willingness to do so (Segawa, 2022). Usage varied widely across countries, influenced by HIV prevalence and distribution efforts: Malawi (50.8%), Zambia (48.9%), and Zimbabwe (34.3%) (Hatzold et al., 2019). Testing preferences also differ, with Kenyan AGYW favoring health facility-based testing (77.5%) over self-testing (22.4%) (Inwani et al., 2021a). Facility-based HIV testing rates vary from 17.3% in Ethiopia to 85.8% in South Africa (Erena et al., 2019; Musekiwa et al., 2021).

In Rwanda, uptake of HIV testing services (HTS) among AGYW ranges between 53.6% and 55% (RDHS, 2021; Musekiwa et al., 2022). Factors positively associated with testing include older age (19–24 years), higher education, wealth status, media exposure, pregnancy history, sexual experience, and HIV knowledge (Musekiwa et al., 2022). HTS are critical to HIV epidemic control by enabling early diagnosis and treatment, which reduces transmission (Anderson et al., 2014). However, barriers such as limited access, confidentiality concerns, stigma, poor provider attitudes, and insufficient knowledge impede uptake (Mafigiri et al., 2017; Tshivhase et al., 2022).

Population-based HIV Impact Assessments (PHIA) highlight that awareness of HIV-positive status directly correlates with antiretroviral therapy (ART) initiation, viral suppression, and decreased transmission (Barradas, 2017; RPHIA, 2019). Despite progress, about 30% of HIV-positive AGYW in Rwanda remain unaware of their status (RPHIA, 2019), underscoring the need to understand factors influencing HTS utilization. This study aims to identify determinants affecting HIV testing uptake among females aged 15 to 24 years in Nyarugenge District, Kigali, Rwanda, focusing on testing rates, preferred modalities, and socio-demographic influences.

2. LITERATURE REVIEW

2.1 Empirical Literature

2.1.1 Use of HIV Testing Services among AGYW

Although the uptake of HIV counseling and testing (HCT) services has improved over time due to expanded testing options (Hatzold et al., 2019), advances in HIV treatment (Menéndez-Arias & Delgado, 2022), stigma reduction efforts (UNAIDS, 2021b), and increased facility availability, utilization remains low in many countries—especially among men, adolescents, and adolescent girls and young women (AGYW) (RPHIA, 2019). In Sub-Saharan Africa, a Ugandan study found only 19% of university AGYW had used HIV self-testing kits (STK), despite over 93% expressing willingness to use them (Segawa, 2022). Data from demographic and health surveys show wide variation in HIV testing prevalence, both facility-based and self-testing, across countries. For example, in Kenya, 77.5% of AGYW preferred staff-assisted testing, while 22.4% preferred self-testing (Inwani et al., 2021a). Facility-based testing rates vary from 17.3% in Ethiopia (Erena et al., 2019) to 61.9% in Tanzania (THIS, 2018b) and 85.8% in South Africa (Musekiwa et al., 2021). Self-testing prevalence also differs widely, with 50.8% in Malawi, 48.9% in Zambia, and 34.3% in Zimbabwe (Hatzold et al., 2019). In Rwanda, uptake among AGYW was approximately 55% (Musekiwa et al., 2022), with health facility testing rates reported at 53.6% in 2020 (RDHS, 2021). These differences reflect national HIV prevalence, investments in universal HTS access, and community awareness.

2.1.2 HIV Testing Modalities among AGYW

Despite HIV/AIDS being a global pandemic, young people aged 15-24 often have insufficient knowledge about testing options (ICAP at Columbia University, 2022). HIV testing traditionally occurs in health facilities using blood samples, but oral-fluid based self-testing kits are increasingly available. However, awareness of self-testing remains limited among both youth and adults. For instance, only 74.3% of 820 AGYW in Zimbabwe had heard about HIV self-testing (Rotsaert et al., 2022). Literature on AGYW awareness of HIV self-testing in Sub-Saharan Africa, including Rwanda, remains sparse.

2.1.3 Factors Linked to HTS Uptake among AGYW

HTS uptake varies with community awareness and perceived HIV risk. A Ugandan study identified increasing age, multiple sexual partners, prior HIV testing experience, and recent sexually transmitted infection (STI) diagnoses as factors promoting HIV self-testing use (Segawa, 2022). In Rwanda, higher testing rates correlate with age 19-24, higher education, wealth, media exposure, pregnancy history, sexual experience, and HIV knowledge (Musekiwa et al., 2022).

2.2 Theoretical Framework

This study applies the Integrated Behavior Model (IBM), which integrates constructs from the Theory of Planned Behavior and Theory of Reasoned Action, to explain AGYW's use of HIV testing services. IBM posits that behavior is influenced by attitude (emotional and instrumental evaluation of testing), social influence (perceived norms from peers, family, and community), and personal agency (perceived control and self-efficacy). Attitude is shaped by prior experiences and social context, often limited among younger AGYW. Social influence includes injunctive norms (what others expect) and descriptive norms (observed behaviors). Personal agency reflects access to testing, financial ability, and confidence in managing testing outcomes. This model helps understand the multifaceted determinants of HIV testing behaviors among AGYW (Njau, 2020).

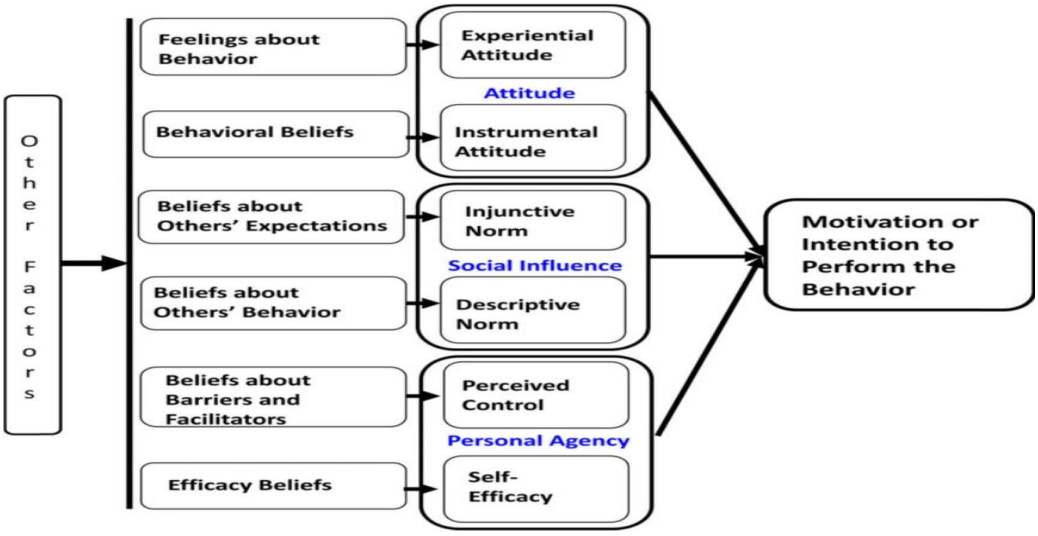

Figure 2.1: Integrated behavioral model(Njau, 2020)

2.3. Conceptual framework

Factors affecting the use of HIV testing (dependent or outcome variable) include independent variables on sociodemographic and economic factors like age, education and wealth index; awareness on STIs like HIV, sexual behaviors, exposure to media like TV and radio, and fear of being discriminated or stigmatized.

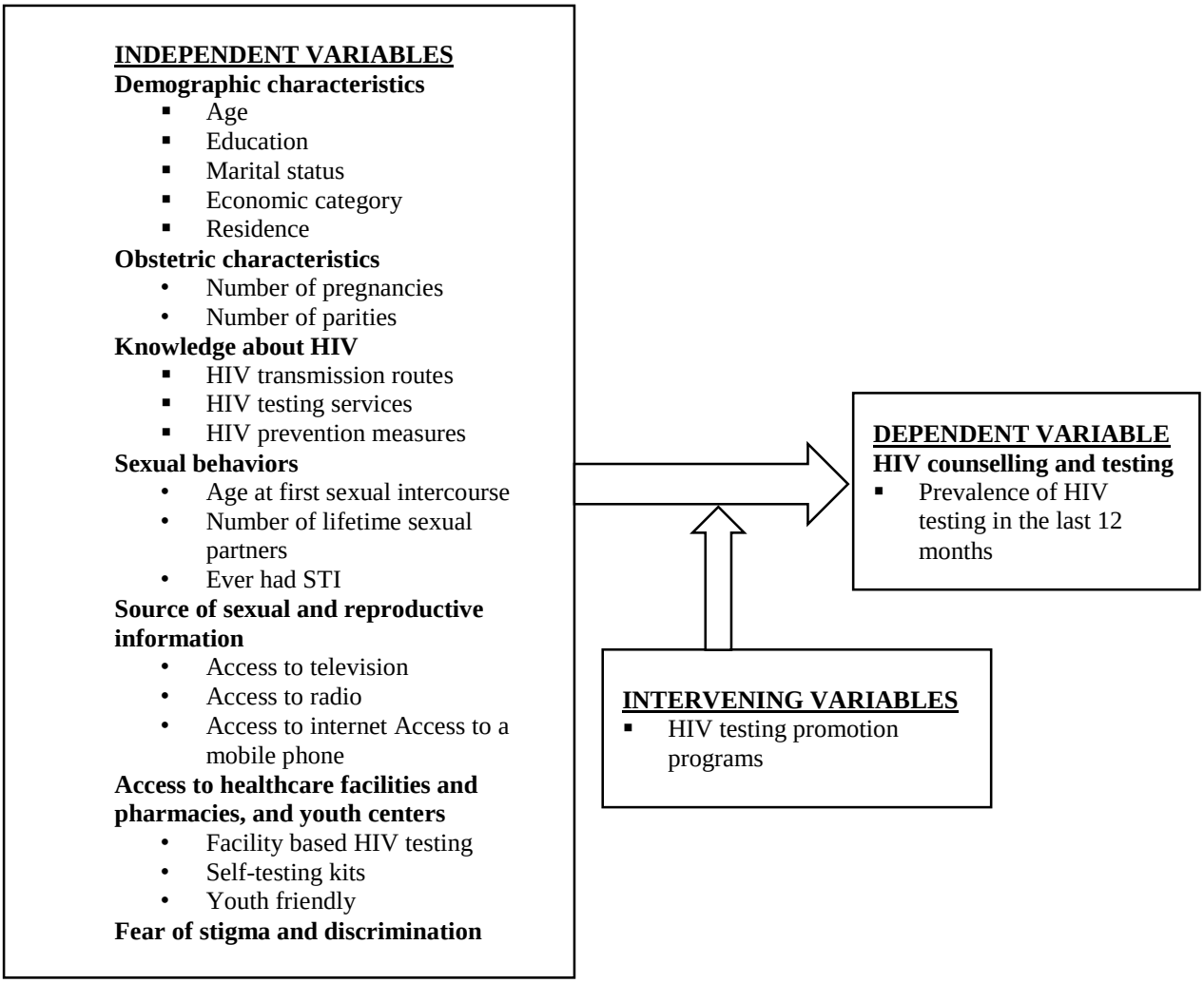

Figure 2.2: Conceptual framework adopted from (Lakhe et al., 2019)

3. RESEARCH METHODOLOGY

This study adopted a descriptive cross-sectional design to collect quantitative data from adolescent girls and young women (AGYW) aged 15 to 24 years in Kigali, Rwanda. Kigali comprises three districts—Nyarugenge, Kicukiro, and Gasabo—and has 44 health facilities offering HIV-related services. Data were gathered from youth centers, markets, health facilities, and secondary schools. The sample size was calculated using the formula:

$n = (Z^2 \times p(1-p)) / d^2$, where Z = 1.96 for 95% confidence level, p = 0.256 (25.6% HIV testing prevalence among AGYW in Rwanda, RPHIA 2019), and d = 0.05. The final sample size was 293 AGYW. Simple random sampling was used, with every second eligible and consenting AGYW included. Inclusion criteria were AGYW aged 15–24 who provided informed consent. Exclusion criteria included refusal to consent, lack of parental/guardian assent, or inability to participate due to illness or communication disabilities. Data were collected using a structured questionnaire adapted from CDC tools (CDC, 2012), programmed in Open Data Kit (ODK). It captured demographic information, knowledge and use of HIV testing services, sexual behaviors, health service access, and stigma experiences. The dependent variable was HIV testing in the past 12 months.

The questionnaire was translated into Kinyarwanda and pretested with 20 AGYW. Revisions were made based on feedback. Reliability testing showed a Cronbach's alpha of 0.72 for HIV knowledge items. Content validity was confirmed by expert review, and construct validity was assessed through variable correlation and exploratory analysis. Data collection occurred from July 17 to October 14, 2024. Ethical clearance was obtained, and approvals were secured from Kigali City and local authorities. Interviews were conducted using smartphones or computers, with data stored securely in Google Drive and exported to Excel. Data analysis was performed using STATA version 17, including descriptive statistics, bivariate analyses, and logistic regression to identify factors associated with HIV testing uptake.

4. PRESENTATION OF FINDINGS

4.1. Socio-demographic of the females aged between 15 to 24 years

Study participants were females aged between 15 to 24 years AGYW in Nyarugenge district. Participants were met from Youth Centers, health facilities, schools, and streets. Socio-demographic characteristics presented include age, marital status, occupation, religion, and obstetric characteristics.

Table 4.1: Socio-demographic information of the females aged between 15 to 24 years

Variable	Frequency (n)	Percent (%)
Demographic information		
Age in years: Mean [Min-Max]	18 [15-24]	
15-17	103	35.2
18-20	133	45.4
21-24	57	19.4
Marital status		
Single	278	93.9
Married/Cohabiting/Divorced	18	6.1
Education		
Primary and below	98	33.1
Secondary and higher	198	66.9
Occupation		
Student	122	41.2
Vocation works/daily wages	107	36.2
Others*	67	22.6
Religion		
Catholic	107	36.2
Protestants	146	49.3
Muslims	43	14.5
Total	296	100

Other occupations: housemaid or agro-farming

Table 4.1 displays that of the 296 females aged between 15 to 24 years (AGYW) enrolled in the study were aged between 15 and 24 years with 18 years as their average age, nearly a half (45.4%) were aged 18 to19 years old, most of them were single (93.9%) while majority had secondary education or higher (66.9%).

4.2. Proportion of AGYW aged 15 to 24 years who used HIV testing services in the last 12 months

Of the 296 participants enrolled in the study, 183 had ever been tested for HIV. Those ever tested for HIV. were asked whether they had tested for HIV in the last twelve months preceding the survey and Figure 4.1 provides the outcome.

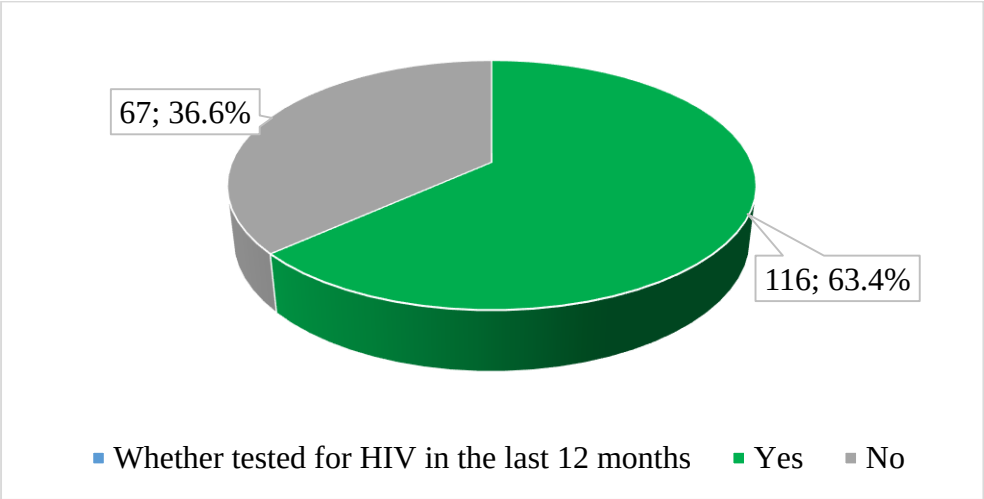

Figure 4.1: Use of one or more HIV testing services in the last 12 months among AGYW

Figure 4.1 shows that about 63.4(n=116) of the females aged between 15 to 24 years aged 15 to 24 years used HIV testing services in the last 12 months preceding data collection interview.

4.3 Preferred testing modalities among AGYW aged 15 to 24 years

Participants were asked to on whether they need to know their HIV status and prefer self-test or health facility based testing.

Table 4.2: Preferred testing modalities among AGYW

Variable	Frequency (n)	Percent (%)
Whether wish to know her HIV status		
Yes	217	76.1
No	68	23.9
Preferred place or mode HIV testing		
A health facility	204	71.6
Test my self	81	28.4
Total	**285**	**100**

4.4. Socio-demographic factors influencing utilization of HTS among AGYW aged 15 to 24 years

Factors associated with utilization of HIV testing services were based on a variable called “ever tested for HIV in the last 12 months”. Of the 296 adolescent girls and young women, about 61.8% had been tested for HIV in their lifetime. Figure 4.2 depicts further information.

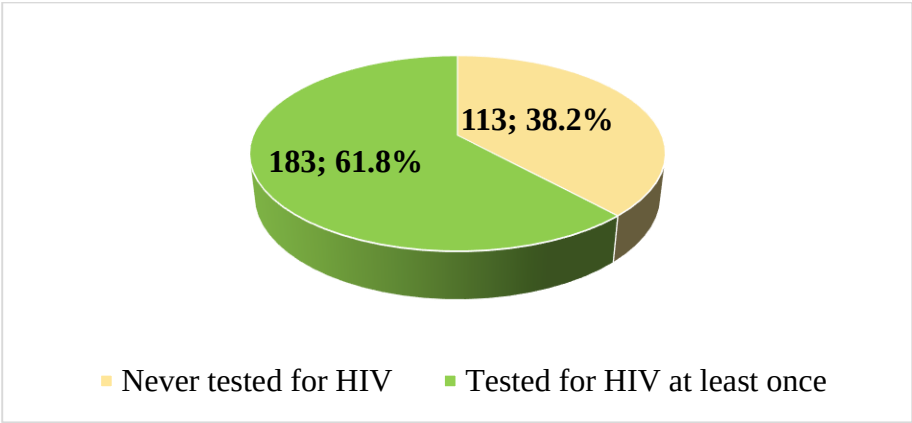

Figure 4.2: Proportion of participants ever tested for HIV in thier lifetime

To find out factors associated with the use of HIV testing services, socio-demographic characteristics of the females aged between 15 to 24 years were cross-tabulated with HIV testing status in the last twelve months. The characteristics include demographic, obstetric, HIV related knowledge, perceived risks to HIV, Sexual behaviors, and sources of HTS information.All variables with chi-square p value less than 0.05 and fitting for logistic regression were included in one logistic regression model, computing adjusted odd ratios, results are shown in table 4.4.

Table 4.3: Factors influencing the utilization of HTS among AGYW aged 15 to 24 years

Variables	Tested for HIV No	Yes	N	Chi-2	p value	aOR*	95% C.I** Lower	Upper	*p* value
Participant's age									
15-17	62(60.2	41(39.8)	103	37.6651	< **0.001**	1			
18-20	42(31.6)	91(68.4)	133			1.7	0.8	3.6	0.14
21-24	8(14.0)	49(86.0)	57			1.5	0.4	5.7	0.576
Marital status									
Single	113(40.7)	165(59.3)	278	11.8344	**0.001**	NA			
Married/Cohabiting/Di	0(0.0)	18(100)	18						
School attained									
Primary and below	56(57.1)	42(42.9)	98	22.3312	< **0.001**	1			
Secondary and higher	57(28.8)	141(71.2)	198			2.2	1.1	4.6	**0.028**
Occupation									
Student	72(59.0)	50(41.0)	122	38.5213	< **0.001**	1			
Vocation works/daily wages	27(25.2)	80(74.8)	107			2.4	1.1	5.3	**0.023**
Others*	14(20.9)	53(79.1)	67			3.1	1	9.3	**0.046**
Religion									
Catholic	50(46.7)	57(53.3)	107	5.2086	0.074				
Protestants	49(33.6)	97(66.4)	146						
Muslims	14(32.6)	29(67.4)	43						
Obstetric characteristics									
Number of lifetime pregnancies									
Never been pregnant	111(44.9)	136(55.1)	247	28.9202	< **0.001**	1			
Pregnant at least once	2(4.1)	47(95.9)	49			1.5	0.1	19.3	0.767
Number of lifetime parities									
Never given birth	1(3.2)	30(96.8)	31	17.9206	< **0.001**	1			
Gave birth once/two	112(42.3)	153(57.7)	265			0.7	0.03	19.3	0.836
HIV Related knowledge									
HIV is not always shown by someone's appearance									
Yes	63(40.1)	94(59.9)	157	0.5396	0.463				
No	50(36.0)	89(64.0)	139						
HIV is commonly transmitted through sexual contact									
Yes	105(36.8)	180(63.2)	285	5.7787	**0.016**	8.2	1.3	50.4	**0.024**
No	8(72.7)	3(27.3)	11			1			
HIV can be transmitted to the baby during pregnancy									
Yes	79(33.8)	155(66.2)	234	9.2263	**0.002**	1			
No/Don't know	34(54.8)	28(45.2)	62			0.9	0.4	2.3	0.892
HIV can be transmitted to baby during delivery									
Yes	92(35.0)	171(65.0)	263	10.201	**0.001**	1			
No/Don't know	21(63.6)	12(36.4)	33			0.4	0.1	1.3	0.121
HIV can be transmitted to baby during breastfeeding									
Yes	66(31.7)	142(68.3)	208	12.3129	< **0.001**	1			
No/Don't know	47(53.4)	41(46.6)	88			1.2	0.5	2.7	0.667
HIV transmitted through-blood transfusion									
Yes	102(36.4)	178(63.6)	280	6.6992	**0.01**	1			
No/Don't know	11(68.8)	5(31.2)	16			0.8	0.2	3.7	0.774
Perceived risks to HIV									
Self-perception of being at high risk of contracting HIV									

Variables	Tested for HIV No	Yes	N	Chi-2	p value	aOR*	95% C.I** Lower	Upper	*p* value
Yes	10(14.9)	57(85.1)	67	19.5402	< **0.001**	1			
No	102(44.7)	126(55.3)	228			0.6	0.2	1.5	0.258
Sexual behaviors									
Number of vaginal, anal, or oral sexual encounters in last 12 months									
Zero	86(52.8)	77(47.2)	163	37.5065	< **0.001**	1			
One	16(20.3)	63(79.7)	79			2.4	1	5.9	0.056
Multiple sex partners	7(14.3)	42(85.7)	49			1.8	0.5	5.7	0.349
Ever exchanged sex for money									
Yes	2(11.8)	15(88.2)	17	5.0873	**0.024**	1			
No	107(39.1)	167(60.9)	274			0.5	0.1	3.8	0.541
Ever had an STI-syphilis, chlamydia, gonorrhea, herpes, or genital warts									
Yes	0(0.0)	11(100.0)	11	6.8699	**0.009**	NA			
No	110(39.0)	172(61.0)	282						
Sources of HTS information									
Received HTS information from a Healthcare provider									
Yes	35(20.5)	136(79.5)	171	53.7976	< **0.001**	4.1	2.1	8.1	< **0.001**
No	78(62.4)	47(37.6)	125						
Received HTS information from a radio or television									
Yes	96(35.9)	171(64.0)	267	5.6939	**0.017**	1			
No	17(58.6)	12(41.4)	29			0.6	0.2	2.2	0.408
Received HTS information from the Internet									
Yes	50(36.0)	89(64.0)	139	0.5396	0.463				
No	63(40.1)	94(59.9)	157						
Received HTS information from her sexual partner, or boyfriend									
Yes	8(10.0)	72(90.0)	80	36.8749	< **0.001**	1			
No	105(48.6)	111(51.4)	216			0.9	0.3	2.7	0.807
Received HTS information from a friend or a colleague									
Yes	58(31.0)	129(69.0)	187	11.0292	**0.001**	1			
No	55(50.5)	54(49.5)	109			0.7	0.3	1.4	0.29
Received HTS information from Parents									
Yes	14(35.9)	25(64.1)	39	0.0988	0.753				
No	99(38.5)	158(61.5)	257						
Received HTS information from Youth centers									
Yes	6(40.0)	9(60.0)	15	0.0223	0.881				
No	107(38.1)	174(61.9)	281						
Received HTS information from the School									
Yes	31(54.4)	26(45.6)	57	7.8597	**0.005**	1			
No	82(34.3)	157(65.7)	239			1.4	0.6	3	0.42
Received HTS information from a Community health worker									
Yes	0(0.0)	13(100.0)	13	8.3961	**0.004**	NA			
No	113(39.9)	170(60.1)	283						
Received HTS information during Youth meetings									
Yes	4(23.5)	13(76.5)	17	1.6392	0.2				
No	109(39.1)	170(60.9)	279						

aOR: adjusted odd ratios(Predicted probabilities are of membership of ever used HTS; CI: Confidence Interval; ***Other profession: house maid Agro-farming, public servant

Table 4.3 shows that several factors were significantly associated with HIV testing in the past 12 months among AGYW aged 15–24 years. Higher testing rates were observed among those aged 15–17 and 21–24, those with secondary or higher education (71.2%), non-students (74.8–79.1%), those ever pregnant (95.9%) or who had given birth (96.8%), and those with a history of STIs (100%). Receiving HIV information from healthcare providers (79.5%), boyfriends (90.0%), or peers (69.0%) also increased testing. Logistic regression revealed education, occupation, STI history, and provider information significantly influenced HIV testing uptake.

5. DISCUSSION OF FINDINGS

The findings of this study indicate that 63.4% of adolescent girls and young women (AGYW) aged 15–24 years had undergone HIV testing within the past 12 months, and 28.4% preferred self-testing over health facility-based testing. Additionally, HIV testing uptake was significantly higher among AGYW with secondary or higher education (aOR = 2.2, 95% CI: 1.1–4.6), those engaged in occupations other than being a student (aOR range: 2.4–3.1), those who acknowledged sexual transmission of HIV (aOR = 8.2, 95% CI: 1.3–50.4), and those receiving information from healthcare providers (aOR = 4.1, 95% CI: 2.1–8.1).

5.1. Proportion of AGYW Who Used HIV Testing Services in the Last 12 Months

This study's 63.4% HIV testing rate aligns with findings from Southern Africa (67.5%) (Govender et al., 2022) and is higher than Rwanda's 2020 DHS figure of 55.4% (Musekiwa et al., 2022). This discrepancy may be due to methodological differences, as this study was limited to one urban district, Nyarugenge, whereas the DHS was population-based across the country. Despite improvements in HIV testing due to the expansion of testing modalities, ART access (Menéndez-Arias & Delgado, 2022), stigma reduction (UNAIDS, 2021b), and more health facilities (Hatzold et al., 2019), the data still highlights persistent unmet testing needs in AGYW, especially adolescents.

5.2. Preferred Testing Modalities Among AGYW

Self-testing preference among 28.4% of respondents is higher than Kenya's 22.4% (Inwani et al., 2021a), but lower than Malawi (50.8%), Zambia (48.9%), and Zimbabwe (34.3%) (Hatzold et al., 2019). Differences may be influenced by national policy on HIV testing, community awareness, and accessibility. Rwanda's HTS uptake among AGYW was 55% (Musekiwa et al., 2022), indicating room for increasing self-testing awareness and availability as an alternative for AGYW hesitant to visit health facilities.

5.3. Socio-Demographic Factors Influencing HIV Testing

Educational attainment significantly influenced HIV testing, supporting earlier studies (Musekiwa et al., 2022). Higher education likely increases awareness, reduces stigma, and boosts confidence in utilizing services. AGYW who were students were less likely to test, potentially due to limited access within school settings, perceived low risk, or less targeted programming. This suggests the need for school-based HIV risk screening and HTS programs tailored to AGYW, given their disproportionate vulnerability. Moreover, HIV knowledge played a major role. Those aware that HIV is primarily sexually transmitted were more likely to test, reinforcing the importance of comprehensive sexuality education. Receiving information from healthcare providers emerged as a strong predictor, suggesting that trusted, professional guidance positively influences service uptake.

This study is not without limitations. Its cross-sectional design prevents causal inferences. Self-reported data may introduce recall and social desirability biases. Unmeasured variables like stigma, partner influence, and actual service availability could also affect testing behaviors. Lastly, findings may not apply to AGYW in rural or different socio-economic settings. Therefore, targeted strategies promoting education, awareness, and provider-driven communication are essential to increase HIV testing uptake among Rwandan AGYW.

6. CONCLUSION AND RECOMMENDATIONS

This study reveals that only 66% of adolescent girls and young women (AGYW) aged 15–24 in Nyarugenge district accessed HIV testing services in the past 12 months, indicating an unmet need—especially among students, those with lower education, and those lacking HIV-related information. To improve uptake, the Ministry of Health should expand youth-friendly, accessible HTC services and enhance health education in schools. Collaborating with partners like RBC, strategies should include targeted awareness campaigns, mobile clinics, and provider training. Future research should use larger, citywide samples to ensure findings reflect broader trends across Kigali and Rwanda.

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