

## **Uptake of HIV Voluntary Counseling and Testing and Associated Factors among Students in the Higher Institutions of Learning in Kigali, Rwanda: A Cross-Sectional Study**

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### **Abstract**

#### **Background**

HIV/AIDS remains a significant global public health challenge with youth bearing the brunt of the burden. One essential method for preventing and accessing AIDS care is through Voluntary Counselling and Testing (VCT). Regardless of this, youth population continues to have low utilization of VCT services.

#### **Objective**

To assess the uptake of HIV VCT services and associated factors among university students in Kigali.

#### **Methods**

A cross-sectional study among 374 students recruited using stratified sampling was conducted. A structured questionnaire was used to gather information. A multivariable logistic regression analysis was used to assess the independent factors associated with VCT uptake.

#### **Results**

The prevalence of VCT uptake was 59.9%. The logistic regression revealed that being Catholic (AOR = 11.99, 95%CI: 5.44-26.41) and Moslem (AOR = 37.34, 95%CI: 2.67-128.36) compared to Protestant, as well as availability of VCT services (AOR = 5.15, 95%CI: 3.11 - 8.541) favored the use VCT. On the other hand, being aged 20 to 24 years (AOR = 0.112, 95%CI: 0.04 - 0.29) had low likelihood of using VCT than those more than 24 years of age.

#### **Conclusion**

VCT uptake was significantly positively associated with religion and VCT services availability, and negatively associated with age 20-24 years in the campus. Therefore, targeted actions of disseminating information on benefits of VCT and enhancing accessibility of VCT services among students are necessary for the increased VCT uptake to be attained.

*Rwanda J Med Health Sci 2023;6(2):104-112*

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**Keywords:** HIV/AIDS, uptake, Voluntary Counseling, and testing services

## Introduction

HIV/AIDS is a significant reason for concern worldwide as it is one of the major causes of death.[1] The High rate of HIV infection negatively affects the development of nations in the economic, political and social dimensions.[2] HIV voluntary counselling and testing (HIV-VCT) is defined as a service offered to an individual for him/her to know his/her HIV status which could be either positive or negative and is typically confidential.[3,4] HIV-VCT still remains essential in the universal fight to reach universal access to prevention and timely HIV treatment and health care.[5] HIV, unlike many other diseases, continues to be a major challenging public health problem, having claimed more than 40.4 million lives so far; and its transmission is still ongoing in all countries globally.[6]

According to 2020 WHO estimates, over 30% of all new HIV infections worldwide are estimated to occur among the youth aged 15 to 25 years.[7] The joint United Nations programme on HIV/AIDS report, indicated that there were approximately 39 million people living with HIV worldwide, including 37.5 million adults (15 years or older) and 1.5 million children (0-14 years) in 2022.[8] In the same year, 86% of all people living with HIV knew their HIV status. However, about 5.5 million people (14%) did not know they were living with HIV.[8] In addition, the Eastern and Southern Africa is the most affected region with an estimated number of 20.8 million people living with HIV, and 260,000 AIDS related deaths.[9]

Rwanda as part of the countries in Eastern and Southern Africa has been affected by HIV/AIDS epidemic with an estimated national HIV prevalence of 3% among adults. The 2019/2020 Rwanda Demographic Health Survey demonstrated that a proportion of young men (59%) and women (45%) aged 15-24 years never tested for HIV.[10]

Young people aged between 15-24 years comprise university students, most of whom are adolescents with freedom from the control of their family; and this might increase their risk of exposure to HIV. Students' way of life at university campuses therefore, place them at a higher risk of contracting HIV.[11,12] Although VCT has been used as a health tool to prevent HIV/AIDS, its uptake is still low among university students. For instance a study done in Nigeria among undergraduates of tertiary institution found only 17.3% where ignorance, fear of positive test as well as stigma and discrimination were identified as barriers of HIV-VCT uptake.[13] In Kenya among 18 to 24 years of university students revealed that the uptake of VCT services was 45% and accessibility to the test site, anxiety about being observed on the test site, and anxiety over test results were all noted as variables influencing the uptake.[14] Another study in Ethiopia, done among young college students also found that 37.8% used VCT services and having peer groups used VCT, desiring to have VCT in the future, being aware of VCT, knew infected/dead individuals with HIV/AIDS, know test sites were positively associated with uptake while being married and fear of confidentiality were identified as barriers to use.[15]

However, little is known regarding the uptake of HIV-VCT and factors contributing to this situation in Rwanda among students of higher learning institution. Thus, it is for this reason, this study was designed and conducted with the aim to assess the uptake of VCT services and associated factors among university students in Kigali, Rwanda.

## Methods

### Study design

This study was of quantitative cross-sectional design, and was conducted from March to August 2021 among the university students in Kigali, Rwanda. The university in this study refers to all higher institutions of learning.

## Setting

The study was conducted in three (3) out of 17 universities located in Kigali, Rwanda. Kigali is the capital of Rwanda, located approximately in the center of the country and covers an area of 730 km<sup>2</sup>. The institutions included in the study were Mount Kenya University, based in Kicukiro District, University of Rwanda (College of science and Technology located in Nyarugenge District, and College of Medicine and Health Sciences in Gasabo District), and Kigali independent university, located in Gasabo district.

## Population, sample size and sampling techniques

The target population of the study was undergraduate students aged 24 years and below, currently studying in the three (3) selected universities. The sample size included for this study was 374 students from chosen universities. The desired sample size was determined using the formula of Fischer et al.[19] The components considered in the formula were: *d*, the preferred margin of error of 5%; *p*, the prevalence (61.5%) of VCT uptake according to study conducted in Ethiopia among university students,[16]; “*z*” the standard normal deviate (1.96) that matches the 95% confidence level.

$$n = \frac{Z^2 P (1 - P)}{d^2} = \frac{(1.96)^2 0.61(1 - 0.61)}{(0.05)^2} = 365$$

By considering a non-response rate of 10%,  
 $n = 365 + 36 = 401$

Therefore, the sample size was 401 undergraduate students (females and males) attending the three universities in Kigali. Stratified sampling technique was used to select the study participants. Schools, departments, and intake levels were used as strata. The list of target population along with their registration numbers was obtained from the registrar’s office of each university. Then, from each stratum, a simple random sampling was employed by generating random numbers. Distribution of questionnaires was made until all the selected numbers in each stratum were covered.

## Data collection instrument and procedures

A structured questionnaire was adapted from the one used in similar studies in Ethiopia. [16,17] The questionnaire was modified to suit the study setting with the exclusion of knowledge and attitude sections as well as sexual characteristics and risk perception of respondents. The questionnaire was first developed in English then translated into Kinyarwanda and back to English to ensure consistency. The research questionnaire consisted of series of questions gathering information about respondents in order to answer research questions. The questionnaire had sections about socio-demographic characteristics, in terms of gender, age, social class and education, as well as VCT utilization aspects including, availability, accessibility, confidentiality and quality. The questionnaire also asked for information about VCT uptake and its associated factors. To ensure clarity and reliability of the tool, a pre-test was conducted in another university which was not among the selected ones.

## Data analysis

The gathered data, were first entered in Excel where they were coded and cleaned. Then, the data were exported and analyzed in IBM SPSS Statistics for Windows version 25.0 (IBM Corp, Armonk, NY, USA), and presented in tables. Frequencies and percentages as well as chi-square test ( $p < 0.05$ ) were used to determine the association between VCT uptake and the independent variables. Multivariable logistic regression was performed to adjust for confounding variables and to determine independent predictors of VCT uptake. All variables with  $p < 0.05$  in bivariate analysis were treated together in multiple logistic regression analysis. The strength of association was determined using adjusted odds ratio and 95% confidence intervals (CI).

## Ethical considerations

Ethical clearance with reference number MKU04/PGS&R/0182/ 2019, was received for this study from Mount Kenya University Ethical Review Board;

and permission to conduct the research was obtained from the three selected universities. The participants were assured that participation in this study was voluntary and that they had full right to withdraw at any time without any consequences. The participants were also told that the information they provided would be safely kept. After the participants had read and understood the purpose and all explanation about it conduct, they were asked without coercion to sign the consent form of the study. Precautions were set to ensure value, respect and autonomy for participants who took part in this study.

## Results

### Socio-demographic characteristics

A total of 374 out of 401 students included in the study returned the questionnaires, giving a response rate of 93.3%. There were slightly more males (54.8%) than females (45.2%). Most students (74.3%) were aged 20 to 24 years, followed by the 19 year olds or younger (12.6%). Most (54%) of the respondents were of Roman Catholic faith, followed by the protestant (24.6%). The majority (98.4%) of respondents were single; less than a half (47.3%) belonged to a second category of social class; and a large (87.7%) number of them were unemployed. Most of the respondents (90.4%) reported being comfortable to use VCT services and more than a half (79.9%) revealed that they would take VCT at the campus. Less than half of the respondents (46%) reported that VCT services were available at the campus; and most respondents (78.9%) reported that using VCT was convenient. Moreover, a large percentage of the respondents (94.1%) expressed an aspiration to undergo VCT in the future (Table 1).

**Table 1. Socio-demographic characteristics of the respondents**

Variables	Frequency (N=374)	Percentage (%)
<b>Gender</b>		
Male	205	54.8
Female	169	45.2
<b>Age</b>		
≤19	47	12.6
20-24	278	74.3
>24	49	13.1
<b>Marital status</b>		
Single	368	98.4
Married	6	1.6
<b>Year of Study</b>		
Year 1	94	25.1
Year 2	94	25.1
Year 3	94	25.1
Year 4	92	24.6
<b>Religion</b>		
Protestant	92	24.6
Catholic	202	54
Muslim	44	11.8
Others	36	9.6
<b>Social class (Ubudehe)</b>		
Category 1	32	8.6
Category 2	177	47.3
Category 3	165	44.1
<b>Parent education</b>		
No education	56	15
Primary	85	22.7
Secondary	99	26.5
University	134	35.8
<b>Occupation</b>		
Government employee	24	6.4
Businessman/ woman	22	5.9
Unemployed	328	87.7
<b>Confirmation on use of VCT</b>		
Yes	338	90.4
No	36	9.6
<b>To take VCT service in the campus</b>		
Yes	299	79.9
No	75	20.1
<b>VCT available in the campus</b>		
Yes	172	46
No	202	54
<b>VCT service is convenient for you</b>		
Yes	295	78.9
No	79	21.1
<b>To undergo VCT in the future by choice</b>		
Yes	352	94.1
No	22	5.9

**Level of uptake of voluntary counselling and testing among respondents**

As shown in Table 2, more than a half 224 (59.9%) of the respondents had had VCT within the previous year; and 96 (25.7%) had taken VCT at the hospitals. Furthermore, the table shows that 108 (28.9%) of those who had taken VCT, desired to know their HIV status; and 149 (39.8%) of the respondents reported that using VCT services was convenient for them (Table 2).

**Table 2. Uptake of voluntary counselling and testing among the respondents**

Variables	Frequency (N=374)	Percent (%)
<b>VCT in the last year</b>		
Yes	224	59.9
No	150	40.1
<b>An area where VCT is conducted (n=224)</b>		
Hospital	96	25.7
Health center	44	11.8
Private clinic	17	4.5
Others	67	17.9
<b>The reason for conducting VCT (n=224)</b>		
Medical care	38	10.2
Mass campaign	11	2.9
Family or friend advice	38	10.2
Desire to know my HIV status	108	28.9
Involve in a sexual relationship in the past	19	5.1
Others	10	2.7
<b>Experience of conducting VCT (n=224)</b>		
Yes	149	39.8
No	75	20.1
<b>If No, the reason for not conducting VCT (n=132)</b>		
Scared of positive results	32	8.6
Getting false positive results	12	3.2
Being a virgin	14	4.3
Don't know any VCT Centre	43	15.5
Using a condom every time having sex	31	11

Key: VCT, voluntary counselling and testing

**Bivariate analysis for factors associated with VCT uptake**

**Table 3. Bivariate analysis for factors associated with VCT uptake**

Variables	VCT uptake		P-value
	Yes, n (%)	No, n (%)	
<b>Gender</b>			
Male	125 (61)	80 (39)	0.638
Female	99 (58.6)	70 (41.4)	
<b>Age</b>			
<20	42 (89.4)	5 (8.5)	<0.001
20-24	135 (48.6)	143 (51.4)	
>24	47 (95.9)	2 (4.1)	
<b>Marital status</b>			
Single	218 (59.2)	150 (40.8)	0.043
Married	6 (100)	0 (00)	
<b>Year of Study</b>			
Year 1	52 (55.3)	42 (44.7)	0.060
Year 2	69 (73.4)	25 (26.6)	
Year 3	58 (61.7)	36 (38.3)	
Year 4	66 (71.7)	26 (28.3)	
<b>Religion</b>			
Protestant	36 (39.1)	56 (60.9)	<0.001
Catholic	140 (69.3)	62 (30.7)	
Muslim	38 (86.4)	6 (13.6)	
Others	10 (27.8)	26 (72.2)	
<b>Social class (ubudehe)</b>			
Category1	19 (59.4)	13 (40.6)	0.202
Category2	98 (55.4)	79 (44.6)	
Category3	107 (64.8)	58 (35.2)	
<b>Parent education</b>			
No education	36 (64.3)	20 (35.7)	0.025
Primary	45 (52.9)	40 (47.1)	
Secondary	51 (51.5)	48 (48.5)	
University	92 (68.7)	42 (31.3)	
<b>Occupation</b>			
Unemployed	196 (59.8)	132 (40.2)	0.697
Government employee	16 (66.7)	8 (33.3)	
Businessman/woman	12 (54.5)	10 (45.5)	
<b>Comfortable to use VCT</b>			
Yes	203 (60.1)	135 (39.9)	0.841
No	21 (58.3)	15 (41.7)	
<b>Availability of VCT services at the campus</b>			
Yes	76 (44.2)	96 (55.8)	<0.001
No	156 (77.2)	46 (22.8)	
<b>VCT service is convenient for you</b>			
Yes	174 (59.0)	121 (41.0)	0.488
No	50 (63.3)	29 (36.7)	
<b>Desiring to have VCT in the future</b>			
Yes	213 (60.5)	139 (39.5)	0.329
No	11 (50.0)	11 (50.0)	

Bivariate analysis results of factors associated with VCT uptake are presented in Table 3. There was a significant association between age ( $p < 0.001$ ), religion ( $p < 0.001$ ) and parents' education ( $p = 0.025$ ) of the respondents and using VCT. Moreover, there is an association between the availability of VCT at the campus and its use ( $p < 0.001$ ).

#### **Multivariable analysis for factors independently associated with VCT uptake**

As presented in Table 4, respondents affiliated with the Roman Catholic church were 11.99 times more likely to use VCT compared to protestants (AOR = 11.99; 95% CI = 5.44–26.41;  $p = 0.001$ ).

The Muslims were 37.34 times more likely to take VCT services compared the protestant (AOR= 37.34; 95% CI = 2.67–128.36;  $p < 0.001$ ). Those aged 20–24 years were 0.11 times less likely to take VCT compared to those who were under 20 years (AOR = 0.11; 95% CI = 0.04–0.29;  $p < 0.001$ ). Not Having VCT service available at the campus made it 5.15 times more likely for students to uptake VCT compared to having the VCT service at the campus (AOR = 5.15; 95% CI = 3.11–8.54;  $p < 0.001$ ).

**Table 4. Logistic regression of factors associated with the uptake of VCT among university students**

<b>Variables</b>	<b>AOR</b>	<b>95% CI</b>	<b>P-value</b>
<b>Marital Status</b>			
Single	1.00	[0.91, 2.34]	0.118
Married	1.46		
<b>Age</b>			
<=19	1.00		
20-24	0.11	[0.04, 0.29]	<b>&lt;0.001</b>
>24	2.44	[0.45, 13.30]	0.302
<b>Religion</b>			
Protestant	1.00		
Catholic	11.99	[5.44, 26.41]	<b>0.001</b>
Muslim	37.34	[2.67, 128.36]	<b>&lt;0.001</b>
Others	0.18	[0.33, 0.78]	<b>0.022</b>
<b>Parent education</b>			
No education	1.00		
Primary	0.63	[0.31, 1.25]	0.184
Secondary	0.59	[0.30, 1.16]	0.125
University	1.22	[0.63, 2.35]	0.558
<b>Availability of VCT services at the campus</b>			
Yes	1.00		<b>&lt;0.001</b>
No	5.15	[3.11, 8.54]	

## **Discussion**

Use of VCT is considered an important factor in the fight against HIV/AIDS. It is broadly recognized as a critical element in the HIV/AIDS preventive methods.

The assessment of HIV Testing and Counselling utilization among youth is important not only because of their higher rate of susceptibility to HIV, but also because they might be experiencing some challenges in accessing the HIV testing and counseling services.[18,19] This study revealed that the uptake of VCT among university students during the year preceding the study was 59.9%. This finding is lower compared to the findings from a study done in Kenya at Mount Kenya University in which the VCT uptake among students was 76%.[20] However, our findings are in line with a study conducted in North West Ethiopia at Debre Markos university where the rate of VCT was 58.5%; in the Gambia, 58.4% and in South Ethiopia at Arba Minch university (61.5%).[16,17,21] On the contrary, the findings from similar studies conducted in Bahirdar and Merawi in Ethiopia, and in Tanzania, respectively reported lower rate at 37.8%, 31.5% and 34.6% of respondents who had undergone VCT.[22,23] The possible explanation for these differences could be sample size, the methods or approach used, advocacy and social mobilization of HIV-VCT services.

In this study, religion of respondents was associated with VCT uptake, whereby Roman Catholics and Muslims were more likely to undergo VCT compared to Protestants. This finding is in line with the study done in Ethiopia whereby being a Muslim in urban area was associated with VCT utilization.[24] Moreover another similar study done in Tanzania among church parishioners revealed that shame related to HIV stigma was strongly associated with religious belief that living with HIV/AIDS was a punishment from God for being unfaithful to God's Word.[25] Conversely, a study conducted in Ethiopia showed that religious affiliation of respondents was negatively associated with VCT uptake.[26]

The protestant taught that a good Christian must stay away from sexual activities till the time they become married, and any teaching concerning sexuality was considered a taboo, not to be talked about.[23,25] Age distribution plays an important part in predicting the uptake of HIV testing and counselling. The current study findings have demonstrated that VCT utilization was associated with age, whereby being aged 20 to 24 years had less likelihood of using VCT than those over 24 years. The study is in line with the one done in Tanzania indicated that the utilization of VCT rose with age, due to the increased exposure to VCT and HIV education.[18]

The study findings additionally showed that not having VCT available at the campus was significantly associated with VCT uptake. [27] Accessibility and confidentiality are the prime factors that can influence students to go for HIV testing elsewhere. In some way, this corroborates the findings of a study done in Kenya, in which the majority of respondents thought that the area and structure of the VCT center influenced the utilization of VCT services, although the association was not statistically significant. [20]

### **Strength and limitations**

The strengths of the study is that all the data was collected at once, making participants less likely to drop out. However, there were limitations to this study, including recall bias, given that the students may not have been able to remember everything asked by the questionnaire about factors to VCT services utilization; focused scope of the study involving three out of 17 universities due to constraints of resources, making it difficult to generalize these findings to all the universities. However, the knowledge generated from this study provides insight into the subject of voluntary counselling and testing and associated factors among students in higher institutions of learning, based on which larger studies can be designed and conducted.

## **Conclusions and Recommendations**

The study revealed that VCT uptake was significantly associated with religion and age. Moreover, the study showed that the likelihood of having used VCT services significantly increased with the absence of availability of VCT service on the campus. Therefore, there is need of increasing privacy and confidentiality in matters of VCT, and ensuring that dissemination of information about VCT benefits reaches the students. Furthermore, VCT counselors will require to encourage students who visit the VCT centers to inform their colleagues about the centres and their functions, to attract them to come and know their sero-status.

### **Authors' contribution**

RI designed the study, collected, analyzed, interpreted the data, and wrote the manuscript. ER and MH supervised the study, contributed to data analysis and manuscript writing. All authors have read and approved the manuscript for publication.

### **Funding**

No funding was received to conduct this research.

### **Declaration of conflict of interest**

The authors declare no conflict of interest with regards to this research and authorship of this article.

### **Acknowledgment**

The authors would like to respectively thank Mount Kenya University, Kigali Independent University and university of Rwanda for allowing us to conduct the study. The authors also thank all research assistants and respondents for their time during data collection.

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