



Factors Affecting utilization of HIV counselling and testing services among youth in Rwanda: secondary analysis of 2014/2015 DHS”

*A dissertation submitted in partial fulfillment of the requirements for the degree of
Master of Science in Epidemiology*

College of medicine and health sciences
School of Public Health

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Co-Supervisor:

Francine BIRUNGI, MD, MPH

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DECLARATION

I, IBRAHIM MOUSSA RAMATOU, hereby declare that the thesis is my original work except references cited in this book, and has not been submitted either wholly or in part to any other university, college or institution for any award.

ABSTRACT

Background: Worldwide, youth aged 15–24 years are at a high risk for Human Immunodeficiency Virus (HIV) acquisition and need specifically to be reached by HIV prevention interventions. Among key strategies towards HIV prevention in Rwanda, the Voluntary HIV counseling and testing (VCT) is identified as one of the most important interventions. In order to support the use this important strategy, key factors that contribute to VCT uptake were investigated. The aim of this study is to assess the utilization of VCT services among youth (15-24 years) in Rwanda.

Methods:

A cross-sectional study design using RDHS 2014/2015 data set was used. Data analysis was done using Stata version 13. Bivariate and multivariate logistic regressions were used to identify predictors of VCT uptake. Association with p -value < 0.05 was considered significant.

Results: The findings revealed that VCT uptake was higher among female youth (72%) than male youth (61%). VCT uptake was found to be significantly associated to the older (20-24) age group (OR=3.16; 95% CI= 2.71–3.68), higher education level (OR= 2.40; 95 % CI= 1.99–2.89), residence in rural area (OR=0.68; 95% CI= 0.55-0.84), exposure to mass media at least once a week, having a comprehensive knowledge on HIV/AIDS (OR = 1.59; 95% CI=1.19–2.14), and age at first sexual intercourse (OR=10.93; 95% CI = 6.77-17.66).The VCT uptake decreases with the increase level of the stigma.

Conclusion: VCT uptake among youth in Rwanda is somehow encouraging with 72% among female and 61% among male. The major factors identified for increased VCT service utilization were the older age group (20-24 years), having achieved secondary or higher education level, location of residence, having comprehensive knowledge on HIV/AIDS and late sexual relation (after 15 years old). Therefore, actions are needed to effectively enhance youth knowledge on HIV prevention and VCT services tailored to the specific needs of adolescents.

Keywords: VCT uptake, HIV, youth.

RESUME

Introduction:

Les jeunes de 15 à 24 ans constituent à travers le monde un groupe particulièrement exposé au risque de l'infection au VIH, d'où la nécessité de les cibler à travers les programmes de prévention du VIH. Le Counseling et le Dépistage Volontaire du VIH (CDV) est l'une des stratégies importantes de prévention du VIH au Rwanda. En vue de promouvoir les efforts des programmes de prévention et de contrôle du VIH, il s'avère important d'étudier les facteurs qui contribuent à son utilisation effective. La présente étude vise à évaluer les déterminants associés à l'utilisation des services de CVD par les jeunes âgés de 15 à 24 ans.

Méthodologie:

Une étude transversale a été utilisée, en se basant sur les données de l'enquête démographique de santé (RDHS2014/2015). Ces données ont été analysées grâce au logiciel Stata version 13. Les modèles d'analyse logistique bivarié et multivariée ont permis de déterminer les facteurs prédictifs de l'utilisation du CDV. L'association avec une valeur de $p < 0,05$ a été considérée comme significative.

Résultats:

Les conclusions montrent que le taux d'utilisation des services du CDV est plus élevé chez les femmes (72%) que chez les hommes (61%). L'utilisation des services du CDV par les jeunes présente une association significative avec : l'appartenance au groupe d'âge de 20 à 24 ans, un niveau élevé d'éducation, une exposition aux mass medias plus d'une fois par semaine, le lieu de résidence, une compréhension approfondie du VIH/SIDA, ainsi que l'âge de plus de 15 ans au premier rapport sexuel. L'utilisation du CDV se trouve diminuée en fonction du degré de stigmatisation et de discrimination des jeunes à l'égard des personnes vivant avec le VIH.

Conclusion:

L'utilisation du CDV par les jeunes au Rwanda est prometteuse avec une prévalence de 72% pour les femmes et 61% pour les jeunes hommes. Les facteurs comme l'âge, le niveau d'éducation, le lieu de résidence, une connaissance approfondie sur le VIH/SIDA, le degré de stigma envers les personnes vivant avec le VIH, une vie sexuelle précoce (avant 15 ans) sont les facteurs déterminant l'utilisation des services du CDV par les jeunes. Par conséquent, des initiatives sont requises pour étendre et améliorer les connaissances des jeunes sur la prévention du VIH/SIDA et pour augmenter le nombre de services de CDV adaptés aux besoins spécifiques des adolescents (15-19 ans).

Mots clés : Utilisation des services du CDV, dépistage du VIH, connaissance approfondie sur le VIH/SIDA, jeunes.

DEDICATION

This book is dedicated to my beloved husband, Dr. BOUBACAR SEYBOU. You have broadened my horizons, you particularly inspired me to believe in what I do, encouraged me, and taught me the virtues of hard work and perseverance. This is also dedicated to my son Imrane and my daughter Alya for your love and patience; and I will never forget what you have endured during the time of my studies.

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God Bless You all.

LIST OF SYMBOLS AND ACRONYMS

AIDS:	Acquired Immunodeficiency Syndrome
ART:	Anti-Retroviral Treatment
ASRH:	Adolescent Sexual and Reproductive Health
BSS:	Behavioral Surveillance Survey
DHS:	Demographic Health Survey
HIV:	Human Immunodeficiency Virus
HTC:	HIV Testing and Counseling
IDU:	Injecting Drug Use
MOH:	Ministry Of Health
NISR:	National Institute of Statistics of Rwanda
NSP:	National Strategic Plan
NYP:	National Youth Plan
RBC:	Rwanda Biomedical Center
RDHS:	Rwanda Demographic Health Survey
SSA:	Sub-Saharan Africa
STI:	Sexual Transmitted Infections
UN:	United Nation
UNAIDS:	Joint United Nations Program on HIV/AIDS
UR/SPH:	University of Rwanda/School of Public Health
VCT:	Voluntary HIV Counseling and Testing
WHO:	World Health Organization
YFS:	Youth-friendly Services

TABLE OF CONTENTS

DECLARATION	i
ABSTRACT	ii
RESUME	iii
DEDICATION	iv
ACKNOWLEDGEMENTS	v
LIST OF SYMBOLS AND ACRONYMS	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	viii
LIST OF FIGURES	ix
DEFINITION OF KEY TERMS	1
CHAPTER 1: INTRODUCTION	2
1.1. Context and problem statement	2
1.2 Rationale of the study	4
1.3. Research objectives.....	5
1.4. Research questions:.....	5
CHAPTER 2. LITERATURE REVIEW	6
2.1 HIV prevalence among youth	6
2-2. Sexuality and vulnerability of youth	6
2-3. VCT services utilization	8
2-4. Accessibility and quality of VCT services	9
CHAPTER 3. METHODOLOGY	12
3.1 -Study design	12
3.2 -Sampling (RDHS 2015) and study population	12
3.3. Variables	12
3.4. Data analysis	13
3.5. Ethical considerations	14
CHAPTER 4: RESULTS	15
4.1. Background characteristics of study population	15
4.2. Multivariate logistic regression analysis.....	22
CHAPTER 5. DISCUSSION	25
STUDY LIMITATIONS	29
CONCLUSIONS	30
RECOMMENDATIONS	31
REFERENCES	32

APPENDICES	36
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LIST OF TABLES

Table 1: socio-demographic characteristics of youth, RDHS 2015	16
Table 2: socio-demographic characteristics of youth, RDHS 2015 (continued).....	17
Table 3: socio-demographic variables versus VCT uptake of youth, RDHS 2015	19
Table 4: Knowledge and attitudes to HIV /AIDs and VCT uptake of youth, RDHS 2015.....	20
Table 5: Sexual risky behaviors and VCT uptake of youth, RDHS 2015.	21
Table 6: Association between VCT uptake and independent variables, by gender.	23

LIST OF FIGURE

Figure 1: conceptual framework.....	11
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DEFINITION OF KEY TERMS

HIV: HIV stands for Human Immunodeficiency Virus leading if untreated, to the disease, Acquired Immunodeficiency Syndrome (AIDS).

VCT: According to World Health Organization (WHO) proposed a formulation that Voluntary HIV Counseling and Testing (VCT) is a client-initiated testing; an intervention that informs individuals on their serostatus and helps them to get access to appropriate health care services.

Youth: “youth” are defined as persons between the ages of 15-24 (United Nation definition). In Rwanda, youth are defined as people aged 14-35 years according to the National Youth Policy (NYP). However, Rwanda adopted the terms of old adolescents (15-19 years) and young adults (20-24 years) taking into account the definition of WHO (def) for the purpose of its Adolescent Sexual and Reproductive Health (ASRH) Policy and Strategic Plan (2011). That policy aims to provide sexual and reproductive health information, education and HIV prevention services to this subgroup of the population.

Accordingly, youth in this study refers to people aged 15-24 years as we investigate the VCT services uptake among this age-group who represent a large proportion of the Rwandan population as well as people at high risk of HIV.

Youth-friendly services: “YFS” refers to high-quality services that are relevant, accessible, attractive, affordable, appropriate and acceptable to young people, in order to fulfill their sexual and reproductive health rights. The services are provided as minimum health package.

CHAPTER 1: INTRODUCTION

1.1. Context and problem statement

Globally in 2015, there were an estimate 36.7 million [34.0 million-39.8 million] people with HIV, 2.1 million [1.8 million-2.4 million] new infections and 1.1 million [940 000-1.3 million] AIDs-related deaths (1). Yet HIV/AIDS remains one of the most serious challenges to global public health. There were globally 4 million youth living with HIV and they represent 35% of new HIV infections, with 1,500 young people around the world acquiring HIV every day (2).

Many efforts have been made to control the HIV epidemic worldwide through prevention, treatment and care interventions. In 2015, new infections have fallen by 6% since 2010 and AIDS related deaths decreased by 45% since 2005 (1). Despite important gains in preventing new HIV infections, Sub-Saharan Africa (SSA) remains the hardest hit region. Although SSA accounts for only 12 percent of the world's population, approximately two-thirds of people living with HIV reside in this region accounting for 71 % of the total of people living with HIV(2). There are 2.9 million youth living with HIV in SSA and 80 % of young women aged 15-24 living with HIV(1). There has been a decrease in the incidence of HIV infection among youth; new HIV infections have declined by 42% since 2001 and by 17% since 2010 (2) . In spite of this, one out of six deaths among adolescents in Africa is due to HIV (2). This is mainly attributed to limited access to sexual health advice, low condom use and knowledge on HIV/AIDS(2). That is why youth constitutes the target group of most HIV programs

in Africa particularly. HIV prevention policies must focus on young people particularly in SSA where many countries have large part of population constituted by young people and general HIV prevalence rates often are high (3) ; this study (3) revealed also that most of the countries with the highest HIV prevalence rates in the world are in Southern Africa. (e.g., in Swaziland, the highest rates in the world, over 26% in 2012; 7% in Uganda;19.1% in South Africa).

In Rwanda HIV/AIDS epidemic continues to be a major development challenge with an estimated overall prevalence of 3% (Rwanda Demographic Health Survey RDHS 2014/2015); HIV prevalence among youth is 0.6% and 1.5 % among 15-19 and 20-24 age groups respectively (RDHS 2014/2015), Like many developing countries, Rwanda's population as a whole is quite young. According to the Rwanda Population and Housing Census (RPHC,

2012)(4), one in two persons is under 19 years old, with 22.7 years as the median age of the population. The age category of young people 14-19 years and 20-24 years were ranked the most highly vulnerable to HIV(5) (6).

Rwanda HIV National Strategic Plan considered youth among key population and vulnerable groups who play an important role in the dynamic of HIV in Rwanda(6) .

SSA is the world's youngest region with an estimate of 200 million people aged between 12-24 years; thus, youth represent the future of these nations (7,8). By addressing determinants that put young people at risk of HIV and other sexually transmitted infections (STIs), we can create a powerful force for economic development and positive change across all societies(8-11).

At any rate, young people are at the forefront of the HIV/AIDS epidemic especially in SSA, because of their vulnerability (7, 10) due to the strong influence of transition in the development of their sexual and social identities (transition from childhood to adulthood). They are also at risk of HIV infection due to their engagement in unsafe sex, drug use, or others unsterilized skin-piercing procedures (7). Thus, youth need information and tools to protect themselves against HIV and to live positively for those who are living with HIV infection– which tools include, HIV voluntary counseling and testing (VCT) and furthermore treatment (7).

HIV testing was clearly shown to be a key entry point for HIV/AIDS prevention, care and support (7, 10). People's knowledge of their HIV status is considered as an important motivating factor for behavior change and a critical linkage to care, treatment, and support services for infected individuals. Knowledge of HIV status helps HIV-negative individuals make specific decisions to reduce risk and increase safer sex practices so that they can remain free of disease. For those who are already infected with HIV, knowing their status allows them to take action to protect their sexual partners, to seek treatment, and to plan for future healthy behaviors. Due to the increasing availability of Anti-Retroviral Treatment (ART) (1,2,7), early diagnosis can reduce transmission and improve health outcomes, thereby decreasing HIV incidence and HIV-related morbidity and mortality (8). Discovering HIV infection at its stage of AIDs symptoms can decrease chance for success in the treatment.

In Rwanda, like many countries in SSA, VCT is among HIV key prevention interventions implemented to reduce the spread of epidemic and youth are among of the targeted group.

Rwanda started VCT in 2001(9) and it was integrated in public and private health facilities; Services are offered free of charge at all public health accredited facilities in Rwanda.

HIV prevention policies must focus on the youth in order to control the spread of the infection; substantial utilization of VCT services by youth should be among prevention strategic priorities.

1.2 Rationale of the study

Although HIV testing is recognized to be a key prevention policy(7)(10) , access and uptake of HIV testing and counseling (HTC) by young people is significantly lower than that of adults in general. Evidence data show that only about 45% of people living with HIV in SSA know their status (11). In 2013, only 10% of young men and 15% of young women (15–24 years) were aware of their HIV status in SSA (8).

Since the start of VCT in Rwanda 2001 until 2013, 493 centers providing VCT were created across the country (9,12). This significantly increased the rate of VCT services delivery in the population. Also, outreach HTC campaigns were regularly carried out at community level to overcome geographical accessibility and to reach key population at risk of transmitting or acquiring HIV infection. Despite these various efforts made by Rwanda government, VCT uptake among young people is low regarding the overall prevalence (85%) in Rwanda. According to the 2015 RDHS, 65% of young women (aged 15–24 years) and 56% of young men (aged 15–24 years) had ever been tested for HIV. VCT programs have the objective (2013- 2018 strategic plan) to reach all young people never tested for HIV(6). The age group 15-24 years has the highest percentage of never tested (28% for females and 38.8% for males) and this age group represents also a key population for altering the course of HIV epidemic. Studies undertaken to capture the factors affecting VCT utilization among youth in Rwanda are limited. By using RDHS 2014/2015 data, the current study seeks to examine the factors that are associated with the utilization of VCT among youth. The aim is to assess the utilization of VCT services among youth (15-24 years) in Rwanda and to inform future VCT programs. This study will contribute to government efforts to strengthen HIV and STIs prevention and control programs among young people, and mainly among young women.

1.3. Research objectives

Main objective

The main objective of this study is to assess the utilization of VCT services among youth in Rwanda.

Specific objectives

-To assess the level of HIV/AIDS related knowledge, stigma and sexual risky behavior among youth in Rwanda.

-To investigate potential factors that influence the VCT utilization.

1.4. Research questions:

1. Is VCT uptake among youth in Rwanda associated with the level of HIV/AIDS related knowledge?
2. Is VCT uptake among youth in Rwanda associated with the level of stigma towards people living with HIV?
3. Is VCT uptake among youth associated with sexual risky behaviors?

CHAPTER 2: LITERATURE REVIEW

2.1 HIV prevalence among youth

More than thirty years into the HIV/AIDS pandemic, the number of people newly infected with HIV is declining in most parts of the world and the total number of AIDS related deaths has been declining over the past decade (2). Despite important gains in preventing new HIV infections, HIV epidemic in SSA remains a public health challenge and young people are most affected.

In the United States, AIDS is the leading cause of death among African-American youth (2). The populations most at risk for HIV are young African American gay social groups. In 2014, young people aged 13-24 accounted for an estimated 22% of all new HIV diagnosed and most of them occurred among young gay and bisexual males (13). Study conducted in Uganda (14) showed that young women had higher HIV prevalence than men (2.8% in 15–19 year olds and 6.3% in 20–24 years). They were also at greater risk for HIV acquisition than men, particularly among 15–19 year-olds (14). Surveys conducted in the European Union (EU) and neighboring countries showed that HIV infection continues to significantly contribute to morbidity and mortality (15).

Rwanda is yet challenged with the burden of HIV with overall prevalence rate of 3% and incidence of 0.27%. Youth account for 0.24% of new infection in the country (16). Data from 2015 RDHS show a significant difference in HIV prevalence between 15-19 year olds (0.6%) and 20-24 year olds (1.5%). Female youth are significantly more likely to be infected than their male peers; among 15-19 years, 0.9% of females and 0.3% males are HIV positive, while among female and males 20-24 year olds, 1.8% and 1%, respectively, are infected.

2-2. Sexuality and vulnerability of youth

Globally, there is an estimated 1.2 billion adolescents (10–19 year-olds), constituting 18% of the world's population (17). There are about 2.2 million (60% of them, female) living with HIV and many are unaware of their infection (17). Available evidence from studies shows that out of 36.9 million people living with HIV globally, 17 million are not aware that they have the virus and need to be reached by VCT services (18).

In her Master thesis, Ahayo Marie A. (2011) found that Age represents a determinant of HIV risky behaviors among youth, particularly in Rwanda. Adolescence (10-19 years) is the period when many people begin to explore their sexuality; it is typically a period of experimentation, new experiences, and vulnerability (3). During this period of their life, young people develop an increased interest in sex, with concomitant risks for STIs, and HIV if unprotected. Some adolescents may experiment with injecting drugs, unsterilised skin-piecing procedures and other sexual orientations (e.g men having sex with men).

Millions of young people who are becoming sexually active live in countries with a high burden of HIV(3). A study (19) using data collected from DHS/AIS surveys in 24 SSA countries showed that the proportion of 15-19 years olds who reported having sex before 15 years varies considerably, ranging from 2% to 27% for males and 5% to 26% for females. There is in general a larger proportion of females who have early sex (before 15 years) than males specifically in West African countries comparing to the others region of Africa (Central, Eastern and Southern) and commonly less educated females were significantly more likely to report early sex than educated females (19) .

Study conducted in Uganda found that in young men and women, incidence rates were high among youth with the greatest number of partners in the last 12 months(14). Also evidence from study showed (19) that in almost all countries in SSA, a higher proportion of youth in urban than in rural areas reported multiple partners. Survey conducted in Rwanda revealed that young people have a hunger for information on sexuality and reproductive health (20); this lead them to make unhealthy decision about sexuality.

In Rwanda, Behavioral Surveillance Survey (BSS) (21) showed that the median age at first intercourse was 16 and 17 years for males and females respectively. Thirty one percent of adolescent and young adults aged 15-25 years reported ever having sex which is a major risk to HIV plus STIs if unprotected. From the same survey (22), only 29% (overall) of youth reported a consistent use of condom in the last 12 months, and among those who ever heard about HIV/AIDs, 30% reported consistent use of condom in the 12 months prior to the survey. Furthermore, up to about half of young women and young men who had had sexual intercourse in the past 12 months had not been tested for HIV (only 59% females and 55% males respectively were tested and received their test results).

WHO recognized the promotion of sexual and reproductive health among youth as essential to reverse HIV epidemic and furthermore for development in general. Thus, youth provides a window of opportunity in which to intervene earlier to control the spread of HIV (2, 23).

2-3. VCT services utilization

VCT for HIV is now recognized within the international arena as an effective and essential strategy for HIV prevention and AIDS care (23, 24). WHO has identified inadequate access to HTC as a contributing factor to AIDS-related adolescent deaths, most of which occur in sub-Saharan Africa (23). Many studies have demonstrated cost-effectiveness of VCT as a sexual behavior-change intervention (22,25). Literature has shown that high-quality counseling and knowledge of HIV status helps individuals assess their level of risk, to reduce their risk, and increase safer sex practices (24, 26).

Studies among African youth have shown that even when youth are aware of HIV/AIDS and of the existing VCT sites, and even when a majority of the youth have a strong interest in knowing their HIV status, only a few go for the actual HIV testing (25). The reasons given for not testing are mostly age, education, sex, inaccurate risk perception, fear of stigma and discrimination. Developed countries are not exempt from the problem: a British nationwide survey (27) found low uptake of VCT among youth. Among 16-24 year olds, 6.8% of men and 5.4% of women reported voluntary HIV testing within the past 5 years (26). In the European Union (EU) and neighboring countries, HIV/AIDS, of all infectious diseases, has one of the highest morbidity and mortality rates (15). The same survey (15) estimates that 30% of people living with HIV are unaware of their serostatus, and may therefore not benefit from timely treatment or may spread the infection to others, unknowingly.

In Uganda, VCT represents a core intervention in the government strategy to address HIV/AIDS epidemic. Although several VCT sites have been set up in almost all health units across the country, utilization remains lower than projected (24). This study tried to understand the reasons of that low utilization and found that almost all participants were generally well aware of HIV/AIDS, its spread and prevention, but this knowledge was not translated into high VCT use and there was limited knowledge of the benefits of testing for HIV. Research findings from Ethiopia(11,25) revealed also low VCT services utilization and evidence from Ethiopia Demographic Health Survey (EDHS 2011)(27) shows that only 38.2% of youth were counseled and tested for HIV.

In South Africa ,with over six million people living with HIV, the incidence of HIV among youth is estimated at 1.5% (28). This led the government to conduct an extensive national social and behavioral change communication and national VCT campaigns in 2010. These campaigns increased significantly the use of condom, HIV awareness and voluntary testing, especially among youth (29). Despite all interventions, survey undertaken in 2013(30) reported that HIV testing uptake still remains low at 52.2%. The study (30)indicated also that youth low levels of perceived HIV risk, fear of stigma, lack of communication and confidentiality are the reasons for not testing for HIV. Although the majority of youth advocated for the importance of HIV testing, some young people intimated that it is only for those showing symptoms of AIDS, rather than for healthy individuals (29, 30).

Evidence is shown between the high level of HIV testing uptake among youth and the reduction of HIV incidence and AIDS-related mortality (31-33). Youth who do not know that they are infected with HIV are unlikely to seek ART, and their diagnosis may be substantially delayed until they experience symptoms of advanced HIV disease. This may reduce chances of success of treatment.

2-4. Accessibility and quality of VCT services

Access and coverage of VCT vary considerably across countries and regions (31). Due to the lower access of VCT by youth, WHO and UNAIDs recommend guidelines for expanding access to VCT services particularly for youth in different epidemic settings. Countries are expected to discuss service delivery approaches that would be effective and acceptable to increase the uptake (8,20).

Many countries are now acknowledging the importance of targeting youth in their HIV prevention and care strategies (specifically in SSA) and include wider access of VCT services for youth in their agenda. In this way, the Ugandan government has made serious efforts to improve VCT service accessibility, acceptability, and utilization for all. Several VCT units have been set up in almost all health facilities. Despite this, VCT uptake remains low. For instance, a study was carried out in communities of Wakiso District in Uganda (24) aiming to understand VCT uptake barriers, found that fully VCT services accessibility, acceptability, and utilization were dependent of government involvement in terms of resource allocation, funding for VCT services and improving advocacy for VCT leaders. In this study, others

barriers include the quality of service delivery by staff and consideration of the characteristics of target groups in terms of their knowledge attitudes and perception towards VCT services.

In Kenya, a study(34) conducted to understand factors of VCT low uptake found that most VCT clients have shortcomings including geographical access, stigmatization, inadequate skilled service providers, lack of anonymity and confidentiality which might hinder the utilization of VCT services especially by youth. The challenges in accessing VCT services require a dialogue with various stakeholders in providing VCT services to the youth, by changing services provision and information dissemination strategy on VCT.

Rwanda also made VCT a core intervention and implemented it throughout all the country in the framework of the National Strategic Plan (NSP 2013-2018) on HIV-AIDS Prevention; the goal was to identify people living with HIV at early stage of infection and enroll them into care and treatment services and to encourage those tested negative to keep using prevention strategies and remain HIV free. Thus, the percentage of health facilities offering VCT services rose to 98%, compared to only 43% in 2009 (33), which increased significantly geographical access coupled with improvements in the quality of services delivery. VCT providers in health facilities are trained to provide adapted services to key populations and other vulnerable groups with specific needs especially for youth by creating **youth-friendly services**. However, only 23 youth-friendly services centers were created in 21 districts. Therefore, currently, the major issue that affects youth accessibility to VCT is lack of special youth-friendly services tailored to the needs and status of youth (34).

Rwanda faces also the challenge (36,37) of increasing the quantity and quality of youth friendly center services, technical and financial support for anti-AIDS clubs, for in-school and out-of-school youth, training healthcare providers for these youth-friendly services in health facilities; extending mobile VCT to reach young people and others key populations and targeting most vulnerable youth with high risk behaviors (particularly out-of school youth).

With this study, we will seek to determine factors associated with the utilization of VCT services by youth and the results will add insight to the policy in HIV and STIs prevention in Rwanda.

Conceptual framework

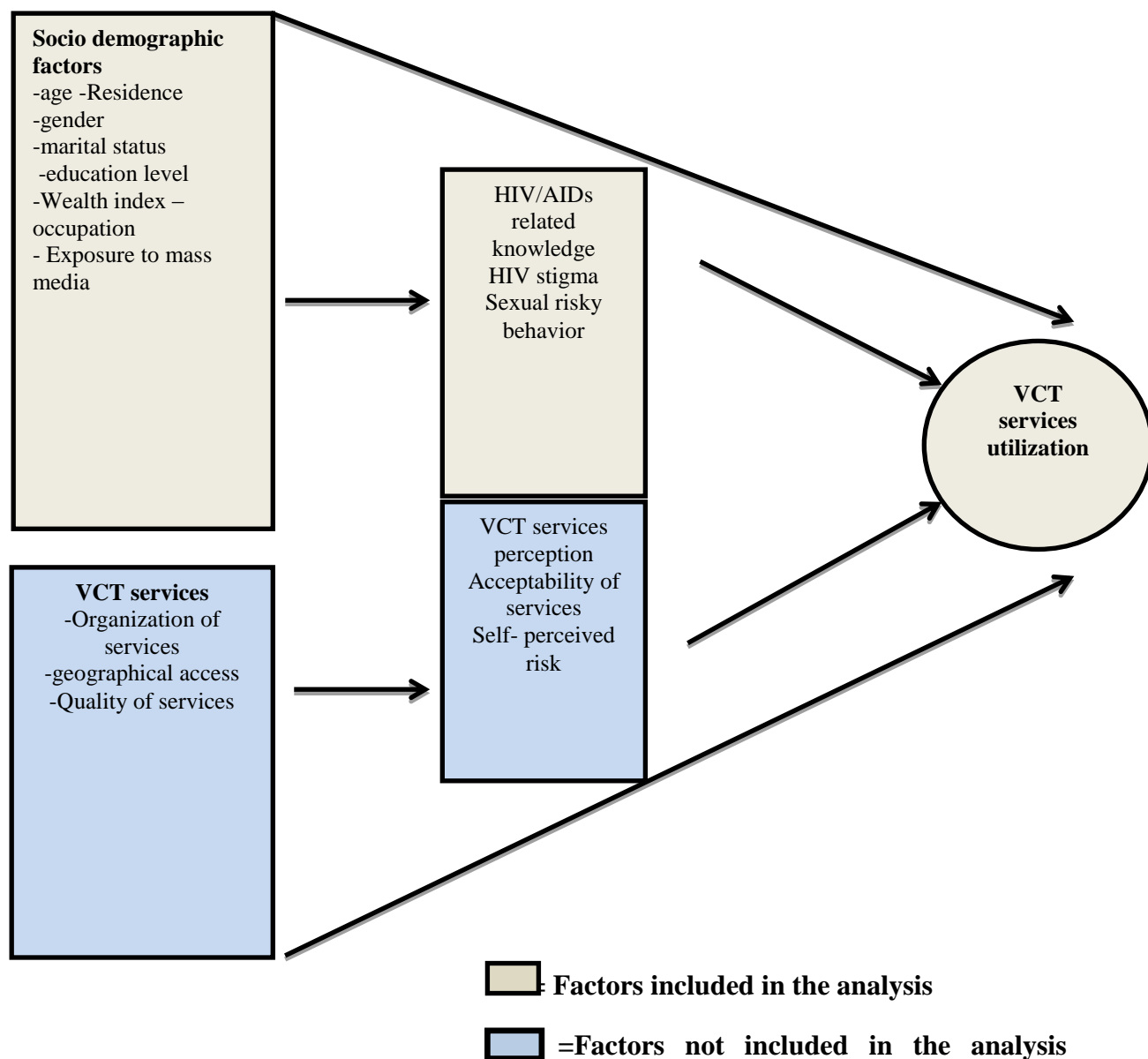


Figure 1: conceptual framework

CHAPTER 3: METHODOLOGY

3.1 -Study design

This is a cross-sectional study using the 2014-15 Rwanda Demographic and Health Survey. 2015/RDHS is a nationally representative survey implemented by the National Institute of Statistics of Rwanda (NISR) from November 9, 2014, to April 8, 2015 which aims to provide population and health indicator estimates at the national and district levels.

3.2 -Sampling (RDHS 2015) and study population

RDHS is a household-based survey. The sampling method used was stratified two-stage cluster sampling. The first stage consisted of selecting clusters (enumeration areas) from each stratum (district). The second stage was a systematic sampling of households from each cluster selected. Then, selected households were visited and interviewed. Representative sample of 12,699 households were selected and from these households, 13,497 women age 15-49, and 6,217 men age 15-59 were eligible for the individual interview and data were collected on the knowledge and attitudes of women and men regarding HIV and STIs, evaluation of recent behavioral changes with respect to condom use, and HIV testing. Our study analysis will consider only a sample of 5,252 women and 2,280 men aged 15-24, interviewed during the survey.

3.3. Variables

Dependent variable

The outcome for this study is VCT utilization.

The independent variables:

- **Socio-demographic factors:** age group, marital status, education level, residence, religion, wealth index and exposure to mass media.
- **Knowledge and attitudes to HIV/AIDs:**
 - “**Comprehensive knowledge**” (RDHS)(35) on HIV defined as knowing simultaneously that: a healthy looking person can have the AIDS virus; rejecting the following common local misconceptions about HIV/AIDS transmission (transmission

by mosquito bites, witchcraft or supernatural means and sharing food with HIV infected person); knowing that consistent use of condom during sexual intercourse and having just one uninfected faithful partner can reduce the chance of getting the AIDS virus

- “**Basic knowledge**” (36) on HIV defined as knowing simultaneously that: a healthy looking person can have the AIDS virus; rejecting the two following most common local misconceptions about HIV/AIDS transmission: transmission by mosquito bites and sharing food with HIV infected person.

- Having stigmatization towards persons living with HIV, “**stigma index**” is constructed using four standard questions: willingness to care if a relative becomes ill with HIV; willingness to buy fresh vegetable from vendor who has the HIV virus; allowing female teacher infected with HIV, but not sick, to continue teaching ; and keeping secret about a family member infected with HIV virus. The scores will be categorized into four groups: none (0), low (1-2), moderate (3) and high (4) stigma.

- **Sexual risky behavior:** age at first intercourse (less than 15 years or after), having multiple sexual partners (more than one sex partner in the last 12 months), condom use, antecedents of STIs during last 12 months.

3.4. Data analysis

Stata version 13 was used to perform data analysis by considering sampling weight and clustering. First descriptive statistics was generated to characterize the study sample and to find prevalence of HIV/AIDS related knowledge, stigma and sexual risky behaviors by gender. After, bivariate and multivariate analysis techniques were applied to examine the association. At bivariate level, analysis was made by the chi square (X^2) test for categorical variables. The association between dependent (ever been tested for HIV) and independent variables is measured by means of odds ratio for which 95% confidence interval will be calculated. Variables that showed statistically significant association ($p < 0.05$) were analyzed at multivariate level in a stepwise logistic regression model. Hosmer-Lemeshow test was used to check the goodness fit of the final model, presented as adjusted model with odds ratios, corresponding p-values and 95% confidence intervals.

3.5. Ethical considerations

This study is a secondary analysis of the 2015 Rwanda Demographic Health Survey and thus, ethical approval was already obtained by NISR. Access to data was obtained from DHS online program/ICF INTERNATIONAL (archive@dhsprogram.com). Approval mail is enclosed in appendix.

CHAPTER 4: RESULTS

4.1. Background characteristics of study population

➤ Socio-demographic characteristics

A total of 7,532 respondents aged 15-24 were included in the analysis. Table 1 shows socio-demographic characteristics of youth by gender. The majority of respondents were 15 – 19 years old (56% for men and 53% for women) and living in the rural areas (73%). Christians make the higher proportion of respondents (84%), followed by Adventists (11%) and Muslims (2%). Nearly 80% of women and 93% of men are singles while the remaining are mainly married or living with partner. Only 40% of youth (in both genders) attended the secondary or higher educational level.

Table 1: socio-demographic characteristics of youth, RDHS 2015

Respondents Characteristics	Total (N=7532)		Women (5,252)		Men (2,280)	
	N	%	N	%	N	%
Age group						
15-19	4,060	53.90	2,779	52.91	1,281	56.18
20-24	3,472	46.10	2,473	47.09	999	43.82
Residence						
Urban	2,026	26.90	1,442	27.46	584	25.61
Rural	5,506	73.10	3,810	72.54	1,696	74.39
Religion						
Christianism	6,396	84.92	4,499	85.76	1,897	83.20
Adventists	839	11.13	583	11.11	256	11.23
Muslim	197	2.62	118	2.25	79	3.46
Others	93	1.23	46	0.88	47	2.06
Marital status						
Never in union	6,283	83.42	4,178	79.55	2,105	92.32
Married or living with Partners	1,093	14.51	926	17.63	167	7.32
Widowed or divorced or no longer living together /separated	156	2.07	148	2.82	8	0.35
Education attainment						
Less than secondary	4,500	59.75	3,110	59.22	1,390	60.36
Secondary +	3,032	40.25	2,142	40.78	890	39.04
Occupation						
Unemployed/self employed						
Agriculture	5,006	66.45	3,719	70.81	1,287	56.45
Employed	2,512	33.35	1,524	29.02	988	43.33
Wealth index						
Poor	2,425	32.20	1,774	33.78	651	28.55
Middle	1,350	17.88	921	17.54	426	18.68
Rich	3,760	49.92	2,557	48.69	1,203	52.76
Exposure to mass media						
Less than once a week or not at all	2,012	26.71	1,575	29.99	437	19.17
At least once a week	5,520	73.29	3,677	70.01	1,843	80.83
HIV basic knowledge						
Yes	5,665	75.21	3,994	76.05	1,671	73.29
No	1,838	24.40	1,235	23.51	603	26.45
HIV comprehensive knowledge						
Yes	4,796	63.67	3,335	63.50	1,461	64.08
No	2,707	35.94	1,892	36.02	815	35.75
HIV stigmatization index						
None	3,601	48.00	2,350	44.74	1,251	55.01
Low	3,623	48.20	2,665	50.74	958	42.13
Moderate	248	3.30	192	3.66	56	2.46
High	38	0.50	29	0.55	9	0.40

➤ **HIV/AIDS related knowledge and stigmatization**

Three out of four youth had good basic knowledge about HIV/AIDS (75% of women and 73% of men) while slightly less proportion of youth (63.50 % of women and 64.08 % of men) had comprehensive knowledge about HIV/AIDS. However, only 45% of women and 55% of men had no stigma towards people living with HIV; further more women present higher levels of stigma (low: 51%, moderate:4% and high:0.55%) compared to men (low:42%, moderate:3% and high:0.40%). Almost all youth reported that they knew a place where they could get tested for HIV (98.61 % of women and 90.09% of men).

Table 2: socio-demographic characteristics of youth, RDHS 2015 (continued).

Knowing where to get HIV test							
Yes	7,233	96.03	5,179	98.61	2,054	90.09	
NO	128	1.70	64	1.22	64	2.81	
Age at first sex intercourse							
<15	509	6.76	263	5.01	246	10.79	
>=15	2,504	33.24	1,869	35.59	635	27.85	
Number of sex partners							
<=1	7,463	99.08	5,220	99.39	2,243	98.38	
>1	69	0.92	32	0.61	37	1.62	
Condom use							
Yes	528	17.52	313	14.68	215	24.40	
No	2,018	26.80	1,690	79.27	328	37.23	
STIs antecedents							
Yes	100	1.33	89	1.69	11	0.48	
No	7,412	98.40	5,147	98.00	2,265	99.34	

➤ **Sexual risky behavior**

Less than one percent of female youths (0.61%) reported having more than one sexual partner in the 12 months prior to the survey while the male youths reported almost two times of such proportion (1.62%). Similarly, the proportion of male youths (11%) who started sex intercourse before the age of 15 years is two times higher than that of female counterpart (5%). Only 25% of male and 15% of female youths who ever had sex reported a consistent use of condom during last sex with the most recent partner.

4.2. Bivariate analysis

➤ **VCT uptake by socio-demographic factors**

Table 2 shows that VCT uptake among females was higher than males (72% for females and 61% for males). When comparing the two age groups, there is higher prevalence for both gender among 20-24 years age group (88% for females and 78% for males). Further, being married, divorced, widowed or separated were associated with greater VCT uptake (more than 96% for both genders). More educated (secondary and high) female and male youths were more likely to test for HIV than less educated males and females youths.

Table 3: socio-demographic variables versus VCT uptake of youth, RDHS 2015

Variables	Ever been tested for HIV							
	Women				Men			
	N	YES (%)	OR	95%CI	N	YES(%)	OR	95%CI
Age group								
15-19	1,622	58.37	1		624	48.71	1	
20-24	2,178	88.21	5.34	(4.62, 6.16)	775	77.58	3.64	(3.03-4.38)
Total	3,800				1,399			
Residence								
Urban	1,110	77.03	1		400	68.49	1	
Rural	2,690	70.66	0.72	(0.62-0.83)	999	58.90	0.66	(0.54-0.81)
Total	3,800				1,399			
Marital status								
Never in union	2,747	65.75	1		1,229	58.20	1	
Married or living	907	98.37	31.50	(18.83-52.68)	163	97.60	29.05	(10.72-78.67)
Widowed/ divorced	146	98.65	38.03	(9.40-153.79)	7	87.50	4.99	(0.61-40.69)
Total	3,800				1,395			
Occupation								
Unemployed	2,644	71.13	1		766	59.52	1	
Employed	1,147	75.36	1.24	(1.08-1.42)	629	63.66	1.19	(1.00-1.41)
Total	3,781				1,395			
Education attainment								
Less than secondary	2,063	66.40	1		740	53.24	1	
Secondary+	1,737	81.13	2.18	(1.91-2.48)	659	74.04	2.51	(2.09-3.01)
Total	3,800				1,399			
Wealth index								
Poor	1,225	69.13	1		380	58.37	1	
Middle	667	72.50	1.18	(0.98-1.40)	267	62.68	1.20	(0.93-1.54)
Rich	1,908	74.65	1.31	(1.14-1.50)	752	62.51	1.19	(0.98-1.44)
Total	3,800				1,399			
Exposure to mass media								
Less than once a week or not at all	1,074	68.32	1		226	51.72	1	
At least once a week	2,726	74.16	1.33	(1.17-1.51)	1,173	63.65	1.63	(1.32-2.02)
Total	3,800				1,399			

VCT uptake by HIV/AIDS related knowledge and stigma

The results in Table 3 show that VCT uptake increased significantly with increased level of HIV/AIDS related knowledge (basic and comprehensive knowledge). Although almost all

youth know where to get HIV test, this is not translated into high uptake particularly for males (73% for females and 60% for males).

Table 4: Knowledge and attitudes to HIV /AIDs and VCT uptake of youth, RDHS 2015

Variables	Ever been tested for HIV							
	Women				Men			
	N	YES(%)	OR	95%CI	N	YES(%)	OR	95%CI
HIV basic knowledge								
No	793	64.31	1		331	54.89	1	
Yes	2,995	75.03	1.67 (1.44-1.91)		1,065	69.73	1.44 (1.20-1.74)	
Total	3,788				1,396			
HIV comprehensive knowledge								
No	1,249	66.09	1		443	54.36	1	
Yes	2,536	76.09	1.63 (1.38-1.88)		954	65.30	1.58 (1.33-1.88)	
Total	3,785				1,397			
HIV stigmatization Index								
None	1,814	77.22	1		817	65.31	1	
Low	1,893	71.11	0.73 (0.64-0.82)		556	58.04	0.76 (0.62-0.87)	
Moderate	78	40.63	0.20 (0.15-0.27)		22	39.29	0.34 (0.20-0.60)	
High	12	41.38	0.21 (0.10-0.44)		3	50.00	0.27 (0.07-1.07)	
Total	3,797				1,398			
Knowing place to get HIV test								
Yes	3,800	73.39			1,242	60.47		
No	0	0.00			0	0.00		
Total	3,800				1,242			

VCT uptake by sexual risky behaviors

Youth who started sex intercourse before 15 years old (Table 4) were less likely to use VCT than those who started after 15 years old in both genders (60.36% for women and 54.04% for men vs 94.26% and 80.31%). Additionally, youth with multiple partners were more likely to be tested for HIV for both genders. However, female youths with STIs antecedents were more likely to be tested for HIV than their counterpart.

Early age at sex debut and having multiple sex partners were important sexual risky behavior associated with VCT uptake in both genders. Condom use and antecedents of STIs showed association with VCT uptake only for females.

Table 5: Sexual risky behaviors and VCT uptake of youth, RDHS 2015.

Variables	Ever been tested for HIV							
	Women				Men			
	N	Yes(%)	OR	95%CI	N	Yes(%)	OR	95%CI
Age at first sex intercourse								
<15	173	65.78	1		137	55.69	1	
>=15	1,758	94.26	8.55 (6.20-11.78)		510	80.31	3.25 (2.36-4.47)	
Total	1,931				647			
Use of condom								
No	1,362	80.78	1		238	72.56	1	
Yes	281	89.78	2.09 (1.42-3.07)		167	77.67	1.32 (0.88-1.97)	
Total	1,643				405			
Number of sex partners								
<=1	3,770	72.28	1		1,368	61.00	1	
>1	30	93.75	5.75 (1.37-24.12)		31	83.78	3.30 (1.37-7.96)	
Total	3,800				1,399			
STIs antecedents								
No	3,708	72.10	1		1,389	61.32	1	
Yes	81	91.01	3.92 (1.89-8.12)		8	72.73	1.58 (0.48-5.16)	
Total	3,789				1,397			

4.2. Multivariate logistic regression analysis

Women

The results of multivariable logistic regression by gender presented in Table 5 showed that socio-demographic factors independently associated with increased VCT uptake among women were: 20–24 years age group (OR = 3.16; 95% CI= 2.71–3.68); attainment of secondary or higher education level (OR =2.87; 95% CI= 2.48–3.31); being married or living with partner (OR= 23.73; 95% CI= 14.05-40.07), being divorced or widowed (OR= 32.37; 95% CI 7.98-131.19). Rural residence is a hindrance of VCT uptake (OR = 0.81; 95% CI=0.70-0.95)

The odds of VCT uptake among women with comprehensive HIV/AIDS knowledge were 1.30 (95% CI= 1.08-1.57) times higher than those with no HIV/AIDS comprehensive knowledge. The uptake of VCT among women with high level of stigma towards people living with HIV was significantly lower (OR = 0.24; 95 % CI=0.11–0.51) in comparison with those who showed positive attitudes. Compared to youth females with age at sexual debut before 15 years, those who were older at sexual debut (after 15 years) had higher odds (OR=10.93; 95% CI = 6.77-17.66) of HIV testing. Youth females who reported condom use during sexual intercourse were less likely to test for HIV (OR= 0.51 95% CI= 0.31-0.85) than those who did not use.

Having basic knowledge of HIV, multiple partners or STIs antecedent were not associated with increased uptake of VCT among youth females.

Table 6: Association between VCT uptake and independent variables, by gender.

Variables	Women		Men	
	<i>Unadjusted</i>	<i>Adjusted</i>	<i>Unadjusted</i>	<i>Adjusted</i>
	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
Age group				
15-19	1	1	1	1
20-24	5.34 (4.62- 6.16)	3.16 (2.71- 3.68)	3.64 (3.03- 4.38)	2.82 (2.33- 3.42)
Residence				
Urban	1	1	1	1
Rural	0.72 (0.62-0.83)	0.81 (0.70- 0.95)	0.66 (0.54- 0.81)	0.68 (0.55- 0.84)
Marital status				
Never in union	1	1	1	1
Married or living	31.50 (18.83- 52.68)	23.73 (14.05-40.07)	29.05 (10.72- 78.67)	16.34 (5.98-44.)
Widowed / divorced/	38.03 (9.40- 153.79)	32.37 (7.98-131.19)	4.99 (0.61-40.69)	2.62 (0.32- 21.08)
Education attainment				
Less than secondary	1	1	1	1
Secondary+	2.18 (1.91-2.48)	2.87 (2.48-3.31)	2.51 (2.09- 3.01)	2.40 (1.99- 2.89)
Exposure to mass media				
Less than once	1	1	1	1
At least once	1.33 (1.17-1.51)	1.21 (1.05-1.41)	1.63 (1.32-2.02)	1.39 (1.12-1.72)
HIV Basic knowledge				
No	1	1	1	1
Yes	1.67 (1.44-1.91)	1.19 (0.97-1.47)	1.44(1.20-1.74)	0.88(0.64-1.21)
HIV comprehensive Knowledge				
No	1	1	1	1
Yes	1.63 (1.38, 1.88]	1.45 (1.58, 1.95)	1.58 (1.33-1.88)	1.59 (1.19-2.14)
HIV stigmatization				
None	1	1	1	1
Low	0.73 (0.64- 0.82)	0.76 (0.67-2.87)	0.76 (0.62- 0.87)	0.79 (0.66- 0.94)
Moderate	0.20 (0.15- 0.27)	0.23 (0.17 -0.31)	0.34 (0.20- 0.60)	0.41 (0.24- 0.71)
High	0.21 (0.10- 0.44)	0.24 (0.11-0.51)	0.27 (0.07- 1.07)	0.32 (0.78- 1.35)
Age at first sex Intercourse				
<15	1	1	1	1
>=15	8.55 (6.20- 11.78)	10.93 (6.77- 17.66)	3.25 (2.36- 4.47)	3.21 (2.33- 4.42)
Condom Use				
No	1	1	1	1
Yes	2.09 (1.42- 3.07)	0.51 (0.31- 0.85)	1.32 (0.88-1.97)	0.71 (0.43-1.15)
Multiple partners				
<=1	1	1	1	1
>1	5.75 (1.37- 24.12)	3.63 (0.32- 40.91)	3.30 (1.37- 7.96)	1.60 (0.63- 4.05)
STIs antecedent				
No	1	1	1	1
Yes	3.92 (1.89- 8.12)	1.58 (0.48- 5.16)	1.58 (0.48-5.16)	1.08 (0.14-8.43)

Men

Socio-demographic factors associated with increased VCT uptake (Table 5) among men were: 20–24 years age group (OR = 2.82; 95 % CI=2.33–3.42); attainment of secondary/ higher education level (OR = 2.40; 95 % CI= 1.99–2.89); marital status, only for those married or living with partners (OR= 16.34; 95% CI= 5.98-44.62), being widowed, divorced or separated did not show association with VCT uptake among men respondents. Youth males living in rural areas were less likely (OR= 0.68; 95% CI= 0.55-0.84) to test for HIV as compared to those living in urban areas.

VCT uptake among youth males with comprehensive HIV/AIDS knowledge were 1.59 times higher than among those men who lacked HIV/AIDS comprehensive knowledge (OR = 1.59; 95% CI=1.19–2.14). HIV/AIDS related stigma was found also to be negatively associated to VCT uptake among males (OR = 0.41; 95 % CI=0.24–0.71). VCT uptake was higher among men who started sex after 15 years old (OR = 3.21; 95 % CI 2.33–4.42) as compared to those who started before. Having multiple partners was not found to be associated with VCT uptake among males.

CHAPTER 5: DISCUSSION

This study that examined the VCT services utilization among youth using RDHS 2015 found that VCT uptake by youth was associated with a number of socio-demographic factors, as well as HIV comprehensive knowledge, related-stigma and some sexual risky behavior factors among men and women.

When comparing these findings with RDHS 2005(17.1% for women and 12.1% for men) and RDHS 2010 (62.2% for women and 54.2% for men), VCT services utilization by youth improved considerably (72% and 61.2%). The current findings on VCT uptake among youth maybe explained by numerous efforts done by the Rwandan government and its international partners to prevent HIV transmission in the country. These results can be explained also by the increase of health facilities providing VCT services; in addition, young people constitute a target group in HIV prevention strategies.

In the same line, the government of Rwanda has done considerable efforts to reverse the trend of HIV epidemic. For example, in July 2016, the First Lady of Rwanda lunched the National "All in campaign to end adolescents AIDS in Rwanda" in collaboration with the MOH and others organizations. In September 2015, the world leaders committed as part of Sustainable Development Goals to end AIDS epidemic by 2030. This program has the objective to bring everyone together to create awareness on the importance of reaching adolescents to end the HIV/AIDS epidemic. Thus, government engaged in more efforts for HIV prevention, care and support. This improvement of VCT uptake by youth is also seen in others countries such as Uganda where the VCT uptake was 25.7% for women and 14.2% for men (UDHS 2006) and increased to 65.2% for women and 39.5% for men in 2011(UDHS 2011). In Kenya, that improvement was also seen with 49.6% for women and 33.6% for men in 2009 (KDHS/2009) and 72.3% for women and 57.5% for men in 2014 (KDHS).

There was difference in VCT uptake between youth females and males, where lower proportion of males (61.2%) utilized VCT when compared with females (72%). This result was consistent with other studies(25)(30)(37)(38) in which females were more frequently tested than males. Women are more likely to use VCT services than men since females tend to start sexual activity earlier compared to males. In addition, women have the opportunity to be tested for HIV during

antenatal care visits. The WHO recommends universal HIV testing for pregnant women for prompt treatment among HIV-positive women in order to prevent vertical transmission of the virus in countries where HIV is endemic. Furthermore, in most situations, women are more likely to seek medical help and visit health care facilities than men (39). Contrary to this study findings, a study from Nigeria and another from Ethiopia found that more males than female youth have been voluntary tested for HIV(40)(41). In these studies, reasons behind this include socioeconomic status, geographical access to health facility, gender inequality and socio-cultural barriers that may contributed to the lower uptake of VCT among women compared to men in these countries.

The current study showed that the age group of 20-24 utilized VCT services more than the 15-19 age group. This might be due that older youth have more sexual experience and risk exposure than younger ones. Hence sexually active youth were more likely to be tested than not sexually active ones. This result is in line with others studies in SSA(25)(30)(38)(40)(42). However, this is in contrast with one study conducted in Gondar in Ethiopia (43) which found that highest VCT acceptance was observed among study subjects aged 15- 19 years. The reason of the acceptance by younger age group found in this study could be the better access to information through public gatherings, organizations, clubs and other means of media. Therefore, HIV prevention strategies should reach more youth aged 15-19 years to make them be fully aware of the importance of VCT.

In agreement with other studies (10)(44), this study found that being more educated, were positively associated with HIV testing. This could be because youths with higher education are more aware of HIV and the risks but also could be more health conscious. As the level of education increases, youth are exposed to more education on VCT services and HIV infection which provide them more confidence of undergoing HIV test.

Living in rural areas was found to be negatively associated to VCT uptake, similar to findings of studies conducted among youths in Nigeria(40)(45) and among Bahirdar University students in Ethiopia(11). The difference in VCT services utilization between urban and rural areas could probably be attributed to differences in access to health care facilities adapted to young people; youth in urban have better access to VCT services since youth centers are more available in urban areas. This indicated that more awareness should be created among rural youths on the need for

HIV/AIDS prevention. These results suggest also that more HIV prevention strategies should be directed on rural and less educated populations.

Youth exposed to mass media were more likely to test for HIV than those who were not (OR= 1.21 95%CI =1.05-1.41 for females and 1.39 95%CI=1.12-1.72 for males) which is consistent with other studies(25)(38)(46) in which it was mentioned that mass media was the major source of information. This shows a need to reconsider and strengthen the use of the mass media (TV, Radio, news-papers, magazines) as a means of reaching youth with information related to VCT services. Additionally, with the rapid usage of the technology by adolescents and young adults, HIV prevention policies makers and partners (Non-Governmental Organizations, Community Based Organizations, etc.) should encourage to provide health related HIV information on their websites; thus, the use of social media networks would have the potential of attracting youth to their various websites for vital information concerning HIV/AIDS and other health reproductive issues.

This study revealed higher levels of HIV testing among youth with comprehensive HIV knowledge, which is consistent with other studies(41)(42). To reduce the spread of HIV among youth, it is important to equip them with information about the virus. This study found that 63.67% of youth demonstrated comprehensive knowledge of HIV. In general, less than 50% of sub-Saharan African youth demonstrates comprehensive knowledge of HIV(42), thus the region failed to meet the United Nations' 2010 target of attaining 95% of comprehensive HIV/AIDS knowledge among young people aged 15–24. Many efforts are needed to reach this target.

In this study, HIV/AIDS-related stigma was found to be strongly and inversely associated with VCT utilization. The observed strong inverse association between stigma level and VCT uptake is consistent with other studies(38)(41) (47)(48), but in opposite with a study conducted in South Africa (30) which didn't find any association. The current findings suggest that having stigma and discrimination is an important barrier to HIV testing. Stigma has significant harmful effects on community health and disease transmission (49). People fears of being indexed, isolated or rejected by disclosing health conditions, thus it can result to non-adherence to medical care. For example, an HIV-positive person may be stigmatized not only for being infected but also for suppositions relating to his/her sexual lifestyle, sexual orientation and other characteristics (e.g drug use, alcohol consumption). Review studies conducted in SSA(50)(51) showed that

HIV/AIDS-related stigma drives the pandemic out of the public view and reduces both individual and societal efforts for behavioral change; that is why we must redouble our efforts to fight against all forms of negative attitudes related to HIV/AIDS by focusing on youth.

In Rwanda as in other SSA countries, heterosexual intercourse is considered as the main route of HIV transmission(35) and age at first sex was demonstrated as risk factor of HIV. The present study found that age of sex debut older than 15 years was significantly associated with increased VCT utilization among youth which is consistent with one previous study(42). Regarding the condom use, youth females who had consistent condom in their sexual activity were less likely to have gone for VCT uptake than those who did not use condom, which is similar to study results conducted in Zimbabwe (37). This may be linked to fell of confidence on the protective efficacy of condom. But a concern is that high HIV risk behavior as multiple sexual partners, early sex debut, inconsistent condom use and STIs antecedent did not lead to higher rates of HIV testing, meaning that these youth, particularly men, are exposing themselves to higher risks for HIV and will more likely ignorantly infect their numerous partners which will further worsen the HIV incidence, especially within this age. A study that analyzed national survey data from 24 SSA countries found that a high proportion of 15-19 years old were sexually active and thus at high risk of contracting HIV and others STIs (19); reasons include the lack of condom use, early sex and through having multiple sex partners. This is to confirm that youth 15-19 years need more to be reached by HIV prevention programs.

STUDY LIMITATIONS

This study has several limitations. First, since this is a secondary analysis of the 2015 RDHS, some independent variables that are needed to complete the conceptual framework such as variables that can be used to assess knowledge, perceptions and attitudes towards VCT services are not presented in the DHS database. Second, given the design of the DHS, we cannot respond to the questions related to the perception and acceptability of VCT services by youth that requires qualitative data. Also, as this survey is cross-sectional, no causal conclusions can be drawn.

CONCLUSIONS

This study findings support the hypothesis that VCT uptake among youth is associated to HIV/AIDS-related knowledge and stigma level, and that youth with sexual risky behaviors were less likely to test for HIV in Rwanda. This highlights the need to improve the VCT services that should be designed to address adolescents' special needs (youth friendly services). VCT education should emphasizes on the prevention of stigmatization and discriminatory behaviors, youth will thus develop positive attitudes towards people living with HIV and AIDS.

RECOMMENDATIONS

Youth friendly VCT services must be expanded and the existing VCT services need to be strengthened and improved to address needs of youth in order to attract more utilization, especially by youth 15-19 years. In addition, the HIV testing campaigns with mobile VCT must be strengthened to target youth in rural areas and poorly educated youth. Further, HIV intervention programs must increase awareness through media and integrate healthcare efforts to help dispel myths about HIV/AIDS, avoiding stigmatization and discriminatory behaviors, increasing thus HIV testing uptake. Further research is needed also to understand the perceptions of youth towards VCT services delivery and their risk perception of HIV (mixed research).

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APPENDICES

**A. Authors's approval if secondary data analysis or use of standards questionnaires
(or other tools)**

