

PREDICTORS OF HIV COUNSELLING AND TESTING UPTAKE AMONG  
UNDERGRADUATE STUDENTS AT THE COLLEGE OF HEALTH  
SCIENCES, UNIVERSITY OF NAIROBI, KENYA.

BY

PAULINA NDANGI KALIMBO

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**DECLARATION OF ORIGINALITY FORM**

Name: ..... Paulina Ndangi Kalimbo

Student number: ..... H57/86929/2016

College: ..... Health Sciences

Faculty/School/Institute: ..... School of Public Health

Course name: ..... Master of Public Health

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**Academic supervisors:**

This dissertation has been submitted to the University of Nairobi with our approvals as university academic supervisors:

1. Dr. Rose O. Opiyo, B.Ed, M.Sc, PhD

Lecturer, School of Public Health, University of Nairobi

Signature..... Date.....

2. Dr. Susan A. Nyawade, B.Ed, M.Sc, MS, PhD

Lecturer, School of Public Health, University of Nairobi

Signature..... Date.....

**Director:**

Prof. Mutuku A. Mwanthi, B.Sc; MSEH; PhD

School of Public Health, University of Nairobi

Signature..... Date.....

## **DEDICATION**

I dedicate this study to the undergraduate students at the College of Health Science, University of Nairobi who were patient with me and took part in my study. This study could not have been possible without them.

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## **LIST OF ACRONYMS**

|        |  |
|--------|--|
| AIDS   | Acquired Immunodeficiency Syndrome         |
| ANC    | Antenatal Care                             |
| ART    | Antiretroviral Therapy                     |
| CD4    | T-lymphocyte cell bearing CD4 receptor     |
| HBM    | Health Belief Model                        |
| HCT    | HIV Counselling and Testing                |
| HIV    | Human Immunodeficiency Virus               |
| KASF   | Kenya AIDS Strategic Framework             |
| KDHS   | Kenyan Demographic and Health Survey       |
| NASCOP | National AIDS and STI Control Programme    |
| ODK    | Open Data Kit                              |
| RDTs   | Rapid Diagnostic Tests                     |
| SSA    | Sub-Saharan Africa                         |
| STIs   | Sexually Transmitted Infections            |
| UNAIDS | Joint United Nations Programme on HIV/AIDS |
| VCT    | Voluntary Counselling and Testing          |
| WHO    | World Health Organization                  |
| YFS    | Youth Friendly Services                    |

## **OPERATIONAL DEFINITIONS**

**Predictor:** predictor refers to any attribute, characteristic or exposure of an individual that influences the likelihood of undergoing HIV counselling and testing among undergraduate students.

**HIV counselling:** HIV counselling refers to a confidential pre and post-test dialogue between a health care provider and client to empower decision making as well as coping with and accepting test results.

**HIV testing:** HIV testing refers to the analysis of blood for the presence of antibodies or antigens to the HIV virus and is normally conducted in a laboratory or VCT center.

**HCT Uptake:** HCT uptake refers to access and receiving HIV counselling and testing services. This was measured as whether the participant has tested for HIV and received results within the past 12 months prior to the study. Possible responses were 'yes' or 'no'.

**Undergraduate students:** undergraduate student refers to any student who is enrolled on a full-time basis but has not yet graduated, is aged between 17 and 26 years and attending her or his classes at the University of Nairobi, College of Health Sciences.

## **ABSTRACT**

**Background:** The human immunodeficiency virus infection and acquired immune deficiency syndrome epidemic remains a burden worldwide and young people constitute the majority of the burden. Establishing factors that influence the uptake of HIV counselling and testing among young people is mandatory to reduce HIV incidences, and hence help to prevent and control the epidemic.

**Objective:** The aim of this study was to determine factors associated with the uptake of HIV counselling and testing among undergraduate students at the University of Nairobi, College of Health Sciences.

**Methods:** An analytical cross-sectional study was conducted at the University of Nairobi, College of Health Sciences among undergraduate students aged 17-26 years. Multi-stage sampling was used to select participants. Data was collected using a mobile tablet device-based questionnaire on the Open Data Kit application. Descriptive statistics, univariable and multivariable logistic regression analysis were performed using STATA software version 11.2 at 20% and 5% level of significance and 95% confidence interval.

**Results:** Of the 386 participants, 51.1% were females and 48.9% were males. Almost all participants (93.0%) were aware of where to access HIV testing services from, and, 76.1% had good HIV related knowledge, while 82.1% knew their HIV status. However, only 46.1% had gone for HIV testing and received their results in the last 12 months prior to the study. Factors that were independently associated with the uptake of HIV counselling and testing among the participants were; privacy of the location of the Voluntary Counselling and Testing center (AOR:8.1; 95%CI:2.7-24.6;  $p<0.01$ ), peer influence (AOR:1.6; 95%CI:1.0-2.4;  $p=0.05$ ), duration in the academic programme (AOR:0.77; 95%CI:0.25-2.28;  $p=0.03$ ), and whether the participants were sexually active or not (AOR:2.1; 95%CI:1.3-3.2;  $p<0.01$ ).

**Conclusion:** Almost all students at the College of Health Sciences were aware of where to go for HIV counselling and testing services, however, only less than half of them went for it. The uptake of HIV Counselling and Testing was increased by; privacy of the Voluntary Counselling and Testing location, sexually active and peer influence. Fear of getting tested for HIV and getting positive test results were possible barriers to the uptake of HIV Counselling and Testing among the students study population.

**Recommendations:** To increase HIV counselling and testing uptake among the university students at the College of Health Sciences, the study recommends that the University of Nairobi should consider privacy of the location for the Voluntary Counselling and Testing centers to attract more students to go for HIV testing services, Pre-and post-counselling services should also be offered to minimize fear associated with the HIV test results. The university should also train smaller groups of students from each of the schools as volunteer peer counsellors to promote voluntary HIV counselling and testing at the College of Health Sciences.

## **CHAPTER 1: INTRODUCTION AND BACKGROUND**

### **1.1 Background**

The epidemic of the human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) remains a global health and socio-economic burden which has brought innumerable public health predicaments. Furthermore, the epidemic is not only a humanitarian disaster but a developmental disaster which is threatening to derail the gains in health and development globally (Sidibé, 2013). According to The Joint United Nations Programme on HIV/AIDS Report, globally there are approximately 36.9 million people worldwide who are currently living with HIV/AIDS, and this includes 3.9 million young people aged 15-24 years (UNAIDS, 2017). However, 25% (9.4 million) of these individuals do not know their HIV status (UNAIDS, 2017). In addition, in 2017 the WHO African Region was reported as the most affected region, with an estimated number of 25.7 million individuals living with HIV.

Globally, Sub-Saharan Africa (SSA) is the most affected region with the highest overall HIV prevalence being among adult populations (15-49 years). The prevalence of HIV infection in SSA varies between countries and Swaziland has the highest at around 27.2%, followed by Botswana with 21.9%, Lesotho with 25.0%, South Africa with 18.90% and Namibia with an estimated prevalence of 13.8% (UNAIDS, 2016). Other SSA countries known to have high rates of HIV/AIDS infection include Zimbabwe (13.5%), Zambia (12.4%), Mozambique (12.3%), Malawi (9.2%), Uganda (6.5%) and Equatorial Guinea (6.2%).

With a population of about 49.7 million (2016), Kenya is one of the countries in SSA that have been affected by a generalized HIV/AIDS epidemic with an estimated national HIV prevalence of 4.9% (females 5.2% and males 4.5%). There was an estimated 1.5 million individuals of all ages living with HIV in 2017 which included 12% of young people aged

15-24 years of age (females 2.6% and males 1.3%) as reported by Kenya HIV Estimates report (National AIDS and STI Control Programme [NASCOP], 2018).

Human Immunodeficiency Virus (HIV) is a virus that deteriorates the human immune system, and if no health interventions are implemented, the gradual physical deterioration of the body results in attaining the final stage known as Auto Immunodeficiency Syndrome (AIDS). However, if detected in a timely manner, HIV can be controlled and prevented from developing to this final stage. The HIV virus enters the body and attacks CD4 cells, thereby exposing the infected individual to opportunistic infections (UNAIDS, 2014).

Routinely, HIV infection is diagnosed through rapid diagnostic tests (RDTs), which identify the presence or absence of HIV antibodies. In most events, these tests provide results on the same day, thus ensuring same-day diagnosis and timely treatment initiation and care. Globally, 36.9 million people are living with HIV of which approximately 75.0% of them know their HIV status and the remaining 25.0% still need access to HIV testing services in 2017. Correct diagnosis, treatment, and health care interventions are important aspects of proper management and monitor the HIV/AIDS epidemic (UNAIDS, 2017).

HIV counselling and testing (HCT) is an important entry point to HIV prevention, treatment, care, and support services, and early treatment initiation greatly reduces AIDS-related symptoms and the rates of transmission (World Health Organization [WHO], 2015). According to WHO (2015), HIV/AIDS prevention interventions include HIV counselling and testing, which is known as the backbone and entry point to treatment, and comprehensive HIV/AIDS infection prevention programmes among infants, women, young people and the whole population at large. Access to HCT consequently aids in early HIV detection and minimizes incidents of HIV infection; hence preventing and controlling the transmission of the epidemic.

Young people are one of the most exposed populations to HIV infection and they significantly contribute to the high HIV prevalence in many countries which are deeply rooted in the epidemic. Determining the factors that influence young people to uptake HCT is important for early HIV detection hence avoiding increased HIV prevalence (Kenya AIDS Strategic Frame Work [KASFW], 2014). It is therefore against this background that an analytic cross-sectional study was undertaken to determine the predictors that influence HCT uptake among undergraduate students at the University of Nairobi, College of Health Science, in Kenya.

## **1.2. Problem statement**

In spite of all the successful and effective strategies implemented to monitor and prevent the HIV/AIDS epidemic, globally, the disease is one of the highlighted public health concerns. About 1.5 million Kenyans are living with HIV with an estimated national HIV prevalence of 4.9% (females 5.2% and males 4.5%) in 2017 which includes 12% of young people aged 15-24 years of age (females 2.6% and males 1.34%) as reported by Kenya HIV Estimates report (National AIDS and STI Control Programme [NASCO], 2018). The report further indicates that 33% of all new HIV infections in Kenya in 2017 occurred among adolescents and young people aged (15-24 years). This is a challenge for the Kenyan youth population as they are at high risk of contracting HIV infection and hence there is need to expand HCT uptake initiatives. To further exacerbate the risk of HIV infection, it is estimated that 33% of girls before they turn 18 years old in Kenya have been raped and nearly one in five (20%) girls aged 15-19 years had a child or were pregnant in 2015 (UNAIDS, 2017). This further puts university students at high risk of acquiring HIV infection as most of them are within the stated age bracket that is most vulnerable to HIV infection. The other problem in Kenya is that condom use appears to be very low as alluded to by KDHS and ICF International, (2015), where only 40% of women and 43% of men who had two or more partners reported



using condoms the last time they had sex. This goes on to show that more than half of the participants with two or more partners did not report condom use in their last sexual encounters, further predisposing the reproductive age group to HIV infection including university students. Several studies have been done on HCT uptake among the general population and university students in Kenya (Macharia, 2013; & Mwangi et al., 2014). However, there is a general paucity on studies done specifically on university students. The other problem is that most of the studies revealed that about 50% of the students were complacent to take up HCT (Mwangi et al., 2014), further revealing the need for HCT services and explanation on its relevance among university students in Kenya.

### **1.3. Theoretical and Conceptual framework**

The conceptual framework of this study was based on the Health Belief Model (HBM) which was established to comprehend why people used or did not use preventative services offered at health facilities. Over the years, the HBM has advanced to address different concerns in prevention and detection as well as lifestyle behaviors such as sexual risk and injury prevention behaviors (Sallis & Owen, 2008). In general, the HBM hypothesizes that people's readiness to take certain actions is influenced by their perceptions on their exposure level of acquiring a certain disease or health condition, the severity of the health condition and their perception of the outcome of taking action to avoid it. Core constructs of the HBM include: perceived susceptibility and severity; perceived benefits and barriers and cues of action and self- efficacy.

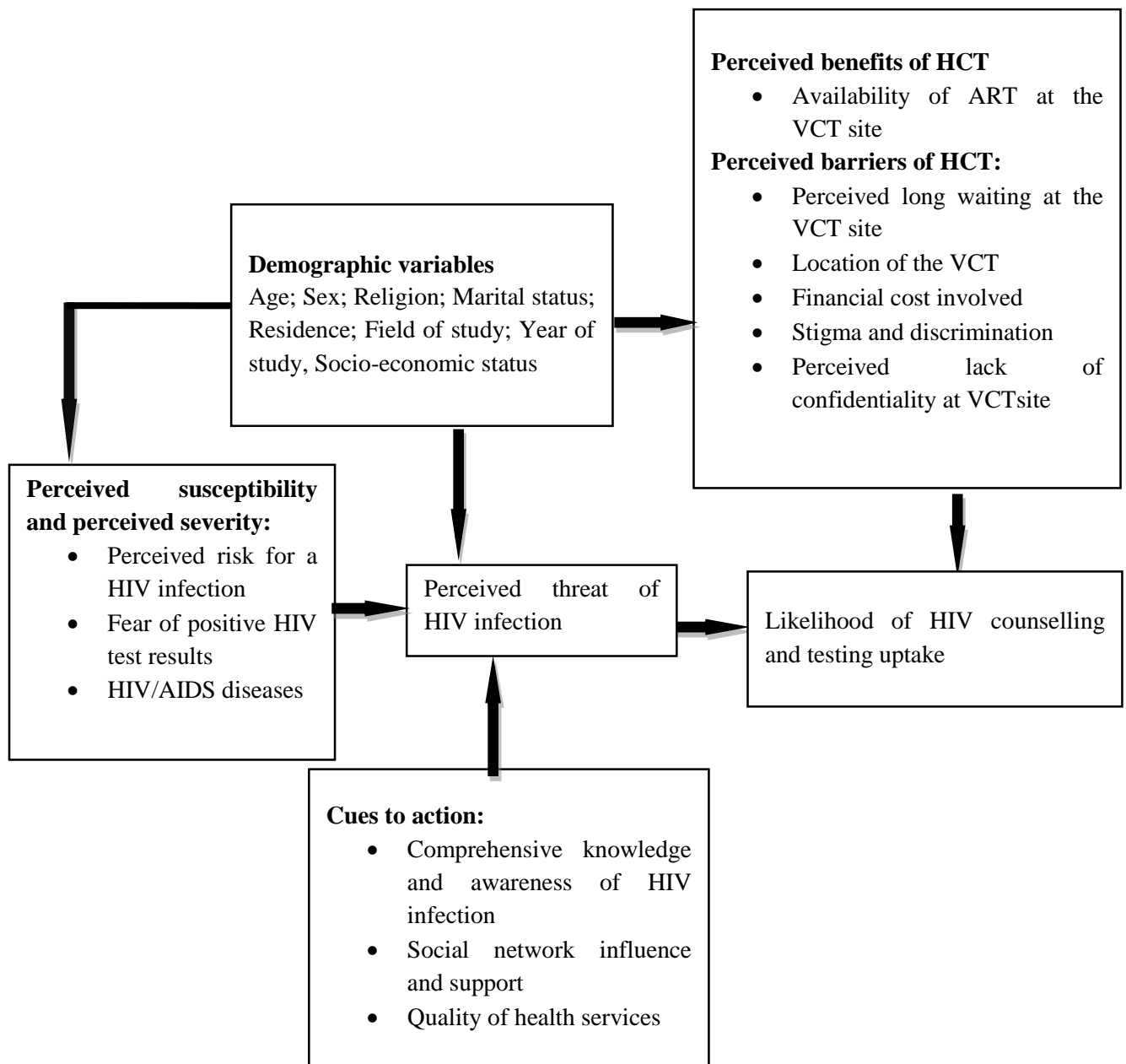
In this study the beliefs of university students on whether or not they are at risk of contracting HIV and their perception of the benefits associated with going for HCT services to prevent the risk will influence their readiness for HCT uptake. In order for a student to go for HCT, several issues are involved and may be summarised by HBM constructs.

For this study, the perceived susceptibility and perceived severity component included perceived risk of acquiring HIV, HIV positive results, and HIV/AIDS related diseases while the perceived benefits and perceived barriers included the availability of ARVs, perceived lack/ availability of confidentiality, perceived long waiting time, quality of health service, access to the VCT, financial cost involved, stigma and discrimination, and fear of HIV results. In addition, cues of action included comprehensive knowledge of HIV, establishing location of HCT centers, family psychosocial support, and the undertaking HCT services. Moreover, advocating HCT services among the youth, repeated HCT services when at risk, and maintenance of behaviour were included in the component of self-efficacy.

**Individual perceptions**

**Modifying factors**

**Likelihood of action**



**Figure 1:** Conceptual framework on risk factors associated with HCT uptake.

*adapted from (Sallis & Owen, 2008).*

Students' perceptions of chances of getting HIV infection and how serious HIV infection is, as well as the barriers and benefits of undergoing HCT are influenced by their demographic characteristics. This accounts for students' readiness to undertake HCT based on perceived threats of HIV infection. Cues to action are reminders which activate the students' readiness and stimulate overt behaviour to reduce or eliminate the perceived threat of HIV infection.

#### **1.4. Justification**

About 33% of all new HIV infections in Kenya in 2017 occurred among adolescents and young people aged 15-24 years (NASCOP, 2018). This is a challenge for the Kenyan youth population as they are at high risk of contracting HIV infection and hence the need to scale up HCT uptake initiatives. According to the Guideline for HIV Testing Services in Kenya (NASCOP, 2015), the youth are at significant risk of acquiring HIV infections. The guideline require the youth to take annual HIV re-tests and encourages the establishment of Youth Friendly Services (YFS) with integrated HIV Testing services. Scaling up the uptake initiatives calls for a deeper understanding of predictors of HCT uptake among the youth, including the university students. Available research indicate that only about half of university students utilize HCT services (Mwangi et al., 2014), further revealing the need of HCT services among university students in Kenya. This can only be possible if there is comprehensive background information on factors associated with the HCT uptake among this population group.

#### **1.5. Research Questions**

The study attempted to answer the following questions:

1. What is the prevalence of HIV counselling and testing uptake among undergraduate students at the College of Health Sciences at the University of Nairobi?
2. What are the factors associated with uptake of HIV counselling and testing among undergraduate students at the College of Health Sciences at the University of Nairobi?

## **1.6. Research hypotheses**

**Ho1:** Socio-demographic, psychosocial and health service-related factors are not associated with the uptake of HIV counselling and testing among undergraduate students at the College of Health Sciences at the University of Nairobi.

**Ha1:** Socio-demographic, psychosocial and health service-related factors are associated with the uptake of HIV counselling and testing among undergraduate students at the College of Health Sciences at the University of Nairobi.

## **1.7. Objectives**

### **1.7.1. Main objective:**

The main objective of this study was to determine factors associated with the uptake of HIV counselling and testing among undergraduate students at the College of Health Science at the University of Nairobi.

### **1.7.2. Specific objectives:**

Specifically, the objectives of this study were:

1. To estimate the prevalence of HIV counselling and testing among undergraduate students at the College of Health Sciences at the University of Nairobi.
2. To determine the barriers to HIV counselling and testing among undergraduate students at the College of Health Sciences at the University of Nairobi.
3. To determine enabling factors to HIV counselling and testing among undergraduate students at the College of Health Sciences at the University of Nairobi.
4. To determine factors associated with HIV counselling and testing among undergraduate students at the College of Health Sciences at the University of Nairobi.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.0. Introduction**

This chapter will provide an overview of studies that have been conducted on factors associated with HCT uptake. It has been subdivided into the following sub-sections: the prevalence of HCT uptake, the impact of HCT as well as predictors of HCT uptake.

### **2.1 The prevalence of HIV counselling and testing uptake among university students**

Levels of reported HCT uptake and collection of testing results vary widely from country to country. The prevalence of HCT uptake among university students reported by most of the studies is about 30% - 50%. Studies show a prevalence of 50.7% from Kenya (Mwangi et al., 2014), 35.4% from Ethiopia (Fikadie et al., 2014), 34.6% from Tanzania (Charles et al., 2009) and 30.4% from Nigeria (Abiodun et al., 2014).

### **2.2. The impact of HCT**

The HCT is recognized as a vital component, with known benefits and positive health outcomes, for all HIV prevention and treatment interventions. HCT provides opportunities to detect individuals infected with HIV infection and are in need of health care interventions while individuals who are not infected with HIV infection are referred for HIV preventative measures. HCT does not only allow individuals to know their HIV status and obtain safety counselling and additional proper health attention related to their HIV status, but also aids communities at large in tackling HIV/AIDS-related stigma and discrimination (Ramjee & Daniels, 2013).

HCT is a health care intervention, which provides chances to individuals to get educated and assisted in order to explore their level of HIV risk; HIV status and ability to manage the consequences thereof. HCT thus aids individuals in learning about HIV preventive measures,

treatment interventions, support services, and acquiring ways to adjust their behaviour to minimize the risk of HIV infection (Mohlabane, Tutshana, Peltzer, & Mwisongo, 2016).

### **2.3. Predictors of HIV counselling and testing uptake among university students.**

#### **2.3.1. Socio-demographic factors**

##### **2.3.1.1. Age distribution**

Age distribution plays a significant role in predicting the uptake of HCT and according to Sanga et al., (2015) the uptake of HCT increases as the age advances because of increased exposure to voluntary counselling and testing (VCT) and HIV education of young people as they grow. This makes them realise the significance of knowing their HIV status. In their study on predictors of HIV/AIDS Knowledge and Attitude among Young Women of Nigeria and Democratic Republic of Congo, Gebremedhin, Youjie, & Tesfamariam, (2017), concluded that HIV/AIDS knowledge does increase with age. The authors found that women of 20-24 years of age had more HIV knowledge compared to women of 15-20 years.

In addition, studies by Abiodun et al., (2014); Chimoyi et al., (2015); Hadish et al., (2017), suggested that older individuals are more likely to use HCT services as opposed to the younger ones. It might be that older people perceive themselves to be at high risk of acquiring HIV virus and will therefore readily access HCT service. However, with advancing age, individuals may also become more educated hence increasing the awareness and economic stability to go for HIV testing (Hadish et al., 2017).

However, Mwangi et al., (2014) argue that as age increases, young people turn out to be more sexually active and hence hesitant to undergo HIV testing due to fear of the test results. As individuals age, they tend to avoid going for HCT due to some life experiences such as illness or loss of someone close due to HIV/AIDS (Gazimbi & Magadi, 2017).

### **2.3.1.2. Sex**

Many studies have found sex to be associated with the uptake of HCT as alluded to by Asaolu et al., (2016); Khawcharoenporn, Chunloy, & Apisarntharak, (2016); Woldeyohannes et al., (2017), who reported that male youth had lower odds of HCT uptake as compared to females. This concurred with findings from a study by Chimoyi et al., (2015) to the effect that females were more likely to be tested for HIV as compared to males. This may be attributed to the fact that females have a window opportunity for HCT uptake during Antenatal Care (ANC) and hence this increases their odds ratio for HCT uptake.

In addition, Charles et al., (2009) found that being female was significantly associated with accepting HCT results as compared to being male. This may be due to the fact that females are more worried about their health than males as they are keen to know more about matters affecting their health which include HCT (Abiodun et al., 2014).

### **2.3.1.3. Religion**

Religion is known to have a great impact on HCT uptake. In their study on evaluation of uptake and attitude to voluntary counselling and testing among health care professional students in the Kilimanjaro Region, Tanzania, (Charles et al., 2009) found that, Catholic people were the least in attendance of HCT services as compared to other religions. This may be attributed to negative outlooks towards the use of condoms as well as other contraceptive methods presented during VCT services.

However, Hadish et al., (2017) found that most other Christian youths are more knowledgeable of VCT locations and hence more likely to access and utilize HCT services as compared to non-Christian youths. On the contrary, Muhinda et al., (2017) did not observe any relationship between religion and HCT uptake.



#### **2.3.1.4. Residence and Distance to HCT Services**

Place of residence and distance to and from health facilities is a significant aspect of accessing health care services hence influencing the uptake of HCT. Urbanization is known to play a vital role in the spread of HIV and globally, there is a huge increase in the prevalence of HIV among urban populations as compared to rural populations. Urbanization has replaced traditional customs for modern urban principles with fewer restraints on young individuals about their sexual behavior. Moreover, the partial deviation of culture and social networks among young people mostly leads to social complications such as drug and alcohol abuse, transactional sex, and having multiple sexual partners which puts them at risk of acquiring HIV infection (Fikadie et al., 2014; Ramjee & Daniels, 2013).

Individuals who reside near VCT facilities have a higher chance of going for HIV testing as compared to individuals who reside far (Gazimbi & Magadi, 2017; Sanga et al., 2015). Thus, distance from the VCT facility directly influences HCT uptake (Lubogo, Ddamulira, Tweheyo, & Wamani, 2015).

However, those who reside in the urban settings have a higher chance to access health facilities for HIV care compared to those who reside in the rural setting. This can be attributed to the opportunities available to individuals in the urban areas; most of them have access to information through the media (Gebremedhin et al., 2017; Hadish et al., 2017; Muhinda et al., 2017; Lubogo et al., 2015). The disparity may also be due to limited accessibility of higher educational establishments, up-to-date health services, reduced coverage of mass media and hence poor and reduced exposure to health-related information in rural areas (Fikadie et al., 2014).

### **2.3.1.5. Level of education**

Education is a key indicator in sociodemographic factors as well as a critical exposure window for students to VCT services and HIV information. As students are exposed regularly to key information on HIV, they become confident to undergo HCT and hence HCT uptake increases with level of education (Abiodun et al., 2014; Sanga et al., 2015). This is consistent with the findings of Gazimbi & Magadi, (2017) in their study on Multi-level Analysis of the Determinants of HIV Testing in Zimbabwe where they found out that educated people had a higher chance to have improved health due to access and action on health information compared to uneducated individuals.

In a related study among undergraduates at Bahidar University in Ethiopia, Fikadie et al., (2014) concluded that second year and above students had a higher chance to utilize VCT services as compared to the first-year students. This pattern is related to the fact that as students stay longer on campus, the HIV exposure risk perception increases and thus they are likely to have increased access to VCT related information compared to first-year students.

In studies by Mohlabane et al., (2016); Tsegay, Edris, & Meseret, (2013); Woldeyohannes et al., (2017), VCT utilization was higher among students in health-related fields compared to those in other non-health related fields. These findings relate to accelerated social mobilization as well as curriculum integration of infectious diseases in general and HIV/AIDS, in particular within the faculty of health.

Faculty of health students are exposed to more information about the benefits of HCT, which is mostly covered within their curriculum, and are inspired to undertake HCT. Moreover, students from non-health science faculties are less informed and experienced about HIV/AIDS hence the lower uptake (Khawcharoenporn et al., 2016; Woldeyohannes et al., 2017).

### **2.3.1.6. Socioeconomic status**

According to WHO (2015), in roughly the last two decades, most SSA countries have faced slow economic growth which has partially affected many lives and has led to poverty. Poverty is known to be a driving force of HIV infection transmission. Being from a low socio-economic status family and unemployed has been related to earlier sexual experience, lower condom use, having multiple sexual partners, drug and alcohol use, transactional sex and increasing the likelihood of having physically forced sex (Ramjee & Daniels, 2013).

Most women resort to transactional sex to sustain their livelihood and mostly young female students are often pressurized into sexual activities with older men to survive. This makes them perceive themselves as high risk of acquiring HIV infection, yet they have fear of HIV test results (Ramjee & Daniels, 2013). Socio-economic related challenges reduce the likelihood of HCT uptake due to lack of financial means which would assist individuals to have access to health care facilities and services. On the contrary, those individuals of good economic standing find it easy to afford transport and consultation costs for health care services (Gazimbi & Magadi, 2017).

### **2.3.1.7. Marital status**

Single women are less likely to go for HCT services as compared to those who are married or have two (2) or more sexual partners, while those who never married perceive themselves to be at lower risk of acquiring HIV infection (Gazimbi & Magadi, 2017). On the other hand, married and widowed women have a higher chance to go for HCT services, and this is because being widowed stirs one to be more careful with their lives and health care (Muhinda et al., 2017).

Furthermore, being currently or formerly married increases the odds of knowing a place to get HIV testing services and get tested as compared to those that never married (Hadish et al.,

2017). This may be due to the fact that HIV testing is mostly undertaken as an essential component and prerequisite to marriage preparation in many practices (Djibuti, Zurashvili, Kasrashvili, & Berg, 2015; Musheke et al., 2013) and during ANC visits (Gazimbi & Magadi, 2017).

### **2.3.2. Psychosocial factors**

It is crucial to monitor trends in HCT uptake in terms of prevention, analysing HCT patterns with respect to psychosocial factors to assist in determining whether those individuals at risk of HIV undergo HCT. In this section, psychosocial factors includes: HIV and AIDS related stigma and discrimination, HIV-related awareness and comprehensive knowledge, perceived risk of HIV infection, fear of getting an HIV positive result, and social support network.

#### **2.3.2.1. Perceived HIV related stigma and discrimination**

HIV and AIDS-related stigma and discrimination are among the factors which play a significant role in influencing decisions surrounding the uptake of HCT and HIV treatment services. They have profound effects on individuals by reducing their willingness in seeking HIV testing, subsequent treatment and prevention which would otherwise have improved an individual's quality of life (Chimoyi et al., 2015).

HIV and AIDS-related stigma and discrimination are best described as attributes that deeply discredit and link individuals to undesirable characteristics, thereby reducing their status in the society (Odimegwu, Adedini, & Ononokpono, 2013). Most of the time, HIV/AIDS discrimination and stigma occur at different levels such as the community, interpersonal, legislative, and institutional levels (Ramjee & Daniels, 2013).

Studies have revealed that stigma and discrimination are vital reasons for non-acceptance of HCT uptake in society. In addition, stigma and discrimination serve as an additional barrier to accepting testing and the extension of social support (Khatoon et al., 2018). In a study by

Odimegwu et al., (2013), they found that HIV related stigma and discrimination is associated with individuals who are believed to possess some features that convey a social identity, for example, individuals who test HIV positive are perceived as abnormal and labelled as humans with undesirable characteristics.

In a systematic review of qualitative studies in Sub-Saharan Africa to establish enabling and deterring factors on HCT uptake, individuals indicated that being seen at the VCT site will lead to presumptions of sexual promiscuity and perceptions of being HIV positive. This inhibits individuals from undertaking HCT (Musheke et al., 2013).

In addition, fear of HIV test results is related to fear of stigmatization and discrimination from families and community members; particularly in individuals labeled as HIV infected (Sanga et al., 2015). This concurs with a study by Tsegay et al., (2013), which found that students who perceived HIV related stigma and discrimination were 0.013 times less likely to utilize VCT service compared to those who did not.

#### **2.3.2.2. HIV-related awareness and comprehensive HIV knowledge**

In order to minimize the spread of HIV among youth, it is crucial to equip them with information about the spread and prevention of HIV. A cross sectional study on predictors of HIV testing uptake among youth in Sub-Saharan Africa by Asaolu et al., (2016), revealed that high uptake of HCT is positively associated with comprehensive HIV knowledge. That is, youth that are knowledgeable about HIV have a higher chance to be tested compared to those that are not knowledgeable about HIV.

Similarly, in related studies conducted by Abiodun et al., (2014); Hadish et al., (2017) it was found out that those having adequate knowledge about HIV have increased odds of HCT uptake as compared to those who are not knowledgeable. Thus it might be assumed that VCT users have prior information regarding HIV before they go for HCT (Tsegay et al., 2013).

However, Gazimbi & Magadi, (2017); Musheke et al., (2013) asserted that HIV awareness and knowledge may be negatively related to HCT uptake if the awareness affects risk perception and associated behaviors. This may be due to heterogeneous distribution of HIV awareness and knowledge on HCT among the population.

### **2.3.2.3. Perceived risk of HIV infection**

The risk perception around contracting HIV infection may either increase or decrease the chances of using health care services and HCT uptake among individuals.

Youth are in danger of contracting HIV infection, mostly young females of the reproductive age group, due to lifestyle exposures and peer pressure. Perceived risk of HIV infection is a vital determinant of behavior modification and thus a complement to HIV and STIs infection preventive actions. In most cases a lot of individuals do not see themselves as being at risk of acquiring HIV infection while some highly perceive themselves as being at high risk (Charles et al., 2009).

Individuals who see themselves as not at risk, or at low risk of acquiring HIV infection, because they either refrain from sex, or do not have sexual partners; or have trusted sexual partners may usually not seek HCT services. This kind of behavior could be due to lack of motivation to undergo HCT and fear of discrimination (Gazimbi & Magadi, 2017; Musheke et al., 2013; Sambisa, 2008) which could negatively affect the uptake of HIV testing.

Lack of signs and symptoms related to HIV infection or weakening of health is alleged as a sign of not having HIV infection (Musheke et al., 2013). This is supported by findings from a study by Mwangi et al., (2014) which suggested that individuals who feel less susceptible to HIV infection may disagree that there is a possibility they might be infected with the virus. Their confidence might have been boosted by the fact that many believed they had not had

sex with someone who is at risk of having HIV infection and consequently do not undergo HCT.

Likewise, another study conducted in Ethiopia among students by Tsegay et al., (2013), suggests that students who feel susceptible to acquiring HIV infection have a higher chance of visiting the VCT for HCT uptake compared to those who do not perceive themselves to be at risk. This is justifiable because a light sense of vulnerability to surrounding threats of HIV infection motivates self-protective behaviors, which include HCT uptake (Sambisa, 2008).

Individuals who engage in risky behaviors such as, having many sexual partners, and misuse of drug and alcohol, which independently affects sexual decision-making on condom negotiation, always consider themselves at high risk of acquiring HIV infection. This consequently makes them perceive themselves as having a need to know their HIV status (Asaolu et al., 2016; Gazimbi & Magadi, 2017; Ramjee & Daniels, 2013).

#### **2.3.2.4. Fear of HIV results**

The belief, burden and assumptions of living with HIV infection play a role in the uptake of HCT. Despite the accessibility of life-prolonging treatment for HIV in most health facilities, being infected with HIV infection is still perceived as related to death. As a result, the motivation to undergo HCT depends on an individual's ability to subsist the results (Musheke et al., 2013).

Anxiety and stress which may arise from the knowledge of one's HIV status especially HIV positive results may be a deterrent to HCT uptake. This is due to a lack of knowledge and confidence in how to deal with one's HIV positive status and support systems available to them as coping mechanisms after HCT (Sambisa, 2008; Sanga et al., 2015).

In addition, the fear of testing positive is associated with many unbearable psychosocial consequences due to a perceived loss of social status, domestic violence in relationships,

divorce in marriages, discrimination, rejection, and abandonment in the community. On that account, individuals fear all these consequences and HCT uptake is negatively affected (Khatoon et al., 2018).

#### **2.3.2.5. Social network support and influence**

Making HIV testing decisions is inseparably connected to social network support and influence. Individuals during the process of making HIV testing decisions seek supportive views from their friends and relatives. It is from relatives and friends where individuals seek and get psychosocial and economic support (Musheke et al., 2013).

Individuals from supportive families and friends have a higher chance to undertake HCT as compared to individuals from unsupportive families and friends. Good peer pressure has a substantial outcome on the HCT uptake since peers are the primary source of information on HIV infection as well as HCT. Hence, individuals whose family members and friends have visited VCT sites are more likely to undergo HCT (Fikadie et al., 2014; Lubogo et al., 2015).

#### **2.3.3. Health service delivery related factors**

An equitable health care approach is mainly concerned with making services available and accessible to those who need them most in order to reduce gaps in accessing HCT services (Makwiza et al., 2009). Understanding the issues affecting the use of HCT services is vital for the success of testing programmes in attaining high levels of HCT uptake.

##### **2.3.3.1. Availability of Antiretroviral Therapy (ART)**

With the extension of antiretroviral therapy (ART) provision, the positive impact of HCT as an entry for HIV/AIDS treatment, as well as a prevention strategy, has become an integral part of global response to the epidemic of HIV/AIDS (Fikadie et al., 2014). The availability of life-prolonging ART at the VCT site has been demonstrated to have a significant effect on the uptake of HIV testing. Since the provision of ART is known to significantly prolong life,



this reinforces acceptance of HCT uptake; creating an undisputed association between availability of ART and HCT uptake (Tsegay et al.,2013).

#### **2.3.3.2. Perceived long waiting time at the VCT site**

According to studies by Meremo et al., (2016); Sambisa, (2008) long waiting time at the VCT deters the uptake of HIV testing. Spending more than 2 hours at the VCT site before being attended to as well waiting long for HIV test results, negatively affect and discourage individuals from undergoing HIV counselling and testing.

#### **2.3.3.3. Perceived lack of privacy and confidentiality at the VCT site**

Perceived lack of confidentiality at the VCT site among health care providers plays a vital role in the HCT uptake. Health care providers' inability to maintain confidentiality acts as barrier that hinders individuals from accessing and utilizing VCT services (Meremo et al., 2016; &Musheke et al., 2013). This goes in line with the findings of a study conducted by Tsegay et al., (2013) among students in Ethiopia, which concluded that students who heard about maintenance of confidentiality at the VCT site were 3 times more likely to go for HIV testing compared to those who heard nothing.

#### **2.3.3.4. Quality of HIV testing services**

Individuals' insights into and experience with health care affect HCT uptake positively or negatively. Factors such as perceived lack of confidence in the competence of health personnel, perceived poor attitude of health staff, and perceived unreliability of HIV test results; negatively affect HCT uptake. Perceived poor and secluded location of HIV testing site and use of VCT specific clinic personal identification cards is associated with low HCT uptake as it brings negative connotations such as being labeled HIV positive, sexually active or having STIs (Musheke et al., 2013).

Health care workers often refuse to provide accurate information on HIV prevention as well as information on reproductive health, and family planning to HIV positive women. Most HIV positive women experience the rejection of services, judgmental treatment, and lack of privacy. Consequently, women are left unwilling to seek HCT and this has a negative impact on HCT uptake (Ramjee & Daniels, 2013).

#### **2.3.3.5. Access to the health facility**

The implementation of opt-out provider initiated HCT in health facilities settings to clients as a standard component of health care is recommended by WHO and positively contributes to HCT uptake (Musheke et al., 2013). Individuals who often visit health facilities are likely to undergo HCT compared to those who do not. This provides them opportunities to know their HIV status, hence increasing HCT uptake (Khatoon et al., 2018; Sanga et al., 2015).

#### **2.3.3.6. Cost involved**

The financial costs involved in accessing HIV testing sites inhibits HCT uptake. Although HIV testing services are mostly provided freely in government health facilities, the cost of getting to the health facilities remains a challenge to many and so is the cost of paying at the non-government health facility (Musheke et al., 2013).

## **CHAPTER 3: METHODOLOGY**

### **3.0. Introduction**

This chapter describes the study design, study area, study population, sampling, selection of participants, data collection and analysis, and ethical considerations.

### **3.1. Study design**

This was an institution based analytic cross-sectional design study. The quantitative research method was utilized for this study because it highlights objectivity and uses systematic procedures to measure participants' human behavior using formally structured research tools when collecting data (Brink, Van der Walt & Van Rensburg, 2012). This method or approach was used to provide facts about predictors of HIV counselling and testing uptake among undergraduate students.

### **3.2. Study area**

This study was carried out at the College of Health Sciences of University of Nairobi, located in Nairobi County, Kenya. The college is found within the capital city of Nairobi and is located within the premises of Kenyatta National Hospital, a regional Teaching and Referral facility. This study was conducted at the School of Medicine, School of Pharmacy, School of Dentistry, and School of Nursing.

### **3.3. Study population**

In this study, the target population was all the undergraduate students attending their classes at the University of Nairobi. In addition, the source population was all the eligible undergraduate students, estimated to be 4,732 and aged 17-26, attending their classes in the four schools listed above at the College of Health Sciences, University of Nairobi.

### **3.4. Selection criteria of the participants**

#### **3.4.1 Inclusion criteria**

This study included all the undergraduate students attending classes at the College of Health Sciences of the University of Nairobi who were:

- Undergraduate students
- Aged 17-26 years
- Have agreed to participate and signed consent on a voluntary basis.

#### **3.4.2 Exclusion criteria**

- Above the age of 26 years
- Postgraduate students

### **3.5. Sample size determination and sampling technique**

#### **3.5.1. Sample size determination**

In this study the sample size was derived using Fisher's formula for cross sectional studies:

$$n = \frac{z^2(pq)}{d^2}$$

Where:

$n$  = sample size for population > 10, 000

$z$  = normal deviation at the desired confidence interval

$p$  = estimated proportion of an attribute that is present in the population

$q = 1-p$

$d$  = desired level of precision

Sample size for this study was determined by taking account of the following parameters: proportion; according to the available previous studies the prevalence of HCT uptake ranges from 29.3% to 50.7% hence 50.7% was used in the formula assuming 5% degree of precision, and 95% confidence interval at 5% type 1 error.

$$n = \frac{(1.96)^2 \times 0.51(1 - 0.51)}{(0.05)^2}$$

$$n = 384$$

Since the total population for undergraduate students was less than 10,000, the above sample size obtained for an infinite population was adjusted using the formula for the desired sample size for this study.

$$an = \frac{n}{1 + \frac{n}{N}}$$

Where:

$an$  = the desired sample size for population < 10,000

$n$  = the calculated sample size

$N$  = the total population

$$an = \frac{384}{1 + \frac{384}{4732}} = 355$$

$an$  = 355 + 10% non-response rate

$an$  = 390

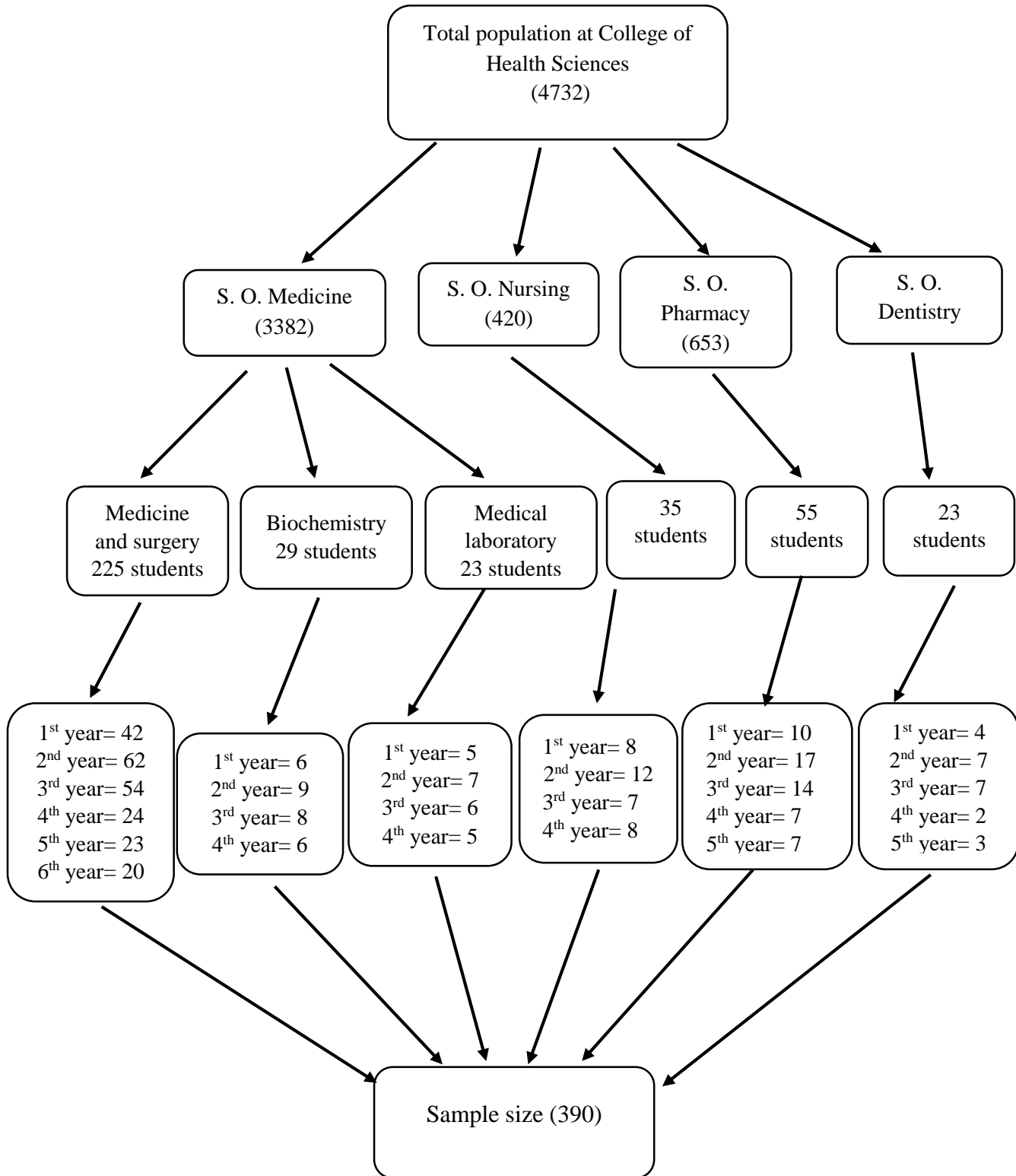
Hence, the sample size in this study was 390.

### 3.5.2. Sampling technique

Multi-stage sampling technique was used in selecting participants for the study. First, schools were stratified proportional to size of student population. The year of study was also stratified

proportional to number of students per year. The study participants were then systematically sampled, where every 12<sup>th</sup> student was picked from the list of the students from each of the schools by year of study.

Since there were three (3) different departments under the School of Medicine (Bachelor of Medicine and Surgery, Biochemistry and Medical Laboratory Science and Technology) which are all included in the 227 students, under each department mentioned above, the sample was proportionally allocated based on the number of students under those different departments. This was to ensure that the number of students selected for the sample from each department was proportionate to the number of the target population. The year of study was also considered in this study in allocating the study participants proportionally to the number of students from each year of study.



**Figure 2:** Schematic presentation of the sampling procedure

*S.O (School of)*

### 3.6. Study variables

The key outcome variable of interest (dependent) of this study was HIV counselling and testing uptake measured on a nominal scale of whether the participant has tested for HIV and received results within the past 12 months or not prior to the study.

The independent variables as shown in the conceptual framework (Figure 1) described in Chapter 2 are presented into specific categories: **Socio-demographic factors** such as age, marital status, residence, religion, year of study, a field of study and socio-economic status; **Psychosocial factors** such as HIV related stigma and discrimination, comprehensive HIV/AIDS knowledge and awareness, perceived risk of HIV infection and social network influence and support; **Health service delivery related factors** included availability of ART at the VCT site, perceived lack of privacy and confidentiality, perceived long waiting at the VCT site, quality of HIV testing services, access to the VCT and cost involved.

**Table 1:** Independent and dependent variables and their measurements

| <b>Variables</b>                            | <b>Measurements of variables</b>  |
|---|---|
| HIV counselling and testing uptake (binary) | This was the dependent variable of interest and was measured by whether participants had tested for HIV and received results within the past 12 months prior to the study. Possible responses were “Yes” or “No”. |
| Age of the student (continuous)             | This was expressed in years. The exact age of participants.   |
| Sex (binary)                                | This was captured in two categories: female or male.  |
| Marital status (nominal)                    | This was captured in the three categories: single (never married), married or others (separated, divorced, widowed, cohabiting).  |



| <b>Variables</b>   | <b>Measurements of variables</b>  |
|--|---|
| Religion (nominal)                                       | This was expressed in seven categories as: Orthodox, Protestant, Catholic, Muslim, Christian, no religion or other religion. During analysis, it was categorized as non-Christian, Christian and not religious.   |
| Residence of origin (binary)                             | This was captured as the place of residence, urban or rural, where student lived before joining the university.   |
| Year of study (ordinal)                                  | This was captured with the current year of study as 1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , or 6 <sup>th</sup> .  |
| Field of study (nominal)                                 | This was categorized as: Medicine and Surgery, Biochemistry; Medical Laboratory Science and Technology; Pharmacy; Nursing; and Dentistry.   |
| Socio-economic status (ordinal)                          | This was captured as: <500KES, 50,000 to 100,000 KES and >100,000KES. Participants were asked to choose the level of income that best matches their family monthly income level.  |
| HIV related stigma and discrimination attitude (ordinal) | To assess HIV related stigma and discrimination, participants were asked 8 statements that reflected positive and negative attitudes towards HIV/AIDS of which participants were asked to agree or disagree to. The maximum score was 16, sum of responses was scaled to $\geq 15$ "High Stigma"; 12-14 "Moderate Stigma", $\leq 11$ "No Stigma". The scale had a good level of internal reliability as determined by a Cronbach's alpha of 0.82 with an average inter-item covariance of 0.09. |
| Comprehensive HIV knowledge and awareness                | To assess HIV related knowledge, participants were asked 10 statements pertaining to correct and incorrect modes of   |

| <b>Variables</b>                                  | <b>Measurements of variables</b>  |
|---|---|
| (ordinal)   | transmission, preventions, cure, and treatment of HIV/AIDS.<br><br>The maximum score was 20, sum of responses was rated as $\leq 14$ “Poor”, 15-18 “Moderate” and $\geq 19$ “Good”. The scale had an acceptable level of internal reliability as determined by a Cronbach's alpha of 0.73 with an average inter-item covariance of 0.06.  |
| Perceived risk of HIV infection (binary)          | Participants were asked if they felt at risk of contracting HIV infection with the responses of “Yes” or “No”.  |
| Peer influence to go for HCT (binary)             | Participants were asked if they were likely to go for HCT if they heard that their partner, relative or classmate went for HCT. Possible responses were “Yes” or “No”.  |
| Fear of HIV test results (binary)                 | This was captured as whether the participants had fear of HIV test results or not. Possible responses were “Yes” or “No”.   |
| Health service delivery related factors (nominal) | Participants were asked how they were influenced to make a decision to go for HCT by 7 health-related factors. The possible responses for each factor were “Not influenced” or “Influenced” and during analysis each factor was individually analyzed.<br><br>The factors represented the following variables: availability of ARVs, waiting time, and quality of health services, confidentiality, and privacy at VCT site, private location of the VCT, financial cost involved and distance to the VCT site. |

### **3.7. Data collection procedure**

#### **Questionnaires**

The study questionnaire template was developed in English guided by the research objectives, and literature review. The questionnaire was then loaded onto the Open Data Kit (ODK) phone-based software for data collection. The questions on the study questionnaire were adapted from the AIDS indicator survey model individual questionnaire by WHO, (WHO, 2011). Stigma and discrimination attitude was assessed from the eight statements that reflected positive and negative attitudes towards HIV/AIDS of which participants were asked to agree or disagree adapted from the WHO tool (WHO, 2011). Each of the eight statements were individually scored as “2”=”Agree” and “1”= “Disagree” (Appedix B). In addition knowledge and awareness was also assessed from the ten statements pertaining to correct and incorrect modes of transmission, preventions, cure, and treatment of HIV/AIDS adapted from the WHO tool (WHO, 2011). Each of the ten statements were individually scored as “2” = “True” and “1” = “False” (Appedix B).

#### **Recruitment and training of the research assistant**

One research assistant supported the researcher in data collection. The research assistant was an MPH student with Nursing as a first degree. A two-day training of the data collection including pre-test was conducted before starting the data collection. To minimize deviations in data collection, the research assistant was also trained by the principal researcher on the study material content, required study procedures, filing and storage of the pre-tested questionnaire properly, with an aim to meet study objectives and ensure validity. After the principal researcher was fully satisfied with the assistant’s competency only then did they begin data collection. The principal researcher strictly adhered to an open-door policy towards the assistant to ensure they consult on any arising issues throughout data collection.

## **Setting**

The principal researcher and research assistant collected data guided by the class representatives, class timetables as well as year of study. This facilitated allocation of students between the two campuses. Data collection took place in private areas identified by participants within the campuses, which the principal researcher, research assistant, together with participants agreed on and ensured were private. Throughout the whole data collection process privacy was ensured and maintained. There were no challenges faced in collecting data as the principal researcher worked hand in hand with the class representatives on the availability of the students.

## **Data collection procedure**

The written informed consent was administered using a tablet which served as a copy for the researcher and a paper-based consent form which served as a copy for the study participants. Participants signed both the electronic and paper-based consent forms. Questionnaires were administered to students using mobile tablet devices through ODK application by the principal researcher and research assistant.

## **Data security and back up**

All mobile devices for data collection were encrypted and password protected and the mobile devices operating system automatically locked the device after 30 seconds. Backup of the collected data in each device was routinely kept encrypted on the device for security measures so that data would not be viewed by unauthorized personnel in events of uncontrolled situations such as transmission, failure or loss of device. Furthermore, backup data was protected with passwords which only the principal researcher had access to until the end of data collection and validation of all the data was done. During and after the survey, the server hosted complete backups of all survey data.

### **3.8. Quality assurance procedures**

#### **3.8.1. Pre-test of data collection tools**

A pilot study is conducted using a few respondents who are not part of the study sample but have met the inclusion criteria of the study (Brink et al., 2012). This study's pilot study was therefore carried out using a few students who met all but one-inclusion criteria, which is, university of study, to minimize contamination through the interaction of target students. The research instrument was pre-tested at the University of Nairobi, Kikuyu Campus among students from the College of Education. Once the pilot procedures were completed, all required changes in the questionnaire were made. In addition, the academic supervisors reviewed the content of the questionnaire.

#### **3.8.2. Data quality control**

Face and content validity was verified through review of research instruments by supervisors and peers. Instrument validity was assured by formulation of the research instrument according to research objectives, relevant literature review on predictors of HCT uptake, and the AIDS indicator survey model individual questionnaire by WHO. The reliability of the research instrument was assured through pilot study as well as test-re-test procedure. In the test-retest procedure, the research instrument was given to pilot participants at different times and answers were assessed for similarities.

### **3.9. Ethical considerations**

Approval to carry out this study was obtained from Kenyatta National Hospital (KNH)-University of Nairobi (UoN) Ethics and Research Committee. Moreover, permission to access participants' information was obtained from all the Deans through the office of the Principal at the College of Health Sciences.

## **Autonomy**

The researcher explained to the study participants the study purpose, the voluntary participation of all participants meaning they could withdraw their participation if they so wished without any consequences in future. Furthermore, the researcher made sure that all aspects of the study were handled in a way which was respectful of the human rights and the needs of the participants. Only those who gave written consent participated in the study.

## **Beneficence**

The researcher exercised beneficence through assessing and taking account of the risks of harm and the potential benefits of research to participants and to the wider community and in being sensitive to the welfare and interests of study participants. In this study, some questions intruded into the participants' privacy, especially during exploration of sexual experiences which were sensitive issues that had the potential to upset the participants. Therefore, the researcher carefully structured the questions so that they would not be provocative or offensive to the participants.

## **Justice**

The principles of justice in this study were maintained through the following measures: the participants were assured that the information obtained from the study would not be shared with anybody who is not directly involved with the study. Personal details such as names of all participants, were not recorded, instead, codes were used to identify the study participants. Participants were further assured that the research findings would be published, in such a way that participants would remain anonymous.

### **3.10. Data management and analysis**

Completed questionnaires were directly sent to the main server whenever transmission was possible. Thereafter, the responses from all the questionnaires were captured using Excel for

validation. The dataset was exported to STATA software version 11.2 for cleaning and coding to detect out of range and missing values. This was done using frequency tables and cross-tabulation for categorical variables and continuous variables which were summarized by means and standard deviations.

Univariable binary logistic regression analysis was carried out to obtain a preliminary insight into the unconditional association of each independent variable and dependent variable (HCT) and statistical significance was set at the p-value than 0.20 ( $P < 0.20$ ) (Dohoo, Martin, & Stryhn, 2012). However, the crude odds ratio and value results obtained from univariable analysis may not demonstrate the independent variables exact influence on the dependent variable, because the influences of other variables were not controlled.

Furthermore, to assess the net effect of each independent variable on dependent variable multivariable binary logistic regression was carried out by controlling the effects of all other intervening variables, and not to miss some significant variables. This was done by including all variables with p value less than 0.20 (20%) from the univariable analysis in the multivariable logistic regression model. Statistical significance was set at the p-value less than 0.05 ( $P < 0.05$ ). In addition, odds ratios and 95% CI estimate were used to examine the associations.

In the multivariable logistic regression, insignificant variables were subsequently removed from the models in backward stepwise fashion if their P values were  $> 0.05$  until the final model was obtained. This final model included the significant variables that influenced HCT uptake among undergraduate students at the College of Health Sciences of the University of Nairobi.

## **CHAPTER 4: STUDY RESULTS**

### **4.1 Descriptive statistics**

#### **Socio-demographic characteristics**

From the total of 390 study participants required for the study, 386 were interviewed, resulting in a response rate of 99.0%. Three of the participants refused after three attempts to interview them, and one was excluded because the participant's age was not within the age range required for this study.

As shown in Table 2, the study sample consisted of 51.1% females and 48.9% males within the age range of 17-26 years with the mean age of 21.6 (SD= 2.0) years. The majority of the participants (95.3%) were single, and three quarters of participants were Christians (75.1%). The study also found that 57.5% of the participants lived in the urban setup before joining the university, and 37.8 percent of them were from families with a monthly income of 50,000 KES to 100,000 KES. Concerning the field of study, more than half of the participants (57.3%) were studying Medicine and Surgery.



**Table 2:** Socio-demographic characteristics of study participants (N=386)

| <b>Characteristics</b>       | <b>Mean (SD)</b> | <b>Frequency n (%)</b> |
|------------------------------|------------------|------------------------|
| <b>Age (years)</b>           | 21.57 (2.0)      |                        |
| <b>Sex</b>                   |                  |                        |
| Male                         |                  | 189 (48.9)             |
| Female                       |                  | 197 (51.1)             |
| <b>Marital status</b>        |                  |                        |
| Never married                |                  | 368 (95.3)             |
| Married                      |                  | 10 (2.6)               |
| Others                       |                  | 8 (2.1)                |
| <b>Religion</b>              |                  |                        |
| Non-Christian                |                  | 80 (20.7)              |
| Christian                    |                  | 290 (75.1)             |
| Not religious                |                  | 16 (4.2)               |
| <b>Residence of origin</b>   |                  |                        |
| Urban                        |                  | 222 (57.5)             |
| Rural                        |                  | 164 (42.5)             |
| <b>Socio-economic status</b> |                  |                        |
| <50,000 KES                  |                  | 111 (28.8)             |
| 50,000KES to 100,000 KES     |                  | 146 (37.8)             |
| >100,000KES                  |                  | 129 (33.4)             |
| <b>Field of study</b>        |                  |                        |
| Nursing                      |                  | 35 (9.1)               |
| Dental                       |                  | 23 (6.0)               |
| Pharmacy                     |                  | 55 (14.3)              |
| Medicine and Surgery         |                  | 221 (57.3)             |
| Biochemistry                 |                  | 29 (7.5)               |
| Medical lab                  |                  | 23 (6.0)               |
| <b>Year of study</b>         |                  |                        |
| 1 <sup>st</sup>              |                  | 74 (19.2)              |
| 2 <sup>nd</sup>              |                  | 112 (29.0)             |
| 3 <sup>rd</sup>              |                  | 96 (24.9)              |
| 4 <sup>th</sup>              |                  | 52 (13.5)              |
| 5 <sup>th</sup>              |                  | 32 (8.3)               |
| 6 <sup>th</sup>              |                  | 20 (5.2)               |

*SD (standard deviation)*

### **Psychosocial characteristics**

Findings on psychosocial factors (Table 3) indicated that 45.6% were sexually active, and of those who were sexually active, 66.5% used condoms on their last sexual act. The examination of data further indicated that the majority of the participants (88.1%) did not pay nor were paid in exchange for sex, 88.6% did not perceive themselves at risk of contracting HIV infection, and only 11.4% perceived themselves at risk. Concerning HIV related stigma and discrimination, majority of the participants had no stigmatizing attitude towards people living with HIV/AIDS (75.4%). The mean (SD) stigma score was 15.1 (1.1). When the scores were grouped according to High Score (15-16) and Moderate (<15), the majority of participants (75.4%) had a low score which suggests that they had no stigmatizing attitude. The remaining 95 (24.6%) had moderate stigmatizing attitude towards people living with HIV/AIDS.

Participants were aware and knowledgeable about HIV/AIDS modes of transmission, prevention, and treatment. The mean (SD) HIV knowledge score was 19.1 (1.0). When the scores were grouped according to High Score (19-20) and Moderate (<18), approximately 90 (23.3%) had moderate knowledge scores whilst the remaining majority 296 participants had good knowledge as shown in Table 3.

On peer influence to go for HCT, of all the study participants, 235 (60.9%) indicated that they would go for HCT if they heard that their partners, relative or classmate had gone for HCT, and 57.3% indicated that they would not seek approval from anyone to go for HCT whilst 28.8% would seek approval from their partners, 21.5% from family which includes parents and relatives and 11.9% from friends as seen in Table 3.

**Table 3:** Psychosocial factors of study participants (N=386)

| <b>Characteristic</b>   | <b>Mean (SD)</b> | <b>Frequency n (%)</b> |
|---|------------------|------------------------|
| <b>Sexually active</b>  |                  |                        |
| Yes   |                  | 176 (45.6)             |
| No  |                  | 210 (54.4)             |
| <b>Perceived risk of HIV infection</b>                              |                  |                        |
| Yes   |                  | 44 (11.4)              |
| No  |                  | 342 (88.6)             |
| <b>Fear of HIV test results</b>                                     |                  |                        |
| Yes   |                  | 105 (27.2)             |
| No  |                  | 281 (72.8)             |
| <b>Did you use condom on last sexual act</b>                        |                  |                        |
| Yes   |                  | 117 (66.5)             |
| No  |                  | 59 (33.5)              |
| <b>Did you have sex in exchange for goods in the last 12 months</b> |                  |                        |
| Yes   |                  | 46 (11.9)              |
| No  |                  | 340 (88.1)             |
| <b>HIV related Stigma and discrimination attitude<sup>a</sup></b>   |                  |                        |
| Stigma score  | 15.1 (1.1)       |                        |
| No stigma   |                  | 291 (75.4)             |
| Moderate stigma   |                  | 95 (24.6)              |
| <b>HIV related awareness and HIV knowledge<sup>b</sup></b>          |                  |                        |
| Knowledge score   | 19.1 (1.0)       |                        |
| Good  |                  | 296 (76.7)             |
| Moderate  |                  | 90 (23.3)              |
| <b>Peer influence to go for HCT</b>                                 |                  |                        |
| Yes   |                  | 235 (60.9)             |
| No  |                  | 151 (39.1)             |
| <b>Approval to go for HCT</b>                                       |                  |                        |
| No one (none)   |                  | 221 (57.3)             |
| Partner   |                  | 111 (28.8)             |
| Family (parents and relatives)                                      |                  | 83 (21.5)              |
| Friends   |                  | 46 (11.9)              |

*SD (standard deviation)*

<sup>a</sup> *stigma score was scored from 1=Disagree and 2=Agree, with a maximum score of 16. High score indicating high level of stigma.*

<sup>b</sup> *knowledge score was scored from 1=False and 2=True, with a maximum score of 20. High score indicating high level of knowledge.*

### Health service delivery related factors influencing participants visit to HCT

Most participants reported that their decision to visit HCT was influenced by the privacy location of VCTs (92.0%), confidentiality and privacy at the VCT site (87.6%), the quality of health services (85.5%), and waiting time at the VCT site (83.2%) as seen on Table 4.

**Table 4:** Reported health service delivery related factors influencing HCT uptake (N=386)

| Characteristic                          | Influenced n (%) | Not influenced n (%) |
|---|------------------|----------------------|
| Private location of VCT                 | 355 (92.0)       | 31 (8.0)             |
| Confidentiality and privacy at VCT site | 338 (87.6)       | 48 (12.4)            |
| Quality of health services              | 330 (85.5)       | 56 (14.5)            |
| Waiting time at VCT site                | 321 (83.2)       | 65 (16.8)            |
| Availability of ART at VCT site         | 296 (76.7)       | 90 (23.3)            |
| Distance to the health facility         | 288 (74.6)       | 98 (25.4)            |
| Financial cost involved                 | 286 (74.1)       | 100 (25.9)           |

### Prevalence of HCT uptake

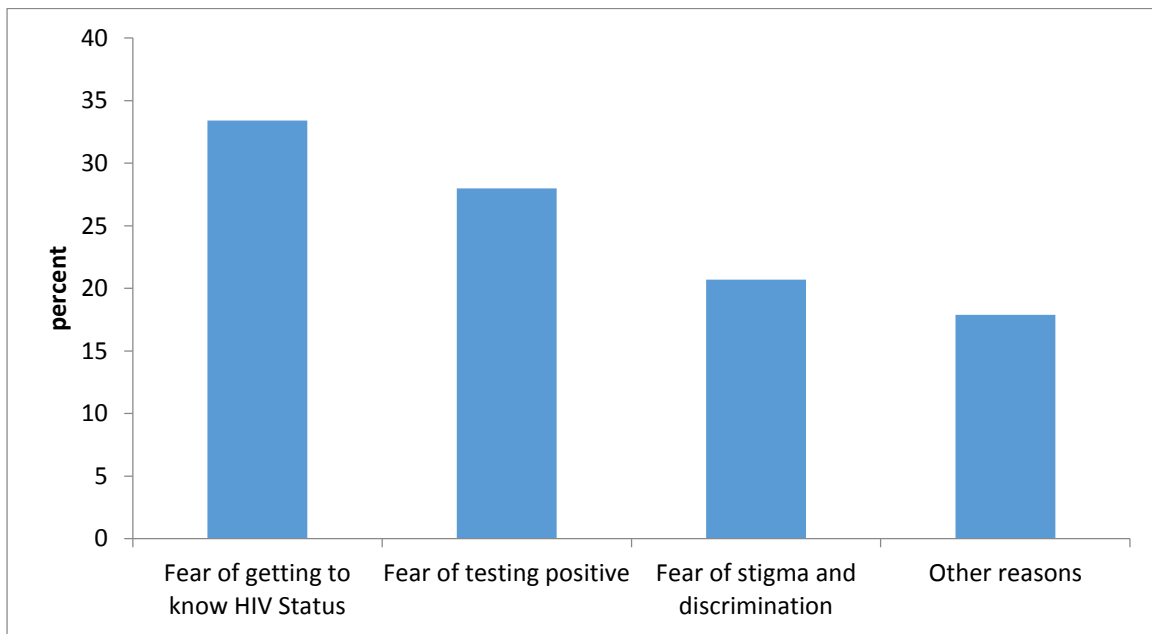
The majority of study participants reported that they were aware of where to get HCT services (93.0%) and most of them (82.1%) also indicated that they knew their HIV status. However, only 46.1% of them had tested for HIV and received their results in the past 12 months prior to the study (Table 5).

**Table 5:** HIV counselling and testing uptake among participants (N=386)

| HCT uptake variables                             | Yes n (%)  | No n (%)   |
|--|------------|------------|
| Knew where to go for VCT                         | 359 (93.0) | 27 (7.0)   |
| Knew HIV status                                  | 317 (82.1) | 69 (17.9)  |
| Had tested and got results in the past 12 months | 178 (46.1) | 208 (53.9) |

### Barriers to HCT among young people

According to participants (figure 3), young people do not go for HCT services due to fear of knowing their test results (33.4%), fear of getting a positive test results (28.0%), and fear of stigma and discrimination around HIV (20.7%). The other reasons reported were ignorance and peer pressure, lack of awareness on the importance of going for HCT and perceived lack of confidentiality and privacy at the health facilities (17.9%) as presented in Figure 3.



**Figure 3:** Perceived barriers to HCT among young people (N=386)

### **Suggestions on how to improve HCT services**

Suggestions provided by participants on how to improve HCT services are shown in Table 6. The ideas given by participants were; provision of incentives (28.2%), and increased confidentiality and privacy at the VCTs (26.7%). Other specific suggestions were provision of VCT centers within campuses just for students (14.3%), and provision of self-testing kits for free to students (10.9%). A few participants also suggested improvement of pre- and post-counselling services, creation of more awareness on the importance of going for HIV testing and eradication of stigma and discrimination (20.0%).

**Table 6:** Suggestions on improving HCT services (N=386)

| <b>Suggestions provided</b>                | <b>Frequency n (%)</b> |
|--|------------------------|
| Provision of incentives after being tested | 109 (28.2)             |
| Confidentiality and privacy at the VCT     | 103 (26.7)             |
| Provision of VCT centers within campuses   | 55 (14.3)              |
| Provision of self-testing kits to students | 42 (10.9)              |
| Other suggestions                          | 77 (20.0)              |

## 4.2. Logistic regression analyses

Based on the univariable logistic regression analyses, socio-demographic factors that were significantly associated with HCT uptake at  $p \leq 0.20$ , (Dohoo et al., 2012) were: *age* ( $OR:1.09$ ;  $95\%CI:0.99-1.21$ ;  $p=0.08$ ), and *year of study* ( $OR:1.02$ ;  $95\%CI:0.37-2.80$ ;  $p=0.013$ ), as shown in Table 7.

**Table 7:** Univariable logistic regression analysis of socio-demographic factors affecting HCT uptake among undergraduate students (N=386)

| Characteristics            | Crude Odds Ratio | 95% CI Lower - Upper | LRT p-value   |
|----------------------------|------------------|----------------------|---------------|
| <b>Age (years)</b>         | 1.09             | 0.99 - 1.21          | <b>0.08*</b>  |
| <b>Sex</b>                 |                  |                      |               |
| Male                       | ref              |                      |               |
| Female                     | 1.01             | 0.67 - 1.50          | 0.97          |
| <b>Marital status</b>      |                  |                      |               |
| Never married              | ref              |                      |               |
| Married                    | 1.77             | 0.49 - 6.36          | 0.59          |
| Others                     | 0.71             | 0.17 - 2.99          |               |
| <b>Religion</b>            |                  |                      |               |
| Non-Christian              | ref              |                      |               |
| Christian                  | 1.34             | 0.81 - 2.22          | 0.36          |
| Not religious              | 1.93             | 0.65 - 5.70          |               |
| <b>Residence of origin</b> |                  |                      |               |
| Urban                      | 0.83             | 0.55 - 1.24          | 0.37          |
| Rural                      | ref              |                      |               |
| <b>Income level</b>        |                  |                      |               |
| <50 000 KES                | ref              |                      |               |
| 50 000KES-100 000 KES      | 0.73             | 0.45 - 1.20          | 0.29          |
| >100 000KES                | 0.68             | 0.41 - 1.13          |               |
| <b>Field of study</b>      |                  |                      |               |
| Nursing                    | ref              |                      |               |
| Dental                     | 0.86             | 0.29 - 2.50          |               |
| Pharmacy                   | 0.96             | 0.41 - 2.26          |               |
| Medicine                   | 1.27             | 0.62 - 2.61          | 0.82          |
| Biochemistry               | 1.24             | 0.46 - 3.35          |               |
| Medical lab                | 0.86             | 0.29 - 2.50          |               |
| <b>Year of study</b>       |                  |                      |               |
| 1st                        | ref              |                      |               |
| 2nd                        | 0.35             | 0.19 - 0.64          |               |
| 3rd                        | 0.55             | 0.29 - 1.02          |               |
| 4 <sup>th</sup>            | 0.58             | 0.29 - 1.20          | <b>0.013*</b> |
| 5 <sup>th</sup>            | 0.77             | 0.34 - 1.78          |               |
| 6 <sup>th</sup>            | 1.02             | 0.37 - 2.80          |               |

\*Significant variable at  $p < 0.20$  Likelihood Ratio Test (LRT)

Among the psychosocial factors (Table 8) the ones that were significantly associated with HCT in univariable logistic regression at  $p \leq 0.20$ , (Dohoo et al., 2012) were *sexually active* ( $OR:2.04$ ;  $95\%CI:1.36-3.07$ ;  $p < 0.01$ ), and *peer influence to go for HCT* ( $OR:1.53$ ;  $95\%CI:1.01-2.31$ ;  $p=0.043$ ).

**Table 8:** Univariable logistic regression analysis of psychosocial factors affecting HCT uptake among undergraduate students (N=386)

| Characteristics   | Crude      | 95% CI        | LRT           |
|---|------------|---------------|---------------|
|   | Odds Ratio | Lower - Upper | p-value       |
| <b>Sexually active</b>  |            |               |               |
| Yes   | 2.04       | 1.36 - 3.07   | <b>0.001*</b> |
| No  | ref        |               |               |
| <b>Perceived risk of HIV infection</b>                              |            |               |               |
| Yes   | 1.32       | 0.70 - 2.48   | 0.38          |
| No  | ref        |               |               |
| <b>Fear of HIV test results</b>                                     |            |               |               |
| Yes   | 0.83       | 0.53 - 1.31   | 0.43          |
| No  | ref        |               |               |
| <b>Did you use condom on last sexual act</b>                        |            |               |               |
| Yes   | 1.02       | 0.54 - 1.91   | 0.96          |
| No  | ref        |               |               |
| <b>Did you have sex in exchange for goods in the last 12 months</b> |            |               |               |
| Yes   | 1.55       | 0.82 - 2.93   | 0.62          |
| No  | ref        |               |               |
| <b>HIV related Stigma and discrimination<sup>a</sup></b>            |            |               |               |
| No stigma   | ref        |               |               |
| Moderate stigma   | 0.76       | 0.48 - 1.22   | 0.25          |
| <b>HIV related awareness and knowledge<sup>b</sup></b>              |            |               |               |
| Good  | 1.23       | 0.76 - 1.98   | 0.40          |
| Moderate  | ref        |               |               |
| <b>Peer influence to go for HCT</b>                                 |            |               |               |
| Yes   | 1.53       | 1.01 - 2.31   | <b>0.04*</b>  |
| No  | ref        |               |               |

\* Significant variable at  $p < 0.20$

Likelihood Ratio Test (LRT)

<sup>a</sup> stigma score was scored from 1=Disagree and 2=Agree, with a maximum score of 16. High score indicating high level of stigma.

<sup>b</sup> knowledge score was scored from 1=False and 2=True, with a maximum score of 20. High score indicating high level of knowledge.



The reported health service delivery related factors influencing participants to visit HCT (Table 9) which were significantly associated with HCT uptake at  $p \leq 0.20$ , (Dohoo et al., 2012) were: *waiting time at the VCT site* (OR:1.46; 95%CI:0.48-2.51;  $p=0.173$ ), *confidentiality and privacy at the VCT site* (OR:1.49; 95%CI:0.80-2.79;  $p=0.19$ ), and *private location of VCT site* (OR:6.4; 95%CI:2.22-18.93;  $p < 0.01$ ). Other related characteristics showed no effect on the uptake of HCT.

**Table 9:** Univariable logistic regression analysis of health service delivery related factors affecting HCT uptake among undergraduate students (N=386)

| Variable                                       | Crude<br>Odds Ratio | 95% CI<br>Lower - Upper | LRT<br>p-value |
|--|---------------------|-------------------------|----------------|
| <b>Availability of ART at VCT site</b>         |                     |                         |                |
| Influenced                                     | 1.30                | 0.80 - 2.10             | 0.28           |
| Not influenced                                 | ref                 |                         |                |
| <b>Waiting time at the VCT site</b>            |                     |                         |                |
| Influenced                                     | 1.46                | 0.84 - 2.51             | <b>0.17*</b>   |
| Not influenced                                 | ref                 |                         |                |
| <b>Quality of health services at VCT site</b>  |                     |                         |                |
| Influenced                                     | 1.07                | 0.61 - 1.89             | 0.81           |
| Not influenced                                 | ref                 |                         |                |
| <b>Confidentiality and privacy at VCT site</b> |                     |                         |                |
| Influenced                                     | 1.49                | 0.80 - 2.79             | <b>0.19*</b>   |
| Not influenced                                 | ref                 |                         |                |
| <b>Distance to the VCT site</b>                |                     |                         |                |
| Influenced                                     | 1.13                | 0.71 - 1.79             | 0.61           |
| Not influenced                                 | ref                 |                         |                |
| <b>Private location of the VCT</b>             |                     |                         |                |
| Influenced                                     | 6.49                | 2.22 - 18.93            | <b>0.001*</b>  |
| Not influenced                                 | ref                 |                         |                |
| <b>Financial cost involved</b>                 |                     |                         |                |
| Influenced                                     | 1.25                | 0.79 - 1.98             | 0.34           |
| Not influenced                                 | ref                 |                         |                |

\*Significant variable at  $p < 0.20$ .

Likelihood Ratio Test (LRT)

The seven variables: *age, year of study, sexually active, peer influence to go for HCT, waiting time at the VCT site, confidentiality and privacy at the VCT site* and *private location of the VCTs* were statistically significantly associated with HCT uptake in the univariable analysis were fed into the multivariable logistic regression model.

In the multivariable model (Table 10) only four variables: *private location of VCT, sexually active, peer influence to go for HCT, and year of study* remained statistically significant predictors of HCT uptake in this study at p value of <0.05.

The rate of HCT uptake increased with VCT site being privately located. Participants whose decision making to go for HCT was influenced by the private location of the VCT site were 8.09 times more likely to go for HCT (AOR:8.09; 95%CI:2.66-24.57; p<0.01) compared to those who were not influenced by the location of VCT, controlling for year of study, sexually active and peer influence to undergo HCT.

Participants who were sexually active were 2.05 times more likely to undergo HCT testing (AOR:2.05; 95%CI:1.32-3.18; p<0.01) compared to those who were not sexually active controlling for year of study, peer influence to undergo HCT, and private location of VCT site. Furthermore, participants who were influenced by their peers were, 1.57 times more likely to go for HCT (AOR:1.57; 95%CI:1.01-2; p=0.05) compared to those who were not controlling for year of study, sexually active, and private location of VCT site.

Participants from final year (6<sup>th</sup> year) were more likely to go for HCT visits than those at the beginning of the academic programme (AOR:0.77; 95%CI:0.25-2.28; p=0.03) controlling for sexually active, peer influence to undergo HCT and private location of VCT site.

**Table 10:** Multivariable logistic regression analysis of the predictors of HCT uptake among undergraduate students (N=386)

| <b>Characteristics</b>              | <b>Adjusted Odds Ratio</b> | <b>95% CI Lower - Upper</b> | <b>p-value</b> |
|-------------------------------------|----------------------------|-----------------------------|----------------|
| <b>Private location of VCT</b>      |                            |                             |                |
| Influenced                          | 8.09                       | 2.66 - 24.57                | 0.0000         |
| Not influenced                      | ref                        |                             |                |
| <b>Sexually active</b>              |                            |                             |                |
| Yes                                 | 2.05                       | 1.32 - 3.18                 | 0.001          |
| No                                  | ref                        |                             |                |
| <b>Year of study</b>                |                            |                             |                |
| 1st                                 | ref                        |                             |                |
| 2nd                                 | 0.27                       | 0.14 - 0.52                 | 0.030          |
| 3rd                                 | 0.42                       | 0.22 - 0.83                 |                |
| 4th                                 | 0.43                       | 0.19 - 0.89                 |                |
| 5th                                 | 0.53                       | 0.22 - 1.31                 |                |
| 6th                                 | 0.77                       | 0.25 - 2.28                 |                |
| <b>Peer influence to go for HCT</b> |                            |                             |                |
| Yes                                 | 1.57                       | 1.01 - 2.43                 | 0.045          |
| No                                  | ref                        |                             |                |

*Significant variables at p value of 0.05*

## **CHAPTER 5: DISCUSSION, CONCLUSION, AND RECOMMENDATIONS**

### **5.1. Discussion**

The main objective of this study was to determine factors associated with the uptake of HIV counselling and testing among undergraduate students at the College of Health Science at the University of Nairobi. The prevalence of HCT uptake in the last 12 months prior the study among university students at the College of Health Science in this study was only 46.1%. Majority of participants (93.0%), however knew where to go for HCT services. A study on HCT uptake among students at the universities of Nairobi, Egerton, Daystar, and African Nazarene in Kenya reported a HCT uptake prevalence of 50.7% (Mwangi et al., 2014). The reported prevalence of HCT uptake in this study is slightly high compared to 35.4% among undergraduate students at Bahidar University in Ethiopia (Fikadie et al., 2014), 34.6% among health care professional students in Tanzania (Charles et al., 2009), and 30.4% among university students in Nigeria (Abiodun et al., 2014). The poor uptake of HCT may imply that the university students have the potential to unknowingly infect others with HIV related diseases. Although fear associated with knowing the HIV test results was not significantly associated with HCT uptake, participants in this study mentioned it as one of the main barriers to HCT uptake. Similar findings on fear and HCT uptake were reported from Zimbabwe (Sambisa, 2008).

In this study, factors that were independently associated with the uptake of HIV counselling and testing among undergraduate students at the College of Health Science at the University of Nairobi were; privacy of the location of VCTs, peer influence, the duration in the academic programme, and whether the participants were sexually active or not. Participants were more likely to go for HCT if the VCT location was privately located. These findings on the privacy of the VCT location could be attributed to fear of stigmatization by peers (Sanga et al., 2015). In this study, however, there was no statistically significant association between

stigmatization and HCT uptake. It is therefore possible that students in this study preferred private VCT location compared to the public facilities within the university where they also conduct their clinical practices. These findings are supported by systematic review study work in Sub-Saharan Africa by Musheke et al., (2013) which explained that perceived poor location of HIV testing site is associated with low HCT uptake as it brings negative connotations such as being labelled HIV positive, sexually active or being infected by other STIs.

Being sexually active was also significantly associated with HCT uptake in this study. These findings suggest that individuals who are sexually active perceived themselves to be at a higher risk of contracting HIV infection, hence they are more likely to go for HCT. Participants who were sexually active were 2.05 times more likely to have undergone HCT in the last 12 months prior to the study compared to those who were not. Similar findings were reported from Sub-Saharan Africa and Ethiopia (Asaolu et al., 2016; Tsegay et al., 2013).

The HCT uptake among participants also increased with the year of study. Participants from the final year (6<sup>th</sup> year) were more likely to go for HCT visits than those at the beginning of the academic programme. Although these findings might be attributed to the increase in source and access to HIV related information, there was no statistical significant association between HIV-related awareness and HCT uptake, despite the reported high level of awareness about HIV/AIDS modes of transmission, preventions and treatment. The increase in HCT uptake with the students' duration in the medical education programme could therefore be attributed to independence, freedom, as well as sexual maturity accompanied by possibility of more relations with opposite sex that may lead to heightened sexual activities which tend to increase with the length of stay on campus, subsequently increasing perceived risk to HIV infection. Similar findings were reported from Ethiopia. It was suggested that as students stay longer on campus, the HIV exposure risk perception increases and thus senior students are

likely to have increased access to VCT related information compared to first year students (Fikadie et al., 2014).

Although only slightly more than half of participants (57.3%) indicated that they would not seek approval from anyone when going for HCT services, peer influence was posit associated with HCT uptake in this study. It is possible that peer pressure or family influence may help one to gather courage and strength to go for VCT. Individuals with supportive families and friends have been known to have a higher HCT uptake compared to those who lack support from families and friends (Fikadie et al., 2014). Peers have also been known to be the primary sources of information on HIV infection and HCT (Fikadie et al., 2014; Lubogo et al., 2015). Hence, individuals whose family members and friends have previously visited VCT sites are more likely to go for HCT.

There was no statistical significant association between HCT uptake and participants' demographic and socio-economic factors of age, sex, religion, residence, socio-economic status, and marital status. These findings are consistent with previous studies conducted in Tanzania, Ethiopia, and Thailand among university students (Charles et al., 2009; Fikadie et al., 2014; Khawcharoenporn et al., 2016; Tsegay et al., 2013). Furthermore, specific disciplines were not associated with HCT uptake, and probably due to the fact that participants had the same medical educational background. Similar observations have been made in Tanzania (Charles et al., 2009).

Among the health service delivery factors, only privacy of the VCT location was significantly associated with HCT uptake. Perceived confidentiality and privacy at the VCT site and HCT uptake were not significantly associated. However, 87.7% of the participnats were influenced by confidentiality and privacy at VCT site, this indicates that lack of confidentiality and privacy at VCT site could be an obstacle to HCT uptake. Similar findings were reported from

Ethiopia (Tsegay et al., 2013). The influence of quality of HIV testing services offered at the VCT site was also not associated with the uptake of HCT. Most of participants (85.5%) indicated that they were influenced by the perceived quality of health services offered at the VCTs. This may stipulate that poor quality of health services offered at VCTs could cause a reduction on the number of participants' turn up for HCT. Similar results were observed in a related systematic review study conducted in Sub-Saharan Africa (Musheke et al., 2013). Furthermore, majority of participants (83.2%) self-reported that short waiting time at VCT determined their desire to go for HCT, however the influence did not make a difference in the uptake of HCT. This may suggest that perceived long waiting time at the VCTs could result in low uptake of HCT. These findings are in sync with findings from Tanzania and Zimbabwe (Meremo et al., 2016; Sambisa, 2008). Knowing that ART was available at the VCT site was also not associated with HCT uptake in this study. However, majority of participants (76.7%) appeared to have been influenced by the knowledge of the availability of ART. This may indicate that lack of ART availability at the VCT site, may result in the reduction of HCT uptake. Similar results were noted in Ethiopia (Tsegay et al., 2013).

## **5.2. Strengths and weaknesses of the Study**

This study fills a gap in research in the area of HCT uptake among university students and the factors that influence the HCT uptake. However, the interpretation of the findings and conclusions should be based on the following limitations: self-reported data, environmental exposure, type of data collected and study population.

Firstly, the study findings were based on self-reported information. The research team however, assured participants that their HIV testing results and status were not required in the study. Secondly, the study did not investigate the environmental exposures such as needlestick injuries which could increase the participants' perception as well as actual risk to contracting HIV infections. Thirdly, only quantitative data was collected in this study.

Similar and subsequent studies should collect both qualitative and quantitative data to enrich the findings on HCT uptake through triangulation of research methods. Forthly, findings from this study may only be generalized to undergraduate student populations of health sciences faculty who are knowledgeable about HIV/AIDS.

### **5.3. Conclusion**

Almost all students at the College of Health Sciences, University of Nairobi were aware of where to go for HCT services, however, only less than half of them went for HCT. The factors that were independently associated with HCT uptake were: privacy of the location of VCT centers, being sexually active, peer influence and the duration in the academic programme. Findings from this study suggested that privacy of the VCT location was the most significant factor that facilitated the HCT uptake among the study participants. The possible barriers to the uptake of HCT among the study population were suggested as fear of getting tested for HIV and getting positive HIV test results.



#### **5.4. Recommendations**

In order to help increase the HCT uptake among the students at the College of Health Sciences, the University of Nairobi should:

1. Ensure that the VCT centers are privately located to attract more students to go for HCT services.
2. Identify and train smaller groups of students from each school as volunteer peer counsellors to promote voluntary HCT at the College of Health Sciences.
3. The delivery of pre-and post-counselling services at the VCT centers should be encouraged to minimize fear associated with the HIV test results.
4. Future qualitative research is also suggested on this topic for an in-depth understanding of the barriers and facilitators of HCT uptake at the College of Health Sciences where students already have background knowledge on HIV/AIDS.

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## **APPENDICES**

### **A: CONSENT FORM**

**Title of Study:** Predictors of HIV counselling and testing uptake among undergraduate students at the College of Health Sciences of University of Nairobi, Kenya.

**Principal Researcher:** Paulina Ndangi Kalimbo

**Institution:** University of Nairobi, School of Public Health

**Phone number:** +254743224819; **E-mail address:** [paulinakalimbo@gmail.com](mailto:paulinakalimbo@gmail.com)

#### **Introduction:**

I would like to tell you about a study being conducted by Paulina N Kalimbo, a Master of Public Health Student at the School of Public Health, University of Nairobi. The purpose of this consent form is to provide you with the information you will need to help you decide whether or not to be a participant in the study. Feel free to ask any questions about the purpose of the research, what happens if you participate in the study, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When we have answered all your questions to your satisfaction, you may decide to be in the study or not. This process is called 'informed consent'. Once you understand and agree to be in the study, I will request you to sign your name on this form. You should understand the general principles, which apply to all participants in a medical research: i) your decision to participate is voluntary. ii) You may withdraw from the study at any time without necessarily giving a reason for your withdrawal iii) Refusal to participate in the research will not affect the services you are entitled to in this health facility or other facilities. We will give you a copy of this form for your records.

**May I continue? YES /NO**

This study has approval by The Kenyatta National Hospital-University of Nairobi Ethics and Research Committee Protocol No. \_\_\_\_\_

### **WHAT IS THIS STUDY ABOUT?**

The investigator listed above is interviewing undergraduate students at the College of Health Sciences of University of Nairobi. The purpose of the interview is to determine factors that influence the uptake of HIV counselling and testing among young people, which includes the students. Participants in this research study will be asked questions about their sociodemographic characteristics, psychological characters as well as they experience with the health services rendered to them in relation with HIV counselling and testing using a validated questionnaire. There will be approximately 390 participants who will be randomly selected within the campus to participate in the study. We are asking for your consent to consider participating in this study.

### **WHAT WILL HAPPEN IF YOU DECIDE TO BE IN THIS RESEARCH STUDY?**

If you agree to participate in this study, the following things will happen:

You will be interviewed by a trained interviewer in a private area where you feel comfortable answering questions. The interview will last approximately 20 Minutes.

### **ARE THERE ANY RISKS, HARMS DISCOMFORTS ASSOCIATED WITH THIS STUDY?**

Medical research has the potential to introduce psychological, social, emotional and physical risks. One potential risk of being in the study is loss of privacy. We will keep everything you tell us as confidential as possible. We will use a code number to identify you in a password-protected computer database and will keep all of our paper records in a locked file cabinet. However, no system of protecting your confidentiality can be absolutely secure, so it is still possible that someone could find out you were in this study and could find out



information about you. Also, answering questions in the interview may be uncomfortable for you. If there are any questions you do not want to answer, you can skip them. You have the right to refuse the interview or any questions asked during the interview.

We will do everything we can to ensure that this is done in private.

**ARE THERE ANY BENEFITS BEING IN THIS STUDY?**

There is no direct benefit to you from participating in the study. However, your responses will help us to determine factors that influences the uptake of HIV counselling and testing which is a vital component in HIV/AIDS epidemic control. The results from this study will provide a better understanding of barriers and enablers to HIV counselling and testing uptake which generally inform students on how to improve HIV counselling and testing uptake.

**WILL BEING IN THIS STUDY COST YOU ANYTHING?**

Participating in this study will not cost you anything apart from the 20 minutes or so of your time.

**WILL YOU GET REFUND FOR ANY MONEY SPENT AS PART OF THIS STUDY?**

We shall not provide any monetary refund for participating in the study.

**WHAT IF YOU HAVE QUESTIONS IN FUTURE?**

If you have further questions or concerns about participating in this study, please call or send a text message to the investigator at the number provided at the bottom of this page. For more information about your rights as a research participant you may contact the Secretary/Chairperson, Kenyatta National Hospital-University of Nairobi Ethics and Research Committee Telephone No. 2726300 Ext. 44102 email: uonknh\_erc@uonbi.ac.ke.

**WHAT ARE YOUR OTHER CHOICES?**

Your decision to participate in research is voluntary. You are free to decline participation in the study and you can withdraw from the study at any time without injustice or loss of any benefits.

## **CONSENT FORM (STATEMENT OF CONSENT)**

### **Participant's statement**

I have read this consent form or had the information read to me. I have had the chance to discuss this research study with a study counselor. I have had my questions answered in a language that I understand. The risks and benefits have been explained to me. I understand that my participation in this study is voluntary and that I may choose to withdraw any time. I freely agree to participate in this research study.

I understand that all efforts will be made to keep information regarding my personal identity confidential.

---

(Signature of Participant)

---

(Date)

---

(Participant's name – printed)

### **Statement of Person Who Obtained Consent**

The information in this document has been discussed with the participant or, where appropriate, with the participant's legally authorized representative. The participant has indicated that he or she understands the risks, benefits, and procedures involved with participation in this research study.

---

(Signature of Person who Obtained Consent)

---

(Date)

---

(Name of Person who Obtained Consent - printed)

## B: QUESTIONNAIRE

Instructions:

- Please complete the questionnaire in full.
- Choose one appropriate answer by using a tick and write where it is required.

Questionnaire number (FOR OFFICE USE ONLY)

|  |
|--|
|  |
|--|

### Survey Information

Location and date:

Campus name

Date

|  |  |
|--|--|
|  |  |
|--|--|

|                |  |                |  |
|----------------|--|----------------|--|
| Interviewer ID |  | Participant ID |  |
|----------------|--|----------------|--|

Has consent obtained?

|     |  |    |  |
|-----|--|----|--|
| Yes |  | No |  |
|-----|--|----|--|

If NO, END SURVEY

### SECTION A: RESPONDENT DEMOGRAPHIC INFORMATION

1. How old are you? (Age in years)

|  |
|--|
|  |
|--|

2. Sex

|        |  |      |  |
|--------|--|------|--|
| Female |  | Male |  |
|--------|--|------|--|

3. What is your date of birth? (dd-mm-year)

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|--|--|--|--|

4. What is your marital status?

|                                       |  |
|---------------------------------------|--|
| Single (never married)                |  |
| Married                               |  |
| Living with the partner (cohabiting)  |  |
| Others (separated, Widowed, divorced) |  |

5. What is your religion?

|             |  |
|-------------|--|
| Orthodox    |  |
| Protestant  |  |
| Catholic    |  |
| Muslim      |  |
| Christian   |  |
| No religion |  |
| Others      |  |

6. What is your residence of origin?

|       |  |       |  |
|-------|--|-------|--|
| Urban |  | Rural |  |
|-------|--|-------|--|

7. What Year of study are you currently?

|                         |  |                         |  |                          |  |             |  |                         |  |                         |  |
|-------------------------|--|-------------------------|--|--------------------------|--|-------------|--|-------------------------|--|-------------------------|--|
| 1 <sup>st</sup><br>year |  | 2 <sup>nd</sup><br>year |  | 3 <sup>rd</sup> y<br>ear |  | 4th<br>year |  | 5 <sup>th</sup><br>year |  | 6 <sup>th</sup><br>year |  |
|-------------------------|--|-------------------------|--|--------------------------|--|-------------|--|-------------------------|--|-------------------------|--|

8. What is your field of study?

|   |  |
|---|--|
| Nursing science                           |  |
| Dental science                            |  |
| Pharmacy science                          |  |
| Medicine and Surgery science              |  |
| Biochemistry science                      |  |
| Medical laboratory science and technology |  |

9. Please choose the level of income that best match with your family monthly income level

|             |  |                             |  |                |  |
|-------------|--|-----------------------------|--|----------------|--|
| <50 000 KES |  | 50 000KES to<br>100 000 KES |  | >100<br>000KES |  |
|-------------|--|-----------------------------|--|----------------|--|

### SECTION B: PSYCHOSOCIAL PROFILE

The following questions are sensitive, but I would like to assure you about your privacy will not be violated in any way, therefore try to give your honest answers.

10. Do you know where to go for HIV counselling and testing?

|     |  |    |  |
|-----|--|----|--|
| Yes |  | No |  |
|-----|--|----|--|

11. Do you have any fear of getting your HIV test results?

|     |  |    |  |
|-----|--|----|--|
| Yes |  | No |  |
|-----|--|----|--|

12. Do you know your HIV status?

|     |  |    |  |
|-----|--|----|--|
| Yes |  | No |  |
|-----|--|----|--|

If no, why?

|  |
|--|
|  |
|--|

13. I do not want to know your HIV status, but have you ever gone for a HIV counselling and testing and received your results in the past 12 months?

|     |  |    |  |
|-----|--|----|--|
| Yes |  | No |  |
|-----|--|----|--|

Now I would like to ask some questions about your sexual activity in order to gain a better understanding of some important life issues. Again, I would like to assure you about your privacy will not be violated in any way, therefore try to give your honest answers.

14. Perceived risk of HIV infection

The following questions please indicate yes or no

| Questions   | Yes | No |
|---|-----|----|
| Are you sexually active?  |     |    |
| The last time you had sexual intercourse, was a condom used?  |     |    |
| Do you think there may be a chance that you may also be infected with HIV?                            |     |    |
| Can a health looking person be still infected by HIV?   |     |    |
| Do you think a one-night stand of unprotected sex is enough to infect someone with HIV?               |     |    |
| Can alcohol and drug abuse be a risk of HIV infection transmission?                                   |     |    |
| Are University students at high risk of getting HIV from sugar daddies/mammies?                       |     |    |
| In the last 12 months, did you pay anyone or were you paid in exchange for having sexual intercourse? |     |    |

Now I would like to ask few questions about HIV/AIDS in order to gain a better understanding on your HIV knowledge and awareness.

15. The following statements are either true or false about HIV transmission

| <b>Statements</b>   | <b>True</b> | <b>False</b> |
|---|-------------|--------------|
| HIV cannot be transmitted by handshaking or kissing                 |             |              |
| HIV can be transmitted through breastfeeding                        |             |              |
| HIV can be transmitted from a mother to her unborn child            |             |              |
| HIV can be transmitted through blood transfusion                    |             |              |
| Men having sex with men are at a very high risk to getting infected |             |              |
| Circumcision reduces the risk of HIV infection                      |             |              |
| Having unprotected sex increases the risk of HIV infection          |             |              |
| Unprotected sex does expose one to HIV infection                    |             |              |
| Condoms are not useful in preventing HIV as they have small holes   |             |              |
| Having only one faithful partner reduces risk of HIV infection      |             |              |

Now I would like to ask some questions about HIV/AIDS in order to gain a better understanding on HIV related stigma and discrimination issues:

16. Do you agree, disagree with the following statements:

| <b>Statements</b>   | <b>Agree</b> | <b>Disagree</b> |
|---|--------------|-----------------|
| People living with HIV could have avoided HIV if they wanted  |              |                 |
| People living with HIV should feel ashamed of themselves      |              |                 |
| People living with HIV should not be respected in the society |              |                 |
| I would not buy vegetables from a shopkeeper living with HIV  |              |                 |
| Children with HIV should attend separate schools from those   |              |                 |



|  |  |  |
|--|--|--|
| without  |  |  |
| I would be ashamed if someone in my family or friend had HIV                         |  |  |
| Female or male lecturers living with HIV should not be allowed to continue lecturing |  |  |
| You can contract HIV if you come in contact with saliva of a person living with HIV  |  |  |

Now I would like to ask you questions related to your social support and networking:

17. If you were to go for HIV Counselling and test from who would you seek approval? Indicate with an X all applicable

| <b>Options</b> | <b>Indicate with X</b> |
|----------------|------------------------|
| My partner     |                        |
| My parents     |                        |
| My friends     |                        |
| My relatives   |                        |
| My classmates  |                        |
| My neighbours  |                        |
| None           |                        |

18. Are you likely to go for HCT if you heard that your partner, relative, or classmate went for HCT?

|     |  |    |  |
|-----|--|----|--|
| Yes |  | No |  |
|-----|--|----|--|

**SECTION C: HEALTH SERVICE DELIVERY PROFILE**

Now I would like to ask a few questions about your experience at the health facilities.

19. In regards to Health service delivery at VCT how the following statement did influence you in decisions making to go for HCT? Indicate not influenced or influenced

| <b>Statements</b>   | <b>Not influenced</b> | <b>Influenced</b> |
|---|-----------------------|-------------------|
| Knowing that ARVs are available if you test positive  |                       |                   |
| Friendly health care providers who are willing to help within a short time                            |                       |                   |
| Highly maintained confidential and privacy  |                       |                   |
| High quality counselling and testing services by complete and confident health care providers at VCT. |                       |                   |
| Zero payment of transportation and testing services   |                       |                   |
| Short distance to the health facility   |                       |                   |
| Secretly located VCT site   |                       |                   |

20. What do you think is the reason why most young people do not go for HIV counselling and testing?

21. How do you think HCT services can be improved to make students readily want to be tested?

## C: LITERATURE REVIEW TABLE

### LITERATURE REVIEW SUMMARY TABLE

| Title author (s)   | Research questions   | Study design          | Study population  | Sample size   | Key findings predictors of VCT   |
|--|--|-----------------------|---|---------------|--|
| Abiodun, O.<br>Sotunsa, J.<br>Ani, F.<br>Jaiyesimi, E.   | What is the knowledge and predictors of HIV and AIDS among undergraduate students of a privately-owned university in Nigeria?                | Cross-Sectional study | University students selected by 2-stage random sampling technique using self-administered questionnaire.  | 1250 students | 95% of the participants knew where to get an HIV test done, only 30.4% had tested for HIV within the six months preceding the study. However, 72.2% of them were willing to test for HIV.                            |
| Asaolu, I. O.<br>Gunn, J. K.<br>Center, K. E.<br>Koss, M. P.<br>Iwelunmor, J. I..<br>Ehiri, J. E.                      | What are the factors that influence uptake of HIV testing and counselling among youth aged 15±24 years in sub-Saharan Africa?                | Cross-sectional study | Youth in Sub-Saharan Africa aged 15-24 years  | 23,367 youth  | VCT uptake was 36.5%. Fewer demonstrated comprehensive knowledge of HIV/AIDS. There was a significant association between HCT and respondents' gender, age, age at sexual debut, and comprehensive knowledge of HIV. |
| Charles, M. P.<br>Kweka, E. J.<br>Mahande, A. M.,<br>Barongo, L. R.<br>Shekalaghe. S.<br>Nkya, H. M.<br>Mahande, M. J. | What is the uptake and attitude to voluntary counseling and testing among health care professional students in Kilimanjaro region, Tanzania? | Cross-sectional study | Health care professional students aged 18-25 years who were enrolled in degrees, diplomas and certificates courses at Kilimanjaro Christian Medical | 420 students  | Awareness of VCT services and willingness to test is high among students; however its uptake is low. All respondents were aware of the benefits of VCT. VCT uptake was 34.6%. About 19.1% of the                     |

| Title author (s)   | Research questions   | Study design                       | Study population   | Sample size       | Key findings predictors of VCT  |
|--|--|------------------------------------|--|-------------------|---|
|  |  |                                    | College and all other Allied health schools.   |                   | students had negative for health care professional to attend VCT. Risk perception among the students was low even though they were found to have higher risk behaviors.   |
| Chimoyi, L. Tshuma, N. Muloongo, K., Setswe, G., Sarfo, B., & Nyasulu, P. S. | To determine the level of HIV/AIDS knowledge, attitudes, and perceptions and to explore factors associated with the use of HCT services among a commuter population.         | Avenue-based cross-sectional study | Commuter population survey in the inner city of Johannesburg, South.                       | 1,146 respondents | The overall HIV/AIDS knowledge was generally high. Gender-specific health education and HIV intervention programmes are needed for improved access to HCT services.   |
| Djibuti, M., Zurashvili, T. Kasrashvili, T. Berg, C. J.                      | What are the factors associated with HIV counseling and testing behavior among undergraduates of universities and vocational technical training schools in Tbilisi, Georgia? | Cross-sectional survey             | 1,879 secondary and post-secondary school students aged 15 to 24 years in Tbilisi, Georgia | 1,879 students    | The vast majority (95.6%) of participants never received HCT. In the multivariate regression model, significant predictors of lifetime receipt of HCT included being married, not having HIV stigmatized attitude, more often reading fiction literature, more often going out in the evenings, and more often passing time with friends. |

| <b>Title author (s)</b>                                 | <b>Research questions</b>   | <b>Study design</b>   | <b>Study population</b>                       | <b>Sample size</b>   | <b>Key findings predictors of VCT</b>   |
|---|---|-----------------------|---|--|---|
| Fikadie, G.<br>Bedimo, M.<br>Alamrew, Z.                | What is the prevalence of Voluntary Counseling and Testing Utilization and Its Associated Factors among Bahirdar University Students?   | Cross-sectional study | Students of Bahirdar University in Ethiopia.  | 801 students.  | The major factors identified for increased VCT service utilization were having a friend who got VCT, having discussion about HIV/AIDS with family, origin of residence, year of study, and having boy- or girlfriend.   |
| Gazimbi, M. M.<br>Magadi, M. A.                         | What are the individual and community-level determinants of HIV testing, focusing on predisposing, enabling and perceived need factors? | Cross-sectional study | Women and men in Zimbabwe (Aged 15-59 years). | 17,797 women and 14,587 men from the 2005/6 and 2010/11 Zimbabwe Demographic and Health Surveys. | There were gender disparities in determinants of HIV testing.   |
| Gebremedhin, S. A.,<br>Youjie, W.<br>Tesfamariam, E. H. | What are the predictors of HIV/AIDS Knowledge and Attitude among Young Women of Nigeria and Democratic Republic of Congo?               | Cross-sectional study | Young women (aged 15-24 years).               | Sample size not specified  | The study identified, universal awareness, substantial gap in HIV/AIDS knowledge and negative attitude towards PLWHA among young women in Nigeria and DRC. Age, place of residence, education and wealth index were significantly associated with HIV/AIDS knowledge and acceptance attitude towards PLWHA. |

| <b>Title author (s)</b>  | <b>Research questions</b>  | <b>Study design</b>   | <b>Study population</b>   | <b>Sample size</b>                        | <b>Key findings predictors of VCT</b>  |
|--|--|-----------------------|---|---|--|
| Hadish, M. T., Mao, J., Gong, G., Hadish, B. T., Tesfamariam, E. H., Tesfay, A. W., ... Hadgu, T. R. (2017). | What are the predictors of Health-Seeking Behavior: HIV Test Experiences among Youth Aged 15-24 Years in Cameroon and Gabon?   | Cross-sectional study | Youth Aged 15-24 Years in Cameroon and Gabon.                         | 14,880<br>9511(Cameroon) and 5369 (Gabon) | Only 11.7% of Cameroonian and 25.9% of Gabonese Youth were tested for HIV in the last 12 months. Variables associated with HIV test and receiving HIV test results were; age, type of residence, educational level, religion, marital status, wealth index, occupation, comprehensive knowledge, and acceptance attitude.  |
| Khatoon, S., Budhathoki, S. S., Bam, K., Thapa, R., Bhatt, L. P., Basnet, B., & Jha, N.                      | What are the socio-demographic characteristics and the utilization of HIV testing and counselling services among the key populations at the Bhutanese Refugees Camps in Eastern Nepal? | Cross-sectional study | The key populations at the Bhutanese Refugees Camps in Eastern Nepal. | 323 refugees                              | The HIV testing and counselling services are utilized by less than a third (29%) of the key population among the Bhutanese Refugees. Common self-reported barriers for utilization of HIV testing and counselling services by the Bhutanese refugees were self-perceived stigma about HIV, the fear of being discriminated and the lack of knowledge about HIV testing and counselling services. |

| <b>Title author (s)</b>   | <b>Research questions</b>  | <b>Study design</b>            | <b>Study population</b>   | <b>Sample size</b> | <b>Key findings predictors of VCT</b>  |
|---|--|--------------------------------|---|--------------------|--|
| Khawcharoenporn, T.<br>Chunloy, K..<br>Apisarntharak, A.                        | What is the uptake of HIV testing and counseling, risk perception and linkage to HIV care among Thai university students?                              | Cross-sectional study          | Undergraduate students at Thai university students, Thailand  | 1081 students      | Independent characteristics associated with no HCT uptake included female sex , lower HIV knowledge score, younger age and students from non-health science faculties. |
| Lubogo, D.<br>Ddamulira, J. B.<br>Tweheyo, R.<br>Wamani, H.                     | What are the factors associated with access to HIV care services in eastern Uganda: the Kumi home based HIV counseling and testing program experience? | Cross-sectional study          | HIV positive clients aged $\geq 18$ year's old, resident in Kumi district and registered with the Kumi HBCT program between 2006 and 2008 | 352 clients        | The main factors associated with access to HIV care include; age 25-34 years (AOR = 5.1, 95 % CI: 1.5-17.1), male sex (AOR = 2.3, 95 % CI: 1.2-4.4), urban residence   |
| Makwiza I.<br>Nyirenda L.<br>Bongololo G.<br>Banda T, Chimzizi R<br>Theobald S. | Who has access to counseling and testing and anti-retroviral therapy in Malawi?  | Equity analysis                | 15-49 years, women and men  | Not specified      | It is estimated that 12% of Malawians are living with HIV or AIDS among the 15-49 age group.   |
| Macharia, M. P.   | What are the barriers to HIV Testing and Counseling Uptake Among Young People Aged 18-24 Years in Nyeri Municipality?                                  | Cross-sectional study          | Young People Aged 18-24 Years in Nyeri Municipality.  | 600 participants   | HIV testing prevalence 69.2%. HIV testing is significantly related to age, sex, marital status, occupation, and young people's perception of counsellors' attitude.    |
| Meremo, A.,<br>Mboya, B.,<br>Ngilangwa, D. P.,<br>Dulle, R., Tarimo,            | What are the barriers to accessibility and utilization   | Mixed methods, cross-sectional | Clients exiting Angaza Zaidi HCT sites (aged 18-49,   | 492 clients        | Findings show that coverage of HCT was high, however long waiting time   |

| <b>Title author (s)</b>                             | <b>Research questions</b>  | <b>Study design</b>    | <b>Study population</b>            | <b>Sample size</b>   | <b>Key findings predictors of VCT</b>   |
|---|--|------------------------|------------------------------------|--|---|
| E., Urassa, D., and Ilako, F.                       | of HIV testing and counseling (HCT) services in Tanzania?  | design                 | male and female).                  |  | and lack of confidentiality impeded its accessibility and utilization.  |
| Mohlabane, N. Tutshana, B.,Peltzer, K. Mwisongo, A. | What are the barriers and facilitators associated with HIV testing uptake in South African health facilities offering HIV Counselling and Testing? | Cross-sectional study  | Youth aged 15-30 years             | 489 participants   | 18.1% participants never had an HIV test. Barriers to HCT uptake comprise being scared of finding out one's HIV test result or what people may say, shyness or embarrassment, avoidance of divulging personal information to health workers and fear of death. Potential facilitators for HIV testing include community or household HIV testing, providing incentives for those who test for HIV, mandatory HIV testing and disclosure of HIV status by those who test HIV positive. |
| Muhinda JC, Pazvakawambwa L.                        | What are the HIV testing patterns and determinants among women in Namibia?   | Cross-sectional study. | Women aged 15-49 years in Namibia. | 20 households were selected in every urban and rural cluster according to equal probability of systematic sampling | The uptake of HIV testing is high among young women who are educated, who have attained the level of higher education, who are poor or found in the middle class, women who are   |



| <b>Title author (s)</b>   | <b>Research questions</b>  | <b>Study design</b>  | <b>Study population</b>  | <b>Sample size</b>  | <b>Key findings predictors of VCT</b>   |
|---|--|--|--|---|---|
|   |  |  |  |   | widowed and women with no sexual partners are more likely to go for an HIV testing in Namibia.  |
| Musheke, M.<br>Ntalasha, H.<br>Gari, S.<br>Mckenzie, O.<br>Bond, V.<br>Martin-Hilber, A., | What are the factors enabling and deterring uptake of HIV testing in Sub-Saharan Africa?   | Systematic review using Noblit and Hare's meta-ethnography method. | Adults aged 15-49 years.   | 5,686 citations out of which 56 were selected for full text review and synthesized 42 papers from 13 countries. | The predominant factors enabling uptake of HIV testing are deterioration of physical health and/or death of sexual partner or child.  |
| Mwangi, R. W.,<br>Ngure, P.<br>Thiga, M.<br>Ngure, J.                                     | What are the factors Influencing the Utilization of Voluntary Counselling and Testing Services among University Students in Kenya? | Cross-sectional study  | University undergraduate students                                  | 980 students  | The intention to seek the services was associated with five attitude subscales that were ranked as follows: people's and personal concerns, friends concerns, value of testing, confidentiality and support, and perceived susceptibility.                            |
| Odimegwu, C.,<br>Adedini, S. A., &<br>Ononokpono, D.<br>N.                                | What are the factors leading to HIV/AIDS stigma and utilization of voluntary counselling and testing in Nigeria?                   | Cross-sectional study(mixed approach)                              | Community members from Osun state and Imo state aged 18 and above. | 1200 respondents  | Nigerian public attitudes to HIV/AIDS and those infected with the disease are negative. The markers for stigma on the overall stigma index are significant predictors of utilization of voluntary counselling and testing. As the sum of negative feelings increases, |

| <b>Title author (s)</b>                             | <b>Research questions</b>   | <b>Study design</b>  | <b>Study population</b>                           | <b>Sample size</b> | <b>Key findings predictors of VCT</b>   |
|---|---|--|---|--------------------|---|
|   |   |  |   |                    | there is less likelihood to using voluntary counselling and testing (VCT).  |
| Ramjee, G.<br>Daniels, B                            | To discuss the HIV epidemic among women in SSA, associated risks for HIV acquisition, and to provide a brief update on HIV prevention options which may collectively impact on reducing incidence of HIV infection. | This was not a study, it was a review on the vulnerability of young women to HIV/AIDS. | Young women in Sub-Saharan Africa.                | None               | Women in SSA are at higher risk of HIV infection compared to their male counterparts. A multitude of factors increase women's vulnerability to HIV acquisition, including, biological, behavioral, socioeconomic, cultural and structural risks.                    |
| Sanga, Z.<br>Kapanda, G.<br>Msuya, S.<br>Mwangi, R. | What are the factors influencing the uptake of Voluntary HIV Counseling and Testing among secondary school students in Arusha City, Tanzania?   | Cross-sectional study  | Students in public and private secondary schools. | 400 students       | The uptake of VCT among secondary school students was found to be low. The uptake of VCT influenced by fear of HIV test results, knowledge and attitude on VCT services, age, education, engagement in sexual relationships, stigma and distance to the VCT centre. |

| <b>Title author (s)</b>  | <b>Research questions</b>   | <b>Study design</b>   | <b>Study population</b>  | <b>Sample size</b> | <b>Key findings predictors of VCT</b>  |
|--|---|-----------------------|--|--------------------|--|
| Tsegay, G.<br>Edris, M.<br>Meseret, S.   | What are the factors voluntary counseling and testing service utilization and associated factors among Debre Markos University Students, North West Ethiopia? | Cross-sectional study | Debre Markos undergraduate University students                         | 753 students       | 58.5% of the study participants had undergone voluntary counselling and testing. VCT service utilization was associated with availability of ART drug in VCT site, heard presence of confidentiality, perceived stigma, risk perception and knowledge about HIV. |
| Woldeyohannes D;<br>Asmamaw Y;<br>Sisay S,<br>Haileselassie W;<br>Birmeta K and<br>Tekeste Z | To assess risky sexual behavior of university students towards HIV/AIDS and use of VCT service.   | Cross-sectional study | All regular students of Addis Ababa Science and Technology University. | 602 students       | Some students were engaged in risky sexual behaviour even though they had heard about HIV/AIDS. The perception of risk for acquisition of HIV infection and utilization of VCT were low.   |

## D: KNH-UoN ERC APPROVAL LETTER



UNIVERSITY OF NAIROBI  
COLLEGE OF HEALTH SCIENCES  
P O BOX 19676 Code 00202  
Telegrams: varsity  
Tel:(254-020) 2726300 Ext 44355

### KNH-UON ERC

Email: [uonknh\\_erc@uonbi.ac.ke](mailto:uonknh_erc@uonbi.ac.ke)  
Website: <http://www.erc.uonbi.ac.ke>  
Facebook: [https://www.facebook.com/uonknh\\_erc](https://www.facebook.com/uonknh_erc)  
Twitter: @UONKNH\_ERC [https://twitter.com/UONKNH\\_ERC](https://twitter.com/UONKNH_ERC)



KENYATTA NATIONAL HOSPITAL  
P O BOX 20723 Code 00202  
Tel: 726300-9  
Fax: 725272  
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/167

Paulina Ndangi Kalimbo  
Reg. No. H57/86929/2016  
School of Public Health  
College of Health Sciences  
University of Nairobi

Dear Paulina

**RESEARCH PROPOSAL: PREDICATORS OF HIV COUNSELLING AND TESTING UPTAKE AMONG UNDERGRADUATE STUDENTS AT THE COLLEGE OF HEALTH SCIENCES, UNIVERSITY OF NAIROBI, KENYA (P163/02/2019)**

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is 6<sup>th</sup> May 2019 – 5<sup>th</sup> May 2020.

This approval is subject to compliance with the following requirements:

- Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
- All changes (amendments, deviations, violations etc.) are submitted for review and approval by KNH-UoN ERC before implementation.
- Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
- Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
- Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of shipment.
- Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
- Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

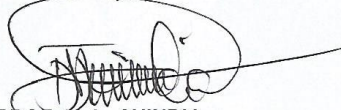
6<sup>th</sup> May, 2019



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For more details consult the KNH- UoN ERC website <http://www.erc.uonbi.ac.ke>

Yours sincerely,



**PROF. M. L. CHINDIA**  
**SECRETARY, KNH-UoN ERC**

c.c. The Principal, College of Health Sciences, UoN  
The Director, CS, KNH  
The Chairperson, KNH- UoN ERC  
The Assistant Director, Health Information, KNH  
The Director, School of Public Health, UON  
Supervisors: Dr. Rose O. Opiyo, Dr. Susan A. Nyawade

BIBS YAM 8/11

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## E: PRINCIPAL'S APPROVAL LETTER



### UNIVERSITY OF NAIROBI COLLEGE OF HEALTH SCIENCES

#### OFFICE OF THE PRINCIPAL

Telephone: 254 721665077  
Tel: KNH 2726300 Ext. 43673  
Telegrams: Varsity Nairobi  
Email: [principal-chs@uonbi.ac.ke](mailto:principal-chs@uonbi.ac.ke)

Kenyatta National Hospital  
P.O. Box 19676, Nairobi 00202  
Kenya

Our Ref: H57/86929/2016

May 15, 2019

Ms. Paulina N. Kalimbo  
C/o. School of Public Health

Dear. Ms. Kalimbo

#### REQUEST FOR PERMISSION TO CONDUCT RESEARCH

This is in connection to your letter dated May.9, 2019 by which you requested for permission to conduct a study titled: 'Predictors of HIV Counseling and Testing Uptake among Undergraduate students at the College of Health Sciences, University of Nairobi, Kenya.'

I am pleased to inform you that the Principal has approved your request, thus you are free to embark on data collection as planned. Information regarding students' data shall be provided by respective schools.

Sincerely

**MR. JAMES M. IRERI**  
**FOR: COLLEGE REGISTRAR**  
**COLLEGE OF HEALTH SCIENCES**

Cc: The Dean, School of Medicine  
The Dean, School of Pharmacy  
The Dean, School of Dental Sciences  
The Director, School of Nursing Sciences

KKM/jm



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