

**Factors Associated with Condom Use among Students at Jomo
Kenyatta University of Agriculture and Technology**

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**A thesis submitted in partial fulfillment for the degree of Master of
Science in Epidemiology in the Jomo Kenyatta University of
Agriculture and Technology**

2012

DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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This thesis has been submitted for examination with our approval as university supervisors.

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DEDICATION

I dedicate this work to my dear dad and mum who made me what I am today, my husband (Peter) and daughter (Lisa) for their support and their daily inspiration.

ACKNOWLEDGEMENTS

I wish to acknowledge the support of all who contributed in various ways making this study a success. Special thanks to my supervisors Prof. Zipporah Ng'ang'a and Dr. Peter Wanzala who worked through my document and advised me accordingly.

I thank the following for their special contributions to this study: Dr. Peter Borus (KEMRI), Dr. Muita Wairimu (KEMRI), Mr. Moses Mwangi (KEMRI) and Dean of students Jomo Kenyatta University of Agriculture and Technology main campus.

I also wish to express my thanks to all my colleagues and friends who encouraged me in my work. Special thanks to Elizabeth, Jane, Mercy, Emma, Vivian, Pastor Evans and many others.

Last but not list, I wish to express my gratitude to my family members my husband Peter and daughter Lisa for their love, patience, support and understanding while I was away and long hours.

May the almighty God bless you all.

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LIST OF ABBREVIATIONS/ ACRONYMS

AIDS	Acquired Immuno Deficiency Syndrome
CDC	Centers for Disease Control and Prevention
CHWs	Commercial sex workers
CI	Confidence interval
CRFs	Circulating recombinant forms
DVD	Digital versatile disc
EIA	Enzyme Immunoassay
ELISA	Enzyme Linked Immunosorbent Assay
FGDs	Focus Group Discussions
HIV	Human Immunodeficiency Virus
FOS	Faculty of Science
IDUs	Injecting Drug Users
IEC	Information Education and Communication
ITROMID	Institute of Tropical Medicine and Infectious Diseases
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KAIS	Kenya AIDS Indicator Survey
KAP	Knowledge, attitude and practices
KDHS	Kenya Demographic and Health Survey
KEMRI	Kenya Medical Research Institute
KNBS	Kenya National Bureau of Statistics
KNH	Kenyatta National Hospital
MOH	Ministry of Health

NACC	National AIDS Control Council
NASCOP	National AIDS/STI Control Program
NCAPD	National Coordinating Agency for Population and Development
NIH	National Institutes of Health
NPHLS	National Public Health Laboratory Services
PI	Principal Investigator
RA	Research Assistant
SAQ	Self Administered Questionnaire
SHAPC	STDs/HIV/AIDS Prevention Centre
STDs	Sexually Transmitted Diseases
STIs	Sexually Transmitted Infections
UNAIDS	Joint United Nations Programme on HIV and AIDS
USAID	United States Agency for International Development
WHO	World Health Organization

DEFINITION OF TERMS AS USED IN THE STUDY

Access	Condition allowing reach of condoms
At risk	Students who scored 1 and above
Attitude	Believes on condom use
Chancroid	A STI caused caused by the bacterium <i>Haemophilus ducreyi</i> .
Co-factor	A risk factor for acquiring a particular infection
Correct/positive response	Likely to use a condom
Condom	A barrier device most commonly used during sexual intercourse to reduce the likelihood of pregnancy and the spread of STDs
Fidelity	Being faithful
Herpes	Disease caused by <i>Herpes simplex Virus</i>
Incorrect/Negative response	Not likely to use a condom
Intoxicated	Under influence of alcohol or a certain drug
Knowledge	Awareness/understanding on HIV
Practices	Things that students do most of the time in relation to sexual matters.

ABSTRACT

Condoms offer protection against unwanted pregnancy and some sexually transmitted infections including HIV. Interventions to promote condom use are essential in efforts to slow the spread of HIV. This study sought to find out factors associated with condom use among undergraduate university students at JKUAT, given that majority of the students fall within the vulnerable 15-24 year's age bracket. The study focused on condom use and students (socio-demographic characteristics, knowledge of selected specific issues of HIV, selected access factors, attitudes, and practices). A cross sectional study design was adopted. Simple random sampling was used to obtain the required sample size for both quantitative data (461 respondents) and qualitative data (64 respondents). Data analysis was conducted using SPSS (for quantitative) and MS word (qualitative). The findings of this study revealed among 461, 66.2% (305) had experienced sexual intercourse. The overall level of condom use was high 72.8% (222). There was a significant relationship between condom use and general attitude ($P=0.010$), privacy of access ($P=0.038$), brand ($P=0.033$) and sexual behavior practices ($P=0.027$). However, there was no significant relationship between condom use and socio-demographic characteristics and knowledge ($p>0.05$). Majority of students are involved in risky sexual behavior practices. Condom use is hampered by several issues main ones being access to privacy and brand. Continuous awareness campaigns should be enhanced aiming at changing the negative attitude and poor practices.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Sexually Transmitted Infections are a group of contagious diseases most commonly transmitted “from person to person by close, intimate”. Although most of this contact has traditionally been sexual intercourse, many categories of sexual practices permit transmission from “person to person.” Vertical transmission from mother to newborn is also possible. The means of transmission unite these diseases, not etiologies, symptoms or clinical consequences (Nelson and Woodward, 2006). Sexually transmitted infections are critical in transmission of HIV. 80.7% HIV infected adults were also infected by *Herpes Simplex Virus* type 2 in Kenya (NASCO, 2009).

The global summary of the AIDS epidemic indicates a total of 34 million people living with HIV/AIDS; among them include 2.6 million people that are newly infected with HIV, 1.8 million people with AIDS related deaths. 22.9 million people from Sub-saharan Africa are living with HIV/AIDS and 1.8 are newly infected and 1.2 million with AIDS related deaths. In Kenya 1.3-1.4 million people are living with HIV, 76,000 – 104,000 newly infected and 80,000 AIDS related deaths (WHO, UNAIDS and UNICEF, 2011).

Many students in the US do not use condoms consistently, especially those who drink heavily or have multiple sexual partners (Certain *et al.*, 2009). In Ghana, students do not use condoms consistently and are not likely to use condoms when the relationship is considered stable because of trust (Tagoe and Aggor, 2009). Various studies from different parts of Nigeria have demonstrated increased level of risky sexual behaviors among students (Okonofua, 1995, Feyisetan and Pebley, 1989, Orubuloye *et al.*, 1991). Some study findings in Kenya indicate high percentage of sexually active students and a low percentage of condom use among the sexually active students (Mutungi, 2006). Reports of people washing and reusing condoms in Kenya have been observed (NACC, 2009). This study therefore aims at determining the factors associated with condom use among undergraduate students at JKUAT.

1.2 Statement of the Problem

It is not known whether religion affects the use of condoms among university student. The proportion of male and female students getting condoms from commercial, health facility and peer sources are not known. The preferred condom brands among the students are also not clearly defined. Given the risks of unprotected sexual intercourse among students, it is necessary to examine those factors associated with use of condoms, as well as to address the needs of students who may be at risk of engaging in unprotected sexual intercourse.

1.3 Justification of the study

Human Immunodeficiency Virus prevalence in Kenya is currently estimated at 3.8 percent in age group 15-24, 7.4 percent in the age group 15-49 and at 7.1 percent in age group 15-64. 12 percent among women and 2.6 percent among men aged 24 years. Incidence remains high and an estimated 200 new HIV infections per day.

It is estimated that there are 1.3 – 1.4 million Kenyans living with HIV (NASCO, 2009). HIV is a public health concern due to high morbidity and mortality. Condom use prevents primary infection and multiple re-infection (CDC, 2008). Since target group of young adults can be located at the University, there is need to determine the factors associated with condom use among the students since few studies that have been conducted do not give clear information on factors associated with condom use. The information obtained will be useful in planning and implementing interventions to promote the use of condoms among university students in Kenya.

1.4 Objectives

1.4.1 General Objective

To determine factors associated with condom use among undergraduate students at JKUAT.

1.4.2 Specific Objectives

1. To determine the socio-demographic, access, knowledge and attitude factors associated with condom use among students at JKUAT.
2. To determine the proportion of condom use among students at JKUAT.
3. To determine the association between socio-demographic, access, knowledge, attitude factors and condom use among students at JKUAT.

1.5 Hypothesis

There is a relationship between condom use and socio-demographic, access, knowledge and attitude factors among students at JKUAT. But since it is a cross-sectional study, the hypothesis is not testable.

1.6 Research questions

1. What are the socio-demographic, access, knowledge and attitude factors associated with condom use among students in JKUAT?
2. What is the proportion of condom use among students in JKUAT?
3. What is the association between condom use and socio-demographic, access, knowledge and attitude factors among students at JKUAT?

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Background information

In Africa, condom promotion in some areas has been impeded by anti-condom campaigns by some religious organizations (Marcella and Alsan, 2006). In Kenya, many religious leaders expressed opposition to condom use (IRIN, 2007; Moszynki, 2008). The overall consistent condom use has been reported to be higher among partnerships reported by men (42.8%) compared to those reported by women (27%) (NASCOP, 2009). In Ghana students did not use condoms consistently and were not likely to use condoms when the relationship was considered stable because of trust (Tagoe and Aggor, 2009).

High proportions of students in Kenya use condoms inconsistently (Othero *et al.*, 2009). Consistent condom use with partners of unknown HIV status was higher in non-marital partnership such as boyfriends, girlfriends or casual partners (NASCOP, 2009). In a KAP study (Mutungi, 2006), it was found that: 15.8% of sexually active students reported to have used condoms every time they had sex; 22.5% reported never having used a condom; almost 77% reported to have used protection at one time or another. In a study carried out in Kenya among university students (Mutungi *et al.*, 2008), results showed that no changes in behavior were evident with respect to either abstinence or number of sexual partners.

In Nairobi male students did not see themselves as susceptible to HIV/AIDS and believes of condom being effective in preventing HIV was found to be low (Yotebieng *et al.*, 2009).

2.2 Sexually transmitted Infections

Sexually transmitted infections (STIs) occur commonly in sexually active human immunodeficiency virus (HIV)–positive men. Sexually transmitted infections (STIs) can present significant diagnostic difficulties when they occur in HIV-positive persons, and the appropriate treatment and follow-up of an HIV-positive patient with an STI occasionally differs from the standard clinical approach to treating HIV-negative patients (Cohen, 1998; Quin, 1996). Pathogens causing STIs represent a wide spectrum of microorganisms: Spirochetes, bacteria, protozoan's, viruses and obligate intracellular organisms. Some STIs are life threatening (HIV, Syphilis) others pre dispose to malignancy (Hepatitis B, Humanpapiloma virus (HPV), HIV, and others destroy fertility (Gonorrhea, Chlamydia) (WHO, 2003).

2.2.1 Epidemiology of Sexually Transmitted Infections

In the US, STIs are the most common infections; of the ten most frequently reported infections, five are STIs (ASHA, 1998). In 1996, the World Health Organization estimated that more than one million people were being infected daily. About 60% of these infections occur in young people <25 years of age, and of these 30% are <20 years. Between the ages of fourteen and nineteen, STIs occur more frequently in girls than boys by a ratio of nearly 2:1; this equalizes by age 20.

An estimated 340 million new cases of syphilis, gonorrhea, chlamydia and trichomoniasis occurred throughout the world in 1999 (STDs statistics, 2009).

Commonly reported prevalences of STIs among sexually active adolescent girls include chlamydia (10–25%), gonorrhea (3–18%), syphilis (0–3%), Trichomoniasis (8–16%), and Herpes Simplex Virus (2–12%). Among adolescent boys include chlamydia (9–11%) and gonorrhea (2–3%). At least one in four U.S. teenage girls has a sexually transmitted disease (CDC, 2008). Sub-Saharan Africa bears the largest burden responsible for 11 to 35% of all new cases of curable STIs. STIs affect the most vulnerable populations- women, children, and the youth (WHO, 2010).

2.2.2 Syphilis

Syphilis is a sexually transmitted disease (STD) caused by the bacterium *Treponema pallidum*. It has often been called "the great imitator" because so many of the signs and symptoms are indistinguishable from those of other diseases (CDC, 2006).

2.2.3 Transmission of syphilis

Syphilis is passed from person to person through direct contact with syphilis sore. Sores occur mainly on the external genitals, vagina, anus, or in the rectum. Sores also can occur on the lips and in the mouth (CDC, 2006). Transmission of the organism occurs during vaginal, anal, or oral sex. Pregnant women with the disease can pass it to the babies they are carrying (CDC, 2006).

2.2.4 Clinical manifestation for syphilis

Treponema pallidum has been shown to induce HIV-1 gene expression in human monocytes (Theus *et al.*, 1998) and has been found to promote the expression of the monocyte b-chemokine receptor CCR5 (Sellati *et al.*, 2000), a coreceptor for HIV transmission (Alkhatib *et al.*, 1996; Dragic *et al.*, 1996). HIV-positive patients with syphilis may be more likely than HIV-negative persons to present with persistent chancres (Hutchinson *et al.*, 1994), ulcerative skin lesions (Sand *et al.*, 1995; Ajithkumar *et al.*, 1998), gummatous disease (Hay *et al.*, 1990; Bari *et al.*, 1989), and early ocular involvement (Shalaby *et al.*, 1997).

2.2.5 Diagnosis of syphilis

Serological tests for syphilis are generally accurate for patients with HIV infection. Nontreponemal serological tests for syphilis (serum Venereal Disease Research Laboratory [VDRL] and rapid plasma reagin [RPR] tests) in particular appear to have less reliable results for HIV positive persons than for those without co-infection. A positive result of serum VDRL or RPR tests along with a negative treponemal antibody test—a “biological false-positive” result— has been reported to be more frequent among those infected with HIV than among the general population (Joyanes *et al.*, 1998; Yinnon *et al.*, 1996).

2.2.6 Treatment for syphilis

A single intramuscular injection of penicillin, an antibiotic, will cure a person who has had syphilis for less than a year. Additional doses are needed to treat someone who has had syphilis for longer than a year. For people who are allergic to penicillin, other antibiotics are available to treat syphilis. Treatment will kill the syphilis bacterium and prevent further damage, but it will not repair damage already done. Persons who receive syphilis treatment must abstain from sexual contact with new partners until the syphilis sores are completely healed. Persons with syphilis must notify their sex partners so that they also can be tested and receive treatment if necessary (CDC, 2006).

2.2.7 Syphilis prevention

To abstain from sexual contact or to be in a long-term mutually monogamous relationship with a partner who has been tested and is known to be uninfected. Avoiding alcohol and drug use may also help prevent transmission of syphilis because these activities may lead to risky sexual behavior. Correct and consistent use of latex condoms can reduce the risk of syphilis, as well as genital herpes and chancroid. Transmission of syphilis cannot be prevented by washing the genitals, urinating, and/or douching after sex. Any unusual discharge, sore, or rash, particularly in the groin area, should be a signal to refrain from having sex and to see a doctor immediately (CDC, 2010).

2.2.8 Herpes Simplex Virus

Genital herpes is a sexually transmitted disease (STD). Mostly caused by HSV-2. Most individuals typically appear as one or more blisters on or around the genitals or rectum (CDC, 2006).

2.2.9 Transmission of Herpes Simplex Virus

Generally, a person can only get HSV-2 infection during sexual contact with someone who has a genital HSV-2 infection. Transmission can occur from an infected partner who does not have a visible sore and may not know that he or she is infected (Corey *et al.*, 2004).

2.2.10 Clinical manifestation of HSV-2

Infection with herpes simplex virus type 2 (HSV-2) is among the most prevalent STDs worldwide (Chen *et al.*, 2000; O'farrell *et al.*, 1999). In the United States, HSV-2 is the most common cause of genital ulcers (Mertz *et al.*, 1998; Hook *et al.*, 1992) and data from the National Health and Nutrition Examination Survey have shown that the seroprevalence of HSV-2 in the United States population is approximately 1 person in 5, which is a 30% increase since the late 1970s (Flemming *et al.*, 1997; Johnson *et al.*, 1990). HSV- 2 seroprevalence is considerably higher among HIV-positive persons than in the general population (Chen *et al.*, 2000; Severson *et al.*, 1999), and HIV can be detected by PCR in nearly 70% of genital ulcers due to HSV-2 in HIV-positive men (Schacker and Ryncarz 1998).

Studies have shown that HSVs stimulate viral replication (Heng *et al.*, 1994; Golden *et al.*, 1992).

2.2.11 Diagnosis of HSV-2

Health care providers can diagnose genital herpes by visual inspection if the outbreak is typical, and by taking a sample from the sore(s) and testing it in a laboratory. HSV infections can be diagnosed between outbreaks by the use of a blood test. Blood tests, which detect antibodies to HSV-2 infection (Wald *et al.*, 2002).

2.2.12 Treatment for HSV-2

There is no treatment that can cure herpes, but antiviral medications can shorten and prevent outbreaks during the period of time the person takes the medication. In addition, daily suppressive therapy for symptomatic herpes can reduce transmission to partners (Corey *et al.*, 2004).

2.2.13 Prevention of HSV-2

Surest way to avoid transmission of genital herpes is to abstain from sexual contact, or to be in a long-term mutually monogamous relationship with a partner who has been tested and is known to be uninfected. Correct and consistent use of latex condoms can reduce the risk of genital herpes. Persons with herpes should abstain from sexual activity with uninfected partners when lesions or other symptoms of herpes are present (Wald *et al.*, 2001).

Sex partners of infected persons should use condoms to reduce the risk. Sex partners can seek testing to determine if they are infected with HSV. A positive HSV-2 blood test most likely indicates a genital herpes infection (Wald *et al.*, 2001).

2.2.14 Health consequences of untreated STIs

Untreated gonorrhea and chlamydia can result in pelvic inflammatory disease in women, a condition that can cause infertility. Untreated syphilis can lead to serious long-term complications, including brain, cardiovascular and organ damage. Syphilis in pregnant women can also result in congenital syphilis (syphilis among infants), which can cause stillbirth, death soon after birth, and physical deformity and neurological complications in children who survive. Untreated syphilis in pregnant women results in infant death in up to 40 percent of cases. Studies suggest that people with gonorrhea, chlamydia or syphilis are at increased risk for HIV (CDC, 2009).

Research demonstrates that the presence of untreated STIs can cause a person to be three to five times more likely to contract HIV. Further, an individual who is infected with both HIV and a STD transmits HIV more easily (WHO, 2010). Providing prompt and adequate STIs treatment under specific conditions had demonstrated a 40% decrease in the amount of heterosexually transmitted HIV (WHO, 2010). AIDS has a long asymptomatic period- during the time which HIV (the human immunodeficiency virus, which causes AIDS) can replicate and the disease can be transmitted to others followed by a symptomatic period, which leads rapidly to death unless treated (Gilbert *et al.*, 2007).

2.3 Human Immunodeficiency Virus (HIV)

Human Immunodeficiency Virus is a retro-virus transmitted from person to person through unprotected penile-vaginal or penile-anal intercourse, use of HIV contaminated needles and syringes, vertical transmission from mother to child during pregnancy, delivery or breastfeeding and through transfusion of infected blood or its components (Heymann, 2008).

2.3.1 HIV transmission

There are two types of HIV: HIV-1 and HIV-2. Both types are transmitted by sexual contact, through blood, and from mother to child, and epidemiologic risk factors are also similar (Campbell *et al.*, 2011).

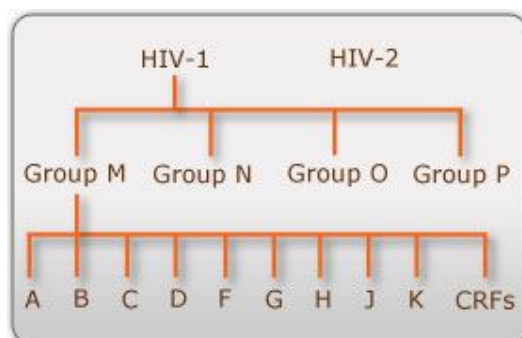
Although HIV-1 infection is associated with most of the global AIDS pandemic, HIV-2 is an important cause of disease in certain regions of the world where it is endemic (Campbell *et al.*, 2011).

Certain subtypes/CRFs are predominantly associated with specific modes of transmission. In particular, subtype B is spread mostly by homosexual contact and intravenous drug use (essentially via blood), while subtype C and CRF A/E tend to fuel heterosexual epidemics (via a mucosal route). Subtype C and CRF A/E are transmitted much more efficiently during heterosexual sex than subtype B (Bhoopat *et al.*, 2001; Essex, 1996). This theory has not been conclusively proven (Pope *et al.*, 1997; Dittmar *et al.*, 1997).

Mother-to-child transmission is more common with subtype D than subtype A (Yang *et al.*, 2003). Some studies have shown that there is no association between subtype and rates of mother-to-child transmission (Murray *et al.*, 2000; Tranchat *et al.*, 1999; Tapia *et al.*, 2003; Martinez *et al.*, 2006). The risk of becoming infected with HIV as a result of sexual intercourse depends on the following: Probability that the sexual partner is infected, number of sexual partners, type of sexual contact involved, amount of virus present in the blood or secretions of the infected partner, presence in either partner of other sexually transmitted infections (STIs) and/or genital lesions, which increase the risk of HIV transmission (Ferris *et al.*, 2002).

2.3.2 Epidemiology of HIV

Worldwide, the predominant virus is HIV-1. The strains of HIV-1 can be classified into four groups: the "major" group M, the "outlier" group O and two new groups, N and P.



Source: [http://www.overt.org/hiv-](http://www.overt.org/hiv-types.htm)

[types.htm](http://www.overt.org/hiv-types.htm) (Plantier *et al.*, 2009)

Figure 2.1: The different levels of HIV classification

Group O appears to be restricted to west-central Africa and group N - a strain discovered in 1998 in Cameroon - is extremely rare. In 2009 a new strain closely relating to gorilla simian immunodeficiency virus was discovered in a Cameroonian woman. It was designated HIV-1 group P. More than 90% of HIV-1 infections belong to HIV-1 group M (Plantier *et al.*, 2009). Within group M there are known to be at least nine genetically distinct subtypes of HIV-1. These are subtypes A, B, C, D, F, G, H, J and K. Occasionally, two viruses of different subtypes can meet in the cell of an infected person and mix together their genetic material to create a new hybrid virus (a process similar to sexual reproduction, and sometimes called "viral sex"). Many of these new strains do not survive for long, but those that infect more than one person are known as "circulating recombinant forms" or CRFs. For example, the CRF A/B is a mixture of subtypes A and B (Burke, 1997). The HIV-1 subtypes and CRFs are typically associated with certain geographical regions, with the most widespread being subtypes A and C.

Studies have shown, individuals are increasingly presenting with sub-types not native to the country of diagnosis (Le Vu *et al.*, 2010; Chalmet *et al.*, 2010). For example, a rise of non-B sub-types among men who have sex with men (MSM) in the UK has been identified (Fox *et al.*, 2010).

Subtype A and CRF A/G predominate in West and Central Africa, with subtype A possibly also causing much of the Russian epidemic (Bobkov *et al.*, 2004). Subtype B has been the most common subtype/CRF in Europe, the Americas, Japan and Australia and is the predominant sub-type found among MSM infected in Europe (Le Vu *et al.*, 2010).

Subtype C is predominant in Southern and East Africa, India and Nepal. It has caused the world's worst HIV epidemics and is responsible for around half of all infections. Subtype D is generally limited to East and Central Africa. Subtype F has been found in Central Africa, South America and Eastern Europe. Subtype G and CRF A/G have been observed in West and East Africa and Central Europe (Chalmet *et al.*, 2010).

2.3.3 Magnitude of HIV in Kenya

Since the beginning of HIV epidemic, almost 60 million people have been infected and 25 million people have died of HIV-related deaths worldwide (UNAIDS and WHO, 2007). HIV/AIDS is the single largest cause of mortality in present day sub-Saharan Africa. In 2008, there were 33.4 million people living with HIV, 2.7 million new infections and 2 million AIDS-related deaths. Sub Saharan Africa accounts for 67% of all people living with HIV worldwide and has 14 million orphaned by the epidemic (UNAIDS and WHO, 2007).

The first AIDS case reported in Kenya was described in 1984 (NAS COP, 1999). HIV prevalence in Kenya is 7.4 percent in the age group 15-49 and at 7.1 percent in age group 15-64, among women aged 24 yrs its estimated at 12% compared to men at 2.6%. Incidence rates in Kenya remains high: an estimated 200 new HIV infections per day between 76,000 – 104,000 new infections per year. It is estimated that there are 1.3 – 1.4 million Kenyans living with HIV (NAS COP, 2009).

2.3.4 Clinical manifestation of HIV

At this stage symptoms including fever, unexplained weight loss, recurrent diarrhea, fatigue and headache. Cutaneous manifestations like seborrheic dermatitis, folliculitis, recurrent herpes simplex infections oral hairy leukoplakia may occur. During this period the CD4 T-cells count continues to come down. Usually anti retroviral therapy is started at this stage.

HIV-1 seroconversion can occur with a variety of clinical manifestations or without symptoms. More severe and numerous symptoms during primary HIV-1 infection predict a higher plasma HIV-1 RNA set-point and faster disease progression.

Diagnostic tests for primary HIV-1 infection include assays for HIV-1 RNA, p24 antigen, and third generation enzyme immunoassay antibody tests capable of detecting IgM antibodies (Daar *et al.*, 2008).

2.3.5 Diagnosis of HIV

In HIV-1 infected patients, two important laboratory determinants of the rate of progression are the CD4 cell count and the plasma viral load (<http://www.cdc.gov/hiv>). In untreated patients, the average rate of decline of CD4 cells ("CD4 slope") is about 50/mm³ per year and the average viral burden (without therapy) is 30,000 to 50,000 copies/mL (Arien *et al.*, 2005). Patients with a CD4 cell count <200 cells/mm³ are considered to have AIDS; such patients are at significantly increased risk for opportunistic infections. Laboratory monitoring for HIV-2 RNA is problematic since testing availability is limited (Cot *et al.*, 1988; Evans *et al.*, 1988).

HIV antibody tests are the most appropriate test for routine diagnosis of HIV among adults. The ELISA antibody test (Enzyme-Linked Immunoabsorbent Assay) also known as EIA (Enzyme Immunoassay). According to the US Centers for Disease Control and Prevention, current HIV-1 EIAs “can accurately identify infections with nearly all non-B subtypes and many infections with group O HIV subtypes” (MMWR, 2001). Most modern rapid HIV-1 tests are capable of detecting all the major subtypes of group M (Phillips *et al.*, 2000). Rapid tests which can detect HIV-2 are also now available (CDC, 2004a).

2.3.6 Treatment implications of HIV

The effectiveness of HIV-1 treatment is monitored using viral load tests. Not all of the drugs used to treat HIV-1 infection are as effective against HIV-2. Response to treatment may be monitored by following CD4+ T-cell counts and indicators of immune system deterioration. More research and clinical experience is needed to determine the most effective treatment for HIV-2 (CDC, 2004b).

2.3.7 Implications for an AIDS vaccine

The development of an AIDS vaccine is affected by the range of virus subtypes as well as by the wide variety of human populations who need protection and who differ, for example, in their genetic make-up and their routes of exposure to HIV. The occurrence of superinfection indicates that an immune response triggered by a vaccine to prevent infection by one strain of HIV may not protect against all other strains (Fox *et al.*, 2010).

2.3.8 The Effectiveness of condoms in preventing STDs and HIV

Abstinence from sexual intercourse or maintaining a mutually monogamous relationship between partners known to be uninfected is the surest way to avoid transmission of HIV and other STDs. Outside of those conditions, correct and consistent use of condom reduces the risk of HIV and other STDs. Scientific studies of sexually active couples, where one partner is infected with HIV and the other partner is not, have demonstrated that the consistent use of latex condoms reduces the likelihood of HIV infection by 80 to 90 percent. However, failure to use condoms correctly with every act of intercourse, or to some extent slippage and breakage of the condom, increases the risk of HIV transmission (CDC, 2008). HIV testing and counseling is one of the main preventive strategy used in HIV prevention in Kenya (NACC, 2010).

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Research Methodology

3.1.1 Study Site

The study was conducted at Jomo Kenyatta University of Agriculture and Technology (Main Campus), a public university in Kenya, situated in Juja, Thika district, 36 kilometers North East of Nairobi, along Nairobi-Thika highway. The prevalence of HIV in Thika was highest in central province at 7.6% (NAS COP, 2005). Recent report shows a prevalence of 3.8% central province. The prevalence of HIV in Nairobi is 8.8% second leading in Kenya (NAS COP, 2009). Nairobi city lies on the central Kenyan plateau at an altitude of about 5,500 feet (1,680 m). It is the commercial and cultural center of Kenya. Jomo Kenyatta University of Agriculture and Technology main campus is within proximity of Nairobi and Thika. It has approximately 9084 undergraduate students.

Map of Kenya showing the study site: Appendix 7

3.1.2 Study population

The study population consisted of undergraduate students from JKUAT main campus in Juja, Thika District.

3.1.3 Inclusion criteria

All undergraduate students who consented to participate in the study.

3.1.4 Exclusion criteria

All undergraduate students who did not consent to participate in the study.

3.1.5 Methodology

3.1.5.1 Sample design

A cross-sectional study design was used which adopted both quantitative (through self-administered questionnaires) and qualitative (through FGDs) approaches.

3.1.5.2 Sampling Technique

Simple random sampling was used to obtain the required number of respondents from the sampling frame (Targeted population-total number of all undergraduate students at JKUAT main campus) using computer generated random numbers. A sample size of 461 was used for the quantitative and 64 for the qualitative data. The randomly selected students were traced through their Faculties/Departments/Courses using an internal memo.

3.1.5.3 Data Collection Procedures

All the respondents who consented were issued with pretested self-administered questionnaire (Appendix3) and those students who consented took part in the FGDs (Appendix4).

3.1.5.4 Data Collection Tools

Pretested self administered questionnaires (Appendix3) were used. The questionnaire had five parts which asked respondents about their background information (socio demographic characteristics), access factors, and knowledge on HIV and other STIs and condom use, attitude and practices. FGDs (Appendix 4) were used to get an indepth of the subject matter (Mugenda and Mugenda, 2003).

3.1.5.5 Sample size determination

The quantitative sample size was determined using the formula of Fisher *et al.*, (1998).

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

$$d^2$$

Z=Standard Normal deviation (1.96 for a 95% confidence level)

P=the proportion of the population having the characteristic being measured (if the proportion is unknown, set P=0.5

d=the level of accuracy desired, or the sampling error (Often set at 0.05).

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = \frac{0.96}{0.05^2} = 384.16$$

$$n=384.16$$

$$20\% \times 384.16=76.832$$

$$384.16+76.832=460.992=461$$

To allow for non response, 20 percent of the sample size (n) was added to the sample (n). Giving a total of $460.992=461$.

The sample size for qualitative research is yet to be explored. As long as representation of the study population exists and the saturation point is reached. Each FGD should have 6-12 persons (Mugenda and Mugenda, 2003). FGDs were 8 in total each with 8 participant, 4 male FGDs and 4 female FGDs. FGDs were conducted until the saturation point (Point in data collection when new data no longer bring additional insights to the research-question) (Mugenda and Mugenda, 2003).

3.1.6 Data Analysis

Quantitative data was entered into SPSS version 11.5 and cleaned prior to analysis. Qualitative data was entered into MS-word. Both quantitative and qualitative data were stored in password protected computer and backed-up, with restricted access.

All variables were subjected to descriptive data analysis. Descriptive statistics such as mean, standard deviation and range were used to summarize continuous variables while categorical variables were summarized using proportions. Bivariate analysis was carried out to determine the relationship between condom use and associated factors using Pearson's chi-square test. Factors that were found to be associated with the outcome at P-value less than 0.1 were considered for multivariate analysis. In the multivariate analysis, binary logistic regression was used to determine factors predictive of condom use. Three successive iterations were performed using backward condition method retaining four factors, adjusting for other factors and keeping them constant. P-value less than 0.05 was considered significant.

Analysis of knowledge on HIV and condom use was assessed using questions (Appendix 5).

Analysis of general attitude towards condom use was analyzed using 24 attitude related issues (Appendix 3). The mean score was 18 ± 3 ranging between 7 and 24. A student who scored 18 and above was considered to have positive attitude on many issues.

Analysis of sexual behavioral practices from the quantitative data was done using 6 variables (Appendix 3). The score range was between 0 and 5. A student who scored 1 and above was considered to be at risk.

FGDs were sorted manually according to themes and then discussed.

3.1.7 Ethical considerations

Approval to carry out the study was sought from the Board of Postgraduate studies of Jomo Kenyatta University of Agriculture and Technology, the Scientific Steering Committee (SSC) (Appendix 7) and Ethical Review Committee (ERC) (Appendix 8) through Center for public health research (CPHR) at KEMRI. Confidentiality was maintained.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSIONS

4.1 Results

4.1.1 Characteristics of the study population

A total of 461 participants were interviewed, majority of them were males (64.2%; 296) and females were (35.8%; 165). Mean age of the study participants was 21 ± 2 ranging between 18 and forty years. The highest proportion (33.4%; 154) of the participants were aged 20 years, and the smallest proportion (18.4%; 85) being 23 years or more (Table 4.1).

As regard marital status, a majority (94.6%; 436) were single. Year of study varied between year 1 and higher than year 4 of the university education, with 49.7% (229) of the participants being at year 1. A small proportion (12.2%; 56) was in year 4 or higher.

Analysis of religious affiliation revealed majority (64.9%; 299) to be Protestants, followed by Catholics (30.4%; 140), the rest were Muslims (10) and others-those who did not indicate their religion (12).

Among the study participants, 43.2% (199) were living with their parents while 10.2% (47) were living with guardians, 31.7% (146) were living with schoolmates. A very small proportion (1.5%; 7) was living with their spouses and 13.4% (62) were living alone (Table 4.1).

Table 4.1: Selected socio-demographic characteristics of the study participants

Variables	N=461	%
Gender		
Male	296	64.2
Female	165	35.8
Age in years		
<20	81	17.6
20	154	33.4
21	87	18.9
22	54	11.7
23	42	9.1
24 or more	43	9.3
Marital status		
Single	436	94.6
Married	25	5.4
Year of study		
1	229	49.7
2	89	19.3
3	87	18.9
4	45	9.8
>4	11	2.4
Religion		
Muslim	10	2.2
Catholic	140	30.4
Protestants	299	64.9
Others	12	2.6
Residence		
Within the campus	203	44.0
Off campus	258	56.0
Live with who		
Parents	199	43.2
Guardian	47	10.2
Schoolmates	146	31.7
Spouse	7	1.5
Alone	62	13.4

4.1.1.1 Sexual exposure among the respondents

Out of the 461 respondents, 305 (66.2%) reported to have experienced sexual intercourse while the remaining 156 (33.8%) participants had not. Out of 305 respondents who had experienced sexual intercourse, 295 (96.7%) were heterosexual. There were no homosexuals (Figure 4.1).

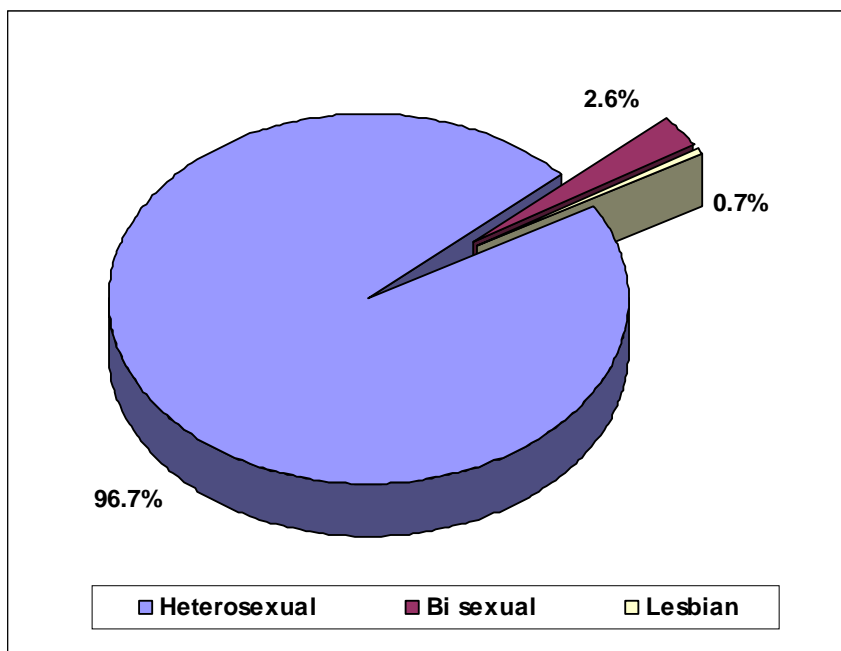


Figure 4.1: Sexual exposure among participants.

4.1.2 Access to condom use among the respondents

4.1.2.1 Economic and non-economic factors affecting the willingness to acquire a condom among the study participants

Economic and non-economic factors affecting the willingness to acquire a condom among the study participants was determined by four variables; 27.9% (85) indicated price to be an important factor, (27.9%; 85) indicated availability, 49.8% (152) privacy while 64.9% (198) indicated condom preference (Table 4.2).

Table 4.2: Economic and non-economic factors affecting the willingness to acquire a condom among the study participants

Variable	N=305	%
Economic and non-economic factors		
Price		
Yes	85	27.9
No	220	72.1
Distance/Availability		
Yes	85	27.9
No	220	72.1
Privacy		
Yes	153	50.2
No	152	49.8
Preference		
Yes	198	64.9
No	107	35.1

4.1.2.2 Preferred sources of condom supply among the study participants

Preferred sources of condom supply varied across six supply points. 51.5% (157) preferred toilets, 52.4% (160) health facilities, 65.2% (199) chemists shops or pharmacies, 43.6% (133) supermarkets and shops, 28.2% (86) peers while 45.6% (139) family planning clinic (Table 4.3).

Table 4.3: Preferred sources of condom supply among the study participants

Preferred sources of condom supply	N=305	%
Toilets		
True	157	51.5
False	148	48.5
Health facility		
True	160	52.4
False	145	47.5
Chemists shops and pharmacies		
True	199	65.2
False	106	34.8
Supermarkets and shops		
True	133	43.6
False	172	56.4
Peers		
True	86	28.2
False	219	71.8
Family planning clinic		
True	139	45.6
False	166	54.4

4.1.2.3 Brand preference among the study participants

Brand preference was assessed using variants; 24.6% (75) of the respondents indicated that there is no difference between specific condom brands, 24.3% (74) preferred Trust, 18.0% (55) Durex, 6.2% (19) Government condoms, and 26.9% (82) indicated mixed preferences (Table 4.4).

Table 4.4: Brand preference among the study participants

Brand preference	N=305	%
Mixed (Durex and Trust)	82	26.9
Government condoms	19	6.2
Durex	55	18.0
Trust	74	24.3
All brands the same	75	24.6

Among 305 respondents; 47.2% (144) preferred a specific brand because their choice increased sexual pleasure, 39.3% (139) because of size, 20.3% (62) prolonged intercourse, and 18.0% (55) indicated cost as a factor (Table 4.5).

Table 4.5: Reasons for brand preference among the study participants

Reasons for brand preference	N=305	%
Increases sexual pleasure		
True	144	47.2
False	161	52.8
Reasonable size		
True	120	39.3
False	185	60.7
Prolong intercourse		
True	62	20.3
False	243	79.7
Spend less money		
True	55	18.0
False	250	82.0

4.1.3 Knowledge on HIV and Condom use among the study participants

4.1.3.1 Knowledge on what is HIV among the study participants

Participant’s knowledge on what is HIV was probed using 5 questions (Appendix 3). Majority of the participants (90.0%; 415) indicated that HIV is not a flavi virus belonging to the family flaviviridae, 58.6% (270) indicated that it is a lentivirus, 91.8% (423) said it is a virus that causes AIDS, 84.2% (388) indicated that it is a virus that attacks the immune system while 94.8% (437) correctly indicated that it is not a virus that can be transmitted by air, insect bites, physical touch. A summary of all the questions revealed that 79.8 % (368) had adequate knowledge on what is HIV (Table 4.6 a).

Table 4.6 a: Knowledge on what is HIV among the study participants

Knowledge on what is HIV	N=461	%
A flavi virus belonging to the family flaviviridae		
Incorrect (True)	46	10.0
Correct (False)	415	90.0
A lentivirus		
Correct (True)	270	58.6
Incorrect (false)	191	41.4
A virus that causes AIDS		
Correct (True)	423	91.8
Incorrect (false)	38	8.2
A virus that attack the immune system		
Correct (True)	388	84.2
Incorrect (false)	73	15.8
A virus that can be transmitted by Air, Insect bites, Physical touch		
Incorrect (True)	24	5.2
Correct (False)	437	94.8
Overall knowledge on what is HIV		
Adequate knowledge	368	79.8
Inadequate knowledge	93	20.2

4.1.3.2 Knowledge on why HIV is Kenyans public health problem among the study participants

Assessment on why HIV is a Kenyans serious public health problem was probed using five questions (Appendix 3). Majority of the participants (83.1%; 383) indicated that HIV is rapidly spreading, 65.7% (303) correctly indicated that it is its inability to suppress reproductive system, 51.4% (237) indicated that with HIV death is inevitable, 85.9% (396) indicated that HIV affects national development and welfare while 51.2% (236) indicated that HIV is related to T.B. A summary of all the questions revealed that 78.2 % (361) had adequate knowledge (Table 4.6 b).

Table 4.6 b: Knowledge on why HIV is a Kenyans serious public health problem among the study participants

Knowledge on why HIV is a Kenyans serious public health problem	N=461	%
Rapid spread		
Correct (True)	383	83.1
Incorrect (false)	78	16.9
Ability to suppress reproductive system		
Incorrect (True)	158	34.3
Correct (False)	303	65.7
Inevitable death		
Correct (True)	237	51.4
Incorrect (false)	224	48.6
Affect national development and welfare		
Correct (True)	396	85.9
Incorrect (false)	65	14.1
Relationship with T.B		
Correct (True)	236	51.2
Incorrect (false)	225	48.8
Overall knowledge on why HIV is a Kenyans serious public health problem		
Adequate knowledge	361	78.2
Inadequate knowledge	100	21.8

4.1.3.3: Knowledge on how HIV/AIDS and other STIs are interlinked among the study participants

Assessment on how HIV/AIDS and other STIs are interlinked was probed using five questions (Appendix 3). A small proportion of the participants (18.4%; 85) correctly indicated that HIV and all the other STIs are not always transmitted the same way, 85.7% (395) said both are co-factors, 94.1% (434) correctly indicated that both do not have a cure only STIs are curable, 80.5% (371) correctly indicated that both HIV and STIs do not cause AIDS only HIV does while 96.1% (236) indicated that their main route of transmission is through sexual intercourse. A summary of all the questions revealed that 70.9 % (327) had adequate knowledge on ways in which HIV/AIDS and other STIs are interlinked (Table 4.6 c).

Table 4.6 c: Knowledge on how HIV/AIDS and other STIs are interlinked among the study participants

Knowledge on ways in which HIV/AIDS and other STIs are interlinked	N=461	%
Not always transmitted in the same way		
Correct (True)	85	18.4
Incorrect (false)	376	81.6
Co-Factors		
Correct (True)	395	85.7
Incorrect (false)	66	14.3
Both have cure		
Incorrect (True)	27	5.9
Correct (False)	434	94.1
Both cause AIDS		
Incorrect (True)	90	19.5
Correct (False)	371	80.5
Main route of transmission is through sexual intercourse		
Correct (True)	443	96.1
Incorrect (false)	18	3.9

4.1.3.4 Knowledge on condom use among the study participants

Participant’s knowledge on what they know about a condom was probed using four questions. Majority of the participants (94.4%; 435) indicated that a condom is a barrier device used to prevent pregnancies and STIs, 90.2% (416) indicated that it is not a barrier device used only for prevention of pregnancies since other methods exist, 94.6% (436) indicated that it is not a barrier device used only for prevention of STIs since other methods exist while 92.2% (425) indicated that it is a device used to prevent contact with body fluids during sexual encounter (Table 4.7 a).

Table 4.7 (a) Knowledge on condom use among the study participants

Variables	N=461 %	
A condom is a barrier device used to prevent pregnancies and STIs		
Correct (True)	435	94.4
Incorrect (False)	26	5.6
A condom is a barrier device used only for prevention of pregnancies		
Incorrect (True)	45	9.8
Correct (False)	416	90.2
A condom is a barrier device used only for prevention of STIs		
Incorrect (True)	25	5.4
Correct (False)	436	94.6
A condom prevent contact with body fluids		
Correct (True)	425	92.2
Incorrect (False)	36	7.8

Assessment on safe use and handling of a condom was probed using seven questions (Appendix 3). Majority of the participants (96.1%; 443) indicated a condom is not safe irrespective of their storage, 68.7% (317) agreed that a condom promotes cleanliness, 63.8% (294) indicated that a condom protects against STIs if they are properly and correctly used, 96.7% (446) indicated that single condom should not be used more than once, 74.8% (345) agreed that it is important to store condoms safely,

96.3% (444) indicated that it is not proper to store condoms next to sunlight while 91.3% (421) agreed that it is proper to open and apply the condom package properly. A summary of all the questions revealed that 76.4% (352) had adequate knowledge on condom use (Table 4.7 b).

Table 4.7 (b) Knowledge on safe use and handling of a condom among the study participants

Variables	N=461	%
A condom is safe irrespective of their storage		
Incorrect (True)	18	3.9
Correct (False)	443	96.1
A condom promote cleanliness		
Correct (True)	144	31.2
Incorrect (False)	317	68.7
A condom protect against STIs if they are properly and correctly used		
Correct (True)	294	63.8
Incorrect (False)	167	36.2
A single condom can be used more than once		
Incorrect (True)	15	3.3
Correct (False)	446	96.7
It is proper storing the condom safely		
Correct (True)	345	74.8
Incorrect (False)	116	25.2
It is proper storing the condom next to sunlight		
Incorrect (True)	17	3.7
Correct (False)	444	96.3
It is proper opening and applying the condom package properly		
Correct (True)	421	91.3
Incorrect (False)	40	8.7
Overall knowledge on condom use		
Adequate knowledge	352	76.4
Inadequate knowledge	109	23.6

4.1.3.5 Channels of communication on condom use among the study participants

Results on the channels of communication on condom use varied among the respondents some indicating multiple channels. The most commonly mentioned channel was TV by 70.5% (325) participants. Radio and peer information 56.2% (259) and 55.3% (255) respectively.

Internet and billboards followed with 40.8% (188) and 38.8% (179) respectively. The rest were print media, Institution (School curricula), family members, VCT/Health facilities among others (Figure 4.2).

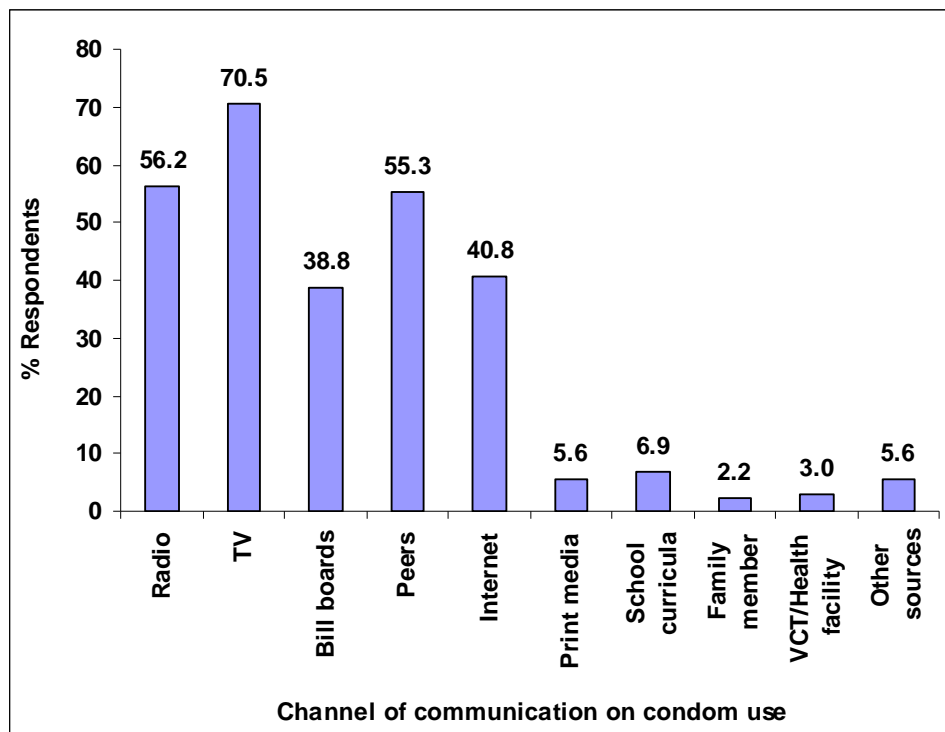


Figure 4.2: Channels of communication on condom use among the study participants

4.1.4 Attitude towards condom use among study participants

Majority of the respondents had positive attitude towards condom use (Table 4.8).

Table 4.8 (a) Attitude towards condom use among the study participants

Variables	N=461	%
Condoms make sex inconvenient		
Positive (Disagreed)	318	69.0
Negative (Agreed)	143	31.0
People plan they are going to have sex		
Positive (Agreed)	253	54.9
Negative (Disagreed)	208	45.1
A mans penis may be too large for a condom		
Positive (Disagreed)	387	83.9
Negative (Agreed)	74	16.1
Condoms are expensive		
Positive (Disagreed)	410	88.9
Negative (Agreed)	51	11.1
Embarrassed to buy a condom		
Positive (Disagreed)	277	60.1
Negative (Agreed)	184	39.9
The correct way to use a condom is to put it on a soft penis		
Positive (Disagreed)	439	95.2
Negative (Agreed)	22	4.8
Condoms help to stop the spread of STI		
Positive (Agreed)	409	88.7
Negative (Disagreed)	52	11.3
It is easy to obtain a condom within the campus		
Positive (Agreed)	400	86.8
Negative (Disagreed)	61	13.2
My friends are concerned about getting infected by the AIDS virus		
Positive (Agreed)	364	79.0
Negative (Disagreed)	97	21.0
Condoms help to stop the spread of AIDS virus		
Positive (Agreed)	382	82.9
Negative (Disagreed)	79	17.1
I am concerned about getting infected by the AIDS virus		
Positive (Agreed)	398	86.3
Negative (Disagreed)	63	13.7

Majority of the respondents (83.9%; 387) disagreed that religious people don't use condoms, 95.0% (438) disagreed that only men should decide if a condom is used during sex, 98.3% (453) disagreed that only gay people get AIDs, 90.0% (415) indicated that its alright for women to insist that men use a condom, 87.6% (404) agreed that its alright to insist that your sexual partner use a condom, 82.4% (380) indicated that its alright for woman to refuse sex if a man does not want to use a condom, 53.8% (248) positively disagreed that condom decrease sexual pleasure for men (Table 4.8 b).

Table 4.8 (b) Attitude towards condom use among the study participants

Variables	N=461	%
Religious people don't use condoms		
Positive (Disagreed)	387	83.9
Negative (Agreed)	74	16.1
Only men should decide if a condom is used during sex		
Positive (Disagreed)	438	95.0
Negative (Agreed)	23	5.0
Only gay people get AIDs		
Positive (Disagreed)	453	98.3
Negative (Agreed)	8	1.7
Its alright for women to insist that men use a condom		
Positive (Agreed)	415	90.0
Negative (Disagreed)	46	10.0
All right to insist that your sexual partner use a condom		
Positive (Agreed)	404	87.6
Negative (Disagreed)	57	12.4
Alright for women to refuse sex if man does not want to use a condom		
Positive (Agreed)	380	82.4
Negative (Disagreed)	81	17.6
Condoms decrease sexual pleasure for men		
Positive (Disagreed)	248	53.8
Negative (Agreed)	213	46.2

65.5% (302) participants indicated that their male friends used condoms when having sex, 25.2% (116) agreed that they are not likely to be infected by AIDS virus if they use a condom, 46.4% (214) indicated that their female friends used a condom when having sex while 67.2% (310) disagreed that condoms decrease sexual pleasure for women, 95.0% (438) disagreed to the fact that using other contraceptives apart from condom cannot contract HIV while 24.1% (111) disagreed that many girls are still brought up to be submissive to men a culture that increases their difficulty in avoiding sexual contact especially with older men without use of a condom. A summary of all the attitude variables revealed that 55.5% (256) had positive attitude to majority of the issues used to measure participant's attitude (Table 4.8 c).

Table 4.8 (c) Attitude towards condom use among the study participants

Variables	N=461	%
Most of my male friends use condoms		
Agreed	302	65.5
Disagreed	159	34.5
You are not likely to be infected by AIDS virus if you use a condom		
Agreed	116	25.2
Disagreed	345	74.8
My female friends use a condom when they have sex		
Agreed	214	46.4
Disagreed	247	53.6
Condoms decrease sexual pleasure for women		
Disagreed	310	67.2
Agreed	151	32.8
Student using other contraceptives other than condom cant contract HIV		
Disagreed	438	95.0
Agreed	23	5.0
Many girls are still brought up to be submissive to men, this increases their difficulty in avoiding sexual contact especially with older men without use of a condom		
Disagreed	111	24.1
Agreed	350	75.9
General attitude towards condom and its use		
Positive on many issues (Accepted)	256	55.5
Positive on few issues (Not accepted)	205	44.5

4.1.5 Sexual practices among the study participants

Sexual practice was assessed using six variables (Appendix 2). 3.9% (12) agreed to have participated in sex with someone of the same gender, 15.7% (48) indicated to have ever participated in sex with more than one partner, 25.2% (77) agreed to have ever participated in sex while intoxicated, 12.8% (39) had ever participated in sex while intoxicated without use of condom, 50.2% (153) indicated to have ever

participated in sex without use of condom while 3.0% (9) had participated in sex for money.

A summary of all the sexual practices variables revealed that 62.3% (190) were at risk (Table 4.9).

Table 4.9: Sexual practices among the study participants

Sexual practices	N=305	%
Ever participated in sex with someone of the same gender		
Yes	12	3.9
No	293	96.1
Ever participated in sex with more than one partner at the same time		
Yes	48	15.7
No	257	84.3
Ever participated in sex while intoxicated		
Yes	77	25.2
No	228	74.8
Ever participated in sex while intoxicated without use of condom		
Yes	39	12.8
No	266	87.2
Ever participated in sex without use of condom		
Yes	153	50.2
No	152	49.8
Ever participated in sex for money		
Yes	9	3.0
No	296	97.0
Overall sexual behavioral practices		
At risk	190	62.3
Not at risk	115	37.7

4.1.5.1 Birth control methods among the study participants

Majority (72.8%; 222) of the respondents indicated that they/their partners had used a condom during the last sexual intercourse mainly to prevent pregnancy (Figure 4.3).

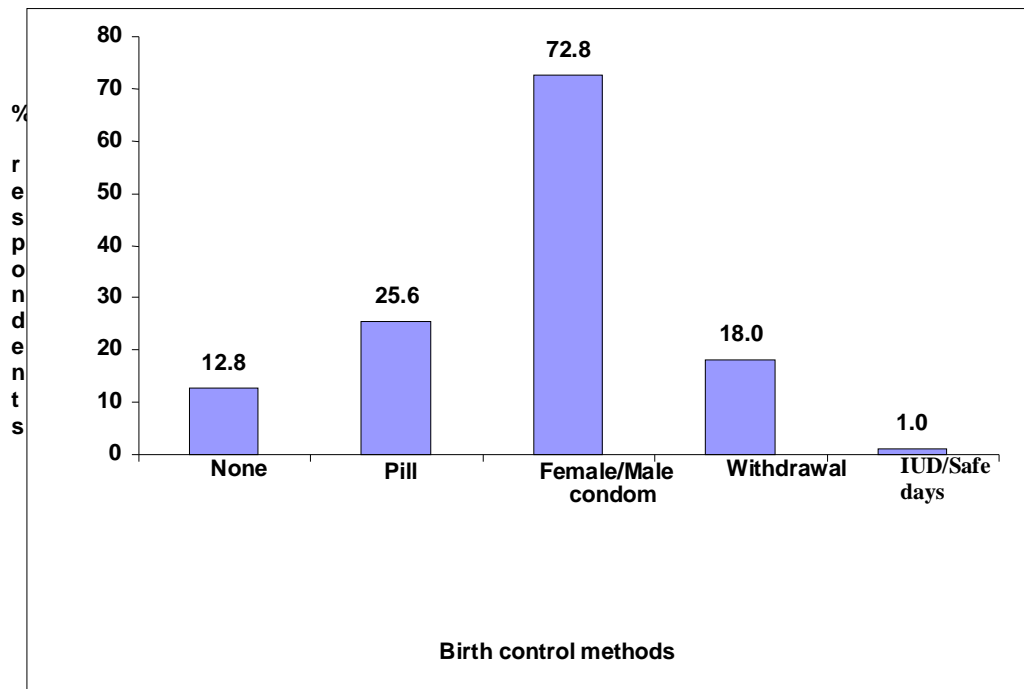


Figure 4.3: Birth control methods among study participants

4.1.6 Bivariate analysis

4.1.6.1 Socio- demographic characteristics

Bivariate analysis showed that none of the socio-demographic factors was associated with condom use ($P > 0.05$). However, marital status showed ($P = 0.074$). Majority of the single students (74.1%; 209) were using a condom while having sex compared to married or otherwise (56.5%; 13). Indicating that single students were 2.20 [95% CI

= 0.93 – 5.24] times more likely to use a condom while having sex compared to students that were married or otherwise (Table 7.10).

Table 4.10: Condom use in relation to socio-demographic characteristics

Variables	Used a condom (n=222)		Did not use a condom (n=83)		O.R	95% CI of O.R		P value
	N	%	N	%		Lower	Upper	
Gender								
Male	155	71.4	62	28.6	0.78	0.44	1.39	0.403
Female	67	76.1	21	23.9	1.00			
Age in years								
<20	30	75.0	10	25.0	1.83	0.69	4.85	0.227
20	83	76.9	25	23.1	2.02	0.91	4.50	0.085
21	42	76.4	13	23.6	1.97	0.79	4.89	0.145
22	27	73.0	10	27.0	1.64	0.61	4.40	0.322
23	17	60.7	11	39.3	0.94	0.34	2.58	0.905
24 or more	23	62.2	14	37.8	1.00			
Marital status								
Single	209	74.1	73	25.9	2.20	0.93	5.24	0.074
Other	13	56.5	10	43.5	1.00			
Year of study								
1	110	74.8	37	25.2	0.37	0.04	3.07	0.358
2	46	74.2	16	25.8	0.36	0.04	3.10	0.352
3	37	67.3	18	32.7	0.26	0.03	2.21	0.216
4	21	65.6	11	34.4	0.24	0.03	2.16	0.202
>4	8	88.9	1	11.1	1.00			
Religion								
Muslim	3	37.5	5	62.5	0.45	0.06	3.57	0.450
Catholic	66	68.0	31	32.0	1.60	0.34	7.57	0.556
Protestants	149	77.2	44	22.8	2.54	0.55	11.78	0.234
Others	4	57.1	3	42.9	1.00			
Residence								
On campus	100	74.6	34	25.4	1.18	0.71	1.97	0.523
Off campus	122	71.3	49	28.7	1.00			
Lives with								
Parents	91	75.2	30	24.8	1.33	0.63	2.81	0.460
Guardian	26	83.9	5	16.1	2.27	0.72	7.15	0.159
Schoolmates	69	69.0	31	31.0	0.97	0.46	2.08	0.945
Spouse	4	57.1	3	42.9	0.58	0.12	2.96	0.515
Alone	32	69.6	14	30.4	1.00			

4.1.6.2 Access factors and condom use

4.1.6.2.1 Economic and non economic factors

Bivariate analysis showed that three factors on economic and non economic (price of condom, distance and preference) were not significantly related to condom use ($P>0.05$) (Table 4.11 a). There was a significant relationship between condom use and privacy of access ($P=0.014$). A student that was concerned by privacy of access to condoms was 1.91 [95% CI = 1.14 – 3.20] times more likely to use a condom while having sex compared to one that was concerned.

Table 4.11 a: Condom use in relation to economic and non-economic factors among the study participants

Variables	Used a condom (n=222)		Did not use a condom (n=83)		O.R	95% CI of O.R		P value
	N	%	n	%		Lower	Upper	
Economic and non-economic factors								
Price								
Price	62	72.9	23	27.1	1.01	0.58	1.78	0.970
No	160	72.7	60	27.3	1.00			
Distance								
Yes	64	75.3	21	24.7	1.20	0.67	2.12	0.541
No	158	71.8	62	28.2	1.00			
Privacy								
Yes	121	79.1	32	20.9	1.91	1.14	3.20	0.014
No	101	66.4	51	33.6	1.00			
Preference								
Yes	150	75.8	48	24.2	1.52	0.90	2.55	0.114
No	72	67.3	35	32.7	1.00			

4.1.6.2.2 Sources of condom supply

None of the factors on preferred source of condom supply was associated with condom use ($P>0.5$) (Table 4.11 b).

Table 4.11 b: Condom use in relation to sources of condom supply among the study participants

Variables	Used a condom (n=222)		Did not use a condom (n=83)		O.R	95% CI of O.R		P value
	N	%	N	%		Lower	Upper	
Toilets								
True	117	74.5	40	25.5	1.20	0.72	1.98	0.483
False	105	70.9	43	29.1	1.00			
Health facility								
True	120	75.0	40	25.0	1.26	0.76	2.10	0.362
False	102	70.3	43	29.7	1.00			
Chemists shops and pharmacies								
True	151	75.9	48	24.1	1.55	0.92	2.61	0.098
False	71	67.0	35	33.0	1.00			
Supermarkets and shops								
True	104	78.2	29	21.8	1.64	0.97	2.77	0.063
False	118	68.6	54	31.4	1.00			
Peers								
True	58	67.4	28	32.6	0.69	0.40	1.20	0.190
False	164	74.9	55	25.1	1.00			
Family planning clinic								
True	98	70.5	41	29.5	0.81	0.49	1.34	0.413
False	124	74.7	42	25.3	1.00			

4.1.6.2.3 Brand preference

There was a significant relationship between condom use and condom brand preference ($P<0.05$) (Table 4.11 c). Majority of the students that had mixed preferences (78.0%; 64) used a condom while having sex compared to those who

preferred Government condoms (78.9%; 15), Durex (78.2%; 43), Trust (77.0%; 57) and those that indicated that there was no difference between specific condom brands (57.3%; 43). Students that preferred Trust brand were 2.50 [P=0.011, 95% CI = 1.23 – 5.07] times more likely to use a condom while having sex compared to ones that indicated that there was no difference between specific condom brands. Students that preferred Durex were 2.67 [P=0.015, 95% CI = 1.21 – 5.86] times more likely to use a condom while having sex compared to ones that indicated that there was no difference between specific condom brands, 2.79 [P=0.092, 95% CI = 0.85 – 9.21] times for ones that preferred Government condom and 2.65 [P=0.006, 95% CI = 1.32 – 5.30] times for one with mixed preference (Table 4.11 c).

Table 4.11c: Condom use in relation to preferred condom among the study participants

Variables	Used a condom (n=222)		Did not use a condom (n=83)		O.R	95% CI of O.R		P value
	N	%	N	%		Lower	Upper	
Brand preferred								
Mixed (durex and trust)	64	78.0	18	22.0	2.65	1.32	5.30	0.006
Government condoms	15	78.9	4	21.1	2.79	0.85	9.21	0.092
Durex	43	78.2	12	21.8	2.67	1.21	5.86	0.015
Trust	57	77.0	17	23.0	2.50	1.23	5.07	0.011
All brands are the same	43	57.3	32	42.7	1.00			
Reasons for brand preference								
Increases sexual pleasure								
True	114	79.2	30	20.8	1.86	1.11	3.13	0.019
False	108	67.1	53	32.9	1.00			

4.1.6.3 Knowledge on specific issues on HIV and condom use

None of the factors on knowledge about specific issues of HIV and condom use was significantly associated with condom use ($P>0.05$).

4.1.6.4 General attitude towards condom use

There was a significant relationship between use of condom and general attitude towards condom use ($P<0.05$).

A significant majority of students (81.5%; 141) that were positive on many attitude related issues (Accepted) used a condom while having sex compared to those that were positive on few issues (Not accepted) (61.4%; 81). A student positive on many attitude related issues was 2.77 [95% CI = 1.65 – 4.66] times more likely to use a condom while having sex compared to one positive on few issues (Figure 4.4).

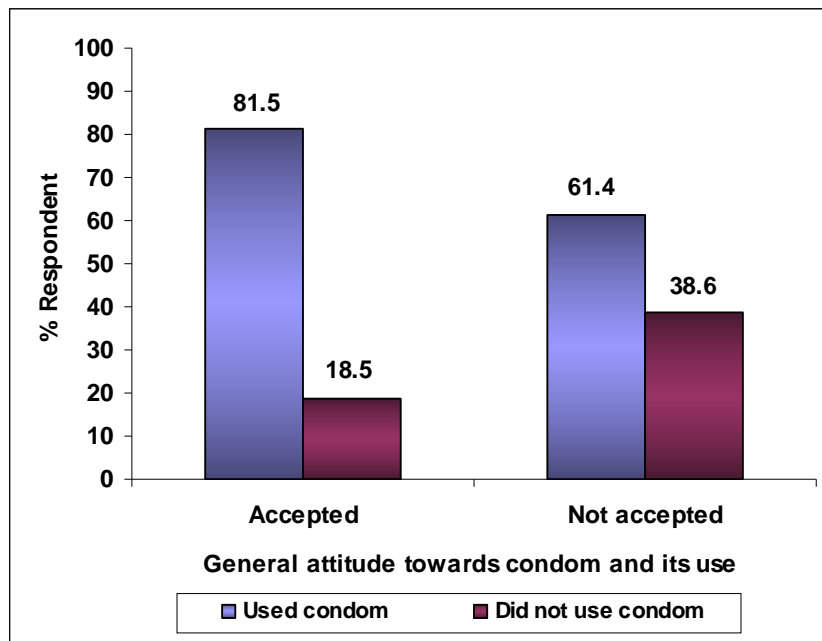


Figure 4.4: Condom use in relation to general attitude

4.1.6.5 Sexual practices and condom use

Bivariate analysis showed a significant relationship between condom use and sexual practices (P=0.029) (Table 4.12). Majority of the students (80.0%: 92 out of 115) not at risk as far as sexual practice was concerned were using a condom while having sex compared to those who were at risk (68.4%; 130 out of 190). Students that were not at risk were 1.85 [95% CI = 1.07 – 3.20] times more likely to use a condom while having sex compared to those at risk.

Table 4.12: Condom use in relation to sexual practices

Variables	Used a condom (n=222)		Did not use a condom (n=83)		O.R	95% CI of O.R		P value
	N	%	N	%		Lower	Upper	
Sexual practices								
Not at risk	92	80.0	23	20.0	1.85	1.07	3.20	0.029
At risk	130	68.4	60	31.6	1.00			

4.1.7 Multivariate analysis

There was a significant relationship between use of condom and general attitude towards condom use ($P=0.010$). A student positive on many attitude related issues was 2.09 [95% CI = 1.19 – 3.66] times more likely to use a condom while having sex compared to one positive on few issues (adjustment from 2.77).

There was a significant relationship between condom use and privacy of access to condoms ($P=0.038$). A student that was concerned by privacy of access to condoms was 1.79 [95% CI = 1.03 – 3.11] times more likely to use a condom while having sex compared to one that was not concerned by privacy (adjustment from 1.91). There was a significant relationship between condom use and condom brand preference ($P<0.05$). A student that preferred Trust brand was 2.25 [$P=0.036$, 95% CI = 1.06 – 4.79] times more likely to use a condom while having sex compared to one that indicated that there was no difference between specific condom brands (adjustment from 2.50). The likelihood increased to 2.50 [$P=0.033$, 95% CI = 1.08 – 5.79] times for one that preferred Durex (adjustment from 2.67). A student that had mixed preference was 2.30 [$P=0.030$, 95% CI = 1.08 – 4.88] times more likely to use a condom while having sex compared to one that indicated that there was no difference (adjustment from 2.65). However, Government condom did not show any significant relationship with condom use.

Relationship between sexual practices and use of condom, was statistically significant (P=0.027).

A student whose outcome on sexual behavior practices was not at risk was 2.02 [95% CI = 1.08 – 3.75] times more likely to use a condom while having sex compared to one whose outcome was at risk (adjustment from 1.85) (Table 4.13).

Table 4.13: Binary logistic regression

Predictor variables	β	S.E. (β)	Df	Adjusted OR	95.0% C.I. for OR		P value
					Lower	Upper	
General attitude towards condom use							
Positive on many issues	0.74	0.29	1	2.09	1.19	3.66	0.010
Positive on few issues	Reference						
Privacy of access							
Not concerned	0.58	0.28	1	1.79	1.03	3.11	0.038
Concerned	Reference						
Preferred brand of condom							
Mixed	0.83	0.38	1	2.30	1.08	4.88	0.030
Government condoms	1.01	0.63	1	2.75	0.80	9.53	0.110
Durex	0.92	0.43	1	2.50	1.08	5.79	0.033
Trust	0.81	0.39	1	2.25	1.06	4.79	0.036
All brands are the same	Reference						
Sexual behavior practices							
Not at risk	0.70	0.32	1	2.02	1.08	3.75	0.027
At risk	Reference						

4.1.8 Focus Group discussions (FGDs)

A total of 64 participants took part in the FGDs, 32 male and 32 female students equally distributed in year of study. Mean age of the study participants was 21

ranging between 19 and 24 years. Most of the participants (33) were aged between 21 and 22 years (Table 4.14).

Table 4.14: Distribution of FGDs study participants by age, gender and level of education

Age in years	Gender and year of study										Total male and female Participants
	Males					Females					
	1st	2nd	3rd	4 th	Total	1 st	2nd	3 rd	4th	Total	
19-20	5	2	-	-	7	4	3	-	-	7	14
21-22	3	6	6	2	17	3	5	6	2	16	33
23-24	-	-	2	6	8	1	-	2	6	9	17
Total	8	8	8	8	32	8	8	8	8	32	64

Majority of the study participant were protestants (40), followed by catholics (21) and the least were muslims (3) (Table 4.15). All the study participants were single.

Table 4.15: Distribution of the FGDs study participant by religion

Religion	Male	Female	Total
Muslims	2	1	3
Christian Catholics	14	7	21
Christian Protestants	16	24	40
Total	32	32	64

4.1.8.1 Themes and responses

Qualitative data was sorted manually according to themes. There were two main themes (attitude and practices), which were further broken down to sub-themes. Multiple responses came out of the participants from the FGDs (Table 4.16).

Table 4.16: Themes and responses

Theme	Response/s
<p>Attitude</p> <ul style="list-style-type: none"> • Sub-theme a. Reasons for condom use 	<p>Prevention of unwanted pregnancies and HIV/STIs <i>“.... we fear indulging in sexual activities without the use of condom... ... our mission here is to complete our studies and.. with pregnancy we will not be able to achieve our goals.”</i></p>
<ul style="list-style-type: none"> b. Whether condoms increase or decrease sexual pleasure 	<p>Depends on the brand used <i>‘....Trust does not break easily.....’</i></p>
<ul style="list-style-type: none"> c. Views about the need for HIV testing 	<p>Stigma: Fear of reactions of peers. <i>“What will our colleagues say when they see us going to the VCT? Everybody will think we are sick.”</i></p>
<p>Practices</p> <ul style="list-style-type: none"> a. How University students negotiate with there partners to use condoms 	<p>Telling them the risks of unwanted pregnancies/STIs. <i>“It can be difficult to talk about using condoms.”</i></p>
<ul style="list-style-type: none"> b. The most popular brand 	<p>Durex: <i>“..the feeling experienced during intercourse is not altered and it increases sexual pleasure, they make some of us last longer, are affordable and easily available”</i> <i>“We prefer Roughrider condom being used by our male partners because of the tingling lines, minty smell and they intensify things.”</i> Other responses:Trust; Salama; Raha; Sure; Government condoms; Femiplan male condom</p>
<ul style="list-style-type: none"> c. Factors influencing sexual behavior among university students 	<p>Drugs and alcohol. <i>“Some of us have ever slept with bar maid without a condom. We realized this and are really ashamed of ourselves.”</i> Others responses: Peer pressure; Religion; Mass media; Too much freedom ; Loneliness; Curiosity; Dressing; Money ; Weather</p>

4.2 Discussions

In this study, there was no significant relationship between condom use and age of the respondents ($P>0.05$). The mean age of the sample population was 21 ± 2 years. This could explain why there was no difference in responses. For instance, the following statement emerged from the FGDs;

“... not matter whether you are young or old, sex is the order of the day here... This is attributed to higher maturity rate experienced by students and the media around. Most of our young ladies push with ‘wazees’. Some are even as young as 19 years with an old man of 40 years. Greedy for money drives many to sex without the use of condoms”

A study carried out in Kenya indicated that condom use at last sex was more among young people compared to older people (Waithaka and Bessinger, 2001). In a study carried out in Brazil, young people from 16 to 24 years of age protected themselves more in sexual intercourse (Berquo *et al.*, 2008). The findings of this study showed that gender was not significantly associated with condom use ($P>0.05$). In the FGDs, both male and female participants gave a similar view that male students use condoms more than female students.

“The ladies think it’s a man’s job to make sure he uses a condom, why aren’t they using condom so that they feel how we men feel”

However, in-availability of female condoms was attributed to high costs. Despite the cost, female students argued that they use condom through their male partners. Studies in Kenya and Nigeria showed that condom use was more amongst men compared to women (NASCO, 2009; Fadiora *et al.*, 2002), the latter with a population of students in institutions of higher learning. Marital status was not significantly related to condom use ($P>0.05$) in this study.

This was confirmed by the FGDs findings where according to the study participants, marriage relationships may be traditionally based on trust but of late things are different. The following statement emerged from the FGDs:

“There is a high perception of risk of infection in relationships these days; therefore we have to use condoms whether married or not married”

Studies carried out in Kenya, Ghana and Brazil (NASCO, 2009; Adih *et al.*, 1999; Calazans *et al.*, 2005) indicated that condom use was less among married couples compared to those who were single. This differs with the findings of this study.

Results from the quantitative findings in this study showed that religion was not significantly associated with condom use ($P>0.05$). However, there were different opinions with regard to condom use in the FGDs. The following statements emerged: specifically, protestants noted the following:

“Our religion allows the use of condom but only to married couples as a means of contraceptive and protection from HIV”

In addition, Catholics noted that condom use was not accepted initially. Muslims on the other hand have opposed the use of condom arguing that the practice will boost promiscuity.

“We cannot bend God’s laws to make them conform to the passions of man”

Even though the FGDs gave a different impression that religion has some influence on the usage of condom, the quantitative results of this study disagree with a study carried out in Africa where in some areas condom promotion had been impeded by anti-condom campaigns from muslims and catholics (Marcella and Alsan, 2006).

In Kenya, many religious leaders expressed opposition to condom use (IRIN, 2007; Moszynki, 2008).

A study carried out in Denver, Colorado (Fanburg *et al.*, 1995) indicated that distributing condoms was seen to be religiously wrong. Another study in Brazil showed that people who have no religious affiliation have higher rates of protection against STIs during sexual intercourse (Berquo *et al.*, 2008).

There was a significant relationship between condom use and privacy of access to condoms ($P=0.038$). According to this study, a student who was bothered by privacy of access to condoms was 1.79 [95% CI = 1.03 – 3.11] times more likely to use a condom while having sex compared to one that was not bothered (adjustment from 1.91). This was confirmed by the FGDs where most students preferred the availability of condoms within the University residential rooms where only students could access them;

“.. they protect us from STIs and also unexpected responsibilities..... why the University cannot think of distributing the condom boxes in each residential room.... students may be concerned about how they are regarded by other people like the workers and lecturers”

The findings of this study are similar to studies carried out in Uganda and Seattle, Washington which indicated that participants expressed interest in continuous availability of condoms at convenient outlets with a view to guarding concerns of privacy (Kipp *et al.*, 1992; Brown *et al.*, 1997). This study showed a significant relationship between condom use and condom brand preference ($P<0.05$). A student that preferred Trust brand was 2.25 [$P=0.036$, 95% CI = 1.06 – 4.79] times more likely to use a condom while having sex compared to one that indicated that there was no difference between specific condom brands (adjustment from 2.50).

A student that preferred Durex brand was 2.50 [P=0.033, 95% CI = 1.08 – 5.79] times more likely to use a condom while having sex compared to one that indicated that indicated there was no difference between specific brands (adjustment from 2.67). A student that preferred mixed brands (preference) was 2.30 [P=0.030, 95% CI = 1.08 – 4.88] times likely to use a condom compared to one that indicated that there was no difference between specific brands (adjustment from 2.65). This was confirmed by the FGDs where majority of the students preferred Durex brand compared to other brands;

“We use Durex because the feeling experienced during intercourse is not altered and it increases sexual pleasure, they make some of us last longer, are affordable and easily available.”

However, other students supported the use of other brands such as, *Trust, Roughrider, Salama, Raha, Sure, Government condoms and Femiplan male condom*. The above findings concur with those of a study carried out in Uganda which identified the brand of condom as the main barrier to condom use (Kipp *et al.*, 1992). There was no significant relationship between condom use and price (P>0.05). The above findings are similar to a study carried out in Nigeria where price of condom was not an important factor in influencing demand of condom (Musibau, 2010).

This study showed no significant relationship between condom use and knowledge (P>0.05). The findings of this study are similar to findings of studies carried out in Kampala and Jamaica which indicated that the level of knowledge about STDs and their prevention was not matched by sexual behavioral patterns (Sekirime *et al.*, 2001, Gillespie, 2008).

Also on knowledge about the effectiveness of condom use, as well as concern about being at risk for HIV infection, were often reported to be unrelated to safe sex (Svenson and Varnhagen, 1990; Carmel *et al.*, 1992; Oswald and Pforr, 1992; Greenlee and Ridley, 1993). Findings of this study differ with a study carried out in Vietnam (Lan *et al.*, 2009) where low levels of STI knowledge was associated with poor practices. A study in Mexico (Tapia *et al.*, 2004) showed that among young men, high levels of HIV/AIDS knowledge increased likelihood of condom use and among young women high levels of knowledge decreased likelihood of using condoms. A study carried out among young African American women (Raiford *et al.*, 2009), young women who were more knowledgeable on STIs were more likely to exhibit inconsistent condom use compared to those who were less knowledgeable.

This study showed a significant relationship between use of condom and attitude ($P=0.010$). According to this study, a student who was positive on many attitude related issues was 2.09 [95% CI = 1.19 – 3.66] times more likely to use a condom while having sex compared to one who was positive on few issues (adjustment from 2.77). This was confirmed by the FGDs where most students had an overall positive attitude towards condom use. For instance, on reasons for condom use, nearly all the students stated that condoms prevented unwanted pregnancies and HIV/STIs. When participants were asked whether condoms increase or decrease sexual pleasure, majority stated that it depended on the brand used. Few participants stated that condom use decreases sexual pleasure;

“Some of us do not feel our sexual partners when using condoms. That is why we rarely use them. Just putting them on interrupts everything so we rather not use them”

The study findings concur with findings of a study carried out in Nigeria among University students (Ike and Aniebue, 2007) which indicated negative attitude to be associated with less condom use. The findings of this study also agree with a study carried out among African-American men (Reece *et al.*, 2007) which showed that perceptions of condom fit and feel were related to the use.

The findings of this study showed a statistically significant relationship between sexual practices and use of condoms. A student who was not at risk was 2.02 [95% CI = 1.08 – 3.75] times more likely to use a condom while having sex compared to one whose outcome was at risk (adjustment from 1.85). This was confirmed by the FGDs which gave an indication that some students indulge in risky sexual behavior. For example, on how university students negotiate with their partners to use condoms, some students said that there is no negotiation when they are intoxicated with drugs/alcohol. The FGDs noted the following;

“Majority of us have slept with bar maids or our partners without using a condom after taking alcohol. We have realized this and have been really ashamed of ourselves. Some of us men intentionally refuse to use condoms even with regular girlfriends”

The findings of this study concur with findings of a study carried out at KNH Kenya among sexually active adolescents in Nairobi, indicated that most sexually active adolescents were involved with risky behavior (Lema and Hassan, 1994).

In addition, a study carried out at Maseno University, Kenya (Othero *et al.*, 2009) indicated that about of the 77.7% of the respondents who said they had used condoms, only 15.8% reported consistent use of condom.

Studies carried out in Nigeria, Ghana and Kathmandu indicated that marijuana and alcohol use was related to low condom use and that that students did not use condoms consistently and were not likely to use condoms (Adufuye *et al*, 2009; Tagoe and Aggor, 2009; Adhikari, 2010).

4.3 Study Limitations

4.3.1 Selection bias

There was a potential selection bias of the study participants with the marital status where a significant majority (94.6%) of the study participants were single and only (5.4%) of the study participants were married. This was related to low number of married university undergraduate students in the university.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions

- The prevalence of condom use among the students was 72.8% in this study
- There was no association between condom use and socio-demographic characteristics
- Access (Privacy of condom and brand preference) had an association with condom use However, there was no association between condom use and price of condom
- There was no association between condom use and knowledge, however attitudes and sexual practices were associated with condom use.

5.2 Recommendations

- There is need to improve access to condoms
- Condoms should be distributed according to the preferred brands. The most preferred brands (Durex/Trust)
- Continuous awareness campaigns should be enhanced aiming at changing the negative attitude and poor practices among the undergraduate students
- Continuous monitoring for the changes in usage of condom

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APPENDICES

APPENDIX 1: Questionnaire monitoring check-list

Name of Research Assistant	Issued serial No's	Returned serial No's	Signature of Research Assistant	Date

Checked by principal investigator:.....

Date.....

APPENDIX 2: Consent form

Factors associated with condom use among undergraduate students at Jomo Kenyatta University.

Researchers' statement

Goodmorning/afternoon, my name is Beatrice Amy Nesidai Kithuka. I am a Master of science Epidemiology student at Jomo Kenyatta University of Agriculture and Technology. Today I am here to carry out a study on factors associated with condom use among undergraduate university students. This form will give you information you need, so that you can make a decision on whether to participate or not to in the study. There are no wrong or right answers. You will be given time to consider if you would like to be in the study. Please read the form well and ask where you don't understand. Please be honest and truthful in answering the questions. I assure you that the information you give will be totally confidential and will not be required to identify yourself by name. Your participation is voluntary, and you may therefore refuse to answer any question or stop the interview at any time without suffering any consequences.

Purpose

The purpose of this research is to determine the factors associated with condom use among university students. This information will be used to improve HIV and other STIs interventions in higher learning institutions. The information will be collected from 461 consenting undergraduate students from JKUAT (main campus).

Procedure:

A total of 461 university students will be interviewed during this study, using self administered questionnaire and 64 using focus group discussions. The interview will last for about half an hour in a quiet place within the university premises and participants will be required to give answers to all the questions. Participants will have the opportunity to make suggestions and give information on the factors affecting condom use within the university.

Risks

People in the university could learn of your involvement in the study. To protect you from this risk, all information you will give us will be kept confidential within our research team. All the data will be stored in lockable cabinets.

Benefits

There is no financial compensation or other personal benefits from participating in the study. However your participation and/or answers to the questions may provide insights into improving future planning, implementation and evaluation of health programmes aimed at increasing condom use among university students in Kenya.

Confidentiality

No names will be used on any of the reports from the study. All the respondents will be given different identification numbers and the information relating to each participant will be strictly confidential, available only to the study team. Notes and any other recordings done will be destroyed once summary is prepared.

Voluntariness

Your participation is voluntary, and you may therefore refuse to answer any question or stop the interview at any time without suffering any consequences.

Instructions:

When you sign below it shows that you have agreed to participate in the study. If you do not understand any part of the information that has been read to you/you have read, be sure to ask questions. Do not sign until you have understood all that is expected or required.

<p>I wish to take part in the study entitled: Factors associated with condom use among students of JKUAT. I understand that I may at any time during the study withdraw my consent without any consequences. I have understood the information given in this sheet and I give my consent to be interviewed.</p> <p>Respondent number ----- Signature----- Date-----</p>

If you require further information please contact **KEMRI/ERC: The secretary,**

Tel.2722541 ext 3307,0722205901, 0733400003

APPENDIX 3: Self administered questionnaire

<p>Part one: Back ground information This section will ask you questions about yourself. Read each question carefully and tick the appropriate response, fill in where necessary.</p>																
1. What is your gender?	i)Male ii)Female															
2. How old are you?	[.....] (years)															
3. What is your marital status? <i>Only male-female marriages are being considered here.</i>	i). Married ii). Single iii). Divorced iv). Widowed v). Cohabiting vi). Other															
4. What is your year of study?	i). 1 st year ii). 2 nd year iii). 3 rd year iv). 4 th year v). >4 years															
5. What is your year of study?	i). 1 st year ii). 2 nd year iii). 3 rd year iv). 4 th year v). >4 years															
6. Do you live on campus or off campus?	i). On campus ii). Off campus															
7. Who do you live with?	1.Parents? 2.Guardian? 3.Older brother/Sister? 4.Other.....Specify															
<p>Part two: Respondents knowledge This section will cover about your knowledge on HIV and other STIs and condom use. Read each question carefully and tick the appropriate response, fill in where necessary. A question may have more than one response."T" means True while "F" means False."Y" means Yes and "N" means No</p>																
8. What is HIV?	<table style="width: 100%; border: none;"> <tr> <td></td> <td style="text-align: right;">T</td> <td style="text-align: right;">F</td> </tr> <tr> <td>i). Is a flavi virus belonging to the family Flaviviridae</td> <td style="text-align: center;">---</td> <td style="text-align: center;">---</td> </tr> <tr> <td>ii). Is a lentivirus</td> <td style="text-align: center;">---</td> <td style="text-align: center;">---</td> </tr> <tr> <td></td> <td style="text-align: right;">T</td> <td style="text-align: right;">F</td> </tr> <tr> <td>iii). Is a virus that</td> <td></td> <td></td> </tr> </table>		T	F	i). Is a flavi virus belonging to the family Flaviviridae	---	---	ii). Is a lentivirus	---	---		T	F	iii). Is a virus that		
	T	F														
i). Is a flavi virus belonging to the family Flaviviridae	---	---														
ii). Is a lentivirus	---	---														
	T	F														
iii). Is a virus that																

	causes AIDS --- --- iv). Is a virus that attacks the immune system. --- --- v). HIV is a virus that can be transmitted by air, insects bites, physical touch such as shaking hands, sharing utensils and sharing food or drinks. --- ---
9. HIV is one of the Kenyans serious public health problem because of :	i). Rapid spread. --- --- ii).Ability to suppress the Reproductive system. --- --- iii).Inevitable death for those with HIV/AIDS. --- --- iv).Resulting problems which affect national development and hence the welfare of all Kenyans. --- --- v).Relationship with TB. --- ---
10. Although HIV/AIDS has received more attention and concern than other STIs, all comprise a single, interrelated problem because:	i).They are not always transmitted the same way --- --- ii). They are co-factors. (Other STIs such as syphilis, chancroid and herpes, are risk factors for HIV infection) --- --- iii). They all have a cure --- --- iv). They both cause AIDS --- ---
11. The MAIN route of transmission of HIV/ other STIs is through sexual intercourse	--- ---
12. Do you think it's important to have a HIV test?	i). Y (Go to question 13) ii). N (Go to question 14)
14. Why don't you think it is important to have a HIV test?	i).I trust my partner no need ii).Not interested iii).Others(specify) -----
15. A student using oral contraceptives cannot contract HIV.	--- ---
16. The safer sexual practice of a person infected with a STI include:	i).Prompt treatment and completing treatment as instructed. --- --- T F ii).Avoiding taking ones partner to a health facility to be tested. --- --- iii).Avoiding sex until cured and always using --- ---

	condom if sex occurs.		
17. What is a condom?	<p>i).Is a barrier device used during sexual intercourse to prevent pregnancies and the spread of STIs. --- ---</p> <p>ii).Is a barrier device used during sexual intercourse only for prevention of pregnancies. --- ---</p> <p>iii).Is a barrier device used only for prevention of the spread of STIs --- ---</p>		
18. Second to faithfulness between two uninfected partners, condoms are the most reliable way to preventing STIs including HIV infection. How safe is it to use a condom?	<p>i).Condom ensures safe sex by preventing contact with the vaginal fluids, semen or blood of sexual partner. --- ---</p> <p>ii).Condoms are always safe irrespective of their storage --- ---</p> <p>iii).Condom use promote cleanliness --- ---</p> <p>iv). Condoms only protect against STIs if they are used properly and ALWAYS used correctly. --- ---</p> <p>v).A single condom can be used more than once --- ---</p>		
19. Students need to know that condoms must be cared for properly. A condom which is not cared for properly is not safe. It will break and tear easily and no longer protect against STIs. Therefore proper condom care is the essential part of safer sex. Proper care means avoiding anything that can weakens a condom. It involves:	<p>i).Using the condom twice or more --- ---</p> <p>ii).Storing the condom safely. --- ---</p> <p>iii).Storing the condoms next to sunlight --- ---</p> <p>iv).Opening the package carefully and applying condom properly. --- ---</p> <p>v).Using the condom only once --- ---</p>	T	F
20. What are the main channels of communications from which you receive information and education about condom use? (Please tick where applicable)	<p>i). Radio</p> <p>ii). Television</p> <p>iii). Billboards</p> <p>iv).Peers</p> <p>v). Internet</p>		

	vi).Others[7] specify.....		
<p>Part three: Respondents attitude towards condom use</p> <p>This section will cover about your attitude on condom use. Read each question carefully and tick the appropriate response, fill in where necessary. A question may have more than one response."T" means True while "F" means False."Y" means Yes and "N" means No</p>			
21. True or false tick where applicable	i).Condoms make sex inconvenient ii).People plan when they are going to have sex iii). A man's penis may be too large for a condom. iv). Condoms are expensive. v). I am embarrassed to buy a condom. vi).The correct way to use a condom is to put it on a soft penis. vii). Most religious people don't use condoms. viii) Only men should decide if a condom is used during sex. ix).Only gay people get AIDS.	--- --- --- --- --- --- --- --- --- --- ---	--- --- --- --- --- --- --- --- --- ---
22.Tick where applicable	i).It's alright for women to insist that men use a condom. ii).All right to insist that your sexual partner use a condom. iii).All right for women to refuse sex if man does not want to use a condom iv).All right for men to refuse sex if woman does not want to use a condom.	Y --- --- ---	N --- --- ---
23. Tick where applicable	i).Condoms help stop the spread of STIs ii).It is easy to obtain a condom within the campus iii).My friends are concerned about getting infected by AIDS virus	--- --- ---	--- --- ---

	iv).Condoms help stop the spread of AIDS virus --- --- v). I am concerned about getting infected by AIDS virus --- --- vi). Condoms decrease sexual pleasure for men --- --- vii).Most of my male friends use condoms when they have sex --- --- viii).You are not likely to be infected by AIDS virus if you use a condom --- --- ix). Most of my female friends use a condom when they have sex --- --- x). Condoms decrease sexual pleasure for women --- ---									
24. Young people tend to believe that nothing bad can happen to them i.e. Not get STIs or pregnancies.	<table style="width: 100%; border: none;"> <tr> <td style="width: 80%;"></td> <td style="text-align: center; width: 10%;">T</td> <td style="text-align: center; width: 10%;">F</td> </tr> <tr> <td>i).This is due to lack of correct information concerning the risk and consequences of STIs</td> <td style="text-align: center;">---</td> <td style="text-align: center;">---</td> </tr> <tr> <td>ii).Many girls are still brought to be submissive to men. This increases their difficulty in avoiding sexual contact, especially with older men.</td> <td style="text-align: center;">---</td> <td style="text-align: center;">---</td> </tr> </table>		T	F	i).This is due to lack of correct information concerning the risk and consequences of STIs	---	---	ii).Many girls are still brought to be submissive to men. This increases their difficulty in avoiding sexual contact, especially with older men.	---	---
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i).This is due to lack of correct information concerning the risk and consequences of STIs	---	---								
ii).Many girls are still brought to be submissive to men. This increases their difficulty in avoiding sexual contact, especially with older men.	---	---								
25. Would you like to be tested for HIV?	<table style="width: 100%; border: none;"> <tr> <td style="width: 80%;"></td> <td style="text-align: center; width: 10%;">Y</td> <td style="text-align: center; width: 10%;">N</td> </tr> <tr> <td></td> <td style="text-align: center;">---</td> <td style="text-align: center;">---</td> </tr> </table>		Y	N		---	---			
	Y	N								
	---	---								
<p>Part four: Respondents Practices</p> <p>This section will cover about your practices on condom use before and after knowing your HIV status. Read each question carefully and tick the appropriate response, fill in where necessary. A question may have more than one response.”T” means True while “F” means False.”Y” means Yes and “N” means No</p>										
26. Have you ever had a sexual intercourse?	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Y</td> <td style="width: 50%;">N(if N go to 30)</td> </tr> <tr> <td style="text-align: center;">---</td> <td style="text-align: center;">---</td> </tr> </table>	Y	N(if N go to 30)	---	---					
Y	N(if N go to 30)									
---	---									
27. How would you describe your sexual identity? (Do not read, one response only).	i). Heterosexual ii). Bisexual iii). Homosexual iv). others (specify-----)									
28. The last time you had sexual intercourse, did you protect yourself/your partner/s against accidental pregnancies/STIs?	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"></td> <td style="text-align: center; width: 10%;">Y</td> <td style="text-align: center; width: 10%;">N</td> </tr> <tr> <td></td> <td style="text-align: center;">---</td> <td style="text-align: center;">---</td> </tr> </table>		Y	N		---	---			
	Y	N								
	---	---								
29.Which of the listed methods did you and your partner use for	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Against pregnancy</td> <td style="width: 50%;">Against STIs</td> </tr> </table>	Against pregnancy	Against STIs							
Against pregnancy	Against STIs									

protection against accidental pregnancies/STIs	i).Pill --- --- ii).Female --- --- Condom iii).Male --- --- Condom iv).Withdrawal --- --- v).Others specify-----																											
<p>Part five: Access This section will cover about access factors. Read each question carefully and tick the appropriate response. A question may have more than one response. “T” means True while “F” means False.”Y” means Yes and “N” means No</p>																												
30. Which of the following economic and non economic factors would affect your willingness to acquire a condom?	<table style="width:100%; border:none;"> <tr> <td></td> <td style="text-align:center">Y</td> <td style="text-align:center">N</td> </tr> <tr> <td>i). Price</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>ii). Distance</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>iii). Privacy</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>iv). Preference</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> </table>		Y	N	i). Price	---	---	ii). Distance	---	---	iii). Privacy	---	---	iv). Preference	---	---												
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i). Price	---	---																										
ii). Distance	---	---																										
iii). Privacy	---	---																										
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31. Which of the following sources of condom supply would you prefer?	<table style="width:100%; border:none;"> <tr> <td></td> <td style="text-align:center">Y</td> <td style="text-align:center">N</td> </tr> <tr> <td>i). Toilets at the university.</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>ii).Health facility at the university.</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>iii).Chemist shops and pharmacies</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td></td> <td style="text-align:center">Y</td> <td style="text-align:center">N</td> </tr> <tr> <td>iv).Supermarkets and shops</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>v).Peers at the university.</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>vi).Family planning clinic</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>vii).Others (Specify)-----</td> <td></td> <td></td> </tr> </table>		Y	N	i). Toilets at the university.	---	---	ii).Health facility at the university.	---	---	iii).Chemist shops and pharmacies	---	---		Y	N	iv).Supermarkets and shops	---	---	v).Peers at the university.	---	---	vi).Family planning clinic	---	---	vii).Others (Specify)-----		
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vii).Others (Specify)-----																												
32. If preference is a factor affecting the choice of condom, which of the following brand do you prefer	<table style="width:100%; border:none;"> <tr> <td></td> <td style="text-align:center">T</td> <td style="text-align:center">F</td> </tr> <tr> <td>ii).Trust</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>iii).Durex</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>iv). Government condoms</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>v).If any others combination please state -----</td> <td></td> <td></td> </tr> </table>		T	F	ii).Trust	---	---	iii).Durex	---	---	iv). Government condoms	---	---	v).If any others combination please state -----														
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33. What are the reasons for your brand preference?	<table style="width:100%; border:none;"> <tr> <td></td> <td style="text-align:center">T</td> <td style="text-align:center">F</td> </tr> <tr> <td>i).Increases the sexual pleasure</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>ii).Have reasonable fitting size</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>iii).Prolong intercourse</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> <tr> <td>iv).Spend less money</td> <td style="text-align:center">---</td> <td style="text-align:center">---</td> </tr> </table>		T	F	i).Increases the sexual pleasure	---	---	ii).Have reasonable fitting size	---	---	iii).Prolong intercourse	---	---	iv).Spend less money	---	---												
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APPENDIX 4: Focus group discussions guide

Goodmorning/afternoon, my name is Beatrice Amy Nesidai Kithuka. I am a Master of Science in Epidemiology student at Jomo Kenyatta University of Agriculture and Technology. I would like to introduce my group members. The overall objective of the study is to determine the factors associated with condom use among undergraduate university students. The benefit of your participation is that you will contribute useful information to the public health programs and the information you give will be used to improve HIV and other STIs interventions in higher learning institutions. Please be honest and truthful in answering the questions. If you agree to participate in this study, we will have focus group discussions with you, covering questions about yourself, attitude and practices towards condom use, and behavior. Your participation is voluntary, and you may therefore refuse to answer any question at any time without suffering any consequences. You will not be charged nor will you have to pay for your participation in the study. I assure you that the information you give will be totally confidential and you will not be required to identify yourself by name. Everything we discuss should not be taken out of this room. Members will have to keep the discussions of the FGD confidential. All the respondents will not be allowed to interact among themselves in the process of the discussions. There are no wrong or right answers. The FGDs will take approximately 45 minutes which indeed is an intrusion on your time. Every participants input is very valuable. Respect the opinion of others. Any question(s) that you may have will be answered after the session. I will answer truthfully to any questions you may have. If I don't have the information you require, I will tell you so and if you wish, I will try to get an answer for you. The FGDs will be tape recorded and written in a note book and flip charts.

Do you accept to be recorded? Notes and any other recordings done will be destroyed once summary is prepared. You are free to choose either to participate or not to participate.

Date (day/month/year): _____ Start time: _____ End time: _____

Name of moderator: _____ Signature: _____

Name of recorder: _____

FGD number.....

Number of respondents.....

Male -----Female-----

Purpose:

This instrument aims at assessing the attitude and practices of students towards condom use in relation to HIV/AIDS and other STIs.

Important Note:

A total of 8 FGDs will be conducted. Four for the male students and four for the female students. Each FGD will have 8 undergraduate students drawn from male and female undergraduate students respectively. Therefore, 64 consenting undergraduate students will participate in the FGD.

Instructions to the interviewer/moderator:

Before starting the interview:

7. Make sure that the location you choose for the interview guarantees privacy and that your conversation can not be heard by anybody.

8. Explain the purpose of the study to the group and ask each participant if you may conduct the interview.
9. Each participant must give consent to be recorded
10. If permitted to interview, give each one of them to read and sign the **'informed consent form'**
11. If the student is willing to be interviewed, then she/he should sign and date the consent form.
12. If the student does not want to be interviewed, politely thank him or her then proceed with those that have accepted to take part.

During the interview:

13. Initiate general conversation to create a relaxed environment
14. Ensure that all participants have an opportunity to talk
15. Ask each question and record the answer in the space provided. If the group does not understand the question, ask it again using different term without changing the meaning of this question. Make sure that the answers are specific. If a participant gives you a general or vague answer, ask him to give an example or to be more specific. Do not suggest answers.
16. At the end of the interview, thank the group for participating before leaving.

Part 1: Background information

Student number	code	Gender	Age	Year of study	Religion

Part 2: Attitude and practices of students towards condom use in relation to HIV/AIDS and other STIs.

1. For what purpose do university students use condom?[Probe]
2. Do condoms increase or decrease sexual pleasure?[Probe]
3. How do university students negotiate with their partners to use condom?
[Probe]
4. What are the most popular brands of condom in this university?[Probe]
5. There are calls for sexually active people including the youth to get tested for HIV. How do university students respond to this call? Or what are your views about the need for testing? [Probe]
6. What factors influence sexual behavior among university students?[probe]

APPENDIX 5: Analysis of Knowledge

Knowledge scores were determined using questions. A score of one was awarded to a correct/positive response. A mean score of each was determined where a student who scored mean and above was said to have adequate knowledge. In the case of knowledge on what is HIV, five questions were used. The mean score was 4 ± 1 ranging between 1 and 5. A student who scored 4 and above was considered to have adequate knowledge on what is HIV. In the case of Knowledge on ways in which HIV is a Kenyans serious public health problem, five questions were used. Similarly, the mean score was 3 ± 1 ranging between 0 and 5. A student who scored 3 and above was considered to have adequate knowledge on ways in which HIV is a Kenyans serious public health problem. Similarly, in the case of Knowledge on ways in which HIV/AIDS and other STIs are interlinked, five questions were used. The mean score was 4 ± 1 ranging between 1 and 5. A student who scored 4 and above was considered to have adequate knowledge on ways in which HIV/AIDS and other STIs are interlinked. Knowledge on condom use was analyzed using 11 questions. The mean score was 9 ± 2 ranging between 1 and 11. A student who scored 9 and above was considered to have adequate knowledge on condom use.

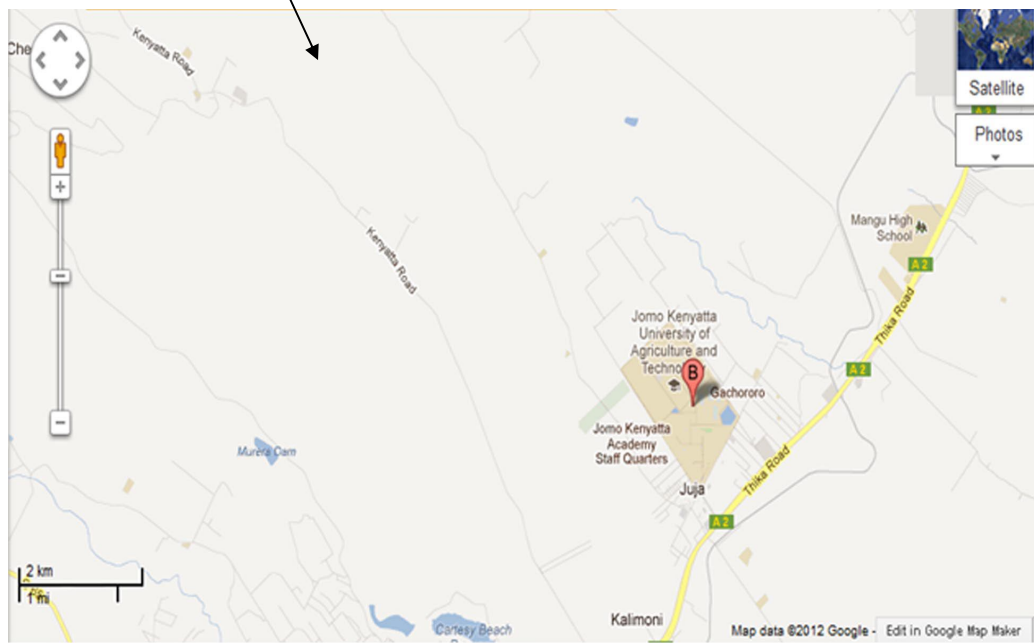
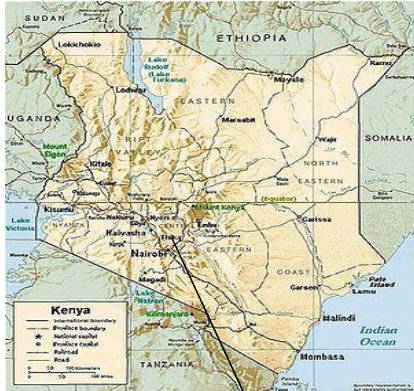
APPENDIX 6: Multivariate analysis

Binary logistic regression was used to identify variables predictive of condom use (0= Did not use, 1= Used). All factors that were related to condom use at $P < 0.1$ in bivariate analysis were used in multivariate analysis.

- Marital status (1= Single, 2= Married)
- General attitude towards condom use (1= Positive on many issues, 2= Positive on few issues)
- Accessibility to condom (1= Other, 2= Privacy)
- Preferred sources of condom supply (1= Chemists and shops, 2= Others)
- Preferred sources of condom supply (1= Supermarkets and shops, 2= Others)
- Preferred brand of condom (1= Mixed, 2= Government condoms, 3= Durex, 4= Trust, 5= No difference)
- Reasons for brand preference (1= Increases sexual pleasure, 2= Others)
- Risky sexual behavior (1= Not at risk, 2= At risk)

Three successive iterations were performed using backward condition method retaining five factors, adjusting for other factors and keeping them constant.

APPENDIX 7: Map of Kenya showing JKUAT



Source: Google maps available at <http://www.maplandia.com/kenya/central/>

APPENDIX 8: Independent and dependent variables

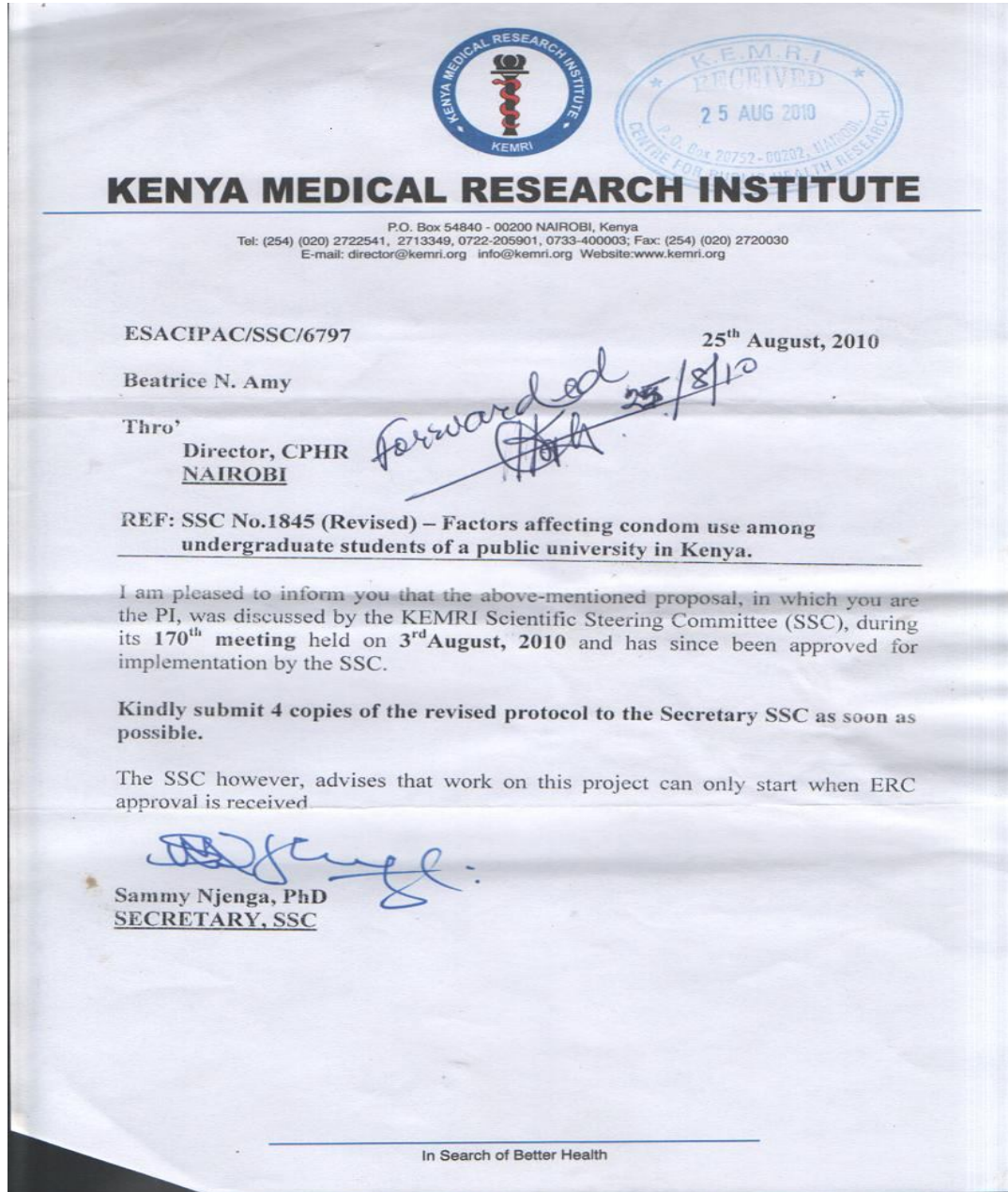
Independent variables

1. Socio-demographic factors-Age, gender, marital status and religion
2. Access factors- Economic and non-economic, preferred sources of condom supply and brand preference
3. Knowledge and attitude in relation to HIV and condom use.



Dependent variable

- Condom use

APPENDIX 9: Scientific Steering Committee (SSC) (Approval) KEMRI



APPENDIX 10: Ethical Review Committee (ERC) (Approval) KEMRI.

KENYA MEDICAL RESEARCH INSTITUTE

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E-mail: director@kemri.org info@kemri.org Website:www.kemri.org

KEMRI/RES/7/3/1 **October 22, 2010**

TO: **MS. BEATRICE AMY NEISIDAI KITHUKA,**
PRINCIPAL INVESTIGATOR

THRO': **DR. YERI KOMBE,**
THE DIRECTOR, CPHR,
NAIROBI *forwarded 20/10/10*

RE: **SSC 1845 (INITIAL SUBMISSION): FACTORS AFFECTING CONDOM**
USE AMONG UNDERGRADUATE STUDENTS OF A PUBLIC
UNIVERSITY IN KENYA

Make reference to your letter dated October 16, 2010 received on October 18, 2010. Thank you for your response to the issues raised by the Committee. This is to inform you that the issues raised during the 183rd meeting of the KEMRI/ERC held on October 12, 2010, have been adequately addressed.

Due consideration has been given to ethical issues and the study is hereby granted approval for implementation effective this **22nd day of October 2010**, for a period of twelve (12) months.

Please note that authorization to conduct this study will automatically expire on **21st October 2011**. If you plan to continue with data collection or analysis beyond this date, please submit an application for continuing approval to the ERC Secretariat by **27th August 2011**.

You are required to submit any amendments to this protocol and other information pertinent to human participation in this study to the ERC prior to initiation. You may embark on the study.

Yours sincerely,
RCKithinji
R. C. KITHINJI,
FOR: SECRETARY,
KEMRI/NATIONAL ETHICS REVIEW COMMITTEE

In Search of Better Health