RISK FACTORS ASSOCIATED WITH SYPHILIS INFECTION AMONG MEN WHO HAVE SEX WITH MEN IN NAIROBI CITY COUNTY, KENYA

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A THESIS SUBMITTED IN PARTIAL FULLFILMENT OF REQUIREMENTS FOR THE AWARD OF A MASTER OF PUBLIC HEALTH (REPRODUCTIVE HEALTH OPTION) IN THE SCHOOL OF PUBLIC HEALTH AND APPLIED HUMAN SCIENCES OF KENYATTA UNIVERSITY
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DECLARATION

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

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We confirm that this proposal has been submitted for review with our approval as the University supervisors.

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Department of Zoological Sciences
DEDICATION

This thesis is dedicated to my lovely husband, Patrick Kabue and My son Jayden Kabue for their support, humble time, prayer and words of motivation.
ACKNOWLEDGEMENT

First and foremost, I would like to thank the God Almighty for giving me good health, source of knowledge and wisdom through which the completion of this thesis was enhanced.

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ABBREVIATIONS AND ACRONYMS

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<td>Men who sex with men</td>
</tr>
<tr>
<td>AIDS</td>
<td>Acquired immune deficiency syndrome</td>
</tr>
<tr>
<td>FSW</td>
<td>Female sex workers</td>
</tr>
<tr>
<td>GALCK</td>
<td>Gay and lesbian coalition of Kenya</td>
</tr>
<tr>
<td>ICRH</td>
<td>International Center for Reproductive Health</td>
</tr>
<tr>
<td>IDU</td>
<td>Injecting drug users</td>
</tr>
<tr>
<td>KACP</td>
<td>Kenya AIDS control program me</td>
</tr>
<tr>
<td>KAIS</td>
<td>Kenya Aids indicator survey</td>
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<tr>
<td>KNH-ERC</td>
<td>Kenyatta National Hospital Ethics and Review Committee</td>
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<td>NACC</td>
<td>National Aids Control Council</td>
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<td>NASCOP</td>
<td>National AIDS /STIs Control Program me</td>
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<td>STD</td>
<td>Sexually Transmitted Diseases</td>
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<td>STI</td>
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<td>Sex workers outreach program me</td>
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<td>UIAI</td>
<td>Unprotected Insertive anal Intercourse</td>
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<tr>
<td>UTI</td>
<td>Urinary Tract Infection</td>
</tr>
<tr>
<td>URAI</td>
<td>Unprotected receptive anal intercourse</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
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<tr>
<td>CSF</td>
<td>Cerebral-spinal Fluid</td>
</tr>
<tr>
<td>FTA-AB</td>
<td>Fluorescent Treponemaal Antibody Absorption</td>
</tr>
<tr>
<td>DFA-TP</td>
<td>Direct Fluorescent Antibody Test for Treponema palladium</td>
</tr>
<tr>
<td>DNA</td>
<td>Deoxyribonucleic Acid</td>
</tr>
<tr>
<td>Acronym</td>
<td>Definition</td>
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<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>ICS</td>
<td>Immunochro-matographic Strip</td>
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<tr>
<td>MHA-TP</td>
<td>Microhaemagglutination Assay for Antibody to Treponema palladium</td>
</tr>
<tr>
<td>NPV</td>
<td>Negative Predictive Value</td>
</tr>
<tr>
<td>PCR</td>
<td>Polymerase Chain Reaction</td>
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<tr>
<td>RPM</td>
<td>Revolutions per Minute</td>
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<tr>
<td>RPR</td>
<td>Rapid Plasma Reagin</td>
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<tr>
<td>SC</td>
<td>Sample Collection</td>
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<tr>
<td>TPHA</td>
<td>Treponema pallidum Haemagglutination Assay</td>
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<tr>
<td>TPI</td>
<td>Treponema pallidum Immobilization Test</td>
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<td>TPPA</td>
<td>Treponema pallidum Particle Agglutination Assay</td>
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<tr>
<td>Tpr</td>
<td>Treponema palladium Repeated Genes</td>
</tr>
<tr>
<td>VDRL</td>
<td>Venereal Disease Research Laboratory</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<td>MARPS</td>
<td>Most at risk persons</td>
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DEFINITION OF TERMS

**Syphilis** - Syphilis is a sexually transmitted disease caused by bacterium Treponema palladium.

**Sexually transmitted infections (STIs)** - It refers to infections that are transmitted mainly through sexual contact via the exchange of semen, vaginal fluid, blood and other fluids; or by direct contact with the affected body areas of people with STIs.

**Infectious diseases** - Are those that are transmitted from person to person by direct or indirect contact. Viruses, bacteria, parasites, and fungi all cause infectious disease.

**Risk factors** are conditions or habits that make a person more likely to develop a disease. They can also increase the chances that an existing disease will get worse.
ABSTRACT

Syphilis is an infectious disease caused by the bacterium Treponema palladium. Globally, about 12 million people, majority of whom come from sub-Saharan Africa and Asia have suffered from syphilis infections. This study therefore determined the prevalence and the risk factors for occurrence of syphilis among men who sex with men in SWOP/MSM clinic in Nairobi City County. The study adopted a cross-sectional study design which encompassed use of qualitative and quantitative data collection techniques. Structured questionnaires were used to collect quantitative data from respondents while Key Informant Interview schedules were used to qualitative data for health workers in SWOP/MSM clinics. The study targeted a sample size of 257 MSMs attending clinical appointments in the facility. Systematic random sampling was used to select respondents using a predetermined interval of 2. The researcher obtained ethical clearance from the Kenyatta University Ethical Review Committee. Before interview each selected respondents, the study sought informed consent from respondents. Blood samples of 3mls were collected from respondents after each interview for VDRL screening. Positive VDRL specimens were subjected to a specific treponema test (Fluorescent treponema antibody absorption FTA-ABS) test for confirmatory diagnosis and treatment was given immediately by the clinical officer in the clinic. Data was then cleaned and entered into a Microsoft excel database for processing. This was later exported to SPSS version 22.0 for analysis. Descriptive data were presented using frequency tables, graphs and pie-charts. Inferential statistics were done using Chi-square to establish the relationship between variables. Qualitative data from KII was triangulated with quantitative data as direct quotes or narrations from respondents. The study found that the prevalence of syphilis among MSMs in Nairobi stood at 18.9%. From Chi-Square analysis, the study revealed significant relationship between knowledge factors, risk factors and attitude towards syphilis infection. Transmission mode (p=0.001), frequency of syphilis testing (p=0.001), knowledge on syphilis reinfection (p=0.011), sexual orientation (p=0.005), number of sexual partners (p=0.001), isolation among MSMs (p=0.034), inconsistent use of condoms (p=0.001) and being afraid of syphilis infection (p=0.001) played a significant role in syphilis infection among respondents. These results will be presented to NASCOP and other NGOs and recommendations advised accordingly. These research findings would assist Key healthcare stakeholders to design strategic policies and initiatives to address the challenges faced by MSMs in acquiring healthcare services. This would in turn reduce the rising prevalence of syphilis infections among MSMs in Kenya.
CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Syphilis infection is caused by the bacterium Treponema palladium. Globally, about 12 million people, majority of whom come from sub-Saharan Africa and Asia have suffered from syphilis infections. It is estimated that 2.1 million people remain undiagnosed in sub-Saharan Africa (WHO, 2012). The World Health organization (WHO) estimates that 2.1 million people remain undiagnosed in sub-Saharan Africa. Syphilis remains a significant cause of preventable death in developing countries with many people remaining untested and thus untreated (Wu et al, 2016).

Recently, cases of syphilis re-emergence has been reported world wide. It is estimated that the prevalence of syphilis is alarmingly high (Li et al, 2013). Despite improved public health conditions due to increased economic development, there has been witnessed higher spread of syphilis and other STDs as a result of internal migrations, commercial sex industries and economic disparities (Poon et al., 2011). Syphilis has been reported to be among the most prevalent communicable infections in most Asian countries even though it was nearly eradicated in 1970s (MOH China, 2012).

The prevalence of syphilis in Kenya is1.8% while in Nairobi is 2.2% (KDHS, 2014). The prevalence of syphilis among MSMs is estimated at 12% (Sanders., 2010). MSMs account for high syphilis prevalence in Kenya due to high risk factors associated with unsafe sexual practices (Muraguri et al., 2015). Male sex workers are at higher risk of these infections compared to female sex workers (Poon et al, 2011).

Vertical transmission and unprotected sexual contact are the most common routes of transmission (CDC, 2014). Syphilis causes three stages of symptomatic disease: primary, secondary and tertiary syphilis (Tucker et al, 2011). Patients infected with
syphilis are more vulnerable to HIV infections especially through ulcers occurring around the genital areas (CDC, 2010). HIV-syphilis co-infections exposes individuals to high risks of getting tertiary syphilis. This can lead to neurosyphilis, a health condition associated with psychosis and other motor-related problems (CDC, 2014).

Screening for syphilis among MSMs remains a very important priority for preventing adverse outcomes (Visser et al., 2017). Serological diagnosis can be carried out by venereal disease research laboratory (VDRL) and the rapid plasma reagin (RPR) tests (Thurnheer et al., 2010). Syphilis can be cured through use of penicillin, even though all damages are not reversible, more particularly tertiary and congenital syphilis. Since syphilis prevalence facilitates HIV infections, it is significant to understand and track the precursors to increased prevalence of syphilis cases as a control strategy towards reducing HIV and syphilis infections.

1.2 Problem Statement

MSMs sexuality remains a global challenge particularly in developing countries with different health needs. Most syphilis cases occur among men with MSMs recording predominantly high numbers (CDC, 2014). Most homosexuals become sexually active before the age of 20 with generally unprotected sexual contacts (WHO, 2010). More than a quarter a million young people are infected with an STI daily and with more than half of all new HIV infections occurring in young people (PEPFAR, 2013).

HIV–infected patients have shown a median-point syphilis prevalence of 9.5% (Myers et al., 2010). More than a half (51% ) of MSMs diagnosed with syphilis are HIV positive (CDC, 2014). One of the consequences of the increasing co-infections of syphilis and HIV is an increase in neurosyphilis among MSM (Mattei et al., 2017). High prevalence of syphilis among MSMs in Kenya due to high risk factors
Gayism in Kenya is illegal and therefore reaching syphilis infected MSMs for treatment is difficult. This is a marginalized cohort with most of their sexual counterparts hard to reach due to chances of being pseudonymous. According to CDC reports, there have been witnessed rise in syphilis incidences among MSMs recently (CDC, 2014). High prevalence of syphilis among MSMs in Kenya is associated with high risk factors (Muraguri et al., 2015).

1.3 Justification of the Study

HIV-syphilis co-infections may be more prevalent among MSMs. There is increased STDs rates among MSMs across the world. Information on syphilis prevalence is limited due to discrimination and and stigma associated with homosexuality. Young MSMs account for many new infections with middle-aged and older MSMs also falling victims of STD and HIV morbidities.

Psychosocial health concerns, for example depression, are predisposing factors to STD infections among MSMs. This may be as a result of responses to familial and societal intolerance associated with homosexuality. Those engaging in serosorting acts are at higher risks of contacting STDs especially syphilis and HIV as compared to those who don’t. It is worrying that over half (52%) of MSMs with primary and secondary syphilis are HIV positive with MSMs accounting for 75% of primary and secondary cases of syphilis (CDC, 2014).
1.4 Research Questions

1. What is the prevalence of syphilis among men who have sex with other men in Nairobi?
2. What are the knowledge factors on Syphilis transmission and prevention among MSMs?
3. What are the risk factors for syphilis among men who sex with other men?
4. What is the attitude towards syphilis among men who have sex with other men in Nairobi City County?

1.5 Hypothesis

There is no statistical significant association between knowledge factors, attitude and risk factors and prevalence of syphilis among MSMs in Nairobi City County.

1.6 Study Objectives

1.6.1 Broad objective

To establish the risk factors associated with prevalence of syphilis among MSMs in Nairobi City County.

1.6.2 Specific objectives.

1. To determine the prevalence of syphilis among MSMs in Nairobi City County.
2. To identify the knowledge factors associated with prevalence of syphilis among MSMs in Nairobi City County.
3. To determine the risk factors associated with prevalence of syphilis among MSMs in Nairobi City County.
4. To determine the attitude towards syphilis prevalence among MSMs in Nairobi City County.
1.7  Significance of the study

The results of this study may be utilized by Ministry of Health especially NASCOP to come up with better strategies on how to reduce the prevalence of syphilis among MSMs in Nairobi.

1.8 Conceptual framework

![Conceptual Framework]

Fig 1.1: Conceptual Framework

Source: Adopted and modified from literature review, 2017
CHAPTER TWO: LITERATURE REVIEW

2.1 Global incidence and burden of syphilis

The World Health Organization (WHO) estimates that the annual global incidence of adult syphilis is approximately 12.2 million cases most of which occur in developing countries (WHO, 2012). The incidence of syphilis among men who have sex with other men (MSM) may vary from one country to another. It is now a rare disease in affluent countries but remains a cause of severe outcome in many less developed countries (Snowden et al., 2010). During 2013, there were 56,471 reported new cases of syphilis, compared to 48,893 and 17,535 cases of primary and secondary syphilis respectively. These are the earliest and most transmissible stages of syphilis (Shilaih et al., 2017).

During the 1990s, syphilis primarily occurred among heterosexual men and women of racial and ethnic minority groups. During the 2000s, however, cases increased among MSMs. In 2002, rates of primary and secondary syphilis were highest among men aged 30-39 years-old while in 2013 they were highest among men aged 20-29 years. This epidemiological shift reflects increasing cases reported among young MSM in recent years. MSM accounted for 75% of all primary and secondary syphilis cases in 2013 (Sekirime et al., 2013).

However, recent reports suggest a re-emergence of congenital syphilis in several developed countries. This is a consequence of an upsurge of infectious syphilis in several major European and North American cities (Sanders et al., 2010). There has been an equally striking increase in congenital syphilis in rural areas of Eastern Europe and Central Asia (Poon et al., 2011).
2.1.1 Syphilis burden in developed countries

In 1990s, there were lower levels of syphilis rates in cities of many developed countries across the world. Since the year 1997, there have syphilis outbreaks among the MSMs in Europe and North America. Those with HIV infections are the most affected cohorts (CDC, 2012). In Australia, there are increased incidences among males living in urban areas compared to those living in indigenous remote areas (Ward et al., 2011). In the year 2002, there was an overall increase in rates of syphilis infection 14.1% (Kilmarx et al., 2013).

Syphilis cases in Canada have recently risen to alarming levels. In 2002, there was a steady and sharp increase in new cases of syphilis reported. The highest cases were recorded in 2011 which accounted for more than 1,750 (5.1 per 100,000 people) indicating a 232% increase from 2002 (Mattei et al., 2017). Gayim and MSMs in Canada have led to increased cases of syphilis epidemics due to high risk behaviours shared among these groups. Many of these individuals are HIV-positive majority of whom who live in most urban areas. It has been further revealed that other factors have contributed to increasing cases of syphilis since despite stability and increased use of condoms in British Columbia (Myers., 2010).

In 2008, 66% of all cases of HIV-Syphilis co-infections were recorded among MSMs indicating unsafe sexual behaviours among these groups. Concurrent occurrence of syphilis and HIV epidemics have been witnessed among MSMs in metropolitan communities. This is due to bleeding from genital ulcers which occur during sexual intercourse due to friction associated with anal sex. This further leads to HIV infection rates among syphilis infected MSMs (Schneider et al., 2011). In fact, 83.5% of syphilis cases in Canada occurred according to reports from the Ministry of Health.
According to a study in United States of America, it was revealed that about 60% of MSMs in California were Syphilis-HIV co-infected. Decreased safe sexual practices among MSMs has led to increased rates HIV-syphilis coinfections among individuals. Perceptions on less likehood of contacting HIV among MSMs has led to increased cases of syphilis transmission (Wang et al., 2010). In Western Europe, the cases of syphilis were reduced in 1990s. Its reemergence has led to large outbreaks thus affecting major cities across Europe (Sullivan et al., 2009). The drastic changes in behavior has increased syphilis prevalence among MSMs and enhanced technological advances have improved case detection rates thus explaining the more number of cases reported (Zhou et al., 2014).

2.1.2 The current Scenario in Developing and Transitional Countries

Data on the incidence and prevalence of syphilis in developing countries are still poor. This is most evident in sub-Saharan Africa, North Africa and the Caribbean, where stigma around homosexuality is still considered appalling. However, even in Asia and Latin America, studies conducted usually lack a clear understanding of these populations and their diverse behaviors (Khayota, 2012).

Reports from STD clinics in India suggest an increase in genital ulcerative STIs such as syphilis. The little information available on rates of syphilis in India show an incidence rate of 5.4 per 100 person years in a STD clinic in India from 1993-2000 and prevalence rates as high as 21.9% amongst a convenience sample of long-distance truck drivers in 2000 (Schneider et al., 2010).

Syphilis was nearly eradicated in China in 1964 but recently it has re-emerged to become one of the top five most reported notifiable diseases (Chow et al., 2011). From 2009 to 2013, the prevalence of HIV among MSM ranged from 1.7% to 21.0%
in China. MSM have increased rates of HIV infection and STDs compared with demographically matched controls (Zeng et al., 2014). The reasons for the disproportionate infection burden are complex, including biological, behavioral, and socio-cultural factors. Cross-sectional studies have found a high prevalence of syphilis among MSMs in China (Kumta et al., 2010).

### 2.1.3 Sub Saharan Africa

In 1999, WHO estimated 4 million cases of syphilis among adults in sub-Saharan Africa. In Africa syphilis is endemic and the incidence is high also among MSMs. This is a worrying fact because syphilis has a severe impact on their health outcome in sub-Saharan Africa (Kim et al., 2016). Data on the prevalence of syphilis in MSM are scanty, likely due to stigma and discrimination against homosexuality (Muraguri et al., 2015). A recent study carried out in Ghana in a sample of 1366 prison inmates, including 403 homosexuals’ men, revealed sero prevalence syphilis rates of 13.7 % and 23.3% in heterosexual and homosexual respectively and syphilis seropositivity was significantly associated with HIV seropositivity (Adjei et al., 2011).

### 2.1.4 Prevalence of syphilis in Kenya

Syphilis prevalence in the general population in Kenya is relatively low and eradication could be possible but would require concerted efforts for its prevention and control (Otieno et al., 2011). The general prevalence of syphilis in kenya stands at 1.8% (KDHS, 2014). However, this differs significantly among gender as its prevalence in men is 1.9% while 1.7% in women. The prevalence of syphilis is higher (6.4%) among HIV positive patients in Kenya. The prevalence of syphilis in Nairobi is 2.2 % (Khayota, 2012)
There is relatively high prevalence of syphilis among men who have sex with other men due to high risk factors associated with its transmission (Muraguri et al., 2015). In Kenya, the prevalence rates vary depending on the population studied. In Kenya, the prevalence of syphilis among MSMs is estimated at 12% (Sanders, et al., 2010).

2.2 Knowledge factors associated with syphilis prevalence

MSMs exhibit low levels of syphilis testing and knowledge in some countries experiencing generalized epidemics (Baral et al., 2009). Knowledge of STIs and their complications is important in promoting disease prevention and early treatment. This impacts on engagement of risky sexual behaviours (Berthe, 2011). According to past studies done in Peru, the rates of syphilis reinfection after cure was high among low income populations. This increases syphilis prevalence especially when the risk factors associated with its transmission are not addressed. It was further revealed that 42% of respondents were aware that there are higher chances of reinfection after cure (Snowden et al., 2010).

Possession of knowledge on STI transmission, treatment and prevention increases awareness among individuals leading to low prevalences in the general population. According to a study done in South Coastal region of China, it was revealed that majority of respondents knew that syphilis was a sexually transmitted infection (Wu et al, 2016). Generally, there was low knowledge level about syphilis prevention among MSMs. Knowledge about STI infection affects condom use among sexual partners. Among MSMs, engaging in unprotected anal sex increases chances of STI infections such as syphilis, chlamydia and HIV/AIDS.

Studies done across the world shows that the cases of partner notification on STI infection are low. When one gets diagnosed with an STI they rarely inform their
partner about their status but instead they seek for medication secretly (Msuya et al., 2011). After cure they may go back to their partners for sexual intercourse resulting in high chances of reinfection and thus increasing disease prevalence. This is very worrying since their partners will not seek care and not use condoms provided their partners or themselves are free of symptoms (Berthe, 2011). This may further be attributed to perceived trust towards their partners provided they seem to stay health.

Men who sex with other men have the highest risk of getting STIs and HIV. Due to these, the Centre for Disease Control advocates for specified official guidelines for STIs testing (Visser et al, 2017). This ranges from being tested atleast once to four times annually among MSMs who practice risk behaviours such as unprotected anal sex and multiple partners. HIV positive MSMs with casual partners and practicing risk behaviours are advised to test atleast once in three months (Vriend et al., 2014).

2.3 Risk factors associated with syphilis transmission among MSMs

There are several factors that are associated with high risk of syphilis infection among the MSMs. They range from social, economic and structural conditions that significantly contribute to their sexual experiences. This affects their health, available choices, and their ability to make decisions leading to positive health outcomes. The heightened risk for syphilis acquisition and transmission among MSMs operates through a variety of behavioral and biological risks (Kilmarx, et al., 2010).

There is consistent data across the world on the risk factors associated with syphilis infection. The prevalence of syphilis among MSMs differs significantly in relation to sexual orientation of each individual. According to a study done in China, it was revealed that there was high prevalence of syphilis infection among the homosexuals as compared to others forms of sexual orientation (Zeng et al., 2014). One of the major
sources of syphilis transmission route is unprotected male-to-male sexual intercourse among the MSMs which include unprotected anal and oral sex (Shilaih et al., 2017). The increased risk of MSM is considered biologically driven by the risk of contracting syphilis through anal intercourse (Beyer et., 2012 & Baral et al., 2012).

There has been consistent promotion of condom use in many countries in the world with major aim of reducing STIs such as syphilis not only among MSMs but also among the general population (Shilaih et al., 2017). The main reasons which have been documented for lack of consistent condom are; perceived decreased sexual pleasure, physical discomfort and power imbalances among partners leading to inability to effectively negotiate for condom use (Hu et al, 2014). This has led to increased advocacy for use of microbicidal agents (Lubricants) that are normally applied to the rectal and vaginal mucosa before intercourse which reduces friction during the act thus lowering chances of transmission of infections. However, the accessibility and acceptability of such lubricants has been a major challenge especially among MSMs hence increased susceptibility to STIs. A study that was conducted in West Hollywood revealed that majority of them preferred use of lubricants to condom use as a protection measure against STDs (Marks et al., 2013).

The risk of syphilis infection is further worsened by having more male sexual partners among the MSMs. They demonstrate a greater risk for STD acquisition through high numbers of sexual partners and frequent concurrency of these partners (Beyrer et al., 2012). Male sexual workers are also at a higher risk of STI infection due to a greater number of exposure to the risk of contradicting such diseases. Engaging in risky sexual activities such as double-penile anal penetration (double fucking), eating semen out of a man's anus (filching), and engaging in anonymous sex increases
syphilis infection (Snowden et al., 2010).

Use of drugs has been associated with higher risk sexual behaviors, including engaging in unprotected anal sex, having an increased number of sexual partners and consequently higher risk of STIs (Gomes et al., 2017). Alcohol use influences engaging in sexual activities as it leads to being pimped or pimping out other sexual partners. This also impairs judgement and perceptions of contradictory syphilis infection among MSMs (Sekirime et al, 2013).

Psychological distress among MSMs is another factor that significantly influences the risk of syphilis/HIV infection. This is a marginalized group which always faces challenges in accessing health care services (Xian et al., 2017). This leads to isolation due to fear seeking for treatment services as they face stiff stigmatization from colleagues. They are even seen as societal outcasts thus increasing the chances of disease prevalence due to the alarming numbers of untreated syphilis cases within populations (Li et al., 2014). Feeling anxious, hopeless and worried may lead to MSMs contemplate attempting suicidal advances due to effects of disease progress.

2.4 Attitude towards syphilis

STIs such as syphilis remains a crucial cause of mortality and morbidity especially among MSMs. Its thus crucial to establish the attitude and perceptions of such men towards STIs in order to understand how they influence prevalence and incident rates (Zhou et al., 2014). Attitude towards syphilis can affect individual’s perception towards the condition and thus influence its transmission. Attitude of the men who have sex with other men or the health care provider is key to use or non-use of a health care service (Kim et al., 2016).

Most men have negative attitude towards testing and treatment thus most report
syphilis when it has resulted to severe complications (Li et al., 2013). Attitudes towards syphilis infection, treatment and prevention depend largely on level of knowledge and amount of information provided (Khayota, 2012). Most men fear asking their partners to go and test for syphilis. Others when they test positive for the disease they don’t tell their partners but instead seek treatment secretively and still gets back to their partners for sexual intercourse (Berthe et al., 2011). This leads to re-infections since the other partner has not been treated for the condition.

Anal sex is a risk factor for syphilis since the rectal muscles are easily affected by friction during intercourse predisposing this men to many STIs (Gomes et al., 2017). However, studies has shown that the level of self-vulnerability is low among MSMs. Some men think they can be at a higher risk of contacting infections but they either assume taking precautions or they lack the power to initiate or negotiate for protected sex from their partners (Sekirime et al., 2013). Sometimes other men are forced to have sex without their consent especially when under influence of alcohol and other substances which makes them unable to make informed decisions during the act leading to spread of infections (Kim et al., 2017).

Some men willingly spread infections to their partners even when they have tested positive (Xian et al., 2017). They feel that since they have been infected its therefore a form of revenging by spreading to others too. Studies have revealed that some men report to feeling happy to transmit infections to others (Thurnheer et al., 2010). Some men who are commercial sex workers sometimes are coerced to unprotected sex for a better pay thus increasing susceptibility to syphilis and other STIs.

The attitude of service providers may determine whether MSMs can seek for syphilis testing and treatment in a facility (Otieno, 2011). The perceived discrimination and
negative attitude towards MSMs. This may aggravate them thus causing them to avoid going to clinics for tests and thus increasing the spread of the infections (Isika, 2012). Good reception by health care workers in a friendly manner inspires these men hence they can seek for clarifications by asking questions about services.

2.5 Epidemiology of syphilis

2.5.1 Stages of syphilis manifestation

The primary stage is characterized by a hard, usually painless, ulcer called a chancre develops at the site of infection, usually on the genitals. There is often painless swelling of lymph glands during this stage. The secondary stage occurs 2 to 4 months after infection, lasts several weeks and often comes back in the following 2 years. The common feature is a flat, red rash over the whole body. And finally, a tertiary stage may occur in up to 30% of untreated individuals after a latent period which may be many years. In some cases the disease may involve the brain and spinal cord (neurosyphilis), or the heart and blood vessels (cardiovascular syphilis), producing severe complications, disability and even death.

2.5.2 Clinical diagnosis and treatment

Diagnosis of syphilis can be made during the primary stage by microscopic examination of a scraping from the base of the chancre, though this test is not commonly performed. Later, diagnosis is made by blood tests. Diagnosis and treatment of cases are essential components of syphilis control. Syphilis involving the brain and spinal cord is confirmed by testing of CSF (cerebrospinal fluid: the fluid surrounding the brain and spinal cord) (Msuya et al., 2011). Mass treatment of populations with a high prevalence of infection has also been effective (CDC, 2014). Effective antibiotic treatment is available.
2.5.3 Prevention and control of Syphilis

The surest way to avoid transmission of sexually transmitted diseases is to abstain from sexual contact or to be in a long-term monogamous relationship with a partner who was tested and is known to be uninfected (CDC, 2014). Correct and consistent use of polyurethane condoms. People with syphilis should also refrain from any sexual contact until sexual partners have been contacted, tested, if indicated treated. Follow-up blood tests must be done to make sure that treatment has cleared the infection. Effective condom use and testing to exclude other sexually transmitted infections is also advisable (CDC, 2010).

Screening generally detects patients with non-infectious latent disease and only occasionally detects those with symptoms or signs (CDC, 2014). The efficiency of case finding can be significantly improved by using epidemiologic features to focus screening efforts; that is, screening of high-risk groups will identify more infectious cases than of the general population (CDC, 2012).

2.6 Summary of literature review

Men who have sex with men (MSM) sexuality remains a global challenge particularly in the developing countries. Sexually transmitted and blood borne infections (STBBIs) continue to be a significant public health concern in Kenya, infectious syphilis rates are on the rise. The majority of infections are among MSM, a proportion of whom are co-infected with HIV. Most new infections are occurring among younger MSMs, a substantial burden of HIV and STD morbidity continues to be found among MSMs. Individuals infected with syphilis are at an increased risk of acquiring HIV; in people living with HIV, syphilis can progress more quickly, be more difficult to treat, and increase the risk of onward HIV transmission. Reaching
MSM who are at risk of syphilis infect presents clear challenges. They are often marginalized and their sexual partners are difficult to engage, since they may be “pseudonymous.” Data on the proportion of syphilis among MSMs in Kenya is scanty, likely because of stigma and discrimination against homosexuality. Low levels of syphilis testing and knowledge have shown to be a problem among MSMs in countries experiencing generalized epidemics.
CHAPTER THREE: MATERIALS AND METHODS

3.1 Study design

The study adopted an analytical cross-sectional descriptive study design. This is a type of observational study involving analysis of data collected from a population, or a representative subset, at a given point in time. It was preferred because it enabled handling a large number of participants at little cost within a short period of time.

3.2 Variables

3.2.1 Independent variables

The independent variables were:

i. Knowledge factors such as transmission, prevention and treatment of syphilis infection among respondents.

ii. Risk factors associated with syphilis infection such as sexual orientation, unprotected sexual intercourse, use of substances and psychological distress.

iii. Socio-demographic factors such as age, sex, income level and religion.

3.2.2 Intervening variable

The intervening variable was attitude towards syphilis infection such as self-vulnerability, sexual pleasure of transmission and condom use among respondents.

3.2.3 Dependent variable

The dependent variable was the prevalence of syphilis infection among respondents.

3.3 Location of the study

The study was conducted at the Swop/MSMs clinic in Nairobi City County. The clinic is located at the City of Nairobi at Kikorok road off River Road approximately 200 meters from the Nairobi Fire Station. The clinic is a branch of Kenya Aids Control Programme (KACP) and the MSMs are registered NASCOP. KACP is a project with a long term goal of reducing the incidence of STDs including HIV infection/AIDS.
3.4 Study population

The study population included all MSMs who attended the Swop/MSM clinic who met the inclusion criteria. Approximately 10,000 registered MSMs by NASCOP with 2,400 regular clients to the clinic per year. Across a period of 3 months, there were approximately 600 MSMs who attended the clinic between January to March 2018. About 10 MSMs visit the clinic per day from Monday to Friday.

3.4.1 Inclusion Criteria

The study included MSMs aged 18 years and above living in Nairobi City County who consented to participate in the study because they were registered at the clinic.

3.4.2 Exclusion Criteria

The study excluded respondents who were very sick during the study hence unable to participate. The study also excluded MSMs who promised not to adhere to treatment when VDRL turned positive.

3.5 Sampling techniques

Systematic random sampling was used to recruit respondents for study. The study used a sampling interval of 2. This was achieved through dividing the study population (600) by the sample size of 257. Averagely, 10 MSMs visit the clinic in a day and thus about 5 respondents were sampled per day for a period of 3 months between January-March 2018. The first respondent was selected using simple random sampling using yes/no riffles. Every 2nd respondent entering the Swop/MSM clinic was interviewed until the required number of respondents was reached. Eight (8) nurses were purposively selected to provide additional information as Key informants. Those who were in a position to give informative reactions were recruited as the Key Informants for the study.
3.6 Sample size determination

The sample was determined using standard formulary Andrew Fisher’s Method (Fishers et al., 1998).

\[ n = \frac{z^2pq}{d^2} \]

Where \( n \) = sample size

\( z \) = The standard normal deviate usually set at 1.96 and corresponding to 95% CI

\( p \) = Assumed syphilis prevalence in the estimate population (50%).

\( q = 1.0 - p = 0.5 \)

\( d \) = desired precision level or allowed standard error \( \pm 5\% \)

Therefore,

\[ n = \frac{(1.96)^2 \times 0.5 \times 0.5}{0.05^2} \]

\[ = 384.16 \]

Since the target population is less than 10000, then the following formulae was used:

\[ n_f = n / (1 + n/N) \]

Where; \( n_f \) = Sample size when estimate population is less than 10,000

\( N \) = total number of MSMs in the area (600)

\( n \) = Standard sample size when population estimate is more than 10000.

Therefore \( n_f = \left[ \frac{384}{1 + \frac{384}{600}} \right] \)

\[ N_f = 234 \text{ MSMs} \]
To cater for nonresponses, 10% of respondents were included. Therefore, 257 MSMs meeting the inclusion criteria were interviewed.

3.7 Construction and pre-testing of research instruments

The research instruments for the study included the VDRL kits for testing the presence of syphilis in scooped blood samples, Key Informant interview schedules for nurses and questionnaires for MSMs. The researcher adopted and modified the Kenya National Council for Population and Development questionnaire covering all study objectives. They were interrogated for content and comprehensiveness by experienced researchers. They were pretested prior to data collection with a sample size of 26 respondents (10%) drawn from Saasa MSM centre in Thika, Kaimbu county. The results were reviewed to identify variations, rectify omissions and correct errors.

3.7.1 Validity

Validity refers to the ability of research instruments to accurately and meaningfully provide inferences based on research results (Mugenda & Mugenda 2003). This ensures they are appraised and checked for feasibility in collecting the right information. Pretesting of research tools ensured clarity of questions to respondents thus eliciting the required information. The researcher also incorporated expert opinions (supervisors) to construct well-structured research instruments. The study adopted sampling methods that resulted in a randomized representative sample.

3.7.2 Reliability

Reliability refers to the ability to measure the degree to which data collection instruments yields consistent results after repeated trials (Saunders et al, 2009). This was achieved during pretesting thus ensured provision of consistent results during the
actual data collection. The research assistants were trained adequately and used qualified laboratory technologists and nurses to administer the research questionnaires and conduct the VDRL test.

3.8 Data collection techniques

The researcher used structured interviews in which structured questionnaires were administered (Sekaran, 2013). Data collection was done across a period of three months between January to March 2018. A minimum of 5 respondents were interviewed in a day. The respondents were guided to fill their responses by the trained research assistants. After each questionnaire interview, a blood sample of about 3mls was drawn from the brachial vein for syphilis testing. In accordance with Kenya National surveillance guidelines, the samples were first screened for VDRL (CDC, 2011). Specimens with positive VDRL were further tested by a specific Treponema test (FTA-ABS) test for confirmatory diagnosis. Active syphilis was defined as VDRL positive and titers of non-Treponema-specific antibodies ≥ 1:8 (China 2011 and Gape et al., 2011). All positive cases were treated with Benzathine penicillin as per the WHO 2015 guideline by the registered clinical officer at the MSM clinic. Qualitative data was collected through key informant interviews with eight selected nurses working in the Swop/MSM clinic. The main researcher held KII sessions from which views and suggestions were captured by research assistants.

3.9 Data management and analysis

Quantitative data from questionnaires and laboratory results were cleaned, coded, double entered, double checked and stored into Microsoft Excel program for analysis. Data was then exported to SPSS version 22.0 for analysis. Descriptive statistics were presented as charts, graphs, percentages and frequency distribution tables. Inferential
statistics were used to test the relationship between the study variables. This was achieved through Chi-square tests done at 95% confidence interval and p-values less than 0.05 were considered significant. Any conflicts of interest were resolved by retrieving the original test results. Syphilis prevalence was calculated using laboratory tests done. Qualitative data from KII were triangulated with quantitative data as direct quotes or narrations presented in verbatims.

### 3.10 Ethical and logical consideration

The researcher sought approval from Kenyatta University Graduate school. Ethical clearance to carry out this research was gotten from Kenyatta University Ethical Review Committee(KUERC). The researcher also got a research permit from the National Commission for Science, Technology and Innovation (NACOSTI). The researcher further sought permission from County Commissioner, County Education Officer and the Director of Halth Services from Nairobi City County. The research got further permission from the director of KACP and the staffs of SWOP/MSM clinic prior to data collection after clarifying the purpose of the study. An informed consent to participate in the study was sought from each respondent. Study respondents were assured of privacy and confidentiality of the information given. They were treated with the respect they deserved and participation in the study was voluntary without due coercion. This findings shall be disseminated for action and future reference for other researchers through publication.
CHAPTER FOUR: RESULTS

4.1 Socio-demographic factors of respondents

The study targeted 257 men who had sex with other men attending the Swop/MSM clinic in Nairobi City County. Out of this, 249 questionnaires were completely filled and considered for analysis representing a response rate of 96.7%. The study found out that less than a half 102(41.0%) of the respondents were aged 30-39 years followed by 69 (27.7%) aged 20-29 years. More middle-aged respondents engaged in MSM acts shows they are sexually active and may be experiencing peer influence.

The study found out that more than a half 143(57.4%) of respondents had attained secondary level of education followed by 54(21.7%) with tertiary education. Those with primary education were 39(15.7%) while the rest 13(5.2%) had no formal education. The higher number of men with secondary and tertiary education engaging in homosexual reflects possession of information regarding MSM activities.

Regarding religion, majority 173(69.5%) of the respondents interviewed were Christians with 62(24.9%) being Muslims. This may be attributed to the fact that most of the inhabitants of Nairobi City County are Christians.

The study revealed that the marital status of slightly less than a half 123(49.4%) of the respondents were single followed by 77(30.9%) who were married. This may be attributed to them having sexual relationships with their fellow men hence considering themselves single since homosexuality is not legalised in Kenya.

Concerning the occupational status, less than a half 112(45.0%) of the respondents were self-employed followed by 88(35.3%) who were employed. Due to high rates of unemployment, many young people are engaging in self-employment activities to earn a living. The results were presented as shown in table 4.1 below.
Table 4.1: Socio-demographic characteristics of respondents (n=249)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Respondent response</th>
<th>Frequency (N)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>&lt;19</td>
<td>13</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>69</td>
<td>27.7</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>102</td>
<td>41.0</td>
</tr>
<tr>
<td></td>
<td>40-49</td>
<td>46</td>
<td>18.5</td>
</tr>
<tr>
<td></td>
<td>&gt;50</td>
<td>19</td>
<td>7.6</td>
</tr>
<tr>
<td>Level of education</td>
<td>No formal education</td>
<td>13</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>Primary education</td>
<td>39</td>
<td>15.7</td>
</tr>
<tr>
<td></td>
<td>Secondary education</td>
<td>143</td>
<td>57.4</td>
</tr>
<tr>
<td></td>
<td>Tertiary education</td>
<td>54</td>
<td>21.7</td>
</tr>
<tr>
<td>Religion</td>
<td>Christian</td>
<td>173</td>
<td>69.5</td>
</tr>
<tr>
<td></td>
<td>Muslim</td>
<td>62</td>
<td>24.9</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>14</td>
<td>5.6</td>
</tr>
<tr>
<td>Marital status</td>
<td>Married</td>
<td>77</td>
<td>30.9</td>
</tr>
<tr>
<td></td>
<td>Single</td>
<td>123</td>
<td>49.4</td>
</tr>
<tr>
<td></td>
<td>Divorced</td>
<td>35</td>
<td>14.1</td>
</tr>
<tr>
<td></td>
<td>Widowed</td>
<td>14</td>
<td>5.6</td>
</tr>
<tr>
<td>Occupation</td>
<td>Not Employed</td>
<td>49</td>
<td>19.7</td>
</tr>
<tr>
<td></td>
<td>Employed</td>
<td>88</td>
<td>35.3</td>
</tr>
<tr>
<td></td>
<td>Self-employed</td>
<td>112</td>
<td>45.0</td>
</tr>
</tbody>
</table>

4.2 Prevalence of syphilis among respondents

The study found out that prevalence of syphilis among the interviewed respondents was 18.9%. This was after 47 respondents had their VDRL results turning positive while 202(81.1%) were negative. The results were as shown in figure 4.1 below.
Fig 4.1: Prevalence of syphilis among respondents

The respondents also reported that previously 72(28.9%), 49(19.7), 24(9.6%) and 16(6.4%) had tested positive for HIV, syphilis, Gonorrhoea and chlamydia respectively. However, 88(35.3%) of the respondents had not tested positive for the stated STIs. This showed that, in many cases, one can be HIV positive without testing positive for syphilis infection. The results were presented in table 4.2 below.

Table 4.2: Previous self-reported STI infections among respondents

<table>
<thead>
<tr>
<th>Variable</th>
<th>Respondent response</th>
<th>Frequency (N)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous STI infection</td>
<td>Syphilis</td>
<td>49</td>
<td>19.7</td>
</tr>
<tr>
<td></td>
<td>HIV</td>
<td>72</td>
<td>28.9</td>
</tr>
<tr>
<td></td>
<td>Gonorrhoea</td>
<td>24</td>
<td>9.6</td>
</tr>
<tr>
<td></td>
<td>Chlamydia</td>
<td>16</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>No STI</td>
<td>88</td>
<td>35.3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>249</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.3 Respondents’ knowledge on syphilis

4.3.1 Awareness of syphilis

Majority 213(85.5%) of the respondents were aware of syphilis infection while the rest 36(14.5%) were not aware. The results were as presented in figure 4.2 below.
4.3.2 Mode of transmission

Among those respondents who were aware about syphilis infection, slightly less than a half 97(46.4%) of respondents reported that unprotected anal sex was the leading mode of syphilis transmission among MSMs. This was closely followed 71(34.0%) who reported that oral sex is also another mode of syphilis transmission. This did not significantly differ with qualitative results as one Key Informant commented, “...Engaging in anal sex puts men at a higher risk of contracting STIs...they are more exposed since rectal muscles are sometimes destroyed due to friction during the act...this is further worsened when they practice anal sex without use of lubricants...” The results were as presented in fig 4.3 below.

![Bar chart showing mode of syphilis transmission](chart.png)

**Fig 4.3: Respondents knowledge on syphilis mode of transmission**

4.3.3 Frequency of syphilis testing among MSMs

On whether respondents were aware of the frequency of syphilis testing, majority 154(61.8%) of them were of the view that a man having sex with another man should be tested for syphilis at least once per month. However, 58(23.3%) thought that one
should get tested for syphilis once in three months. The results were as presented in figure 4.4 below.

![Graph showing the frequency of syphilis testing among respondents.](image)

**Fig 4.4: Syphilis testing frequency among respondents**

### 4.3.4 Healthy looking person having syphilis

On whether respondents were knowledgeable on a healthy looking person having syphilis infection, slightly more than a half 131(52.6%) of them were of a contrary opinion. The results were as presented in table 4.3 below.

<table>
<thead>
<tr>
<th>Table 4.3: Healthy looking person having syphilis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Healthy looking person having syphilis</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

### 4.3.5 Oral sex, medication and syphilis reinfection

The study revealed that about a half 126(50.6%) of respondents reported that oral sex is less likely to lead to syphilis infection as compared to anal sex. Most 190(76.3%) of the respondents revealed that syphilis can be cured through medication. Despite
this, they further reported that one can get reinfected as indicated by slightly less than a half 121(48.6%) of respondents. The results were as shown in table 4.4 below.

**Table 4.4: Knowledge on oral sex, syphilis medication and reinfection among respondents (n=249)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Respondent response</th>
<th>Frequency (N)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral sex less likely to lead to syphilis infection than anal sex</td>
<td>Yes</td>
<td>126</td>
<td>50.6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>96</td>
<td>38.6</td>
</tr>
<tr>
<td></td>
<td>Cannot tell</td>
<td>27</td>
<td>10.8</td>
</tr>
<tr>
<td>Syphilis can be cured through medication</td>
<td>True</td>
<td>190</td>
<td>76.3</td>
</tr>
<tr>
<td></td>
<td>False</td>
<td>43</td>
<td>17.3</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>16</td>
<td>6.4</td>
</tr>
<tr>
<td>One can get reininfected even after getting treated for syphilis</td>
<td>True</td>
<td>121</td>
<td>48.6</td>
</tr>
<tr>
<td></td>
<td>False</td>
<td>90</td>
<td>36.1</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>38</td>
<td>15.3</td>
</tr>
</tbody>
</table>

**4.3.6 Knowledge of syphilis prevention among respondents**

The study found out that less than a half 95(38.2%) of respondents reported that abstinence from sexual intercourse could help prevent one from getting infected with syphilis. The results were as presented in figure 4.5 below.

![Fig 4.5: Knowledge of syphilis prevention among respondents](image-url)
4.3.7 Importance of knowing syphilis status

The study found out that most 221(88.8%) of respondents reported that it was significant to know ones status. This would enable them to seek early comprehensive care if infected. The results were as shown in figure 4.6 below.

![Pie chart showing 88.8% 'Yes' and 11.2% 'No'.]

**Fig 4.6: Importance of knowing syphilis status among respondents**

4.3.8 Association of knowledge factors and prevalence of syphilis among respondents

The study results showed that majority 40(85.1%) of the respondents who tested positive for syphilis were aware of syphilis infection. This may be attributed to the fact that they might have been tested previously for the disease. There was no significant statistical association (p=1.000) between awareness of syphilis and testing positive for the infection. A half 20(50.0%) of those who were aware of syphilis infection reported that the most common mode of its infection was having unprotected anal sex. There was a significant statistical association between mode of transmission and syphilis status. This results were consistent with qualitative data in which one of the nurses said,
“…Our clients are mostly MSMs and engage in unprotected anal sex with their counterparts...they are even aware that this predisposes them to STIs.”

Regarding respondents’ knowledge on syphilis testing frequency, slightly less than a half 22(46.8%) of the participants reported that men having sex with other men should be tested once in a month. The results showed a significant statistical association (p=0.001) between knowledge on syphilis testing frequency and syphilis status. Qualitative results from one of the service providers confirmed this by saying,

“…the incubation period for syphilis bacterium averages for 21 days... However, it ranges between 10 to 90 days... Men seeking treatment in MSM clinics are advised to be tested once per month...”

Majority 33(70.2%) of respondents whose VDRL test indicated positive said that there were no chances of a healthy looking individual having syphilis infection. This means that they were not aware of the asymptomatic stage of syphilis infection which does not show clinical symptoms. However, at this stage individuals are highly infectious. There was a significant statistical association (p=0.002) between a healthy looking person and testing positive for syphilis infection.

The study results showed that majority 112(55.4%) of respondents who tested negative for syphilis infection thought that it is likely to get infected while engaging in oral sex. However, it was revealed that engaging in oral sex was less likely to cause syphilis infection than anal sex with a statistical significant of pvalue of 0.001. Majority 157(77.7%) of respondents believed that syphilis can be cured through medication. They might have been infected previous and
got cured after seeking respective treatment options. However, the study did not show any statistical association (p=0.692) between knowledge on syphilis medication and status among respondents.

The study results showed that slightly more than a half 25(53.2%) of the respondents who tested positive for syphilis were not knowledgeable about syphilis reinfection after cure. There was a significant statistical association (p=0.011) between knowledge on syphilis reinfection and syphilis status among respondents. Regarding knowledge on syphilis prevention, less than a half 79(39.1%) of respondents who tested negative said that abstinence can help prevent infection. There was a significant statistical association (p=0.001) between prevention knowledge and syphilis status. Majority 189(93.6%) of respondents who tested negative reported that it was important to know their syphilis status. There was a significant statistical association (p=0.001) between importance of knowing syphilis status and VDRL test results. The results were as presented in table 4.5 below.
<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Respondent response</th>
<th>Dependent variable (Syphilis infection (VDRL test))</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive (N=47)</td>
<td>Negative (N=202)</td>
</tr>
<tr>
<td>Awareness syphilis</td>
<td>Yes</td>
<td>40 (85.1%)</td>
<td>173 (85.6%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>7 (14.9%)</td>
<td>29 (14.4%)</td>
</tr>
<tr>
<td>Transmission mode</td>
<td>Unprotected anal sex</td>
<td>20 (50.0%)</td>
<td>77 (45.7%)</td>
</tr>
<tr>
<td></td>
<td>Oral sex</td>
<td>7 (17.5%)</td>
<td>64 (37.9%)</td>
</tr>
<tr>
<td></td>
<td>Sharing unsterile needles</td>
<td>3 (7.5%)</td>
<td>9 (5.3%)</td>
</tr>
<tr>
<td></td>
<td>Skin to skin contact</td>
<td>1 (2.5%)</td>
<td>10 (5.9%)</td>
</tr>
<tr>
<td></td>
<td>Body fluid contact with infected</td>
<td>4 (10.0%)</td>
<td>7 (4.1%)</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>5 (12.5%)</td>
<td>2 (1.1%)</td>
</tr>
<tr>
<td>Syphilis testing frequency</td>
<td>Several times per month</td>
<td>17 (36.2%)</td>
<td>41 (20.3%)</td>
</tr>
<tr>
<td></td>
<td>Once per month</td>
<td>22 (46.8%)</td>
<td>132 (65.3%)</td>
</tr>
<tr>
<td></td>
<td>Several times per year</td>
<td>8 (17.0%)</td>
<td>29 (14.4%)</td>
</tr>
<tr>
<td>Healthy looking person having syphilis</td>
<td>True</td>
<td>8 (17.0%)</td>
<td>89 (44.1%)</td>
</tr>
<tr>
<td></td>
<td>False</td>
<td>33 (70.2%)</td>
<td>98 (48.5%)</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>6 (12.8%)</td>
<td>15 (7.4%)</td>
</tr>
<tr>
<td>Oral sex less likely to cause infection than anal sex</td>
<td>Yes</td>
<td>14 (29.8%)</td>
<td>112 (55.4%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>24 (51.1%)</td>
<td>72 (35.6%)</td>
</tr>
<tr>
<td></td>
<td>Cannot tell</td>
<td>9 (19.1%)</td>
<td>18 (8.9%)</td>
</tr>
<tr>
<td>Syphilis can be cured through medication</td>
<td>True</td>
<td>33 (70.2%)</td>
<td>157 (77.7%)</td>
</tr>
<tr>
<td></td>
<td>False</td>
<td>8 (17.0%)</td>
<td>35 (17.3%)</td>
</tr>
<tr>
<td></td>
<td>Cannot tell</td>
<td>6 (12.8%)</td>
<td>10 (5.0%)</td>
</tr>
<tr>
<td>A person can be re-infected after syphilis cure</td>
<td>True</td>
<td>9 (19.1%)</td>
<td>112 (55.4%)</td>
</tr>
<tr>
<td></td>
<td>False</td>
<td>25 (53.2%)</td>
<td>65 (32.2%)</td>
</tr>
<tr>
<td></td>
<td>Cannot tell</td>
<td>13 (27.7%)</td>
<td>25 (12.4%)</td>
</tr>
<tr>
<td>Knowledge on syphilis prevention</td>
<td>Faithfulness</td>
<td>14 (29.8%)</td>
<td>34 (16.8%)</td>
</tr>
<tr>
<td></td>
<td>Abstinence</td>
<td>16 (40.4%)</td>
<td>79 (39.1%)</td>
</tr>
<tr>
<td></td>
<td>Avoid syphilis victims</td>
<td>2 (4.3%)</td>
<td>16 (7.9%)</td>
</tr>
<tr>
<td></td>
<td>Use of condoms</td>
<td>8 (17.0%)</td>
<td>68 (33.7%)</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>7 (14.9%)</td>
<td>5 (2.5%)</td>
</tr>
<tr>
<td>Important to know syphilis status</td>
<td>Yes</td>
<td>32 (68.1%)</td>
<td>189 (93.6%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>15 (31.9%)</td>
<td>13 (6.4%)</td>
</tr>
</tbody>
</table>
4.4 Risk factors for syphilis infection

4.4.1 Sexual activities

Regarding sexual orientation, the study revealed that majority 156(62.7%) of respondents interviewed were homosexuals. The study further showed that slightly more than half 129(51.8%) of respondents had first sexual encounter with a man at the age of between 16-19 years. Majority 161(64.7%) of respondents revealed that they spend their nights in lodges. Concerning the frequency of having oral sex among respondents, slightly more than a half 129(51.8%) of respondents reported that they did not engage in oral sex in their past one month.

Majority 153(61.4%) of respondents reported that over the last one month they had had one sexual partner. However, majority 137(58.8%) reported that the gender of the sexual partner was a top. When asked about the type of sexual partner, 79(33.9%) of the respondents revealed that the type of sexual partner they engaged in sex with was a steady (commercial) sexual partner.

Concerning condom use among respondents, slightly less than a half 121(48.6%) reported that over the last months they sometimes used a condom when engaging in anal sex. Majority 131(52.6%) of respondents revealed that over the last 6 months they never used lubricants during anal sexual intercourse as shown in table 4.6 below. This did not significantly differ with qualitative results as one the Key Informant commented,

“…When engaging in anal sex, using a condom is not pleasurable as revealed by our clients. This may be because of lack of proper lubrication during anal sex…this may lead to burst of condoms due to friction.”
### Table 4.6: Sexual activities among respondents among respondents (n=249)

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Respondent response</th>
<th>Frequency (N)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual orientation</td>
<td>Homosexual</td>
<td>156</td>
<td>62.7</td>
</tr>
<tr>
<td></td>
<td>Bisexual</td>
<td>47</td>
<td>18.9</td>
</tr>
<tr>
<td></td>
<td>Heterosexual</td>
<td>32</td>
<td>12.8</td>
</tr>
<tr>
<td></td>
<td>Trans-gender</td>
<td>14</td>
<td>5.6</td>
</tr>
<tr>
<td>Age of first sexual encounter with a man</td>
<td>&lt;12 years</td>
<td>19</td>
<td>7.6</td>
</tr>
<tr>
<td></td>
<td>13-15 years</td>
<td>79</td>
<td>31.7</td>
</tr>
<tr>
<td></td>
<td>16-19 years</td>
<td>129</td>
<td>51.9</td>
</tr>
<tr>
<td></td>
<td>&gt;20 years</td>
<td>22</td>
<td>8.8</td>
</tr>
<tr>
<td>Where you spend nights</td>
<td>Home</td>
<td>88</td>
<td>35.3</td>
</tr>
<tr>
<td></td>
<td>Not at home</td>
<td>161</td>
<td>64.7</td>
</tr>
<tr>
<td>Frequency of oral sex in the last one month</td>
<td>None</td>
<td>129</td>
<td>51.8</td>
</tr>
<tr>
<td></td>
<td>Once</td>
<td>72</td>
<td>28.9</td>
</tr>
<tr>
<td></td>
<td>More than once</td>
<td>48</td>
<td>19.3</td>
</tr>
<tr>
<td>Frequency of anal sex in the last one month</td>
<td>None</td>
<td>24</td>
<td>9.6</td>
</tr>
<tr>
<td></td>
<td>Once</td>
<td>56</td>
<td>22.5</td>
</tr>
<tr>
<td></td>
<td>More than once</td>
<td>169</td>
<td>67.9</td>
</tr>
<tr>
<td>No of sexual partners in the last one month</td>
<td>None</td>
<td>16</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>One</td>
<td>153</td>
<td>61.4</td>
</tr>
<tr>
<td></td>
<td>More than one</td>
<td>80</td>
<td>32.1</td>
</tr>
<tr>
<td>Gender of sexual partner</td>
<td>Top</td>
<td>137</td>
<td>58.8</td>
</tr>
<tr>
<td></td>
<td>Bottom</td>
<td>96</td>
<td>41.2</td>
</tr>
<tr>
<td>Type of sexual partner</td>
<td>Steady (non-commercial)</td>
<td>48</td>
<td>20.6</td>
</tr>
<tr>
<td></td>
<td>Casual (non-commercial)</td>
<td>64</td>
<td>27.5</td>
</tr>
<tr>
<td></td>
<td>Anonymous (non-commercial)</td>
<td>19</td>
<td>8.2</td>
</tr>
<tr>
<td></td>
<td>Steady (commercial)</td>
<td>79</td>
<td>33.9</td>
</tr>
<tr>
<td></td>
<td>Casual (commercial)</td>
<td>23</td>
<td>9.9</td>
</tr>
<tr>
<td>Had anal sex without a condom in the last 6 months</td>
<td>Never</td>
<td>39</td>
<td>15.7</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>121</td>
<td>48.6</td>
</tr>
<tr>
<td></td>
<td>Always</td>
<td>89</td>
<td>35.7</td>
</tr>
<tr>
<td>Use of lubricants in the last 6 months</td>
<td>Never</td>
<td>131</td>
<td>52.6</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>96</td>
<td>38.6</td>
</tr>
<tr>
<td></td>
<td>Always</td>
<td>22</td>
<td>8.8</td>
</tr>
</tbody>
</table>

#### 4.4.2 Association of sexual activities and syphilis status

The study revealed that majority 29(61.7%) of respondents who tested positive for syphilis were homosexuals. This study showed a statistically significant association (p=0.001) between sexual orientation and syphilis infection. It was further revealed
that majority 108(53.5%) who tested negative had their sexual debut with a man between ages of 16-19 years. However, the study did not show any statistical association (p=0.163) between age of sexual debut with a man and syphilis status.

Majority 40(85.1%) of the respondents who tested positive for syphilis infection reported that they spent most of their nights away from home with a significant statistical association of p=0.001. Those who spent their nights away from home were 3.8 times more likely to get syphilis infection as compared to their counterparts (OR=3.831). The study further revealed that slightly less than a half 22(46.8%) of the respondents reported having anal sex once in their previous one month. There was a significant statistical association (p=0.001) between frequency of anal sex among respondents and their syphilis status.

The study revealed that majority 30(63.9%) of the respondents who tested positive for syphilis reported that they had had more than one sexual partner in their previous one month. There was a statistically significant association (p=0.001) between number of sexual partners and syphilis status. Regarding the type of sexual partner, 21(44.7%) of those who had tested positive for syphilis reported that they had a steady (commercial) sexual partner in their last one month. There was a significant statistical association (p=0.001) between the type of sexual partner and syphilis status.

Slightly less than a half 23(48.9%) of respondents who tested positive for syphilis reported that they had always had sex without using a condom for their previous 6 months. There was a significant statistical association (p=0.001) between having anal sex without a condom and syphilis status. Regarding using lubricants during anal sex in the last 6 months, slightly above average 110(54.5%) of the respondents who tested negative for syphilis reported that they never used lubricants. However, there was no
statistical significance (p=0.522) between use of lubricants during anal sex and syphilis status. The results were are presented in table 4.7 below.

Table 4.7: Relationship between sexual activities and syphilis status among respondents (n=249)

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Respondent Response</th>
<th>Dependent variable</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>VDRL Postive (N=47)</td>
<td>VDRL Negative (N=202)</td>
</tr>
<tr>
<td>Sexual orientation</td>
<td>Homosexual</td>
<td>29(61.7%)</td>
<td>127(62.9%)</td>
</tr>
<tr>
<td></td>
<td>Bisexual</td>
<td>15(31.9%)</td>
<td>32(15.8%)</td>
</tr>
<tr>
<td></td>
<td>Heterosexual</td>
<td>0(0.0%)</td>
<td>32(15.8%)</td>
</tr>
<tr>
<td></td>
<td>Trans-gender</td>
<td>3(6.4%)</td>
<td>11(5.3%)</td>
</tr>
<tr>
<td>Age of first sexual encounter with a man</td>
<td>&lt;12 years</td>
<td>5(10.6%)</td>
<td>14(6.9%)</td>
</tr>
<tr>
<td></td>
<td>13-15 years</td>
<td>14(29.8%)</td>
<td>65(32.2%)</td>
</tr>
<tr>
<td></td>
<td>16-19 years</td>
<td>21(44.7%)</td>
<td>108(53.5%)</td>
</tr>
<tr>
<td></td>
<td>&gt;20 years</td>
<td>7(14.9%)</td>
<td>15(7.4%)</td>
</tr>
<tr>
<td>Where you spend nights</td>
<td>Not home</td>
<td>40(85.1%)</td>
<td>121(59.9%)</td>
</tr>
<tr>
<td></td>
<td>Home</td>
<td>7(14.9%)</td>
<td>81(40.1%)</td>
</tr>
<tr>
<td>Frequency of oral sex in the last one month</td>
<td>None</td>
<td>23(49.0%)</td>
<td>106(52.5%)</td>
</tr>
<tr>
<td></td>
<td>Once</td>
<td>16(34.0%)</td>
<td>56(27.7%)</td>
</tr>
<tr>
<td></td>
<td>More than once</td>
<td>8(17.0)</td>
<td>40(19.8%)</td>
</tr>
<tr>
<td>Frequency of anal sex in the last one month</td>
<td>None</td>
<td>7(14.9%)</td>
<td>17(8.4%)</td>
</tr>
<tr>
<td></td>
<td>Once</td>
<td>22(46.8%)</td>
<td>34(16.8%)</td>
</tr>
<tr>
<td></td>
<td>More than once</td>
<td>18(38.3%)</td>
<td>151(74.8%)</td>
</tr>
<tr>
<td>No of sexual partners in the last one month</td>
<td>None</td>
<td>9(19.1%)</td>
<td>7(3.5%)</td>
</tr>
<tr>
<td></td>
<td>One</td>
<td>8(17.0%)</td>
<td>145(71.8%)</td>
</tr>
<tr>
<td></td>
<td>More than one</td>
<td>30(63.9%)</td>
<td>50(24.7%)</td>
</tr>
<tr>
<td>Gender of sexual partner</td>
<td>Bottom</td>
<td>25(53.2%)</td>
<td>(35.1%)</td>
</tr>
<tr>
<td></td>
<td>Top</td>
<td>13(27.7%)</td>
<td>124(61.4%)</td>
</tr>
<tr>
<td>Type of sexual partner</td>
<td>Steady (non-commercial)</td>
<td>0(0.0%)</td>
<td>48(23.8%)</td>
</tr>
<tr>
<td></td>
<td>Casual (non-commercial)</td>
<td>2(4.4%)</td>
<td>62(30.7%)</td>
</tr>
<tr>
<td></td>
<td>Anonymous (non-commercial)</td>
<td>15(31.9%)</td>
<td>4(2.0%)</td>
</tr>
<tr>
<td></td>
<td>Steady (commercial)</td>
<td>21(44.7%)</td>
<td>58(28.7%)</td>
</tr>
<tr>
<td></td>
<td>Casual (commercial)</td>
<td>0(0.0%)</td>
<td>23(11.4%)</td>
</tr>
<tr>
<td>Had anal sex without a condom in the last 6 months</td>
<td>Never</td>
<td>14(29.8%)</td>
<td>25(12.4%)</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>10(21.3%)</td>
<td>111(54.9%)</td>
</tr>
<tr>
<td></td>
<td>Always</td>
<td>23(48.9%)</td>
<td>66(32.7%)</td>
</tr>
</tbody>
</table>
4.4.3 Use of drugs

The study revealed that slightly less than a half 121(48.6%) of respondents interviewed sometimes use drugs before engaging in sexual intercourse. They cited alcoholic drinks and tobacco products that they sometimes use. The results were as presented in figure 4.7 below.

![Pie chart showing drug use frequency among respondents]

**Fig 4.7: Frequency of drug use among respondents**

4.4.4 Association between use of drugs and syphilis status

The study revealed that about a half 22(50.5%) of respondents who tested negative for syphilis infection reported that they sometimes had used a drug before they engaged in sex with a man. However, there was no significant statistical association (p=0.304) between use of drugs during sexual intercourse and syphilis status. The results were presented in table 4.8 below.
Table 4.8: Relationship between use of drugs and syphilis status among respondents (n=249)

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Respondent Response</th>
<th>Dependent variable</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>VDRL Positive (N=47)</td>
<td>VDRL Negative (N=202)</td>
</tr>
<tr>
<td>Frequency of drugs use</td>
<td>None</td>
<td>12(25.5%)</td>
<td>34(16.8%)</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>19(40.4%)</td>
<td>102(50.5%)</td>
</tr>
<tr>
<td></td>
<td>Always</td>
<td>16(34.1%)</td>
<td>66(32.7%)</td>
</tr>
</tbody>
</table>

4.4.5 Psychological distress

Regarding psychological distress as a risk factor towards syphilis infection, majority 181(72.7%) of respondents reported that over the last 12 months they felt isolated from the world in one way or the other. On whether the respondents ever contemplated attempting suicide, majority 223(89.6%) of the participants did not attempt suicide. A large number 132(53.0%) of respondents indicated that they had ever felt worried, anxious or fearful at one point in their lifetime as they engaged in MSM activities. More than a half 136(54.6%) of respondents revealed that they felt hopeless or sad almost daily. The results were presented in table 4.9 below.

Table 4.9: Psychological distress among respondents (n=249)

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Respondent response</th>
<th>Frequency (N)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever felt isolated in the last 12 months</td>
<td>Yes</td>
<td>181</td>
<td>72.7</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>68</td>
<td>27.3</td>
</tr>
<tr>
<td>Ever contemplated attempting suicide</td>
<td>Yes</td>
<td>26</td>
<td>10.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>223</td>
<td>89.6</td>
</tr>
<tr>
<td>Ever felt worried, anxious or fearful</td>
<td>Yes</td>
<td>132</td>
<td>53.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>117</td>
<td>47.0</td>
</tr>
<tr>
<td>Ever felt hopeless or sad almost daily</td>
<td>Yes</td>
<td>136</td>
<td>54.6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>113</td>
<td>45.4</td>
</tr>
</tbody>
</table>
4.4.6 Association between psychological distress and status of syphilis infection

Regarding influence of psychological distress on syphilis status, the study found out that majority 40(85.1%) of respondents who tested positive reported that they had ever felt isolated from the world in the last 12 months. There was a significant statistical association (p=0.034) between feeling of isolation and syphilis status. Those who felt isolated were 2.5 times more likely to test positive for syphilis infection (OR=2.472).

Concerning contemplating suicide attempt amongst respondents, most 156(77.2%) of the respondents who tested negative for syphilis infection reported that they had never contemplated attempting suicide. The study did not show any significant statistical association (p=0.825) between contemplating attempting suicide and syphilis status.

When the respondents were asked whether they had ever felt worried, anxious or fearful in the last 12 months, 109(54.0%) of the respondents who tested negative for syphilis reported that they had felt worried, anxious or fearful. The study did not show any significant statistical association (p=0.534) between feeling worried, anxious or fearful and syphilis status. Majority 112(55.4%) of the respondents who tested negative for syphilis reported that they had felt hopeless or sad almost daily. However, there was no significant statistical association (p=0.587) between feeling hopeless or sad and syphilis status. The results were as presented in table 4.1 below.
Table 4.10: Realationship between psychological distress and syphilis status (n=249)

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Respondent Response</th>
<th>Dependent variable</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>VDRL Positive (N=47)</td>
<td>VDRL Negative (N=202)</td>
</tr>
<tr>
<td>Ever felt isolated in the last 12 months</td>
<td>Yes</td>
<td>40 (85.1%)</td>
<td>141 (69.8%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>7 (14.9%)</td>
<td>61 (30.2%)</td>
</tr>
<tr>
<td>Ever contemplated attempting suicide</td>
<td>Yes</td>
<td>10 (21.3%)</td>
<td>46 (22.8%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>37 (78.7%)</td>
<td>156 (77.2%)</td>
</tr>
<tr>
<td>Ever felt worried, anxious or fearful</td>
<td>Yes</td>
<td>23 (48.9%)</td>
<td>109 (54.0%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>24 (51.1%)</td>
<td>93 (46.0%)</td>
</tr>
<tr>
<td>Ever felt hopeless or sad almost daily</td>
<td>Yes</td>
<td>24 (51.1%)</td>
<td>112 (55.4%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>23 (48.9%)</td>
<td>90 (44.6%)</td>
</tr>
</tbody>
</table>

4.5 Attitude towards syphilis infection

The study showed that 95(38.2%) of respondents were extremely afraid of contracting syphilis infection. They further revealed that 99(39.8%) of respondents felt that they were not at a higher risk of contracting syphilis than other fellow men. However, more than a half 136(54.6%) disagreed that there was nothing to be done to prevent them from being infected with syphilis. From qualitave results, one of the nurses working in an MSM/Swop clinic reiterated,

“...From my experience working in this clinic for a couple of years, it has been clearly indicated that the self-vulnerability level of MSMs is very low despite being afraid of contracting the STIs....”
Concerning transmission of STIs to their counterparts, the study revealed that 74(29.7%) of respondents strongly agreed that they sometimes enjoy infecting other men with STIs. The study further showed that fairly 97(39.1%) of respondents agreed that sex with a condom was not natural and pleasurable to them thus engaged in unprotected anal sex. However, majority 132(53.1%) of the respondents strongly agreed that using a condom consistently and correctly reduces the risk of infection among sexual partners. The results were presented in table 4.11 below.

**Table 4.11: Attitude towards syphilis infection (n=249)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Respondent response</th>
<th>Frequency (N)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Am afraid of getting syphilis infection</td>
<td>Extremely</td>
<td>95</td>
<td>38.2</td>
</tr>
<tr>
<td></td>
<td>Very</td>
<td>72</td>
<td>28.9</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>72</td>
<td>28.9</td>
</tr>
<tr>
<td></td>
<td>Not bothered</td>
<td>10</td>
<td>4.0</td>
</tr>
<tr>
<td>Am at a higher risk of contracting syphilis infection</td>
<td>Strongly agree</td>
<td>30</td>
<td>12.0</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>44</td>
<td>17.7</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>76</td>
<td>30.5</td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>99</td>
<td>39.8</td>
</tr>
<tr>
<td>Believe that there is nothing I could do to prevent being infected</td>
<td>Strongly agree</td>
<td>22</td>
<td>8.8</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>19</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>136</td>
<td>54.6</td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>72</td>
<td>28.9</td>
</tr>
<tr>
<td>Enjoy transmitting STIs to other men</td>
<td>Strongly agree</td>
<td>74</td>
<td>29.7</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>72</td>
<td>28.9</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>43</td>
<td>17.3</td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>60</td>
<td>24.1</td>
</tr>
<tr>
<td>Sex with condoms is not natural and pleasurable</td>
<td>Strongly agree</td>
<td>62</td>
<td>24.9</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>97</td>
<td>39.1</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>35</td>
<td>14.1</td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>52</td>
<td>20.9</td>
</tr>
<tr>
<td>Using a condom consistently and correctly reduces risk of infection</td>
<td>Strongly agree</td>
<td>132</td>
<td>53.1</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>77</td>
<td>30.9</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>21</td>
<td>8.4</td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>19</td>
<td>7.6</td>
</tr>
</tbody>
</table>
4.5.1 Association between attitude towards syphilis and syphilis status

The study found out that slightly more than a half 24(51.1%) of the respondents who were positive for syphilis reported that they were very afraid of contracting syphilis. However, there was a significant statistical association between feeling afraid of contracting syphilis and syphilis status. The study further revealed that slightly below average 94(46.6%) of respondents who tested negative strongly disagreed that they were at a higher risk of contracting syphilis infection. There was no significant statistical association (p=0.617) between believe of higher risk of contracting syphilis and syphilis status.

Regarding believe that there was nothing one could do to prevent himself from being infected, 118(58.5%) of respondents who were negative disagreed. However, there was an association (p=0.001) between believe that there was nothing one could do to prevent himself from being infected and syphilis status. When the respondents were asked whether they would enjoy transmitting STIs to their respective sexual partners, 16(34.0%) strongly agreed. There was a significant statistical association (p=0.029) between enjoying transmitting STIs to sexual partners and syphilis status.

Concerning sex with condom presumed not to be natural and pleasurable, 22(46.8%) of respondents who were positive agreed. There was a significant statistical association (p=0.021) between sex with a condom being presumed to be unnatural and pleasurable and syphilis status. Majority 119(58.9%) of respondents who tested negative for syphilis infection strongly agreed that use of condoms consistently and correctly reduces risk of infection. There was a significant statistical association
(p=0.001) between using condoms consistently and correctly reduces risk of syphilis infection and syphilis status. The results were presented in table 4.12 below.

Table 4.12: Relationship between attitude and syphilis status (n=249)

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Respondent response</th>
<th>Dependent variable (VDRL Test)</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Am afraid of getting syphilis infection</td>
<td>Extremely</td>
<td>11(23.4%)</td>
<td>84(41.6%)</td>
</tr>
<tr>
<td></td>
<td>Very</td>
<td>24(51.1%)</td>
<td>48(23.8%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>7(14.9%)</td>
<td>65(32.2%)</td>
</tr>
<tr>
<td></td>
<td>Not bothered</td>
<td>5(10.6%)</td>
<td>5(2.4%)</td>
</tr>
<tr>
<td>Am at a higher risk of contracting syphilis infection</td>
<td>Strongly agree</td>
<td>16(34.1%)</td>
<td>14(6.9%)</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>12(25.5%)</td>
<td>32(15.8%)</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>14(29.8%)</td>
<td>62(30.7%)</td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>5(10.6%)</td>
<td>94(46.6%)</td>
</tr>
<tr>
<td>Believe that there is nothing I could do to prevent being infected</td>
<td>Strongly agree</td>
<td>6(12.8%)</td>
<td>16(7.9%)</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>2(4.3%)</td>
<td>17(8.4%)</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>18(38.2%)</td>
<td>118(58.5%)</td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>21(44.7%)</td>
<td>51(25.2%)</td>
</tr>
<tr>
<td>Enjoy transmitting STIs to other men</td>
<td>Strongly agree</td>
<td>16(34.0%)</td>
<td>58(28.7%)</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>10(21.3%)</td>
<td>62(30.7%)</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>13(27.7%)</td>
<td>30(14.9%)</td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>8(17.0%)</td>
<td>52(25.7%)</td>
</tr>
<tr>
<td>Sex with condoms is not natural and pleasurable</td>
<td>Strongly agree</td>
<td>13(27.7%)</td>
<td>49(24.3%)</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>22(46.8%)</td>
<td>75(37.1%)</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>5(10.6%)</td>
<td>30(14.9%)</td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>7(14.9%)</td>
<td>48(23.8%)</td>
</tr>
<tr>
<td>Using a condom consistently and correctly reduces risk of infection</td>
<td>Strongly agree</td>
<td>13(27.7%)</td>
<td>119(58.9%)</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>31(66.0%)</td>
<td>46(22.8%)</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>2(4.3%)</td>
<td>19(9.4%)</td>
</tr>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>1(2.0%)</td>
<td>18(8.9%)</td>
</tr>
</tbody>
</table>
CHAPTER FIVE: DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussions

5.1.1 Prevalence of syphilis

The study found out that the prevalence of syphilis among men having sex with other men was relatively higher than that of the general population. This was about 10 times higher than that of the entire Kenyan population (KDHS, 2014). This may be attributed to the fact that MSMs form part of the most at risk populations thus higher prevalence. This results were contrary with another Kenyan study done in Nairobi which found out that the prevalence of syphilis among men who have sex with other men was slightly lower (Sanders et al, 2010). The results were also inconsistent with a study done in Ghana which found out that the prevalence of syphilis among the homosexuals was higher than this study’s (Adjei et al, 2013).

Based on self reported prevalence of Sexually Transmitted Infections among respondents, the study found out that the prevalence of HIV was higher than that of syphilis. This would be because most MSMs infected with syphilis are likely to be HIV positive. These results were consistent with another study conducted in Ghana among prison inmates which showed that syphilis seropositivity was significantly associated with HIV seropositivity (Adjei et al, 2013).

5.1.2 Knowledge factors associated with syphilis prevalence

Concerning syphilis awareness among MSMs, this study found out that majority of respondents were aware of syphilis infection. This would be due the fact that Nairobi City is a cosmopolitan region where access to information is relatively easier. Many of the respondents were able to state at least one mode of transmission and symptoms.
This was in line with a study done in South coastal region of China which revealed that majority of men having sex with other men had knowledge about syphilis (Wu et al, 2016). This finding was inconsistent with a study done in Swaziland which showed that there were low levels of knowledge and testing of syphilis among MSMs (Baral et al, 2013).

Regarding respondents’ knowledge on syphilis mode of transmission, majority reported that syphilis among MSMs is largely attributed to unprotected anal sex. The prevalence of syphilis infections among respondents increased with increased exposure to unprotected anal sex. This study concurs with another Kenyan study done in Nairobi City County which found out that majority of respondents attributed high prevalence of syphilis infection among MSMs with exposure to unprotected anal sex (Khayota, 2012).

The study found out that majority of respondents had knowledge on syphilis reinfection occurring among medically treated cases. This finding was consistent with a study done in rural Tanzania which revealed that majority of MSMs were aware of syphilis reinfection after cure (Berthe, 2012). These results were inconsistent with a Peruvian study which found out that slightly less than half of respondents in MSM cities were knowledgeable about syphilis reinfection. This would be because most MSMs don’t notify their partners on their syphilis status hence when they are treated they still go back to their partners for unprotected sex irrespective of their status. These results concurred with study done by Msuya et al (2011), who found out that syphilis reinfection among MSMs was largely attributed to lack of partner notification and presumed trust among couples.
Majority of respondents had high knowledge on prevention of syphilis amongst themselves. This was after they were able to identify prevention measures such as abstinence, faithfulness and consistent and correct use of condoms among MSMs partners. These results were contrary to a study done in China which attributed low knowledge levels among MSMs as the contributing factor for the rising prevalence of syphilis infections among most at risk populations (Wu et al., 2016).

Regarding knowledge on testing frequency for syphilis infection among MSMs engaging in risk sexual behaviours and having multiple partners, majority of respondents revealed that they should be tested frequently. This shows that they had prior access to information or had been counselled and guided on issues to do with syphilis management and treatment in their previous Swop/MSMs clinic visits. This concurs with a study done in Netherlands which advocates for more frequent syphilis testing among MSMs practising risk behaviours to ensure early treatment thus prevent its transmission to their sexual partners (Visser et al., 2017).

5.1.3 Risk factors associated with syphilis prevalence

Sexual orientation played a significant role towards syphilis prevalence among MSMs. This study revealed that majority of respondents with positive syphilis status were homosexuals. These findings were consistent with another study conducted in China which showed that there was high prevalence of syphilis infections among the homosexuals (Zeng et al., 2014). This may be attributed to high sexual risk behaviours among MSMs exposing them to contracting syphilis.

The study showed that engaging in unprotected sex was a predisposing factor towards syphilis infection among MSMs. Majority of the MSMs revealed that in most cases they do not prefer using condoms while having sex because they presume that sex
with a condom is not natural and pleasurable. These results were consistent with a study conducted in Switzerland among Swiss HIV cohorts which revealed that the major source of transmission route was unprotected male-to-male sexual intercourse among the MSMs (Shilaih et al., 2017). Lack of consistent condom use among MSMs in North East China was attributed to perceived decreased sexual pleasure, physical discomfort and power imbalances among partners leading to inability to effectively negotiate for condom use (Hu et al., 2014).

The findings of this study revealed that majority of respondents did not use lubricants during their previous anal sexual intercourse. This was demonstrated by high cases of syphilis infections among those who did not use lubricants. These results were contrary to a study done in West Hollywood which revealed that majority of the MSMs preferred use of lubricants as a protection measure against sexually transmitted diseases (Marks et al., 2013). This was because lubricants reduce friction and consequently damage of anal muscles resulting to decreased chances of infection among sexual partners.

In regard to the number of sexual partners one had in their previous 12 months, the study revealed that majority of respondents who had more than one sexual partner tested positive for syphilis. This may be due to the fact that as the number of sexual partners increases, the risk of getting infected with syphilis also increases. These findings were in line with a study done in Texas, United States of America, which found out that risk of syphilis infection among MSMs is worsened by higher number of sexual partners and frequent concurrence of this partners (Mattei et al., 2012).

In relation to use of drugs among MSMs, majority of respondents who most frequently used drugs before engaging in sexual activities tested positive for syphilis
infection. This may be attributed to the fact that drug and substance abuse impairs judgement and therefore affects negotiation for safe sex. This further predisposes this individuals to higher risks of contracting STIs including syphilis. These results were consistent with a study done in Kampala, which revealed that abuse of substances among MSMs is a risk factor towards syphilis infection due to impaired judgement and poor decision making thus exposed to high chances of getting infected (Sekirime et al., 2013). The results also concurred with another Brazilian study which showed that use of drugs has been associated with higher risk sexual behaviors, including engaging in unprotected anal sex, having an increased number of sexual partners and consequently higher risk of STD infection (Gomes et al., 2017).

The results of this study revealed that majority of respondents felt isolated from the world. This may be due to perceived stigmatization and discrimination associated with homosexuality among MSMs. This is further aggrieved by the fact that in many African countries including Kenya, homosexuality is illegal. These results were consistent with another study done in China which revealed that MSMs are a marginalized group which faces a lot of challenges especially in accessing healthcare services (Xian et al., 2017). They feel treated as outcasts and excluded from engaging in societal activities.

The current study showed that majority of respondents reported to had felt anxious, worried and/or fearful in their past 12 months. The feeling of isolation due to discrimination leads to MSMs feeling worried and anxious about their lives hence may expose them suicidal thoughts. These results were consistent with a study done in a Chinese City which expressed that MSMs activities exposes them to feelings of anxiety, hopelessness and worry (Li et al., 2014). This may further lead to men having
sex with other men contemplating on attempting suicidal advances due to effects disease progress.

5.1.4 Attitude towards syphilis infection

The study showed that majority of respondents were afraid of getting a syphilis infection. This would be attributed to their previous experience with syphilis infection. This might have made them aware of the deadly effects of the disease when it manifests itself into the human body. The results were in agreement with a study done in Uganda, which revealed that attitude towards individuals’ perceptions on the condition and thus influence its transmission (Kim et al., 2016). The attitude of MSMs or the healthcare providers is key to seeking for healthcare services. This makes them suffer in silence and continuing spreading the infection leading increased syphilis prevalence.

Regarding self-vulnerability levels among the respondents, the study found out that they low self-vulnerability perceptions. This results to engagement in risk sexual behaviours such unprotected anal sex, multiple sexual partners and abusing drugs leading to increased incidences of syphilis among men having sex with other men. These findings were consistent with a study done in Uganda which found out that the levels of self-vulnerability among MSMs was low (Sekirime et al., 2013).

The study showed that majority of respondents enjoyed or were not guilty of transmitting STIs to their counterparts. This can be explained by the fact that whenever one is infected they have a feeling of revenge or some go to seek for treatment secretly without informing their partners. Among the commercial male sex workers, they are coersed to engage in unprotected sex for favors . The results of the current study were therefore consistent with a study done in Switzerland which
revealed that some men report coerce their anal sex partners to engage in unprotected sex thus leading to high transmission rates among MSMs (Thurnheer et al., 2010).

The study found out that majority of respondents reported that sex with condoms does not feel natural and pleasurable. This significantly affected the prevalence of syphilis among MSMs as they prefer sex without condoms thus exposing them to high risks of getting Sexually Transmitted Infections. This results were in line with a study done in Nairobi Womens Hospital among sex workers which found out that use of condoms is presumed to be unpleasurable and not natural (Isika, 2012). Sex workers are not given chances to make decisions concerning safe sex since they coersed to fulfil the desires of their clients. Inconsistent use of condoms is attributed to perceived trust among sexual partners (Zhou et al, 2014).

5.2 Conclusions

The prevalence of syphilis among MSMs in NairobiCty County is alarmingly high, despite the concerted efforts that have been put in place to reduce its prevalence. This would be due to lack of partner notifications leading to syphilis reinfection and other associated factors.

Majority of the knowledge factors were significantly associated with syphilis status. Possession of correct information on transmission mode, syphilis reinfection and syphilis prevention played a significant role in exposing respondents to contracting the infection. However, despite having this information, MSMs still engage in risk sexual behaviours.

The study established that most risk factors had a significant effect on syphilis status among respondents. Engaging in risky sexual activities, drug and substance abuse and
psychological distress directly influenced syphilis satus among MSMs. Having more than one sexual partner was the most reported risk factor among the infected MSMs.

The respondents attitude towards syphilis was moderately gauged among MSMs. Majority of them reported to be afraid of syphilis infection despite them not practicing safe sex such use of condoms. However, many of the MSMs indicated that use of condoms consistently and correctly reduces risk of infections.

5.3 Recommendations

5.3.1 Recommendation from the study

i. The relevant NGOs dealing with marginalized groups should expand free syphilis screening and treatment services to the community.

ii. The relevant stakeholders in health should tailor and scale up MSMs education and sensitization campaigns on facts and best practices related to practice of anal sexual to to identify prevention points. This would ensure improved transfer of correct knowledge on preventive measures adopted and frequent testing to ensure early detection and treatment of syphilis among MSMs.

iii. The relevant stakeholders in health should provide psycho-social support such as counselling services and help reduce stigmatization associated with MSMs among the general public. MSMs should be helped to form social groups to help share information amongst themselves and champion for their rights.

iv. The relevant stakeholders in health should help demystify beliefs associated with syphilis infections. They should also be encouraged to improve their attitude towards syphilis through engaging in activities that would help themlive a positive life.
5.3.2 **Recommendations for further study**

i. There is need for conducting a meta-analysis study to establish the existence of high HIV prevalence than syphilis prevalence.

ii. A study should also be conducted to determine the quality of healthcare services offered in the SWOP/MSMs clinics.
REFERENCES


APPENDICES

Appendix i: Informed Consent

I am Hellen Mwangi, a masters student from Kenyatta University. I am conducting a study on "Risk factors of syphilis infection among Men who have sex with other men in Nairobi City County". The information will be used by the Ministry of Medical Services to improve access and quality for screening of syphilis infection among Men in hospitals as well as in other regions of Kenya.

Procedures to be followed

Participation in this study will require that I ask you some questions and I also examine you in order to screen you for syphilis, a blood sample of 3mls will be collected for syphilis testing. In accordance with Kenya National surveillance guidelines (CDC 2011). Specimens with positive VDRL will further be tested by a specific Treponema test FTA-ABS test for confirmatory diagnosis. Active syphilis will be defined as VDRL positive and titers of non-Treponema-specific antibodies ≥ 1:8. All negative result samples will be discarded immediately while positive one will be centrifuged to get the serum then discarded immediately after the confirmatory test. All positive cases will be referred to the registered clinical officer on duty at the clinic for treatment with Benzathine penicillin as per the WHO guidelines-2015.

You have the right to refuse participation in this study. You will get the same care and medical treatment whether you agree to join the study or not. Please remember the participation in this study is voluntarily. You may ask questions related to the study at any time.

You may refuse to respond to any questions and you may stop an interview at any time. You may also stop being in the study at any time without any consequences to
the services you receive from this clinic or any other organization now or in the future.

If you participate in this study you will help us to learn how to provide effective screening services that can improve the health of MSM and reduce the risk of syphilis infection. You will also benefit from being screened for syphilis and if you are found to have a problem you will be advised on the treatment.

**Reward**

If you agree to participate in this study, lunch of ksh.50 and transport of ksh.100 will be reimbursed.

**Confidentiality**

The interviews and examinations will be conducted in a private setting within the clinic. Your name will not be recorded on the questionnaire. The questionnaires will be kept in a locked cabinet for safe keeping. Everything will be kept private.

**Community considerations**

The respondents will be safeguarded when involved in the research and the researcher will ensure that their rights and welfare are adequately protected. The results will not be used to promote stigma or prejudice against the community. The respondents will be treated in an ethical manner, not only by respecting their decision but also by facilitating their well being. The researcher will operate in a manner that will both maximize the potential benefits and minimize the possible harms of the research.

**Contact Information**

If you have any questions you may contact my supervisors: Dr. George Evans Owino On 0722614878 or Dr. Sharma Rehka On 0786954818 or the Kenyatta University Ethical Review Committee Secretariat on chairman.kuerc@ku.ac.ke, secretary.kuerc@ku.ac.ke, ercku2008@gmail.com
**Participant’s statement**

The above information regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time. I understand that I will still get the same care and medical treatment whether I decide to leave the study or not and my decision will not change the care that I will receive from the clinic today or that I will get from any other clinic at any other time.

**Participant’s Name………**

**Signature…………………… Date……………………………………….**

**Principal investigator’s statement**

I, the undersigned, have explained to the volunteer in a language he understands, the procedures to be followed in the study and the risks and benefits involved

**Name……………………………………….**

**Signature…………………… Date……………………………………….**
Appendix ii: Research questionnaire

Risk factors associated with syphilis transmission among men having sex with other men in Nairobi City County, Kenya.

A. SOCIO-DEMOGRAPHICS

1. What is your age?

2. What is your religion?

3. What is your level of education?

4. What is your marital status?

5. What is your occupation?

B. RESPONDENTS KNOWLEDGE ON SYPHILIS

6. Have you ever heard of syphilis?

7. If yes, how can one get infected with syphilis?

8. How frequent should a man having sex with another man get tested for syphilis?

9. A person seemingly healthy can be carrying syphilis?
10. Engaging in oral sex is less likely to get infected with syphilis than those engaging in anal sex


11. Syphilis can be cured through medication


12. A person can get re-infected even after getting treated and cured


13. How can we prevent the spread of syphilis?


C. SYPHILIS PREVALENCE AMONG RESPONDENTS


15. Do you think that knowing your syphilis status is important?


16. What do you think are the benefits of knowing your syphilis status?


17. Has the respondent tested positive for any of the following STIs?


18. Have you ever been previously treated for syphilis?


D. RISK FACTORS FOR SYPHILIS INFECTION

19. What is your sexual orientation?


20. At what age was your first sexual encounter with a man?....................

21. Where do you spend your nights?
22. How frequent did you engage in oral sex in the last one month?

23. How frequent did you engage in anal sex in the last one month?

24. How many sexual partners have you had in the last one month?

25. If one or more, what was the gender of the sexual partners?

26. What type of sexual partner were they?
   [5] Casual (commercial)

27. In the last six months, did you engage in any sexual encounter without using a condom?

28. In the last six months, did you use lubricants during sexual encounters?

29. During the last one year, did any of the following happen to you?
   [3] Sexually assaulted  [4] Refused services such as health

30. Do you take any illicit drug such as alcohol, tobacco, bhang etc before having sexual intercourse?

31. During the last 12 months, have you felt isolated from the world?

32. During the last 12 months, have you ever contemplated on attempting suicide?

33. During the last 12 months, have you ever felt worried, anxiously or fearful?
34. During the last 12 months, have you felt hopeless or sad almost daily?


E: ATTITUDE TOWARDS SYPHILIS

35. Are you afraid that you may contract syphilis?


36. Do you believe that you are at a higher risk of contracting syphilis than other men?


37. I believe that there is nothing I could do to prevent me from contracting syphilis.


38. I enjoy transmitting STIs to other sexual partners


39. Sex with condoms does not feel natural and pleasurable.


40. Using a condom consistently and correctly reduces risk of syphilis infection.


Thank you for participating!
Appendix iii: Interview schedule for the Key Informant Interview

You are hereby invited to participate in a Key Informant Interview session in study on "Risk factors of syphilis infection among Men who have sex with other men in Nairobi City County". You are requested to be honest, free and active in your participation. There will be an observer, moderator and note taker for you’re the interview session. All information gathered will be held under strict confidentiality and will be used for purposes of this research only.

1. As a client, what do you understand by the termsyphilis? What are the causes and epidemiology of its manifestations?

2. From your own view, do you think MSMs are most at risk populations? What makes them more vulnerable towards contacting STIs?

3. From your experience, do you think MSMs attitudes affects their heath seeking behaviours?

4. How can you describe the nature of services offered in his facility? Are the clients free to interact with care givers during service delivery?

5. In your opinion, what do you think can be done to reduce the risk behaviours associated with syphilis infection?

Thank you for your participation!
Appendix iv: Research approval from Kenyatta University Graduate School

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: degr-graduate@kun.ac.ke
Website: www.ku.ac.ke

FROM: Dean, Graduate School
TO: Mwangi Hellen Nyambura
C/o Population & Reproductive Health Department.

DATE: 24th November, 2016
REF: Q138/CTY/PT/27692/2013

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

We acknowledge receipt of your revised Research Proposal as per our recommendations raised by the Graduate School Board of 21st September, 2016 entitled “Risk Factors of Syphilis Infection among Men Have Sex with Men in Nairobi”.

You may now proceed with your Data collection, subject to clearance with the Director, Ethics Office, Kenyatta University and Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University’s Website under Graduate School webpage downloads.

Thank you,

GIDEON KAINENYI
FOR: DEAN, GRADUATE SCHOOL

CC: Chairman, Population and Reproductive Health Department

GK/10416
Appendix v: Research authorization from Kenyatta University Graduate School

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean.graduate@ku.ac.ke
Website: www.ku.ac.ke

Our Ref. Q139/CTY/PT/27692/2013

DATE: 24th November, 2016

P.O. Box 43844, 00110
NAIROBI, KENYA
Tel. 8710901 Ext. 37530

Director General,
National Commission for Science, Technology
& Innovation
P.O. Box 30623-00100,
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MWANGI HELLEN NYAMBURA – REG. NO. Q139/CTY/PT/27692/2013

I write to introduce Ms. Mwangi Hellen Nyambura who is a Postgraduate Student of this University. She is registered for M.P.H degree programme in the Department of Population and Reproductive Health.

Ms. Nyambura intends to conduct research for an M.P.H Proposal entitled, “Risk Factors of Syphilis Infection among Men Have Sex with Men in Nairobi”.

Any assistance given will be highly appreciated.

Yours faithfully,

[Signature]

MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL
Appendix vi: Ethical clearance from KU Ethics and Review Committee

KENYATTA UNIVERSITY
ETHICS REVIEW COMMITTEE

Fax: 8711242/8711575
Email: kuerc.chairman@kuc.ac.ke
kuerc.secretary@kuc.ac.ke
Website: www.kuc.ac.ke

Our Ref: KU/ERC/APPROVAL/VOL.1 (32) Date: 13th April 2017

Mwangi Hellen Nyambura
Kenya University,
P.O Box 43844,
Nairobi

Dear Hellen,

APPLICATION NUMBER PKU/625/620 – “RISK FACTORS OF SYPHILIS INFECTION AMONG MEN WHO HAVE SEX WITH MEN IN NAIROBI, KENYA”

1. IDENTIFICATION OF PROTOCOL
The application before the committee is with a research topic Application Number PKU/625/1709 “Risk Factors of Syphilis Infection among Men Who Have Sex with Men in Nairobi, Kenya”

Received on 15th December 2016 and discussed on 10th January 2017.

2. APPLICANT
Mwangi Hellen Nyambura

3. SITE
Nairobi, Kenya

4. DECISION
The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (Section 7.2.1.3) and the Kenyatta University Review Committee Guidelines AND APPROVED that the research may proceed for a period of ONE year from 13th April, 2017.
ADVICE/CONDITIONS
i. Progress reports are submitted to the KU-ERC every six months and a full report is submitted at the end of the study.
ii. Serious and unexpected adverse events related to the conduct of the study are reported to this committee immediately they occur.
iii. Notify the Kenyatta University Ethics Committee of any amendments to the protocol.
iv. Submit an electronic copy of the protocol to KUERC.

When replying, kindly quote the application number above.
If you accept the decision reached and advice and conditions given please sign in the space provided below and return to KU-ERC a copy of the letter.

DR. TITUS KAHIGA
CHAIRMAN ETHICS REVIEW COMMITTEE

1. HELEN............................................. accept the advice given and will fulfill the conditions therein.

Signature:........................................ Date this day of. 21/04/2017...................... 2017.

cc.
DVC: Research Innovation and Outreach
Appendix vii: Research authorization from National Council for Science, Technology and Innovation

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471, 2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: dgs@nacost.go.ke
Website: www.nacost.go.ke
When replying please quote

Ref. No. NACOST/P/17/73742/17233

Hellen Nyambura Mwangi
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Risk factors for syphilis infection among men who have sex with men in Nairobi County, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Nairobi County for the period ending 22nd June, 2018.

You are advised to report to the County Commissioner, the County Director of Education and the County Director of Health Services, Nairobi County before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in pdf of the research report/thesis to our office.

GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:
The County Commissioner
Nairobi County.

The County Director of Education
Nairobi County.

The County Director of Health Services
Nairobi County.
Appendix viii: Research permit from Nairobi City County, County health services

NAIROBI CITY COUNTY

COUNTY HEALTH SERVICES

28th August, 2017

Hellen Nyambura Mwangi
Kenyatta University
P.O. Box 43844-00100
Nairobi

RE: RESEARCH AUTHORIZATION

This is to inform you that the Nairobi City County Operational Technical Working Group reviewed the documents on the study titled, "Risk factors for syphilis infection among men who have sex with men in Nairobi County".

I am pleased to inform you that you have been authorized to undertake the study in Nairobi County.

On completion of the study, you will submit one hard copy and one copy in PDF of the research findings to our operational research technical working group.

FOR: COUNTY DIRECTOR
HEALTH SERVICES
NAIROBI COUNTY

R. K. MULI
FOR: COUNTY DIRECTOR OF HEALTH SERVICES

CC:

All SCMOHs
Appendix ix: Research permit from state department of basic education

STATE DEPARTMENT OF BASIC EDUCATION

DATE: 22nd August, 2017

RE: RESEARCH AUTHORIZATION

We are in receipt of a letter from the National Commission for Science, Technology and Innovation regarding research authorization in Nairobi County on "Risk factors for syphilis infection among men who have sex with men in Nairobi County."

This office has no objection and authority is hereby granted for a period ending 22nd June, 2018 as indicated in the request letter.

Kindly inform the Sub County Director of Education of the Sub County you intend to visit.

DIRECTOR OF EDUCATION

FOR REGIONAL COORDINATOR OF EDUCATION
NAIROBI
Appendix x: Research Permit from National Council for Science, Technology and Innovation

**CONNECTIONS**

1. The License is valid for the proposed research, research sites or specified periods.

2. Rights to licence and licence holder are non-transferable.

3. Upon request of the Committee, the Licencee shall submit a progress report.

4. The Licencee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.

5. Excavation, filming and collection of specimens are subject to further permission from the relevant Government agencies.

6. This Licence does not give authority to transfer research materials.

7. The Licencee shall submit two (2) hard copies and upload a soft copy of their final report.

8. The Committee reserves the right to modify the conditions of this Licence including its cancellation without prior notice.
Appendix xi: Map of Nairobi City County