# PREVALENCE OF SEXUALLY TRANSMITTED INFECTIONS AMONG HIV PRE-EXPOSURE PROPHYLAXIS USERS IN SELECTED HEALTH FACILITIES IN NAIROBI CITY COUNTY, KENYA

**EMMANUEL KIBALA KADIANGA (MBChB)**
**Q57F/CTY/PT/26254/2019**

**A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF PUBLIC HEALTH (EPIDEMIOLOGY AND DISEASE CONTROL) IN THE SCHOOL OF HEALTH SCIENCES OF KENYATTA UNIVERSITY**

**FEBRUARY, 2024**

## DECLARATION

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

Signature:…… Date……

**Emmanuel Kibala Kadianga;** Q57F/CTY/PT/26254/2019
Department of Family Medicine, Community Health and Epidemiology

## SUPERVISORS

We confirm that the work reported in this thesis was carried out by the candidate under our supervision.

Signature:…… Date……

**Dr. Harun M. Kimani (**PhD)
Department of Family Medicine, Community Health and Epidemiology
Kenyatta University

Signature:…… Date……

**Dr. George O. Orinda (**PhD)
Department of Biochemistry, Microbiology and Biotechnology
Kenyatta University

## DEDICATION

This thesis is dedicated to whoever played a major role in my education.

## ACKNOWLEDGEMENTS

I am most indebted to my supervisors Dr. Harun Kimani and Dr. George Orinda as well as my former supervisor Prof. Ephantus Kabiru for their best of scholarly insights, dedication, systematic guidance, constant availability, motivation, patience and close supervision throughout my research work. They consistently allowed this thesis to be my own work.

I wish to convey my gratitude to Dr. Tom Marwa and Prof. Patou Musumari for their unwearied mentorship and guidance.

Special thanks to School of Health Sciences of Kenyatta University for granting me the opportunity to pursue my master's degree in Public Health (Epidemiology and disease control).

My gratitude goes to Pastor Ann Jackson (ANLC Kenol), Dr. Didier Bakajika, Dr. Norbert Kafindo, Brother Christian Nguayila, Madam Ann Muange and Mr. Wallace Njenga, for their great support and endless encouragement.

I would like to thank all of the study participants for providing the data I needed to complete this course.

I am grateful to all of my friends who came to my assistance and helped in whatever way they could throughout my stay in Kenya.

Above all, I thank the Almighty God for the grace as well as good health he gave me to complete my study.

# TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

## ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **ACCESS:** | Australian Collaboration for Coordinated Enhanced Sentinel Surveillance |
| **AIDS:** | Acquired Immunodeficiency Syndrome |
| **CDC**: | Centers for Disease Control and Prevention |
| **CT:** | *Chlamydia trachomatis* |
| **FSW:** | Female Sex Worker |
| **GBMSM:** | Gay Bisexual and Other Men Who Have Sex with Men |
| **HIV:** | Human Immunodeficiency Virus |
| **HPV:** | Human Papilloma Virus |
| **HSV:** | Herpes Simplex Virus |
| **KHIS:** | Kenya Health Information System |
| **MDG:** | Millennium Development Goal |
| **MG**: | *Mycoplasma genitalium* |
| **MoH:** | Ministry of Health |
| **MSM:** | Men Who Have Sex with Men |
| **NACOSTI:** | National Commission for Science, Technology and Innovation |
| **NASCOP:** | National AIDS and STIs Control Programme |
| **NG:** | *Neisseria gonorrhoea* |
| **PEP:** | Post-Exposure Prophylaxis |
| **PLHIV:** | People living with HIV |
| **PrEP:** | Pre-Exposure Prophylaxis |

**PWID:** People Who Inject Drugs

**SDG:** Sustainable Development Goals

**SPSS:** Statistical Package for Social Sciences

**SSA:** Sub-Saharan Africa

**STIs:** Sexually transmitted infections

**TV:** *Trichomonas vaginalis*

**UHC:** Universal health coverage

**WHO:** World Health Organization

## DEFINITION OF OPERATIONAL TERMS

**Attitudes towards HIV-PrEP:** A mental position with regard to HIV-PrEP.

**Behavioural Risk Factors:** Factors that individuals have the most ability to modify.

**Health Seeking Behaviour:** This is any type of activity undertaken by people that regard themselves to have a health problem or to be ill for the objective of finding a suitable treatment.

**Health System Policy:** This is the decision, plan and action that are undertaken to achieve specific healthcare goals in a society.

**HIV-PrEP Users:** These are people who are not HIV positive yet are at very high risk of getting HIV to prevent HIV infection by taking daily medication.

**Prevalence:** Prevalence in public health is the proportion of a specific population found to be affected by an illness at a specific time.

**STIs Related Knowledge:** This is the amount of information HIV-PrEP Users have regarding the prevalence of STIs.

**Positive attitude**: This is a tendency to expect the best possible outcome or dwell on the most hopeful aspects of a situation.

**Curable STIs:** These are STIs that can be treated and cured

**Key populations:** These are groups who, due to specific higher-risk behaviors, are at increased risk of HIV, irrespective of the epidemic type or local context

## ABSTRACT

Sexually transmitted infections remain a significant public health problem mainly in low-income countries including Kenya. Currently, approximately half a billion new cases occur worldwide annually, and more than one million STIs are acquired per day. Of the estimated total of 357 million incident cases of the curable STIs world-wide, 131 million are from *Chlamydia trachomatis*, 78 million are from *Neisseria gonorrhea*, 5.6 million are from syphilis and 143 million are from *Trichomonas vaginalis*. In May 2017, the Kenya Ministry of Health, through the National AIDS and STI Control Program rolled out pre-exposure prophylaxis nationally to individuals at high risk of HIV acquisition. However, the roll out of HIV-PrEP by NASCOP has not been assessed to establish the prevalence and behavioural risk factors of STIs among those on HIV-PrEP. Additionally, attitudes toward HIV-PrEP, STIs related level of knowledge and health seeking behaviour for STIs among HIV-PrEP users in Nairobi have not been investigated. The main aim of this study therefore was to address the above gaps by assessing the prevalence of STIs among HIV-PrEP users in Nairobi City County. This study employed an analytical cross-sectional research design. The study targeted 3,330 HIV-PrEP users in Nairobi with a focus on five main health facilities in Nairobi City County namely; Mbagathi District Hospital, Mama Lucy Level Five Referral Hospital, Lang'ata Health Centre, STC MOH-Casino Heath Centre (Comprehensive Care Centre) and Sex Workers Outreach Program Kenya. Simple random sampling technique was adopted to obtain a sample size of 357 respondents. The study used primary data which was collected using structured questionnaire and secondary data (lab results). Descriptive and inferential statistics were analyzed using Statistical Packages for Social Sciences version 26.0. Chi square test and logistic regression was used to derive relationships between variables; results were considered statistically significant with p value $\leq 0.05$. The results were presented on tables and charts. The study findings revealed that 45.8% of the PrEP users visiting health facilities in Nairobi City County had at least one curable STI. The prevalence of STIs among this groups was; 13.4% for *Gonorrhea*, 9.7% for *Chlamydia*, 7.4% for Syphilis, 6.0% for Trichomoniasis, 5.1% for Herpes (Genital herpes), 3.7% for HIV and 0.5% for Genital warts. The study also found that most of the HIV-PrEP users visiting health facilities in Nairobi City County were well informed and knowledgeable about STIs occurrence and the benefits of HIV-PrEP. The findings furthermore revealed a significant association between level of related knowledge on STIs and the prevalence of STIs among HIV-PrEP users in the County, ($\chi^2$=62.280, $p$=0.033). The study further established that HIV-PrEP users in Nairobi City County were engaging in risky sexual behaviours as most of them were involved in the following behavioural risk activities: condomless sexual intercourse, greater number of sex partners, etc... This was further confirmed by having STIs diagnosis. It was shown that there existed a statistically significant association between behavioural risk factors of STIs and the prevalence of STIs among HIV-PrEP users in Nairobi City County ($\chi^2$=31.170, $p$=0.005<0.05). The study concludes that the adoption of HIV-PrEP is likely to influence sexual behaviour causing a greater risk-taking tendency. The study thus recommends that there is need for the County facilities offering HIV-PrEP services to implement a continuous comprehensive routine screening tests for STIs for prompt identification and treatment of asymptomatic cases, to create awareness about STIs for risky behaviour change, in order to lower the prevalence of STIs among HIV-PrEP users.

# CHAPTER ONE: INTRODUCTION

## 1.1 Background to the study

Sexually transmitted infections (STIs) are caused by viral, bacterial or parasitic microorganisms that spreads out from one person to another during sexual contact. However, various other means of transmission may consist of mother-to-child while pregnant or childbirth, blood transfusion, or other contact with blood or blood items (Choudhri *et al.,* 2018). More than 30 various bacteria, viruses and parasites are understood to get transmitted during sexual contact; eight of these pathogens are connected to the greatest occurrence of sexually transmitted illness (Aggarwal *et al.,* 2022). Broadly, STIs are categorized into two: curable STIs such as syphilis, gonorrhoea, chlamydia and trichomoniasis; and incurable which are viral infections such as hepatitis B, herpes simplex virus (HSV II), Human immunodeficiency virus (HIV) and Human papillomavirus (HPV) (Hughes & Sawleshwarkar, 2023). These infections can have long-term consequences if they are not diagnosed on time or when they are left untreated. STIs such as HIV and HPV can be asymptomatic over long periods of time while the signs and symptoms of others such as genital herpes can be mild and passing. As a result, no attention is paid to them leading not only to delayed diagnosis and treatment, but also increasing the chances of infections being passed on unaware during unprotected sexual intercourse (Samkange-Zeeb *et al.*, 2016). STIs, if left, can lead to complications such as pelvic inflammatory diseases, ectopic pregnancies or infertility in women, or epididymitis in men (Lemly & Gupta, 2020).

More than a million STIs occur per day worldwide (Bae & Lee, 2022). Around 357 million new cases of curable STIs among 15-49-year-olds were reported globally in 2012 (Newman *et al*., 2015). These consist of CT (131 million), NG (78 million), syphilis (6 million), and TV (143 million). Furthermore, around 500 million individuals are contaminated with Herpes simplex (HSV) type 2, and also about 290 million women are harboring HPV.

The WHO (2020) reported that around 3.5 million cases of syphilis, 15 million cases of chlamydia, 16 million cases of gonorrhea, and 30 million cases of trichomoniasis occur in Africa each year.

In Kenya, the prevalence of STIs, particularly HIV, in adults is about 6.2% (Saito *et al.*, 2020). Studies revealed a significant spread of gonococcal infection among men who have sex with men (MSM) in Kenya (Nacht *et al.*, 2020).

In combating HIV and AIDS as one of the STIs, the Millennium Development Goal (MDG) 6 targeted to achieve by 2010, universal access to treatment for HIV and AIDS for all those who need it and Sustainable Development Goal (SDG) 3, which prioritises Good Health and Well-being is one of the 17 Sustainable Development Goals established by the United Nations in 2015. To achieve these goals, various preventive measures have been developed, including of HIV-PrEP as a pre-exposure prophylaxis to prevent HIV infection among those who do not have the disease but are at high risk of getting HIV infection.

In 2017, the Government of Kenya (GOK) through National AIDS and STIs Control Programme (NASCOP) rolled out HIV-PrEP to prevent the spread of HIV and AIDS among the most at-risk groups (Ndaga, 2020). The intervention was carried out in a variety of venues or settings, including HIV care facilities, testing/prevention centres, STI clinics, drop-in centres for at-risk groups, and safe spaces for adolescents countrywide. However, the impact of HIV-PrEP on curable STIs among the most at-risk groups has not been elucidated and this is the focus of this study. HIV-PrEP refers to using antiretroviral medication to prevent the acquisition of HIV infection by an uninfected person at substantial risk of acquiring HIV infection. The recommended regimen is TRUVADA (Tenofovir 300 mg/Emtricitabine 200 mg) once daily. Alternatively, Tenofovir 300 mg once daily or Tenofovir 300 mg/ Lamuvidine 300 mg may be used.

### 1.2 Statement of the problem

The Global Health Sector Strategy aims to eradicate new STI infections by 2030 through a series of ambitious targets. These include reducing of *T. pallidum* incidence worldwide by 90% (Global Baseline, 2018), decreasing NG occurrence globally by 90% (Global Baseline, 2018), attaining a congenital syphilis rate of 50 or less per 1000 births in four fifth of countries globally, attaining 90% nationwide and a minimum of 80% coverage in all districts (or equivalent management system) in countries with the HPV vaccination in their national immunization program (WHO, 2023).

Similarly, Kenya has set targets to reduce annual new STIs by 75% among adults by 2022. In pursuit of this target, the Kenya Ministry of Health (MoH), through NASCOP rolled out HIV-PrEP nationally in May 2017 for individuals at high risk of HIV infection (Were *et al.*, 2020). However, the roll out of HIV-PrEP by NASCOP has not been assessed to determine the prevalence of curable STIs among those on HIV-PrEP in Nairobi, Kenya. Additionally, there is limited information on health seeking behaviour for STIs, STIs related level of knowledge and behavioural risk factors of STIs among HIV-PrEP users in Kenya. This study therefore sought to address these gaps by assessing the prevalence of STIs among HIV-PrEP Users in Nairobi City County.

### 1.3 Justification of the Study

STIs are associated with an outcome of morbidity and mortality and remain a significant public health problem mainly in low-income countries including Kenya (Chan *et al.,* 2019). Despite the roll out of HIV-PrEP by NASCOP, there is dearth of data on the prevalence of STIs among HIV-PrEP users in Nairobi, Kenya. This study addresses this gap, paving the way for evidence-based practice that will contribute to achieving SDG and Universal health coverage (UHC) agenda in Kenya as well as the Kenyan target of 75% reduction in STIs by 2022 by informing policy formulation and development of effective interventions.

The study was conducted in Nairobi City County because of the high HIV-PrEP uptake (Wahome *et al.,* 2020).

Around 35,774 people use HIV-PrEP in the County (Kenya health information system for aggregate reporting and analysis, 2020) Furthermore, a large number of HIV-PrEP users visit health facilities in the County for STIs treatment despite being on HIV-PrEP.

### 1.4 Research questions

1. What is the prevalence of STIs among HIV-PrEP users in Nairobi City County, Kenya?
2. What are the attitudes toward HIV-PrEP by its users in Nairobi City County, Kenya?
3. What is the STIs related level of knowledge among HIV-PrEP users in Nairobi City County, Kenya?
4. What are the behavioural risk factors of most common STIs among HIV-PrEP users in Nairobi City County, Kenya?
5. What is the health seeking behaviour for STIs among HIV-PrEP users in Nairobi City County, Kenya?

### 1.5 Null hypothesis

1. There is no association between attitudes toward HIV-PrEP and STIs prevalence among HIV-PrEP users in Nairobi City County, Kenya.
2. There is no association between STIs related level of knowledge and STIs prevalence among HIV-PrEP users in Nairobi City County, Kenya.

3. There is no association between behavioural risk factors of STIs and STIs prevalence among HIV-PrEP users in Nairobi City County, Kenya.
4. There is no association between health seeking behaviour for STIs and STIs prevalence among HIV-PrEP users in Nairobi City County, Kenya.

## 1.6 Research objectives

### 1.6.1 Broad objective

The main objective of this study was to assess the prevalence of STIs among HIV-PrEP users in selected health facilities in Nairobi City County, Kenya.

### 1.6.2 Specific objectives

1. To determine attitudes toward HIV-PrEP by its users in Nairobi City County, Kenya.
2. To establish STIs related level of knowledge among HIV-PrEP users in Nairobi City County, Kenya.
3. To identify behavioural risk factors of STIs among HIV-PrEP users in Nairobi City County, Kenya.
4. To determine health seeking behaviour for STIs among HIV-PrEP users in Nairobi City County, Kenya.

## 1.7 Significance of the study

The findings of the current study will help HIV-PrEP users in Kenya to obtain the right information on the importance of living responsibly and avoiding the STIs risk factors even when on HIV-PrEP.

Additionally, the study will benefit the managements of health facilities offering HIV-PrEP service in Nairobi in identifying the magnitude of HIV-PrEP use in Kenya so as to come up with response measures which will ensure HIV-PrEP users visiting or being enrolled in their facilities are accorded the necessary help and with high level of confidentiality. Further, the study may be helpful to health policy advisors and makers concerned in identifying the factors associated with STIs among HIV-PrEP users and the challenges they are facing. For future researchers and academicians, the findings of this study will provide a source of information for those who wishes to conduct further research in the same field.

## 1.8 Limitation and delimitation

### 1.8.1 Limitations

One of the anticipated limitations was that the respondents would withhold sensitive information for fear that it would be used by the relevant stakeholders to stop the supply of HIV-PrEP. To circumvent this, the participants/ respondents were informed about the study objectives as an academic study. Secondly, this study was also anticipated to face the challenge of non-response as some respondents would not be willing to disclose the nature of their work or sex orientation; however, this was addressed by assuring the

respondents that the information they would provide would be used for academic research and nothing else.

### 1.8.2 Delimitation of the study

The study setting included 5 main health facilities offering HIV-PrEP services in Nairobi, providing triangulation in data collection, thereby reducing bias in findings. The study involved only HIV-PrEP users enrolled in these facilities and healthcare providers.

## 1.9 Conceptual framework

As illustrated in figure 1.1 the dependent variable is STIs prevalence among HIV-PrEP users in Nairobi which is influenced by the independent variables namely; Socio-demographic factors, attitudes toward HIV-PrEP, STIs related level of knowledge and behavioural risk factors of STIs. Health seeking behaviour for STIs as moderating variable.

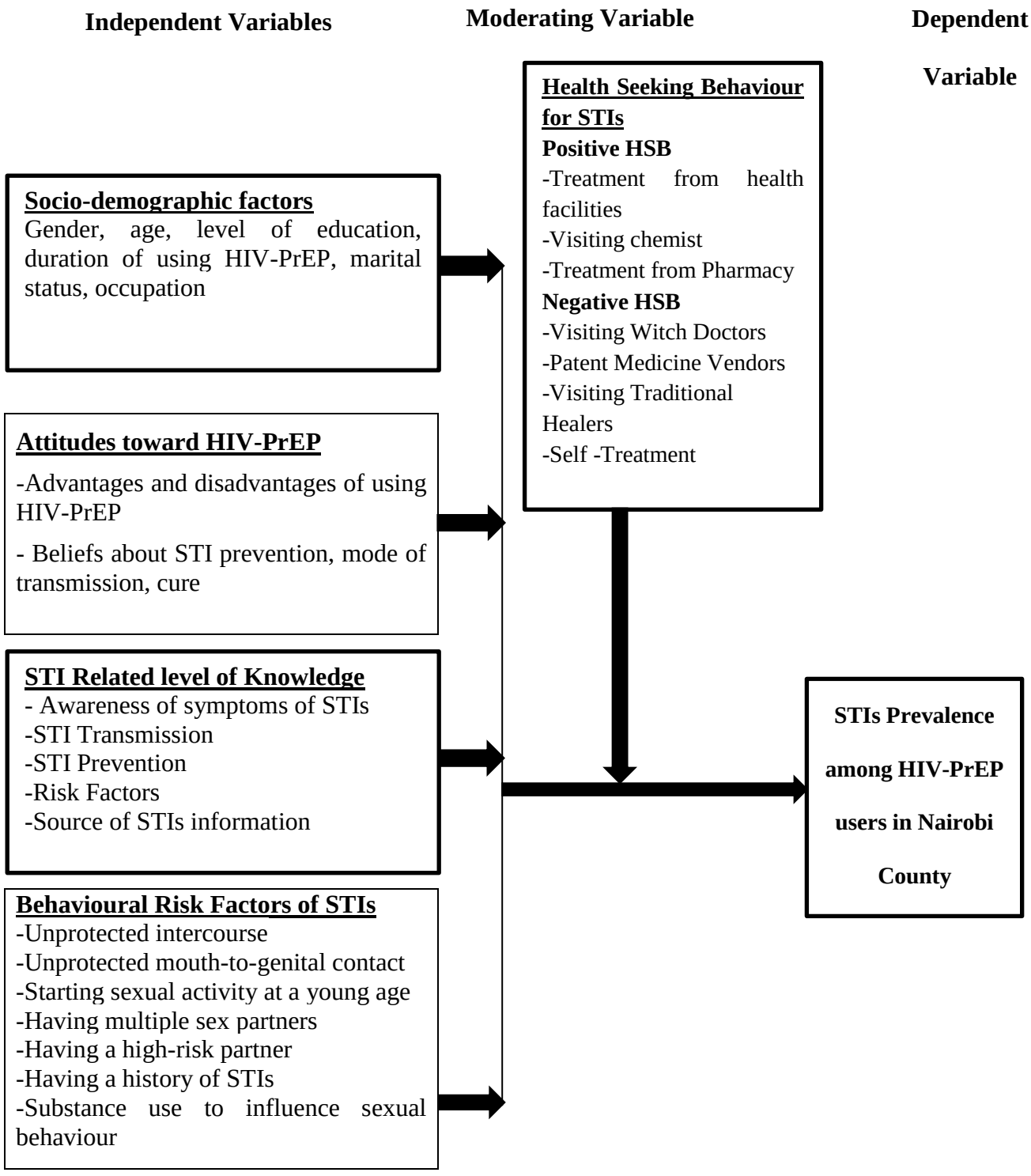



**Figure 1.1: Conceptual Framework showing relationship between study variables**

Source: Researcher (2020)

# CHAPTER TWO: LITERATURE REVIEW

## 2.1 Global prevalence of STIs

In developing countries, STIs constitute among the most prevalent five diseases categories for which individuals seek healthcare services (Deuba 2017). STIs are widespread contagious conditions affecting children, women and men globally (Skaletz Rorowski *et al*., 2021). Gamarel *et al*. (2020) reported that individual who obtain STIs deal with preconception, stereotyping, and also shame as well as are vulnerable to gender-based violence. As reported by WHO (2019), the frequency and incidence of four curable sexually STIs; trichomoniasis, gonorrhoea, chlamydia and syphilis remain high, recording more than one million new infections each day typically. The African countries record the highest frequency for chlamydia in males, trichomoniasis in women, as well as gonorrhoea as well as syphilis in women and men (WHO, 2019)

However, there is disparity in the burden of STIs among different regions (Mwangi, 2020). According to WHO (2018), women experience the long-lasting effects of the STIs once they end up being sterile, or various other major consequences, such as death and all individuals that seek analysis and therapy for STIs must be evaluated for HIV infection as well. As a result, testing needs to be routine, despite whether the individual is understood or suspected to have certain behavioural risks for HIV infection (Craig-Kuhn *et al.*, 2020).

In Canada, a comparatively significant STI and HIV burdens exist in specific subpopulations including MSM populations, indigenous peoples, African, injection drug users (IDUs), Caribbean and Black communities (Dyer *et al.*, 2020).

In 2011, 208 individuals per 100,000 (0.2%) were infected with HIV in Canada (Nelson *et al.*, 2019). Nonetheless, Ontario's Black population (about 3.9% of the overall population) comprises approximately 22.5% of individuals coping with HIV in the district. The majority of the available data are based upon samples from populations in the USA (Moges *et al.*, 2020). Several key studies indicate that the closed characteristics of social/sexual networks increase the odds that Black/African-Americans will be exposed to HIV or another STI.

Jansen *et al.* (2020) assessed STI in times of PrEP focusing on high prevalence of chlamydia, gonorrhea and mycoplasma at different anatomic sites in MSM in Germany. In this study both HIV-PrEP use was integrated for defining risk groups as well as utilized multivariable logistic regression and directed acyclic graphs to identify risk factors for STI. The study established that a significant proportion of MSM respondents acknowledged either being solitary or to live in an open relationship with a contract for sex with others. Additionally, the study showed that condomless anal intercourse was reported by 73.2% of the participants. Further MSM reported greater than 5 sex partners.

Due to their high prevalence and incidence rates, the potential for major complications and adverse effects, and the social and economic burden, STIs constitute a substantial

public health problem in Africa (Mcharo *et al.,* 2022). Furthermore, different STIs have been recognized as increasing chances of contracting HIV infection, and HIV has also led to the rise in STIs, especially viral infection such as HPV or HSV (Mcharo *et al.,* 2022).

A study conducted on prevalence of STIs and bacterial vaginosis among women in sub-Saharan Africa revealed that higher-risk populations had better occurrence of gonorrhoea and syphilis than clinic/community-based populaces. The study discovered chlamydia in 10.3% among 15-24-year-old women especially recruited from higher-risk settings for HIV in Eastern Africa and 15.1% among South African clinic/community-based people (Torrone *et al.,* 2018).

Africa has the highest prevalence and incidence rates of STIs. The overall yearly incidence rate of curable STIs in Africa is estimated at 254 per 1000 persons of sexually active age, yet it is only 77–91 per 1000 in developed countries (Wand *et al.,* 2020).

STIs is present a major burden of disease in Kenya's population. Although STIs remain one of the leading causes of the disease burden in Kenya, the focus on HIV and AIDS in the last 10-15 years has overshadowed the predominance of STIs. NACC (2014), also showed that, the prevalence of STI was 0.5% among persons with zero or only one lifetime sexual partner compared with 1.0% among persons who had more than one lifetime sexual partner.

FSWs contribute to 33% of STI prevalence and 29.3% of HIV prevalence (which is substantially greater than the Country's average HIV prevalence of 5.6%) in Kenya. The 2015 Polling Booth Survey Report revealed that more than 20% of FSWs were

experiencing an STI symptom at the time of the survey. Meru had the highest number of FSWs experiencing symptoms (39%), while Eldoret reported STI prevalence of 24%. Overall, 25% of FSWs had an STI in the 90 days before the survey and only 29% of FSWs received STI treatment (NASCOP, 2017).

### 2.2 Impact of HIV- PrEP on STIs

HIV-PrEP is a biomedical prevention strategy where HIV-negative individuals take a once daily antiretroviral pill to prevent contracting HIV among at-risk populations (Beymer *et al.*, 2018). Several experimental studies have demonstrated that HIV-PrEP can effectively reduce the incidence of new HIV infections by about 44% to 75% in diverse high-exposure groups (Grant *et al.*, 2016). The first large cohort study of HIV-PrEP efficacy found a 44% reduction in the incidence of HIV between the treatment and placebo groups among persons engaging in high-risk sexual behaviour (Grant *et al.*, 2016). A similar study by McCormack *et al.* (2016) reported 1.2% of infections in the experimental group than 9% of infections among people who did not administer HIV-PrEP.

Based on the findings of these large-scale trials, the CDC recommended HIV-PrEP for people at increased risk for HIV exposure, including sexually active, HIV-negative gay, bisexual, and MSM (Beymer *et al.*, 2018).

However, there have been concerns regarding the potential of HIV-PrEP to instigate behavioural disinhibition associated with decreased HIV-risk perception

that may lead to unsafe sexual practices and increase their chances of acquiring STIs (Blumenthal *et al.*, 2016).

McCormack *et al.* (2016) revealed similarities in curable STI incidences between HIV-PrEP users and non-HIV-PrEP users. Similarly, Volk *et al.* (2017) found that after 42 and 84 weeks of HIV-PrEP use, 30% and 50% of PrEP users, respectively, had STI. A study by Marcus *et al.* (2016) found that 35% of HIV-PrEP users were diagnosed with an STI during follow-up. However, these studies, only at STIs prevalence after starting HIV-PrEP and failed to consider STI rates prior to initiating HIV-PrEP.

In a study conducted by Nguyen *et al*. (2018) in Montreal, Canada, increases in the rates of curable STIs including gonorrhea, chlamydia, and/or syphilis in HIV-PrEP users were demonstrated in 109 HIV-seronegative homosexual men 12 months before and 12 months after beginning Truvada for HIV prevention.

The increased rates of STI in HIV-PrEP users suggest a need to reinforce counselling and STI diagnosis and treatment efforts (Barreiro, 2018). Although HIV-PrEP may provide a public health benefit beyond the immediate prevention of HIV infection but doctors in charge must take this opportunity for informing adequately on STI and the risks inherent to multiple and occasional sexual contacts (Barreiro, 2018).

A 2018 meta-analysis by Traege *et al.* (2018) among HIV-PrEP users which compared STI incidence before and after HIV-PrEP initiation reported a nonsignificant increase in STI diagnoses overall (odds ratio, 1.24 [95% CI, 0.99-1.54]). On contrast, meta-analysis by Ong *et al* (2019) of epidemiological characteristics of STIs in HIV-PrEP users found

high pooled prevalence of STI at initiation (23.9% [95% CI, 18.6%-29.6%]) and high pooled incidence during HIV-PrEP (72.2 cases per 100 person-years [95% CI, 60.5-86.2 cases per 100 person-years]).

McManus *et al.* (2020) reported that *N. gonorrhoea* positivity was 19.5% per quarter before HIV-PrEP including baseline, and 22.9% per quarter after HIV-PrEP, representing a 17% increase.

In the period before HIV-PrEP enrollment, there was an increasing trend in quarterly *C. trachomatis* or *N. gonorrhoea* positivity; however, no trend was observed after starting HIV-PrEP. The rate of increase in combined *C. trachomatis* or *N. gonorrhoea* positivity after starting PrEP was less than the rate of increase before starting HIV-PrEP. There was no difference in positivity trends before and after HIV-PrEP for infectious syphilis.

In Africa HIV-PrEP is being rapidly rolled out at a higher rate than in higher-income nations in several countries. At the recent HIV Research for Prevention Conference, AIDS Vaccine Advocacy Coalition revealed that sub-Saharan Africa has substantially expanded HIV-PrEP access from about 4,000 initiations in 2016 to over 500,000 in 2020 with South Africa, Kenya, Zambia, and Uganda having the highest number of HIV-PrEP initiations on the continent.(Paul Adepoju, 2021).

Kenya, the Government of Kenya through NASCOP rolled HIV-PrEP in 2017 as a national program, in the public sector. HIV-PrEP is now offered in over 900 facilities countrywide. There are currently over 14 000 HIV-PrEP users 1 year after launching

HIV-PrEP (Masyuko *et al.*, 2018). Routine STI testing offered is unavailable in most settings, which may have limited understanding of the implication of an STI while on HIV-PrEP (Oluoch *et al.*, 2020). However, there is no study that has been carried out to establish the magnitude of STIs among HIV-PrEP users in Nairobi City County.

### 2.3 Attitudes toward HIV-PrEP

An estimated of 50% of people aged 20 are sexually active in Kenya (Kenya Demographic and Health Survey, 2018), increasing their vulnerability to HIV infection (UNAIDS, 2018). To reduce this vulnerability, sexual behaviour and HIV risk perception of and individual is important (UNAIDS, 2018). However, HIV risk perception, on the other hand, is a challenge for youths, since they are particularly prone to underestimating rather than exaggerating their exposure to HIV (Chapin, 2019). While young people admit to practicing or engaging in high-risk sexual behaviour, it has been discovered that they have the tendency to have an inaccurate or lower HIV risk perception, as many do not believe themselves to be at risk (Family Health International, 2019).

A study by Puro *et al*. (2018) assessed attitude in regard to HIV-PrEP use among 311 HIV medical practitioners. The findings revealed that 70% of the practitioners would recommend HIV-PrEP mainly to discordant couples while 56% of specialists recommended HIV-PrEP to people who are at risk of HIV infection. Those who were opposed to HIV-PrEP use preferred changes in behaviour and were also concerned about toxicity of the medication. The negative attitude was attributed to lack of

information on HIV-PrEP. Despite the contrasting attitudes Overall, a large proportion of practitioners were prepared to advocate HIV-PrEP use.

Regardless of limited research data demonstrating that HIV susceptibility attitudes and knowledge change sexual behaviour, regulations from pertinent organizations along with additional scientific studies on the efficacy of HIV-PrEP could assist in promoting positive attitudes toward its use (Kiragu, 2018, Puro *et al.*, 2018).

**2.4 STIs related level of knowledge**

Knowledge of STIs and their complications is important for adequate prevention and treatment, as people who cannot recognize their symptoms may fail to seek care. Despite this, there is low understanding of various STIs other than HIV and AIDS in most African countries (Subbarao & Akhilesh, 2017). In industrialized countries including the United States, Australia, Canada and the United Kingdom the general consensus is that adolescents are poorly informed about STIs other than HIV and AIDS (Samkange-Zeeb, 2016). According to the findings of a study conducted among sexually active teenage girls in the United States indicate that the adolescents acquired basic information on STIs such as chlamydia, gonorrhoea and syphilis only after infection (Goodreau *et al*., 2021). Most of the surveys on STIs knowledge and awareness among adolescents in a number of developed countries have focused on HPV and chlamydia in recent years. In general, low proportions of adolescents (range 5-66%) were able to identify the two infections or knew that they were sexually transmitted (Samkange-Zeeb *et al.*, 2016).

Previous studies on the knowledge and awareness of HPV and chlamydia among young adults in two German cities (Bonn and Berlin), also reported low knowledge levels: in Bonn, 15 % of participants had heard of chlamydia (Lengen *et al.*, 2019), and in Berlin, less than a third were aware of the fact that HPV can be sexually transmitted (Blödt *et al.*, 2020). In another study also conducted in Berlin however, comparatively higher levels of HPV awareness were observed, with more than 50% of participating adolescents recognized that HPV infection can cause premalignant lesions and cervical and penis cancer (Stöcker *et al.*, 2019).

### 2.4.1 Sources of STI information

Globally, a significant proportion of people report that they acquire their information on sexual health in general, and on STIs in particular, primarily through formal health education in schools (Samkange-Zeeb, 2016). While sexually active people may get (more) information on STIs from their physicians or gynaecologists, people who have not begun sexual activity have low chance to have experienced in-depth STIs conversations and discussions with health care professionals (Samkange-Zeeb, 2016). Parents, friends, and different media such as the radio, television or internet are frequently mentioned as other sources of information of STIs by teenagers (Samkange-Zeeb, 2016).

## 2.5 Behavioural risk factors of STIs

Behavioural risk factors such as unprotected sexual intercourse, commercial sex, homosexuality and multiple sexual partnering are major drivers of STIs especially

among adolescents and young adults aged 15-24 years (Jayawardena *et al.*, 2018). According to the WHO, 20% of persons living with HIV and AIDS are aged between 20 and 29, and one out of twenty adolescents contract an STI each year (Kavana, 2021). Youths are more likely to practice unprotected sex, have multiple sexual partners, and have transactional and transgenerational sex. Due to the cervical lining, young women and adolescent girls are predisposed to STIs (Amu *et al.*, 2020).

Yet evidence from studies in Sub-Saharan African countries indicate that many young people are sexually active and engage in risky sexual behaviours such as commercial sex, unprotected sexual intercourse, homosexuality and multiple sexual partnering (Owoaje & Uchendu, 2019). Posing a significant burden to the health care system as they contribute to increase in the morbidity and mortality rate among this cohort (Habu *et al.*, 2018).

Substance use also increases the possibility of individuals engaging in risky sexual behaviours such as non-condom use and multiple sexual partners exposing them to HIV and AIDS and STIs in general (Mavhandu-Mudzusi & tesfay Asgedom, 2016).

A study of street youths in South Western Nigeria reported that 30% used alcohol and other drugs such as cannabis (10%) and tobacco (14%). According to Desmennu *et al*. (2018), risky sexual behaviours among street youths in Ibadan, Nigeria as well as other behaviours such as drug use are of major public health and social health concern, but there is a lack of current information on these behaviours and the reproductive health needs of these young people.

### 2.5.1 Age at first sexual contact

Girls are more prone to STIs due to anatomical developmental changes that occur from childhood through puberty into adulthood (Naswa & Marfatia, 2019). Soon after birth, the squamous epithelium which lines the vagina and cervix of newborns is replaced by columnar epithelium which, with age, eventually slowly recedes to be replaced again with squamous epithelium. The replacement continues well into adulthood and a typical cervix in an adolescent still has columnar epithelium, the epithelium typically infected by *C. trachomatis* and also susceptible to other STIs such as gonorrhea (Balle *et al.*, 2018). The average age at first sexual intercourse is reported to have gone down over the last 30 years, further increasing the risk of infection for adolescent girls. European studies show that a considerable proportion of adolescents report sexual activity before reaching 16 years old (Samkange-Zeeb *et al.*, 2016). This observation was supported by the most recent results of the international health behaviour in School-Aged Children survey carried out in 2018 (Steppan *et al.*, 2019). On average, one in four of 15-year-olds who took part in the survey reported having had sexual intercourse, with a higher prevalence being observed for boys than for girls (29 vs. 23%). In addition to increasing the chances of contracting an STI, an early onset of sexual activity also increases the probability of having various sexual partners over a lifetime (Wildsmith *et al.*, 2020). The percentage of teenage girls in Sweden who had more than three sexual partners doubled from 8% to 17% between 2000 and 2007, while the rates of boys went up from 11 to 17% during the same period (Danielsson *et al.*, 2016).

## 2.6 Health seeking behaviour for STIs

Health-seeking behaviour is influenced by a group of factors classified as cultural and sociodemographic factors, economic conditions, physical and financial accessibility, healthcare services and the degree of one's autonomy (Daka *et al.,* 2021). A study by Zachariah *et al.* (2018) reported that an important determinant of effective STI control is the health seeking behaviour of people with STIs who may seek care from alternative sources (other than STI clinic) such as traditional healers, private clinics, pharmacists, and market vendors. Knowledge about the relative importance of these traditional healers in STI control could encourage better collaboration with some of these groups, encourage early referral for effective antibiotic treatment, and help remove or reduce potential barriers to STI control. Control of STIs involves not only providing effective and early treatment, but also promoting safe sexual practices by those that are infected. Information on such practices would be useful for assessing and improving existing control activities.

In Africa, there is a growing body of literature on STI-related, health-seeking behaviour, because of the prevalence of HIV/acquired immune deficiency syndrome (AIDS) on the continent and its relationship with STIs. Socio-cultural (particularly issues of stigma), economic and physical access to healthcare facilities, among others, are factors that impact on STI-related, health-seeking behaviour in Africa (Govender & Eche, 2017).

## 2.7 Summary of literature review

Based on literature reviewed, STIs remain a major health problem globally. HIV-PrEP users are among the most vulnerable populations. According to literature, this is associated with various factors including limited knowledge on STIs (prevention and transmission), high risky sexual behaviour, poor health seeking behaviour, attitudes toward HIV-PrEP use which do not translate into safe sexual behaviour against STIs.

In Kenya, the prevalence of STIs among HIV-PrEP users and little is known about the effect of the independent variables on their prevalence among this population, hence the focus of this study.

# CHAPTER THREE: MATERIALS AND METHODS

## 3.1 Research design

This study employed an analytical cross-sectional research design.

## 3.2 Study variables

As shown in the conceptual framework, the study variables are outline below.

### 3.2.1 Independent variables

Socio-demographic factors, attitudes toward HIV-PrEP, STIs related level of knowledge and behavioral risk factors of STIs among HIV-PrEP users.

### 3.2.2 Moderating variable

Health seeking behaviour for STIs among HIV-PrEP users.

### 3.2.3 Dependent variable

STI prevalence among HIV-PrEP users

## 3.3 Study area

The study was conducted in Nairobi City County. Nairobi City County is one of the 47 counties in the Republic of Kenya. Nairobi City County is the first place where the roll out of HIV-PrEP by NASCOP was carried out. Therefore, the utilization of HIV- PrEP has matured in this place. According to a report by KHIS for aggregate reporting and analysis (2020), there were 314,523 people taking HIV-PrEP in Kenya as at the time this study was carried out, out of which 35,774 (which was the highest number of users) were

living in Nairobi City County compared to other counties. Of the 314,523 users on HIV-PrEP 52% serodiscordant relations, 21% Key populations, 10% adolescents and 17% general population.

### 3.4 Study population

The participants in this study were the clients seeking HIV-PrEP service in 5 (five) main health facilities in Nairobi City County namely; Mbagathi District Hospital, Mama Lucy Level Five Referral Hospital, Lang'ata Health Centre, STC MOH - Casino Heath Centre (Comprehensive Care Centre) and SWOP (Sex Workers Outreach Program) Kenya. The units of analysis were the HIV-PrEP users visiting these five selected facilities over a period of 12 months.

#### 3.4.1 Inclusion criteria

**a.** Consented HIV-PrEP users (Adults of 18 years or older, sexually active persons) who have been visiting health facilities (5 main facilities) for a period of 12 months.

#### 3.4.2 Exclusion criteria

**a**. Consented HIV-PrEP users with any other underlying conditions (Chronic illness such as HTN, Diabetes, gout….)

**b.** HIV-Post Exposure Prophylaxis users

**c.** PLHIV

### 3.5 Sampling techniques

To ensure representativeness, based on the categorization of the health facilities in Nairobi City County, purposive sampling was employed to select health facilities offering HIV-PrEP services for the qualitative aspect of the study. The health facilities

purposively selected were Mbagathi District Hospital, Mama Lucy level five Referral Hospital, Lang'ata Health Centre, STC MOH- Casino Health Centre and SWOP Kenya, formed the study strata. Thereafter simple random sampling was adopted to select study participants at the respective health facilities until the sample size per facility was achieved.

### 3.6 Sample size determination

The sample size for this study was determined by using Taro Yamane (1967:886) simplified formula.

$$n = \frac{N}{1 + N(e)^2}$$

Where:
***n*** = corrected sample size,

***N*** = population size.

***e*** = margin error or the level of precision

1 = Constant

This formula assumes a degree of variability (i.e. proportion) of 0.5, the level of precision of 5% and a confidence level of 95%. Applying the formula to 3,330 target population as shown in Table 3.1, the sample size for the study was:

n = 3,330/ {1+ 3,330 $(0.05)^2$}

**n = 357**

The minimum sample size for the study was therefore be **357 respondents** which was distributed among the five target health facilities. To take care of non-response, 10 percent of the sample size (36) was added to give 393 as shown in Table 3.1.

**Table 3.1: Sampling frame and sample size**

The figures in the table below were the number of HIV-PrEP users in each facility sampled in Nairobi as described in page 22.

| Facility | Sampling Frame | Sample Size |
|---|---|---|
| Mbagathi District Hospital | 1,183 | 140 |
| Mama Lucy Level Five Referral Hospital | 263 | 31 |
| Lang'ata Health Centre | 258 | 30 |
| STC MOH-Casino Heath Centre (Comprehensive Care Centre) | 200 | 24 |
| SWOP (Sex Workers Outreach Program) Kenya | 1,426 | 168 |
| **Total** | **3,330** | **393** |

### 3.7 Data collection tools

Structured questionnaire was employed in this study for the purposes of collecting primary data from the respondents. The researcher also obtained laboratory test results (secondary data) of the respondents that had been attending the facilities over a period of 12 months. The questionnaire was structured in such a way that it included both open ended questions and closed ended questions.

### 3.8 Pre-testing

Pre-testing study was conducted in Mbagathi District Hospital from which 36 respondents were randomly selected for the purposes of pre-testing to demonstrate clarity and objectivity of research instrument. The respondents that participated in the pre-test were excluded in the main study.

### 3.9 Validity

To ensure content validity, the questionnaire was subjected to thorough examination by experts (Supervisors). They were asked to evaluate the statements in the questionnaire for relevance and whether they are meaningful, clear and objective.

### 3.10 Reliability

In this study, reliability was measured using Cronbach alpha α, as a coefficient of internal consistency where reliability of 0.7 and above was considered reliable for this study (Philip, 2011). The value for Cronbach alpha is 0.7 to 1.0 is considered acceptable according to Abouserie (1992).

### 3.11 Data collection techniques

Clients seeking HIV-PrEP service were identified from the registration desk at the identified facilities. All available patients meeting the inclusion criteria were recruited to participate in the study. Every client who met the inclusion criteria and gave a verbal and written informed consent in their preferred language was recruited systematically until the desired sample size was achieved. Recruitment was done by research assistants trained on good clinical practice and conduct of the research. Face to face interview was then conducted by the research assistant using a pretested structured questionnaire. Upon conclusion, the participant was thanked for their participation. Further, the researcher obtained laboratory test results (secondary data) of the respondents that had been attending the facility over a period of 12 months as per the inclusion criteria. In addition, all the respondents whose secondary data were not available, were tested for

STIs using specific tests (Appendix IV) during the study. The cost of the laboratory tests of the respondents who were not be able to pay were borne by the researcher. The appropriately filled questionnaires, laboratory results and consent forms were collected and arranged in a box file. For confidentiality purpose, the file was placed safely in a cabinet under lock and key for future analysis. To measure attitudes, knowledge and behavioural changes, Likert scale was used (Vogt, 1999).

**3.12 Data analysis**

Once the appropriately filled questionnaires were availed and analyzed for completeness, the data in hard copy were entered in Microsoft Excel, reviewed for consistency and completeness and analyzed using statistical package for social sciences (SPSS) software 26.0 to aid in coding, entry and analysis of the quantitative data in relation to the research objectives. Frequencies were presented as absolute values and percentages. Associations between categorical variables and STIs prevalence were assessed using contingency tables and Chi-square tests. Strength of association was measured using 95% confidence intervals. The categorical data was summarized as graphs, frequency charts and tables then association done by Chi-square.

Binary logistic regression was carried out to find the significant predictor for STIs prevalence among HIV-PrEP users. For all tests, $p \leq 0.05$ (5% level of significance) was considered to be statistically significant.

### 3.13 Logistical and ethical considerations

Upon approval by the Graduate School, ethical clearance was sought from Kenyatta University Ethics review committee who reviewed the proposal and approved all study procedures. Research permit to conduct the study was thereafter obtained from the National Commission for Science, Technology and Innovation (NACOSTI). Research authorisation was given by the Nairobi County Department of Health. Administrative authority to conduct the study was sought from the respective hospitals. All study personnel were trained in ethical issues related to study participants. Study participants were informed about the study objectives and procedures for data collection, and their right to refuse to participate, to decline to answer any questions, and to withdraw from the study at any time. A written consent was obtained from all study participants. All interviews were carried out by trained local study personnel. The participants were assured of confidentiality and anonymity as there were no identifiers on the administered questionnaires. The computer used was password protected to protect the privacy of the participants. Any adverse findings were reported to those responsible for their care and to the Ethics and Review Committee. Medical advice was provided whenever necessary. Finally, the researcher ensured to observe the Covid-19 containment measures laid down by the Ministry of Health.

# CHAPTER FOUR: RESULTS

## 4.1 Introduction

The purpose of this study was to establish the magnitude of STIs among HIV-PrEP users in selected health facilities in Nairobi City County, Kenya. The chapter presents the findings of the study in line with the research questions and objectives. The results are discussed under the following subtopics: Socio-demographic characteristics, attitudes toward HIV-PrEP, STIs related level of knowledge, behavioural risk factors of STIs and health seeking behaviour for STIs of the study population. SPSS was used to generate the descriptive statistics and to establish the relation between the dependent and the independent variables of the study. The summary of the study findings was presented in tables, graphs and charts in textual forms in order to bring out a more logical and meaningful picture of the data gathered by the researcher.

## 4.2 Response rate

The researcher sought to establish the return rate for the research instruments from the respondents. A total of 393 questionnaires were administered to the sampled respondent, out of which 351 of the questionnaires were dully filled and returned translating into a response rate of 89.3% which was considered to be adequate. According to Bailey *et al.* (2000) a response rate of 50% and above is adequate, while if a response rate is more than 70% is considered very good. The returned questionnaires were used for data analysis.

### 4.3 Socio-demographic characteristics contributing to STIs prevalence

As shown in Table 4.1 majority (58.4%) of the study participants were male, while 41.6% were female. This implies that majority of HIV-PrEP users in Nairobi County are male compared to female. Regarding age, 11.1% were aged between 18-24 years, 39% of the study participants were aged between 25-34 years, 25.1% were aged between 35-44 years, 17.9% were aged between 45-54 years and 6.8% of the study participants were aged 55 years and above. The responses indicate that all the study participants were within the recommended age of 18 years as per the inclusion criterion (Adults of 18 years or older).

For education, 43.6% of the respondents were holders of bachelor's degrees, 37.3% were diploma holders, 18.2% studied up to secondary level, while 0.9% were primary school leaners. This indicates that most of the HIV-PrEP users in Nairobi County are well educated individuals who understand the importance of using HIV-PrEP to safeguard themselves against contracting HIV and AIDS. Regarding the duration the respondents have been using HIV-PrEP, the study revealed that 49.3% have been using HIV-PrEP for a period of more than 5 years, 25.9% for a period of between 4-5 years, 16.8% for a period of between 1-3 years, while 8% for just less than 1 year. The responses imply that most of the HIV-PrEP users visiting the targeted facilities had experience in using HIV-PrEP and so were in a position to provide the information sought by the researcher.

Regarding marital status, during the time of the study majority of the respondents (37.9%) were single, 31.3% were either divorced or separated, 20.8% widowed, while 10% either married or cohabiting. This is a clear indication that most of the HIV-PrEP users in Nairobi City County are single men and women who have no commitment to particular sexual partner and are likely to engage in risky sexual behaviours.

Additionally, the respondents were asked to indicate their occupations, whether employed, self-employed or unemployed and the findings revealed that 53% were self-employed, 27.6% were employed, while 19.4% were unemployed. The responses show that most of the patients visiting the health facilities has source of income to be able to sustain the use of HIV-PrEP.

**Table 4.1: Socio-demographic characteristics of the study respondents**

| Variable | Response | Frequency (N=351) | Percentage |
|---|---|---|---|
| Gender | Male | 205 | 58.4 |
| | Female | 146 | 41.6 |
| Age | 18-24 Years | 39 | 11.1 |
| | 25-34 Years | 137 | 39 |
| | 35-44 Years | 88 | 25.1 |
| | 45-54 Years | 63 | 17.9 |
| | 55 Years and above | 24 | 6.8 |
| Level of Education | Primary | 3 | 0.9 |
| | Secondary | 64 | 18.2 |
| | Diploma | 131 | 37.3 |
| | Degree | 153 | 43.6 |
| Duration of using HIV-PrEP | Less than 1 year | 28 | 8 |
| | 1-3 Years | 59 | 16.8 |
| | 4-5 Years | 91 | 25.9 |
| | More than 5 Years | 173 | 49.3 |
| Marital Status | Single | 133 | 37.9 |
| | Married/Cohabitating | 35 | 10 |
| | Divorced/Separated | 110 | 31.3 |
| | Widowed | 73 | 20.8 |
| Occupation | Employed | 97 | 27.6 |
| | Self-employed | 186 | 53 |
| | Unemployed | 68 | 19.4 |

### 4.4 STIs prevalence among HIV-PrEP users

#### 4.4.1 Combined prevalence of STIs among HIV-PrEP users

The study sought to establish the prevalence of STIs among HIV-PrEP Users in Nairobi city County. Figure 4.1 shows the combined prevalence of STIs among HIV-PrEP users in Nairobi County. The results revealed that the combined STIs prevalence among HIV-PrEP users in Nairobi City County was 45.8% (161/351). 54.2% of the patients tested negative of all the curable STIs tested.

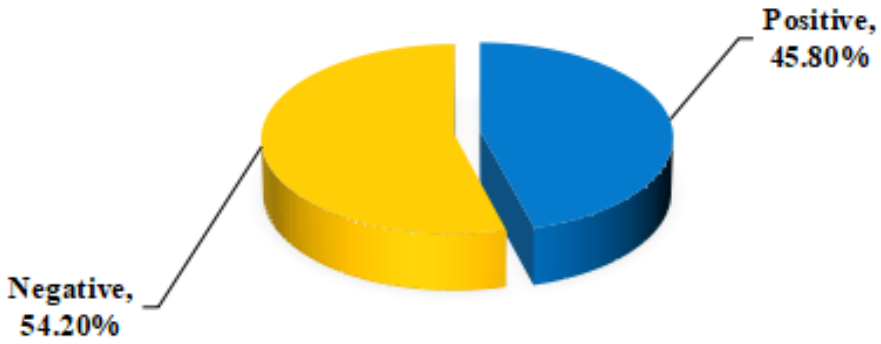



**Figure 4.1: Combined prevalence of STIs among HIV-PrEP users**

#### 4.4.2 Prevalence of specific STIs among HIV-PrEP users

The study sought to establish the prevalence of specific STIs among HIV-PrEP users in Nairobi City County. The findings show the prevalence of individual STIs tested namely; Chlamydia, Gonorrhea, Herpes (Genital herpes), Syphilis, HIV, genital warts and Trichomoniasis. STIS prevalence among this group was; 13.4% for Gonorrhea,

9.7% for Chlamydia, 7.4% for Syphilis, 6.0% for Trichomoniasis, 5.1% for Herpes (Genital herpes), 3.7% for HIV and 0.5% for Genital warts (Table 4.2).

**Table 4.2: Prevalence of specific STIs among HIV-PrEP users**

| STI Tested | Frequency (N=161) | Percentage |
|---|---|---|
| Gonorrhea | 47 | 13.4 |
| Chlamydia | 34 | 9.7 |
| Syphilis | 26 | 7.4 |
| Trichomoniasis | 21 | 6.0 |
| Genital herpes | 18 | 5.1 |
| HIV | 13 | 3.7 |
| Genital warts | 2 | 0.5 |
| **Total** | **161** | **45.8** |

### 4.4.3 STIs prevalence per health facility

The study further sought to find out STIs prevalence in the five health facilities studied. As presented in Table 4.3, the results show that majority 70 (43.5%) tested positive for STIs at SWOP (Sex Workers Outreach Program) Kenya, followed by 52 (32.3%) at Mbagathi District Hospital, 20 (12.4%) tested positive at STC MOH - Casino Heath Centre (CCC). The least number of cases (3.7%) were registered at Lang'ata Health Centre. These results imply that most of the patients went for testing at SWOP (Sex Workers Outreach Program) Kenya since it is a social justice network fighting for the rights of sex workers, and people who engage in sexual behaviours, so they feel free to attend this facility.

**Table 4.3: STIs prevalence per health facility**

| Facility | Frequency (N=161) | Percentage |
|---|---|---|
| SWOP (Sex Workers Outreach Program) Kenya | 70 | 43.5 |
| Mbagathi District Hospital | 52 | 32.3 |
| STC MOH - Casino Heath Centre (CCC) | 20 | 12.4 |
| Mama Lucy Level Five Referral Hospital | 13 | 8.1 |
| Lang'ata Health Centre | 6 | 3.7 |
| **Total** | **161** | **100** |

## 4.5 Attitude towards HIV-PrEP

### 4.5.1 Attitudes toward HIV PrEP among respondents

The respondents' attitudes toward HIV-PrEP were assessed and the results were as shown in Table 4.4. The results show that majority (89.8%) of the respondents agreed that they believe HIV-PrEP works for them, 89.2% agreed that they were less worried about HIV infection because they were on HIV-PrEP, while 89.7% were less worried about STIs since they were on HIV-PrEP. The results also show that majority (88.7%) believed that HIV-PrEP makes people less likely to contract HIV.

Moreover, most (88%) of the study participants agreed that they were of the belief that if people take HIV-PrEP, they would probably stop using condoms, while 87.2% were of the opinion that if people take HIV-PrEP, they would have multiple sexual partners. It is further evident that most (90.9%) of the respondents believed that HIV-PrEP would encourage people to take sexual risks, 59.8% disagreed with the statements that HIV-PrEP has serious side effects, while 58.4% of the respondents did not believe that HIV-PrEP is more dangerous than good. The results imply that HIV-PrEP users in Nairobi City County have varied attitudes with regards to the use of HIV-PrEP, which then may affect the use of the daily pill and consequently compromising its effectiveness.

**Table 4.4: Attitudes toward HIV PrEP among respondents**

| Statement | Category | Frequency (N=351) | % |
|---|---|---|---|
| I believe that HIV-PrEP works for me | Strongly Disagree | 9 | 2.6 |
| | Disagree | 27 | 7.7 |
| | Agree | 154 | 43.9 |
| | Strongly Agree | 161 | 45.9 |
| I am less worried about HIV infection, now that I am on HIV-PrEP | Strongly Disagree | 10 | 2.8 |
| | Disagree | 28 | 8.0 |
| | Agree | 149 | 42.5 |
| | Strongly Agree | 164 | 46.7 |
| I am less worried about STIs now that I am on HIV-PrEP | Strongly Disagree | 5 | 1.4 |
| | Disagree | 31 | 8.8 |
| | Agree | 118 | 33.6 |
| | Strongly Agree | 197 | 56.1 |
| I believe that HIV-PrEP makes people less likely to contract HIV | Strongly Disagree | 7 | 2.0 |
| | Disagree | 29 | 8.3 |
| | Agree | 113 | 32.2 |
| | Strongly Agree | 202 | 57.5 |
| I believe that if people take HIV-PrEP, they will probably stop using condoms | Strongly Disagree | 6 | 1.7 |
| | Disagree | 36 | 10.3 |
| | Agree | 138 | 39.3 |
| | Strongly Agree | 171 | 48.7 |
| I believe that if people take HIV-PrEP, they will have multiple sexual partners | Strongly Disagree | 17 | 4.8 |
| | Disagree | 28 | 8.0 |
| | Agree | 157 | 44.7 |
| | Strongly Agree | 149 | 42.5 |
| I believe that HIV-PrEP will encourage people to take sexual risks | Strongly Disagree | 6 | 1.7 |
| | Disagree | 26 | 7.4 |
| | Agree | 121 | 34.5 |
| | Strongly Agree | 198 | 56.4 |
| I believe that HIV-PrEP has serious side effects | Strongly Disagree | 98 | 27.9 |
| | Disagree | 112 | 31.9 |
| | Agree | 63 | 17.9 |
| | Strongly Agree | 78 | 22.2 |
| I believe that HIV PrEP is more dangerous than good | Strongly Disagree | 106 | 30.2 |
| | Disagree | 99 | 28.2 |
| | Agree | 65 | 18.5 |
| | Strongly Agree | 81 | 23.1 |

### 4.5.2 Beliefs about STIs among HIV-PrEP users

The researcher further sought the respondents' levels of agreement and/or disagreements with statement regarding beliefs about STIs among HIV-PrEP users and their responses were as shown in Table 4.5. The study established that majority (72.6%) of the respondents believed most STIs can be prevented with condom, while 27.4% had contrary opinion. Most of the respondents (75.5%) believed that most STIs could be cured with treatment, 61.5% were positive that STIs can be transmitted through kissing. The results further show that majority (73.8%) of the study participants were of the belief that STIs could only be transmitted sexually, while 64.1% strongly believed that PrEP could protect an individual against other STIs other than HIV.

**Table 4.5: Beliefs about STIs among HIV-PrEP Users**

| Variable | | Freq (N=351) | Percentage |
|---|---|---|---|
| Most STIs can be prevented with condom | Agree | 255 | 72.6 |
| | Disagree | 96 | 27.4 |
| Most STIs can be cured with treatment | Agree | 265 | 75.5 |
| | Disagree | 86 | 24.5 |
| STIs can be transmitted through kissing | Agree | 216 | 61.5 |
| | Disagree | 135 | 38.5 |
| STIs can only be transmitted sexually | Agree | 259 | 73.8 |
| | Disagree | 92 | 26.2 |
| PrEP can protect against other STIs other than HIV | Agree | 225 | 64.1 |
| | Disagree | 126 | 35.9 |

### 4.6 STIs related level of knowledge among HIV-PrEP Users

#### 4.6.1 Descriptive analysis on STIs related level of knowledge of respondents

The study sought to assess the respondents' STIs related level of knowledge and the results were presented in Table 4.6. Regarding knowledge of transmission of STIs, the results show that 76.4% of the respondents had heard about STIs; 56.7% of the respondents knew that STIs could be transmitted through sex without using condom; 43.3% knew that sex with sex workers whether male or female could make one get STIs. Further, 58.7% of the respondents were aware that STIs could be transmitted through sexual contact with multiple partners; while 53.3% of respondents knew receiving infected blood could be a channel of STIs.

Additionally, regarding knowledge of prevention of STIs, majority (59.5%) of the respondents were knowledgeable about the use of condom during sexual intercourse could prevent one from getting STIs; 59.8% were aware that STIs could be prevented by avoiding sexual contact with sex workers whether male or female. Similarly, majority of the respondents (54.1%) were aware that avoiding sexual contact with multiple partners was a prevention measure of STIs. Finally, most of the respondents (58.7%) were found to be aware of the fact that avoiding unscreened blood was a prevention measure of STIs.

**Table 4.6: STIs related level of knowledge of respondents**

| Knowledge | | Response | Freq (N=351) | Percentage |
|---|---|---|---|---|
| Awareness | Have you ever heard about STIs | No | 48 | 13.7 |
| | | Yes | 268 | 76.4 |
| | | I don't Know | 35 | 9.9 |
| Knowledge of transmission | Sex without condom | No | 99 | 28.2 |
| | | Yes | 199 | 56.7 |
| | | I don't Know | 53 | 15.10 |
| | Sex with sex workers (M or F) | No | 119 | 33.9 |
| | | Yes | 159 | 43.3 |
| | | I don't Know | 73 | 20.8 |
| | Sex with multiple partners | No | 106 | 30.2 |
| | | Yes | 206 | 58.7 |
| | | I don't Know | 39 | 11.1 |
| | Receiving infected blood | No | 104 | 29.6 |
| | | Yes | 187 | 53.3 |
| | | I don't Know | 60 | 17.1 |
| Knowledge of prevention | Use of condom | No | 88 | 25.1 |
| | | Yes | 209 | 59.5 |
| | | I don't Know | 54 | 15.4 |
| | Avoid sex with sex workers (M or F) | No | 101 | 28.8 |
| | | Yes | 210 | 59.8 |
| | | I don't Know | 40 | 11.4 |
| | Avoid sex with multiple partners | No | 83 | 23.6 |
| | | Yes | 190 | 54.1 |
| | | I don't Know | 78 | 22.2 |
| | Avoid unscreened blood | No | 92 | 26.2 |
| | | Yes | 206 | 58.7 |
| | | I don't Know | 53 | 15.1 |

### 4.6.2 Source of STIs information

The respondents were asked to indicate their sources of information regarding STIs. Their responses were presented in Table 4.7. The results depict that most of the

respondents 134 (38.2%) received information about STIs from the internet specifically the social media platforms, 102 (29.0%) indicated that they received information from television or radio, 43 (12.2%) received information from friends, whereas 38 (10.9%) received STIs information from brochures.

The results show that only 6.3% and 3.4% of the respondents received STIs information from magazines and newspapers and books respectively. The responses indicate that most of the HIV-PrEP users in Nairobi receives information on STIs from social media platforms where a lot of information may be misleading.

**Table 4.7: Source of STIs information**

| Source | Frequency (N=351) | Percentage |
|---|---|---|
| TV/Radio | 102 | 29.0 |
| Internet (social media) | 134 | 38.2 |
| Friends | 43 | 12.2 |
| Brochures | 38 | 10.9 |
| Books | 12 | 3.4 |
| Magazines/Newspaper | 22 | 6.3 |

### 4.6.3 Awareness of symptoms of STIs experienced by HIV-PrEP users

The study sought to establish the types of symptoms of STIs experienced HIV-PrEP users in Nairobi and their responses were as shown in Table 4.8. The study results revealed that majority (60.7%) of the respondents had not experienced urethral

discharge during the past 12 months; most of them (63.5%) had not experienced any abnormal vaginal discharge with strong odour during the past 12 months.

Regarding genital ulcers, the study established that most (65.0%) had not experienced genital ulcer or sore during the past 12 months. Moreover, majority (56.4%) of the respondents had not experienced genital itching during the previous 12 months; 72.6% also indicated that they had not experienced any pain during urination in the past 12 months. Similarly, majority (65.8%) of the respondents did not experience any swelling around the genital during the past 12 months. Finally, majority of the respondents indicated that they had not experienced frequent urination during the past 12 months (50.7%). This indicate that majority of HIV-PrEP users were asymptomatic.

**Table 4.8: Awareness of symptoms of STIs experienced by HIV-PrEP users**

| Variable | Response | Freq (N=351) | Percentage |
|---|---|---|---|
| Urethral discharge during the past 12 months | Yes | 110 | 31.3 |
| | No | 213 | 60.7 |
| | I don't Know | 28 | 8.0 |
| Abnormal vaginal discharge with strong odour during the past 12 months | Yes | 96 | 27.4 |
| | No | 223 | 63.5 |
| | I don't Know | 32 | 9.1 |
| Genital ulcer or sore during the past 12 months | Yes | 82 | 23.4 |
| | No | 228 | 65.0 |
| | I don't Know | 41 | 11.6 |
| Genital itching during the past 12 months | Yes | 109 | 31.1 |
| | No | 198 | 56.4 |
| | I don't Know | 44 | 12.5 |
| Pain during urination during the past 12 months | Yes | 75 | 21.4 |
| | No | 255 | 72.6 |
| | I don't Know | 21 | 6.0 |
| Swelling around the genital during the past 12 months | Yes | 69 | 19.7 |
| | No | 231 | 65.8 |
| | I don't Know | 51 | 14.5 |
| Frequent urination during the past 12 months | Yes | 134 | 38.2 |
| | No | 178 | 50.7 |
| | I don't Know | 39 | 11.1 |

## 4.7 Behavioural risk factors of STIs among HIV-PrEP users

### 4.7.1 Descriptive analysis on behavioural risk factors of STIs

Descriptive analysis on behavioural risk factors of STIs among HIV-PrEP users in Nairobi City County is presented below (Tables 4.9 - 4.10). The respondents were then

asked the age at which they first engaged in sexual intercourse and their responses were as shown Table 4.9. It is evident from the results that, majority (75.5%) of the respondents started engaging in sexual intercourse way before they attained the age of 18 years, compared to 24.5% whose first time to engage in sexual relationship was after attainment of the age of 18 years. This implies that most of the HIV-PrEP users in Nairobi started having sexual intercourse before adulthood which amounts to risky sexual behaviour. Moreover, when asked who they were attracted to, the study participants responded as shown in Table 4.9. Based on the results, most of the male respondents (47.9%) were attracted to women. This is justified given that majority of the respondents were men, which naturally mean that they would be attracted to women. It is also clear from the results that slightly more than three tenths (31.30%) of the respondents were attracted to men, while 20.8% were attracted to both men and women. This implies that among HIV-PrEP users in Nairobi City County, there are bisexuals who are attracted to both genders.

The study results revealed that, majority (55.8%) of the respondents did not have a regular partner, with 44.2% having regular partners. The results also show that minority (18.8%) of the study participants were always using condoms with their regular partners. Furthermore, majority (52.1%) of the respondents did not use condom the last time they had sexual intercourse with their regular partners. Only 47.9% of the respondents reported having been using condom the last time they had sexual intercourse with their regular. Moreover, majority (61%) of the respondents were found

to have had non-regular partners (such as girlfriend/boyfriend, sex-workers, clients, Co – worker, etc.) in the previous 12 months. Additionally, the results show that majority (56.1%) of the respondents were not using condom the last time they had sexual intercourse with their non-regular partner.

The respondents who were using condom when having sexual intercourse with their regular partners were also asked to indicate how consistently they were doing that in the last 12 months. It is evident from the results that most of the respondents (39.3%) were using condom just sometimes whenever having sexual intercourse with regular partners, 22.2% had not used condom for the past 12 months, 19.7% reported that they were using condom with their regular partners most of the time, while 18.80% were using condom always. This implies that most of the HIV-PrEP users visiting health facilities in Nairobi City County are not consistent with the use of condom, which is a risky sexual behaviour.

The researcher further asked the respondents to indicate the number of non-regular partner(s) (e.g. girlfriend/boyfriend; sex workers; clients; etc.) they had in the last 12 months.

The study found that, more than half (54.10%) of the study participants had had more than 2 non-regular sexual partners in a span of 12 months, 19.9% having had just a single non-regular sexual partner in the same period, 19.4% had had 2 non-regular partners, while 6.6% had not engaged in sexual relationships with non-regular partners

in the past 12 months. This is a clear indication that most of the HIV-PrEP users in Nairobi City County engages in very risky sexual behaviours that involve having multiple non-regular sexual partners.

When asked how consistently they were using condom with non- regular partners in the last 12 months, 26.2% of the respondents with non-regular partners were using condom most of the time when engaging in sexual intercourse, 25.1% had never used condom in the past 12 months, 24.8% were always using condom, while 23.9% were using condom just some of the times when engaging in sexual intercourse with non-regular partners. This implies that most of the HIV-PrEP users in Nairobi City County engages in risky sexual behaviours, which can explain why they resort to the use of HIV-PrEP.

**Table 4.9: Respondents behavioural risk factors of STIs**

| Variable | Category | Frequency (N=351) | Percentage |
|---|---|---|---|
| Age at first sexual intercourse | < of 18 years | 265 | 75.5 |
| | > 18 years | 86 | 24.5 |
| Gender attracted to | Men | 110 | 31.3 |
| | Women | 168 | 47.9 |
| | Both | 73 | 20.8 |
| Regular partner | Yes | 155 | 44.2 |
| | No | 196 | 55.8 |
| Condom use Consistency with regular partner | Always | 66 | 18.8 |
| | Most of the time | 69 | 19.7 |
| | Sometimes | 138 | 39.3 |
| | Never in the past12 months | 78 | 22.2 |
| Condom in last intercourse with regular partner | Yes | 168 | 47.9 |
| | No | 183 | 52.1 |
| Non-regular partner | Yes | 214 | 61 |
| | No | 137 | 39 |
| Number of non-regular partners | None | 23 | 6.6 |
| | 1 | 70 | 19.9 |
| | 2 | 68 | 19.4 |
| | >2 | 190 | 54.1 |
| Consistency of condom use with non-regular partner | Always | 87 | 24.8 |
| | Most of the time | 92 | 26.2 |
| | Sometimes | 84 | 23.9 |
| | Never in the past 12 months | 88 | 25.1 |

Moreover, the respondents who were found to be using condoms when having sexual intercourse with their regular partners were asked to indicate the purpose for which they used condom while having sexual intercourse with their regular partners and their responses captured in Table 4.10. The outcome shows that 47.3% of the respondents were using condom while having sexual intercourse with their regular partners as a way of protecting themselves against contracting STIs and HIV and AIDS, 18.50% cited requests from partners as the reason behind using condom, while 10.8% doing it for pleasure. Moreover, 13.10% of the respondents indicated that they were using condom with their regular partners to prevent pregnancy or as a birth control method, while 10.3% were using condom to protect their partners from STIs and HIV and AIDS. These results points to the fact there are diverse reasons as to why one would prefer to use condom while having sexual contact with their regular partners, common among them is protection against STIs and HIV and AIDS.

On the other hand, HIV-PrEP users that were not using condom while having sexual intercourse with their regular partners were asked to give reasons for their actions. Their responses were as shown in Table 4.10. Based on the results, 49.6% of those found not to be using condom with regular partners cited being on PrEP as the reason for not using condom; 9.4% thought condom was too expensive for them, another 9.4% of the respondents cited trusting their partners as the reason for not using condom, while 8.5% of them indicated that they were not using condom because of the dislike they had for it and because condom reduces sexual pleasure. Furthermore, 8.3% of the respondents

cited trust issues as the reason for not using condom with regular partners, they explained that their partners would think they do not trust them. 8% of them indicated the objection of the partner; Only 6.8% of the respondent cited unavailability of condom as the reason for not using it when having sexual intercourse with regular partners.

The researcher further asked the respondents who were using condom whenever engaging in sexual intercourse with non-regular partners to give reasons as to why they were using condom. The analysis outcome showed that 23.4% of the respondents were using condom with non-regular partners because their partners requested for it; 21.1% cited protection from STIs and HIV and AIDS as the reason, 20.2% were using condom for pleasure, 17.9% wanted to protect their partners from STIs and HIV and AIDS, while 17.4% were trying to avoid unplanned pregnancies. This implies that most of the HIV-PrEP users in Nairobi City County with non-regular partners uses condom as a way of safeguarding themselves against STIs and HIV and AIDS.

Finally, regarding behavioural risk factors, the respondents that were never using condom when having sexual intercourse with non-regular partners, were asked to give reasons for not doing so. Based on the results, the reasons cited for not using condom while having sexual intercourse with non-regular partners were; partner objection (24.5%), being on HIV-PrEP (21.9%), trusting the partner (13.1%), partner might think I don't trust him/her (11.7%), condom not available (10.3%), reduced sexual pleasure (10%) and condom being too expensive (8.5%). This implies that most of the HIV-PrEP users in Nairobi City County with non-regular partners do not use condom as a way of

safeguarding themselves against STIs and HIV and AIDS because of their partners' objection and the fact of being of HIV-PrEP.

**Table 4.10: Behavioural risk factors (use of condom with regular/non-regular partner)**

| Variable | Category | Reason | Freq (N=351) | Percentage |
|---|---|---|---|---|
| Regular partner used condom | Yes | To avoid pregnancy | 46 | 13.1 |
| | | To protect myself from STIs and HIV/AIDS | 166 | 47.3 |
| | | To protect my partner from STIs and HIV/AIDS | 36 | 10.3 |
| | | My partner requested it | 65 | 18.5 |
| | | For pleasure | 38 | 10.8 |
| | No | I am on PrEP | 174 | 49.6 |
| | | Not available | 24 | 6.8 |
| | | Too expensive | 33 | 9.4 |
| | | Partner objected | 28 | 8 |
| | | Don’ like/reduce sexual pleasure | 30 | 8.5 |
| | | Partner might think I don't trust him/her | 29 | 8.3 |
| | | Trust my partner | 33 | 9.4 |
| Non-regular partner used condom | Yes | To avoid pregnancy | 61 | 17.4 |
| | | To protect myself from STIs and HIV/AIDS | 74 | 21.1 |
| | | To protect my partner from STIs and HIV/AIDS | 63 | 17.9 |
| | | My partner requested it? | 82 | 23.4 |
| | | For pleasure | 71 | 20.2 |
| | No | I am on HIV-PrEP | 77 | 21.9 |
| | | Not available | 36 | 10.3 |
| | | Too expensive | 30 | 8.5 |
| | | Partner objected | 86 | 24.5 |
| | | Don’t like/reduce sexual pleasure | 35 | 10 |
| | | Partner might think I don't trust him/her | 41 | 11.7 |
| | | Trust my partner | 46 | 13.1 |

### 4.7.2 Substance use to influence sexual behaviour

The respondents were asked to indicate substances they were using as behavioural risk factors. The responses were captured in Table 4.11. Based on the results, majority 191 (54.4%) were using alcohol, 140 (39.9%) were abusing drugs, 75 (21.4%) were found to be using injectable drugs, whereas 62 (17.7%) were using recreational drugs such as marijuana. This implies that the substance commonly used by patients that took part in this study was alcohol. Alcohol use may contribute to engagement in sexual behaviours (e.g., sex without a condom) that increase one's risk for HIV and other STIs.

**Table 4.11: Respondents' substance use to influence sexual behaviour**

| Substance | Response | Frequency (N=351) | Percentage |
|---|---|---|---|
| Alcohol | Yes | 191 | 54.4 |
| | No | 160 | 45.6 |
| Drug abuse | Yes | 140 | 39.9 |
| | No | 211 | 60.1 |
| Drug by injection | Yes | 75 | 21.4 |
| | No | 276 | 78.6 |
| Recreational drug (Marijuana) | Yes | 62 | 17.7 |
| | No | 289 | 82.3 |

### 4.8 Health seeking behaviour for STIs among HIV-PrEP users

Based on the results in Table 4.12, majority (59%) of the respondents did not seek treatment for STIs in the past year, while 41% did seek treatment in health facilities when they fell ill in the past year. In addition, majority (60.7%) of the respondents indicated that they did not have any health check-up at a health facility because they did not have any symptoms of STIs. Furthermore, most (63%) of the respondents agreed that they had had instances in their lives where they refused to visit health center, even although they were in serious need of care. These results points to poor health seeking behavior among HIV-PrEP users in the county.

The respondents were also asked to indicate where they would seek treatment under normal circumstances with exception to emergency cases, majority of the respondents (39.3%) pointed out that they would seek treatment from pharmacist at drugstore/pharmacy under normal circumstances with exception to emergency cases, 23.6% would seek treatment from public health facility, 15.1% would seek treatment from private health facility, and 19.1% indicated they would visit traditional practitioners or healers under normal circumstances with exception to emergency cases.

**Table 4.12: Respondents' health seeking behaviour for STIs**

| Variable | Response | Frequency (N=351) | Percentage |
|---|---|---|---|
| In the past year, did you seek treatment for STIs? | Yes | 144 | 41.0 |
| | No | 207 | 59.0 |
| In the past year, have you had any health check-up at a health facility although you had no symptoms of STIs? | Yes | 138 | 39.3 |
| | No | 213 | 60.7 |
| Have you ever refused to visit a health centre, although you were in need of care? | Yes | 221 | 63.0 |
| | No | 130 | 37.0 |
| Normally (with exception to emergency cases), where do you seek treatment from? | Public health facility | 83 | 23.6 |
| | Private health facility | 53 | 15.1 |
| | Pharmacist at Drugstore/pharmacy | 138 | 39.3 |
| | Self-medication | 67 | 19.1 |
| | Traditional practitioner/healer | 10 | 2.8 |

### 4.9 Bivariate analysis

Cross-tabulation was done to determine whether any of the independent variables in this study influenced the prevalence of STIs among HIV-PrEP users. The association was determined using Pearson's Chi-square statistics. The independent variables included socio-demographic characteristics, attitude of participants towards HIV-PrEP and their beliefs about STIs, STIs related level of knowledge, behavioral risk factors and health seeking behavior for STIs among HIV-PrEP users. A p-value less than 0.05 was significant at 95 percent confidence interval.

#### 4.9.1 Association between Socio-demographic characteristics and STIs prevalence

The study also conducted bivariate analysis to assess the nature of the association between socio-demographic characteristics and STIs prevalence among clients visiting health facilities in Nairobi City County. The results were as shown in Table 4.13. The findings show that there was statistically significant association between gender of the respondent and STIs prevalence among HIV-PrEP users in Nairobi ($\chi^2$=18.011, $p$=0.021<0.05). There was statistically significant association between level of education and prevalence of STIs among HIV-PrEP users in Nairobi ($\chi^2$=32.912, $p$=0.000<0.05). Duration of using HIV-PrEP was also found to be significantly associated with STIs prevalence among HIV-PrEP users in Nairobi ($\chi^2$=9.846, $p$=0.009<0.05). Finally, the analysis results showed that there was statistically

significant association between occupation of the respondents and STIs prevalence among HIV-PrEP users in Nairobi ($\chi^2$=45.910, $p$=0.001<0.05).

There was, however, no significant association between age of the respondent and STIs prevalence among HIV-PrEP users in Nairobi ($\chi^2$=11.892, $p$=0.102>0.05). further, there was no statistically significant association between marital status and STIs prevalence among HIV-PrEP users in Nairobi ($\chi^2$=0.903, $p$=0.761>0.05). The outcomes imply that socio-demographic characteristics factors play significant role in influencing the STIs prevalence among HIV-PrEP users in Nairobi City County.

**Table 4.13: Association between Socio-Demographic Characteristics and STIs prevalence**

| | | STIs prevalence | | | Chi-Square df |
|---|---|---|---|---|---|
| **Variable** | **Response** | **Positive** | **Negative** | **Total** | **P-value** |
| Gender | Male | 76(37.1) | 129(62.9) | 205 | $\chi^2$=18.011 df=1 |
| | Female | 85(58.2) | 61(41.8) | 146 | P-value=0.021 |
| Age | 18-24 Years | 11(28.2) | 28(71.8) | 39 | |
| | 25-34 Years | 77(56.2) | 60(43.8) | 137 | |
| | 35-44 Years | 31(35.2) | 57(64.8) | 88 | $\chi^2$=11.892 |
| | 45-54 Years | 25(39.7) | 38(60.3) | 63 | df=4 |
| | 55 Years and above | 17(70.8) | 7(29.2) | 24 | P-value=0.102 |
| Level of Education | Primary | 1(33.3) | 2(66.7) | 3 | |
| | Secondary | 28(43.8) | 36(56.2) | 64 | $\chi^2$=32.912 |
| | Diploma | 69(52.7) | 62(47.3) | 131 | df=3 |
| | Degree | 63(41.2) | 90(58.8) | 153 | P-value=0.000 |
| Duration of using HIV-PrEP | Less than 1 year | 17(60.7) | 11(39.3) | 28 | |
| | 1-3 Years | 31(52.5) | 28(47.5) | 59 | $\chi^2$=9.846 |
| | 4-5 Years | 47(51.6) | 44(48.4) | 91 | df=3 |
| | More than 5 Years | 66(38.2) | 107(61.8) | 173 | P-value=0.009 |
| Marital Status | Single | 72(54.1) | 61(45.9) | 133 | |
| | Married/Cohabitating | 21(60.0) | 14(40.0) | 35 | $\chi^2$=0.903 |
| | Divorced/Separated | 46(41.8) | 64(58.2) | 110 | df=3 |
| | Widowed | 22(30.1) | 51(69.9) | 73 | P-value=0.761 |
| Occupation | Employed | 31(32.0) | 66(68.0) | 97 | $\chi^2$=45.910 |
| | Self-employed | 89(47.8) | 97(52.2) | 186 | df=2 |
| | Unemployed | 41(60.3) | 27(39.7) | 68 | P-value=0.001 |

### 4.9.2 Association between attitude towards HIV-PrEP and STIs prevalence

To determine whether attitude of the respondents towards the use of HIV-PrEP influences STIs prevalence, the study conducted a bivariate analysis to assess the association between attitude towards the use of HIV-PrEP and STIs prevalence. The results are shown in Table 4.14. The results show that there was statistically significant association between beliefs that HIV-PrEP works and STIs prevalence ($\chi 2=12.110$, $p=0.000<0.05$). The results also show that there existed statistically significant association between being less worried about HIV infection when on HIV-PrEP and STIs prevalence ($\chi 2=19.245$, $p=0.000<0.05$). There was statistically significant association between being less worried about STIs while on HIV-PrEP and STIs prevalence ($\chi 2=23.104$, $p=0.003<0.05$).

Additionally, it is evident that there was statistically significant association between the beliefs that if people take HIV-PrEP, they will probably stop using condoms and STIs prevalence ($\chi 2=11.346$, $p=0.031<0.05$). The belief that if people take HIV-PrEP, they will probably stop using condoms was found to be significant against STIs prevalence ($\chi 2=38.261$, $p=0.000<0.05$). Moreover, the results show that there was statistically significant association between the beliefs that if people take HIV-PrEP, they will have multiple sexual partners and STIs prevalence ($\chi 2=20.446$, $p=0.001<0.05$).

Furthermore, there existed statistically significant association between beliefs that HIV-PrEP will encourage people to take sexual risks and STIs prevalence ($\chi 2=12.897$,

p=0.020<0.05). However, there was no statistically significant association between the beliefs that HIV-PrEP has serious side effects and STIs prevalence ($\chi 2$=1.774, p=0.091>0.05). Finally, there was no statistically significant association between believing that HIV-PrEP is more dangerous than good and STIs prevalence ($\chi 2$=0.923, p=1.253>0.05). The results indicate that the attitude patients have towards the use of HIV-PrEP has influence on the STIs prevalence.

**Table 4.14: Association between attitudes toward HIV-PrEP and STIs prevalence**

| Statement | Category | STIs Prevalence | | | Chi-square Df P-value |
|---|---|---|---|---|---|
| | | Positive | Negative | Total | |
| I believe that HIV PrEP works for me | Strongly Disagree | 5(55.6) | 4(44.4) | 9 | $\chi^2$=25.110 df=3 p-value=0.000 |
| | Disagree | 16(59.3) | 11(40.7) | 27 | |
| | Agree | 79(51.3) | 75(48.7) | 154 | |
| | Strongly Agree | 61(37.9) | 100(62.1) | 161 | |
| I am less worried about HIV infection, now that I am on HIV PrEP | Strongly Disagree | 4(40.0) | 6(60.0) | 10 | $\chi^2$=19.245 df=3 P-value=0.000 |
| | Disagree | 9(32.1) | 19(67.9) | 28 | |
| | Agree | 75(50.3) | 74(49.7) | 149 | |
| | Strongly Agree | 73(44.5) | 91(55.5) | 164 | |
| I am less worried about STIs now that I am on HIV PrEP | Strongly Disagree | 2(40.0) | 3(60.0) | 5 | $\chi^2$=23.104 df=3 P-value=0.003 |
| | Disagree | 15(48.4) | 16(51.6) | 31 | |
| | Agree | 72(61.0) | 46(39.0) | 118 | |
| | Strongly Agree | 72(36.5) | 125(63.5) | 197 | |
| I believe that HIV PrEP makes people less likely to contract HIV | Strongly Disagree | 2(28.6) | 5(71.4) | 7 | $\chi^2$=11.346 df=3 P-value=0.031 |
| | Disagree | 10(34.4) | 19(65.6) | 29 | |
| | Agree | 65(57.5) | 48(42.5) | 113 | |
| | Strongly Agree | 84(41.6) | 118(58.4) | 202 | |
| I believe that if people take HIV PrEP, they will probably stop using condoms | Strongly Disagree | 3(50.0) | 3(50.0) | 6 | $\chi^2$=38.261 df=3 P-value=0.000 |
| | Disagree | 13(36.1) | 23(63.9) | 36 | |
| | Agree | 81(58.7) | 57(41.3) | 138 | |
| | Strongly Agree | 64(37.4) | 107(62.6) | 171 | |
| I believe that if people take HIV PrEP, they will have multiple sexual partners | Strongly Disagree | 6(35.3) | 11(64.7) | 17 | $\chi^2$=20.446 df=3 P-value=0.001 |
| | Disagree | 11(39.3) | 17(60.7) | 28 | |
| | Agree | 89(56.7) | 68(43.3) | 157 | |
| | Strongly Agree | 55(36.9) | 94(63.1) | 149 | |
| I believe that HIV PrEP will encourage people to take sexual risks | Strongly Disagree | 1(16.7) | 5(83.3) | 6 | $\chi^2$=12.897 df=3 P-value=0.020 |
| | Disagree | 5(19.2) | 21(80.8) | 26 | |
| | Agree | 64(52.9) | 57(47.1) | 121 | |
| | Strongly Agree | 91(46.0) | 107(54.0) | 198 | |
| I believe that HIV PrEP has serious side effects | Strongly Disagree | 33(36.7) | 65(63.3) | 98 | $\chi^2$=1.774 df=3 P-value=0.091 |
| | Disagree | 41(36.6) | 71(63.4) | 112 | |
| | Agree | 46(73.0) | 17(27.0) | 63 | |
| | Strongly Agree | 41(52.6) | 37(47.4) | 78 | |

### 4.9.3 Association between beliefs about STIs and STIs prevalence

To establish the nature of the association between beliefs about STIs and STIs prevalence among HIV-PrEP users, the study conducted bivariate analysis. The results showed that there was significant association between the belief that most STIs can be prevented with condom and prevalence of STIs ($\chi 2=9.880$, $p=0.000<0.05$); belief that STIs can be cured with treatment was significantly associated with prevalence of STIs ($\chi 2=17.912$, $p=0.000<0.05$); it was further established that the belief that STIs can be transmitted through kissing was significantly associated with STIs prevalence ($\chi 2=13.312$, $p=0.001<0.05$).

Similarly, there existed statistically significant association between the belief that STIs can only be transmitted sexually and STIs prevalence ($\chi 2=10.511$, $p=0.007<0.05$). Finally, the results revealed that there was statistically significant association between the belief that PrEP can protect against other STIs other than HIV and STIs prevalence ($\chi 2=14.329$, $p=0.000<0.05$). These findings imply that belief about STIs is significant in influencing STIs prevalence among HIV-PrEP users in Nairobi City County.

**Table 4.15: Association between beliefs about STIs and STIs prevalence**

| Variable | Category | STIs Prevalence | | | Cross-Tabulation |
|---|---|---|---|---|---|
| | | Positive | Negative | Total | |
| Most STIs can be prevented with condom | Agree | 123(48.2) | 132(51.8) | 255 | $\chi^2$=9.880 df=1 p-value=0.000 |
| | Disagree | 38(39.5) | 58(60.5) | 96 | |
| Most STIs can be cured with treatment | Agree | 137(51.7) | 128(48.3) | 265 | $\chi^2$=17.912 df=1 p-value=0.000 |
| | Disagree | 24(27.9) | 62(72.1) | 86 | |
| STIs can be transmitted through kissing | Agree | 109(50.5) | 107(49.5) | 216 | $\chi^2$=13.312 df=1 p-value=0.001 |
| | Disagree | 52(38.5) | 83(61.5) | 135 | |
| STIs can only be transmitted sexually | Agree | 133(51.4) | 126(48.6) | 259 | $\chi^2$=10.511 df=1 p-value=0.007 |
| | Disagree | 28(30.4) | 64(69.6) | 92 | |
| PrEP can protect against other STIs other than HIV | Agree | 117(52.0) | 108(48.0) | 225 | $\chi^2$=14.329 df=1 p-value=0.000 |
| | Disagree | 44(34.9) | 82(65.1) | 126 | |

### 4.9.4 Association between STIs related level of knowledge and STIs prevalence

The study conducted bivariate analysis to establish the association between STIs related level of knowledge and STIs prevalence among HIV-PrEP users in Nairobi City County. As shown in Table 4.16, there was statistically significant association between knowledge of transmission regarding having sex with sex workers (M or F) and STIs prevalence ($\chi$2=27.012, p=0.038<0.05). There was also statistically significant association between knowledge of transmission regarding receiving infected blood and STIs prevalence ($\chi$2=29.452, p=0.002<0.05).

The study also found statistically significant association between knowledge about STIs prevention using condom and STIs prevalence ($\chi 2=41.231$, $p=0.000<0.05$). Statistically significant association was also found between knowledge about avoiding sex with multiple partners and STIs prevalence ($\chi 2=38.010$, $p=0.007<0.05$). Finally, there was statistically significant association between knowledge about avoiding unscreened blood and STIs prevalence ($\chi 2=29.110$, $p=0.012<0.05$).

**Table 4.16: Association between STIs related level of knowledge and STIs prevalence**

| Knowledge | | Response | STIs Prevalence | | | Cross Tabs |
|---|---|---|---|---|---|---|
| | | | Positive | Negative | Total | |
| Awareness | Have you ever heard about STI | No | 38(79.2) | 10(20.8) | 48 | $\chi^2$=17.400 df=2 p-value=0.121 |
| | | Yes | 102(38.1) | 166(61.9) | 268 | |
| | | I don't Know | 21(60.0) | 14(40.0) | 35 | |
| Knowledge of Transmission | Sex without Condom | No | 61(61.6) | 38(38.4) | 99 | $\chi^2$=0.951 df=2 p-value=1.301 |
| | | Yes | 62(31.2) | 137(68.8) | 199 | |
| | | I don't Know | 38(71.7) | 15(28.3) | 53 | |
| | Sex with Sex workers (M or F) | No | 23(19.3) | 96(80.7) | 119 | $\chi^2$=27.012 df=2 p-value=0.038 |
| | | Yes | 97(61.0) | 62(39.0) | 159 | |
| | | I don't Know | 41(56.2) | 32(43.8) | 73 | |
| | Sex with Multiple Partners | No | 31(29.2) | 75(70.8) | 106 | $\chi^2$=1.104 df=2 p-value=0.076 |
| | | Yes | 111(53.9 | 95(46.1) | 206 | |
| | | I don't Know | 19(48.7) | 29(51.3) | 39 | |
| | Receiving Infected Blood | No | 39(37.5) | 65(62.5) | 104 | $\chi^2$=29.452 df=2 p-value=0.002 |
| | | Yes | 94(50.3) | 93(49.7) | 187 | |
| | | I don't Know | 28(46.7) | 32(53.3) | 60 | |
| Knowledge of Prevention | Use of Condom | No | 50(56.8) | 38(43.2) | 88 | $\chi^2$=41.231 df=2 p-value=0.000 |
| | | Yes | 83(39.7) | 126(60.3) | 209 | |
| | | I don't Know | 28(51.9) | 26(48.1) | 54 | |
| | Avoid sex with Sex workers (M or F) | No | 56(55.4) | 45(44.6) | 101 | $\chi^2$=0.129 df=2 p-value=2.623 |
| | | Yes | 80(38.1) | 130(61.9) | 210 | |
| | | I don't Know | 25(62.5) | 15(37.5) | 40 | |
| | Avoid Sex with Multiple Partners | No | 57(68.7) | 26(31.3) | 83 | $\chi^2$=38.010 df=2 p-value=0.007 |
| | | Yes | 59(31.1) | 131(68.9) | 190 | |
| | | I don't Know | 45(57.7) | 33(42.3) | 78 | |
| | Avoid Unscreened Blood | No | 51(55.4) | 41(44.6) | 92 | $\chi^2$=29.110 df=2 p-value=0.012 |
| | | Yes | 77(37.4) | 129(62.6) | 206 | |
| | | I don't Know | 33(62.3) | 20(37.7) | 53 | |

### 4.9.5 Association between source of STIs information and STIs prevalence

Bivariate analysis results on the association between source of STIs information and STIs prevalence was presented in Table 4.17. The results show that there was statistically significant association between source of information about STIs and STIs prevalence ($\chi 2=33.129$, $p=0.000<0.05$). This implies that where on gets information regarding STIs plays significant role in determining whether they are likely to contract STIs or not.

**Table 4.17: Association between Source of STIs Information and STIs Prevalence**

| | STIs Prevalence | | | Cross |
|---|---|---|---|---|
| **Source** | **Positive** | **Negative** | **Total** | **Tabulation** |
| TV/Radio | 47(46.1) | 55(53.9) | 102 | |
| Internet (social media) | 58(43.3) | 76(56.7) | 134 | $\chi^2=33.129$ |
| Friends | 11(25.6) | 32(74.4) | 43 | df=5 |
| Brochures | 24(63.2) | 14(36.8) | 38 | p- |
| Books | 6(50.0) | 6(50.0) | 12 | value=0.000 |
| Magazines and Newspaper | 15(68.2) | 7(31.8) | 22 | |

### 4.9.6 Association between awareness of symptoms of STIs experienced and STIs prevalence

The association between the types of symptoms of STIs experienced and STIs prevalence was tested by conducting bivariate analysis. As shown in Table 4.18, there was statistically significant association between experiencing abnormal vaginal

discharge with strong odour during the past 12 months and STIs prevalence ($\chi 2=22.303$, $p=0.004<0.05$). Statistically significant association was also observed between experiencing genital itching during the past 12 months and STIs prevalence ($\chi 2=15.935$, $p=0.012<0.05$). Additionally, there was statistically significant association between experiencing pain during urination during the past 12 months and STIs prevalence ($\chi 2=18.100$, $p=0.009<0.05$). Finally, there was statistically significant association between experience of frequent urination during the past 12 months and STIs prevalence ($\chi 2=24.021$, $p=0.000<0.05$).

**Table 4.18: Association between awareness of symptoms of STIs experienced and STIs prevalence**

| Variable | Response | STIs Prevalence | | | Cross Tabs |
|---|---|---|---|---|---|
| | | Positive | Negative | Total | |
| Urethral Discharge during the past 12 months | Yes | 60(54.5) | 50(45.5) | 110 | $\chi^2$=2.183 df=2 p-value=0.082 |
| | No | 86(40.4) | 127(59.6) | 213 | |
| | I don't Know | 15(53.6) | 13(46.4) | 28 | |
| Abnormal Vaginal Discharge with strong odour during the past 12 months | Yes | 49(51.0) | 47(49.0) | 96 | $\chi^2$=22.303 df=2 p-value=0.004 |
| | No | 94(42.2) | 129(57.8) | 223 | |
| | I don't Know | 18(56.3) | 14(43.7) | 32 | |
| Genital ulcer or sore during the past 12 months | Yes | 55(67.1) | 27(32.9) | 82 | $\chi^2$=0.087 df=2 p-value=0.836 |
| | No | 80(35.1) | 148(64.9) | 228 | |
| | I don't Know | 26(63.4) | 15(36.6) | 41 | |
| Genital Itching during the past 12 months | Yes | 70(64.2) | 39(35.8) | 109 | $\chi^2$=15.935 df=2 p-value=0.012 |
| | No | 78(39.4) | 120(60.6) | 198 | |
| | I don't Know | 13(29.5) | 31(70.5) | 44 | |
| Pain during urination during the past 12 months | Yes | 43(57.3) | 32(42.7) | 75 | $\chi^2$=18.100 df=2 p-value=0.009 |
| | No | 107(42.0) | 148(58.0) | 255 | |
| | I don't Know | 11(52.4) | 10(47.6) | 21 | |
| Swelling around the genital during the past 12 months | Yes | 38(55.1) | 31(44.9) | 69 | $\chi^2$=1.902 df=2 p-value=0.202 |
| | No | 94(40.7) | 137(59.3) | 231 | |
| | I don't Know | 29(56.9) | 22(43.1) | 51 | |
| Frequent Urination during the past 12 months | Yes | 77(57.5) | 57(42.5) | 134 | $\chi^2$=24.021 df=2 p-value=0.000 |
| | No | 65(36.5) | 113(63.5) | 178 | |
| | I don't Know | 19(48.7) | 20(51.3) | 39 | |

### 4.9.7 Association between behavioural risk factors and STIs prevalence

To establish the relationship between behavioural risk factors and STIs prevalence, this study conducted bivariate analysis and the results were as shown in Table 4.19. The table depicts that there existed significant association between having a regular partner or not and STIs prevalence ($\chi$2=17.803, p=0.000<0.05). Consistency in use of condom also had statistically significant influence on STIs prevalence ($\chi$2=8.925,

p=0.000<0.05). Furthermore, there was statistically significant association between having or not having non-regular partner and STIs prevalence ($\chi$2=11.675, p=0.000<0.05). In addition, the study has established that the number of non-regular partners had significant influence on the STIs prevalence ($\chi$2=7.934, p=0.049<0.05). Similarly, there was statistically significant association between consistency in using condom with non-regular partners and STIs prevalence ($\chi$2=23.269, p=0.009<0.05).

There was, however, no significant association between use condom during the last sexual intercourse and STIs prevalence ($\chi$2=1.893, p=6.362>0.05). No statistically significant association between gender attraction and STIs prevalence ($\chi$2=10.391, p=0.114>0.05). Furthermore, there was no significant association between age at first sexual intercourse and STIs prevalence ($\chi$2=9.354, p=0.218>0.05). Finally, there was no significant association between use of condom with non-regular partner during the last sexual encounter and STIs prevalence ($\chi$2=2.985, p=0.602>0.05).

**Table 4.19: Association between behavioural risk factors and STIs prevalence**

| | | STIs Prevalence | | | |
|---|---|---|---|---|---|
| **Variable** | **Category** | **Positive** | **Negative** | **Total** | **Cross-Tab** |
| Age at first sexual intercourse | < of 18 years | 118(44.5) | 147(55.5) | 265 | $\chi^2$=9.354 df=1 p-value=0.218 |
| | > 18 years | 43(50.0) | 43(50.0) | 86 | |
| Gender attracted to | Men | 47(42.7) | 63(57.3) | 110 | $\chi^2$=10.391 df=2 p-value=0.114 |
| | Women | 71(42.2) | 97(57.8) | 168 | |
| | Both | 43(58.9) | 30(41.1) | 73 | |
| Regular partner | Yes | 61(39.4) | 94(60.6) | 155 | $\chi^2$=17.803 df=1 p-value=0.000 |
| | No | 100(51.0) | 96(49.0) | 196 | |
| Condom use Consistency with regular partner | Always | 16(24.2) | 50(75.8) | 66 | $\chi^2$=8.925 df=3 p-value=0.000 |
| | Most of the time | 36(52.2) | 33(47.8) | 69 | |
| | Sometimes | 77(55.8) | 61(44.2) | 138 | |
| | Never in the past 6 months | 32(41.0) | 46(59.0) | 78 | |
| Condom in last intercourse with regular partner | Yes | 55(32.7) | 113(67.3) | 168 | $\chi^2$=1.893 df=1 p-value=6.362 |
| | No | 106(57.9) | 77(42.1) | 183 | |
| Non-regular partner | Yes | 121(56.5) | 93(43.5) | 214 | $\chi^2$=11.675 df=1 p-value=0.000 |
| | No | 40(29.2) | 97(70.8) | 137 | |
| Number of non-regular partners | None | 6(26.1) | 17(73.9) | 23 | $\chi^2$=7.934 df=3 p-value=0.049 |
| | 1 | 29(41.4) | 41(58.6) | 70 | |
| | 2 | 41(60.3) | 27(39.7) | 68 | |
| | >2 | 85(44.7) | 105(55.3) | 190 | |
| Consistency of condom use with Non-regular partner | Always | 38(43.7) | 49(56.3) | 87 | $\chi^2$=23.260 df=3 p-value=0.009 |
| | Most of the time | 44(47.8) | 48(52.2) | 92 | |
| | Sometimes | 32(38.1) | 52(61.9) | 84 | |
| | Never in the past 12 months | 47(53.4) | 41(46.6) | 88 | |

Furthermore, regarding the reasons for using or not using condom during sexual intercourse with regular partner, Table 4.20 depicts that there was statistically significant association between the reasons for not using condom with regular partner and STIs prevalence ($\chi$2=22.229, p=0.000<0.05). The study also demonstrated that

there was statistically significant association between reasons for not using condom during sexual intercourse with non-regular partner and STIs prevalence ($\chi 2=8.122$, $p=0.003<0.05$).

**Table 4.20: Association between use of condom with regular/non-regular partner and STIs prevalence**

| | | | STIs Prevalence | | | |
|---|---|---|---|---|---|---|
| **Variable** | **Category** | **Reason** | **Positive** | **Negative** | **Total** | **Cross-Tabs** |
| Regular partner used condom | Yes | To avoid pregnancy | 27(58.7) | 19(41.3) | 46 | $\chi^2=0.512$ df=4 p-value=0.849 |
| | | To protect myself from STIs and HIV/AIDS | 65(39.2) | 101(60.8) | 166 | |
| | | To protect my partner from STIs and HIV/AIDS | 24(66.7) | 12(33.3) | 36 | |
| | | My partner requested it | 29(44.6) | 36(55.4) | 65 | |
| | | For pleasure | 16(42.1) | 22(57.9) | 38 | |
| | No | I am on PrEP | 81(46.6) | 93(53.4) | 174 | $\chi^2=22.229$ df=6 p-value=0.000 |
| | | Not available | 9(37.5) | 15(62.5) | 24 | |
| | | Too expensive | 12(36.4) | 21(63.6) | 33 | |
| | | Partner objected | 17(60.7) | 11(39.3) | 28 | |
| | | Don't like/reduce sexual pleasure | 8(26.7) | 22(73.3) | 30 | |
| | | Partner might think I don't trust him/her | 11(37.9) | 18(62.1) | 29 | |
| | | Trust my partner | 23(69.7) | 10(30.3) | 33 | |
| Non-regular partner used condom | Yes | To avoid pregnancy | 29(47.5) | 32(52.5) | 61 | $\chi^2=2.985$ df=4 p-value=0.602 |
| | | To protect myself from STIs and HIV/AIDS | 38(51.4) | 36(48.6) | 74 | |
| | | To protect my partner from STIs and HIV/AIDS | 32(50.8) | 31(49.2) | 63 | |
| | | My partner requested it? | 39(47.6) | 43(52.4) | 82 | |
| | | For pleasure | 23(32.4) | 48(67.6) | 71 | |
| | No | I am on PrEP | 33(42.9) | 44(57.1) | 77 | $\chi^2=8.122$ df=6 p-value=0.003 |
| | | Not available | 21(58.3) | 15(41.7) | 36 | |
| | | Too expensive | 19(63.3) | 11(36.7) | 30 | |
| | | Partner objected | 39(45.3) | 47(54.7) | 86 | |
| | | Don't like/reduce sexual pleasure | 18(51.4) | 17(48.6) | 35 | |
| | | Partner might think I don't trust him/her | 15(36.6) | 26(63.4) | 41 | |
| | | Trust my partner | 16(34.8) | 30(65.2) | 46 | |

### 4.9.8 Association between substance use to influence sexual behaviour and STIs prevalence

The study conducted bivariate analysis to determine the association existing between substance use and STIs prevalence. The findings are presented in Table 4.21. The study results revealed that there was statistically significant association between the use of alcohol as a substance and STIs prevalence ($\chi 2=17.329$, $p=0.021<0.05$); drug abuse was significant against STIs prevalence ($\chi 2=22.981$, $p=0.000<0.05$), there was also statistically significant association between injection of drugs and STIs prevalence ($\chi 2=12.911$, $p=0.044<0.05$). Moreover, there was statistically significant association between use of recreational drugs such as marijuana and STIs prevalence ($\chi 2=19.337$, $p=0.011<0.05$). The results imply that use of substances has influence on the prevalence of STIs among HIV-PrEP users in Nairobi City County.

**Table 4.21: Association between substance use to influence sexual behaviour and STIs prevalence**

| | | STIs Prevalence | | | |
|---|---|---|---|---|---|
| **Substance** | **Response** | **Positive** | **Negative** | **Total** | **Cross Tab** |
| Alcohol | Yes | 115(60.2) | 76(39.8) | 191 | $\chi^2=17.329$ |
| | No | 46(28.8) | 114(71.2) | 160 | df=1 |
| | | | | | p-value=0.021 |
| Drug abuse | Yes | 121(86.4) | 19(13.6) | 140 | $\chi^2=22.981$ |
| | No | 40(19.0) | 171(81.0) | 211 | df=1 |
| | | | | | p-value=0.000 |
| Drug by injection | Yes | 48(64.0) | 27(36.0) | 75 | $\chi^2=12.911$ |
| | No | 113(40.9) | 163(59.1) | 276 | df=1 |
| | | | | | p-value=0.044 |
| Recreational drug (Marijuana) | Yes | 35(56.5) | 27(43.5) | 62 | $\chi^2=19.337$ |
| | No | 126(43.6) | 163(56.4) | 289 | df=1 |
| | | | | | p-value=0.011 |

### 4.9.9 Association between health seeking behaviour and STIs prevalence

The study moreover sought to establish the association between health seeking behaviour and STIs prevalence using bivariate analysis. The results are shown in Table 4.22. The results show that as to whether or not one sought treatment for STIs in the past year was significantly associated with STIs prevalence ($\chi 2=29.105$, $p=0.003<0.05$).

The study also found that as to whether one had any health check-up or not at a health facility although they had no symptoms of STIs had significant influence on STIs prevalence ($\chi 2=31.672$, $p=0.000<0.05$).

Moreover, as to whether one refused to visit a health centre or not, although they were in need of care had significant influence on STIs prevalence ($\chi 2=18.409$, $p=0.027<0.05$). Finally, it is evident that where one seeks medical treatment had significant association with STIs prevalence ($\chi 2=41.084$, $p=0.000<0.05$). The findings implies that health seeking behaviour for STIs exhibited by patients has significant influence on whether they are likely to contract STIs or not.

**Table 4.22: Association between health seeking behaviour and STIs prevalence**

| | | STIs Prevalence | | | |
|---|---|---|---|---|---|
| **Variable** | **Response** | **Positive** | **Negative** | **Total** | **Cross Tab** |
| In the past year, did you seek treatment for STIs? | Yes | 58(40.3) | 86(59.7) | 144 | $\chi^2$=29.105 df=1 |
| | No | 103(49.8) | 104(50.2) | 207 | p-value=0.003 |
| In the past year, have you had any health check-up at a health facility although you had no health complaints? | Yes | 61(44.2) | 77(55.8) | 138 | $\chi^2$=31.672 df=1 |
| | No | 100(46.9) | 113(53.1) | 213 | p-value=0.000 |
| Have you ever refused to visit a health centre, although you were in need of care? | Yes | 112(50.7) | 109(49.3) | 221 | $\chi^2$=18.409 df=1 |
| | No | 49(37.7) | 81(62.3) | 130 | p-value=0.027 |
| Normally (with exception to emergency cases), where do you seek treatment from? | Public health facility | 35(42.2) | 48(57.8) | 83 | $\chi^2$=41.084 df=4 p-value=0.000 |
| | Private health facility | 29(54.7) | 24(45.3) | 53 | |
| | Pharmacist at Drugstore/pharmacy | 56(40.6) | 82(59.4) | 138 | |
| | Self-medication | 33(49.3) | 34(50.7) | 67 | |
| | Traditional practitioner/healer | 8(80.0) | 2(20.0) | 10 | |

### 4.9.10 Moderating influence of health seeking behaviour on STIs prevalence

To assess the moderating influence of health seeking behaviour on STIs prevalence among HIV-PrEP users in Nairobi City County, the researcher interacted each independent variable with health seeking behaviour (moderator) to obtain compisit variables (level of knowledge among HIV-PrEP users health seeking behaviour and behavioural risk factors of STIs health seeking behaviour) which were then cross-tabulated with the depenedent. The results are presented in Table 4.23.

The results show that there was statistically significant association between the interaction of level of knowledge among HIV-PrEP users and health seeking behaviour and the dependent variable prevalence of STIs among PrEP users in Nairobi City County ($\chi^2$=39.281, $p$=0.000<0.05). The results also show that interaction of behavioural risk factors of STIs among HIV-PrEP users and health seeking behaviour and the dependent variable STIs prevalence among HIV-PrEP users in Nairobi City County was significant ($\chi^2$=29.085, $p$=0.001<0.05).

Furthermore, the interaction of attitude towards HIV-PrEP and beliefs about STIs and health seeking behaviour and the dependent variable STIs prevalence among PrEP users in Nairobi City County was significant ($\chi^2$=33.126, $p$=0.027<0.05). Finally, the interaction between socio-demographic characteristics and health seeking behaviour and the dependent variable STIs prevalence was signifivant ($\chi^2$=25.901, $p$=0.023<0.05). Since health seeking behaviour as a moderating variable was insignificant against STIs prevalence, but significant when interacted with the independent variables, the conclusion is that health seeking behaviour has significant moderating influence of health seeking behaviour on STIs prevalence among HIV-PrEP users in Nairobi City County, Kenya.

**Table 4.23: Moderating effect of health seeking behaviour on STIs prevalence**

| Dependent Variable | Interaction | Cross Tabulation Chi-square Value | P-value |
|---|---|---|---|
| STIs Prevalence | STI related level of knowledge among HIV-PrEP users* health seeking behaviour for STIs | $\chi^2$=39.281 df=1 | 0.000 |
| | Behavioural risk factors of STIs*health seeking behaviour for STIs | $\chi^2$=29.085 df=1 | 0.001 |
| | Attitude towards HIV-PrEP and Beliefs about STIs* health seeking behaviour for STIs | $\chi^2$=33.126 df=1 | 0.027 |
| | Socio-demographic Characteristics* health seeking behaviour for STIs | $\chi^2$=25.901 df=1 | 0.023 |

## 4.10 Binary logistic regression analysis

A logistic regression was performed to identify factors that contribute to STIs prevalence among HIV-PrEP users in Nairobi City County.

### 4.10.1 Logistics regression between Socio-demographic characteristics and STIs prevalence

The study sought to establish the statistical relationship between socio-demographic characteristics and STIs prevalence among HIV-PrEP users in Nairobi City County. As shown in Table 4.24, there was significant association between gender of respondent

and STIs prevalence (*P=0.000*). The results show that female HIV-PrEP users were more likely to contract STIs as compared to their male counterparts (OR=12.440, *p*=0.000).

It is also evident that respondents with degree as highest level of education were less likely to contract STIs compared to those with primary level of education (OR=0.883, *p*=0.009). Moreover, those who had used HIV-PrEP for a period of between 4-5 years were less likely to contract STIs as compared to those who had been using it for lee than 1 year (OR=0.917, *p*=0.000). Furthermore, the study established that respondents who were employed were less likely to contract STIs compared to the unemployed ones (OR=0.981, *p*=0.000).

**Table 4.24: Binary logistic analysis between Socio-demographic factors and STIs prevalence**

| Independent Variables | Categories | Wald Statistics | OR | P-Value | 95% Confidence Interval (CI) Lower | Upper |
|---|---|---|---|---|---|---|
| Gender | Male | Ref | | | | |
| | Female | 14.767 | 12.440 | 0.000 | 0.115 | 0.689 |
| Level of Education | Primary | Ref | | | | |
| | Secondary | 0.712 | 0.920 | 0.267 | 0.753 | 1.119 |
| | Diploma | 2.035 | 0.355 | 0.154 | 0.892 | 2.059 |
| | Degree | 0.742 | 0.883 | 0.009 | 1.152 | 126.503 |
| Duration of using HIV-PrEP | < 1 year | Ref | | | | |
| | 1-3 Years | 0.882 | 0.843 | 0.436 | 0.933 | 1.727 |
| | 4-5 Years | 43.717 | 0.917 | 0.000 | 2.911 | 14.971 |
| | >5 Years | 0.742 | 0.383 | 0.389 | 0.152 | 126.503 |
| Occupation | Unemployed | Ref | | | | |
| | Self-employed | 1.892 | 0.782 | 0.121 | 0.796 | 1.007 |
| | Employed | 1.580 | 0.981 | 0.002 | 1.735 | 11.092 |

### 4.10.2 Logistics regression between attitudes toward HIV-PrEP use and STIs prevalence

The study sought to establish the statistical relationship between attitudes toward HIV-PrEP use and STIs prevalence among HIV-PrEP users in Nairobi City County by conducting binary logistics regression analysis. The results (Table 4.25) indicate that those who strongly agreed HIV-PrEP works for them were less likely to contract STIs compared to those who strongly disagreed (OR=0.990, *p*=0.001); the respondents who agreed that they were less worried about HIV infection, since they were on HIV-PrEP were more likely to contract STIs compared to those who strongly disagreed with the statement (OR=8.355, *p*=0.008).

Moreover, those who were less worried about STIs since they were on HIV-PrEP were more likely to be infected by STIs compared to those who disagreed (OR=43.717, *p*=0.000) and (OR=21.383, *p*=0.030). It is further evident that respondents who strongly believed that I believe that if people take HIV-PrEP, they will have multiple sexual partners were more likely to contract STIs compared to those who believed otherwise (OR=5.721, *p*=0.023). Finally, the respondents who agreed with the statement that HIV-PrEP will encourage people to take sexual risks were more likely to contract STIs compared to those who strongly disagreed with the statement (OR=2.945, p=0.012).

**Table 4.25: Logistic analysis between attitudes toward HIV-PrEP use and STIs prevalence**

| Independent Variables | Categories | Wald Statistics | OR | P-Value | 95% Confidence Interval (CI) Lower | Upper |
|---|---|---|---|---|---|---|
| I believe that HIV PrEP works for me | Strongly Disagree | Ref | | | | |
| | Disagree | 14.767 | 12.440 | 0.391 | 0.115 | 1.689 |
| | Agree | 11.836 | 0.628 | 0.061 | 0.889 | 1.968 |
| | Strongly Agree | 28.205 | 0.990 | 0.001* | 0.540 | 0.998 |
| I am less worried about HIV infection, now that I am on HIV PrEP | Strongly Disagree | Ref | | | | |
| | Disagree | 0.712 | 0.920 | 0.267 | 0.753 | 1.119 |
| | Agree | 2.035 | 8.355 | 0.008* | 2.892 | 8.059 |
| | Strongly Agree | 0.742 | 11.883 | 0.722 | 0.152 | 126.503 |
| I am less worried about STIs now that I am on HIV PrEP | Strongly Disagree | Ref | | | | |
| | Disagree | 0.882 | 0.843 | 0.436 | 0.933 | 1.727 |
| | Agree | 43.717 | 16.917 | 0.000* | 1.911 | 14.971 |
| | Strongly Agree | 0.742 | 21.383 | 0.030* | 3.152 | 126.503 |
| I believe that HIV PrEP makes people less likely to contract HIV | Strongly Disagree | Ref | | | | |
| | Disagree | 1.892 | 0.782 | 0.121 | 0.796 | 1.007 |
| | Agree | 1.580 | 3.981 | 1.412 | 0.735 | 11.092 |
| | Strongly Agree | 2.217 | 4.023 | 2.137 | 0.993 | 1.055 |
| I believe that if people take HIV PrEP, they will probably stop using condoms | Strongly Disagree | Ref | | | | |
| | Disagree | 2.360 | 0.705 | 0.241 | 0.811 | 8.012 |
| | Agree | 19.116 | 9.776 | 1.301 | 0.833 | 7.007 |
| | Strongly Agree | 0.628 | 6.955 | 0.428 | 0.881 | 2.815 |
| I believe that if people take HIV PrEP, they will have multiple sexual partners | Strongly Disagree | Ref | | | | |
| | Disagree | 43.717 | 0.177 | 0.982 | 0.911 | 14.971 |
| | Agree | 7.742 | 1.583 | 0.389 | 0.152 | 126.503 |
| | Strongly Agree | 12.371 | 5.721 | 0.023* | 2.761 | 11.028 |
| I believe that HIV PrEP will encourage people to take sexual risks | Strongly Disagree | Ref | | | | |
| | Disagree | 2.761 | 0.881 | 0.115 | 0.821 | 1.897 |
| | Agree | 5.900 | 2.945 | 0.012* | 1.669 | 4.208 |
| | Strongly Agree | 1.227 | 1.081 | 0.268 | 0.200 | 8.647 |

### 4.10.3 Logistics regression between STIs related level of knowledge and STIs prevalence

The study sought to establish the statistical relationship between STIs related level of knowledge and STIs prevalence among HIV-PrEP users in Nairobi City County by conducting binary logistics regression analysis. The results as shown in Table 4.26, respondents who were having sex with sex workers whether male or female, were 10.947 times more likely to contract STIs as compared those who were not having sex with sex workers (OR=10.947, p=0.004).

Additionally, it is evident that, patients who were receiving infected blood were 15.551 times more likely to be infected by STIs as compared to those who were not receiving infected blood (OR=15.551, p=0.009). Moreover, those who were using condoms during sexual intercourse were less likely to contract STIs compared to those who were not using condom (OR=0.538, p=0.025). Finally, the study found out that respondents who were avoiding having sex with multiple partners were less likely to contract STIs compared to those who had no problem having multiple partners (OR=0.664, p=0.017).

**Table 4.26: Logistic analysis between STIs related level of knowledge and STIs prevalence**

| Independent Variables | Categories | Wald Statistics | OR | P-Value | 95% Confidence Interval (CI) Lower | Upper |
|---|---|---|---|---|---|---|
| Sex with Sex workers (M or F) | No | Ref | | | | |
| | Yes | 9.131 | 10.947 | 0.004* | 2.716 | 9.779 |
| | I don't Know | 11.836 | 8.528 | 0.123 | 0.889 | 3.968 |
| Receiving Infected Blood | No | Ref | | | | |
| | Yes | 23.102 | 15.551 | 0.009* | 1.878 | 7.261 |
| | I don't Know | 10.205 | 3.190 | 0.051 | 0.911 | 2.771 |
| Use of Condom | No | Ref | | | | |
| | Yes | 8.613 | 0.538 | 0.025* | 0.898 | 0.979 |
| | I don't Know | 11.091 | 1.813 | 0.133 | 0.632 | 1.309 |
| Avoid Sex with Multiple Partners | No | Ref | | | | |
| | Yes | 107.152 | 0.664 | 0.017* | 1.209 | 11.321 |
| | I don't Know | 12.472 | 1.411 | 1.272 | 0.934 | 1.018 |
| Avoid Unscreened Blood | No | Ref | | | | |
| | Yes | 2.360 | 0.705 | 0.892 | 0.811 | 8.012 |
| | I don't Know | 19.116 | 3.120 | 1.023 | 0.521 | 7.022 |

### 4.10.4 Logistics regression between behavioural risk factors and STIs prevalence

The study sought to establish the statistical relationship between behavioural risk factors and STIs prevalence among HIV-PrEP users in Nairobi City County by conducting binary logistics regression analysis. As shown in Table 4.27, respondent with regular sexual partners were less likely to contract STIs compared to those who did not have regular sexual partners (OR=0.771, p=0.000); respondents who had not been consistent with the use of condom with regular partners in the previous 6 months were

found to be 15.123 times more likely to get infected with STIs than those who were using condom consistent in the same time period with regular partners (OR=15.123, p=0.011).

In addition, the study established that those who had non-regular sex partners were 17.792 times more likely to be infected with STIs than their counterparts that did not have non-regular sex partners (OR=17.792, p=0.000). The respondents who indicated that they had 2 non-regular sex partners were 5.613 times more likely to contract STIs compared to those who had none (OR=5.613, p=0.005); similarly, those with more than two non-regular sex partners were found to be 8.959 times more likely to be infected with STIs as compared to those who had none (OR=8.959, p=0.008). Finally, respondents who were using condom just some of the times with their non-regular partners were 3.790 times more likely to be infected with STIs compared with those who were always using condom with their non-regular partners (OR=3.790, p=0.001).

**Table 4.27: Logistic analysis between behavioural risk factors and STIs prevalence**

| Independent Variables | Categories | Wald Statistics | OR | P-Value | 95% Confidence Interval (CI) Lower | Upper |
|---|---|---|---|---|---|---|
| Regular partner | No | Ref | | | | |
| | Yes | 15.519 | 0.771 | **0.000*** | 1.002 | 8.139 |
| Condom use Consistency with regular partner | Always | Ref | | | | |
| | Often | 2.138 | 1.721 | 1.982 | 0.108 | 9.122 |
| | Sometimes | 8.260 | 1.983 | 2.021 | 0.911 | 11.012 |
| | Never in 6 months | 35.967 | 15.123 | **0.011*** | 1.009 | 23.379 |
| Non-regular partner | No | Ref | | | | |
| | Yes | 45.294 | 17.792 | **0.000*** | 1.088 | 7.011 |
| Number of non-regular partners | None | Ref | | | | |
| | 1 | 8.919 | 0.374 | 1.209 | 0.833 | 1.139 |
| | 2 | 11.091 | 5.613 | **0.005*** | 1.011 | 1.309 |
| | >2 | 12.451 | 8.959 | **0.008*** | 1.221 | 39.330 |
| Consistency of condom use with non-regular partner | Always | Ref | | | | |
| | Often | 8.409 | 1.705 | 0.892 | 0.811 | 8.012 |
| | Sometimes | 27.227 | 3.790 | **0.001*** | 4.243 | 69.119 |
| | Never in 6 months | 5.557 | 7.302 | 0.205 | 0.263 | 6.692 |

### 4.10.5 Logistics regression between health seeking behaviour and STIs prevalence

The study sought to establish the statistical relationship between health seeking behaviour and STIs prevalence among HIV-PrEP users in Nairobi City County by conducting binary logistics regression analysis. The results (Table 4.28) indicate that respondents who had in the past 12 months visited health care facility when they fell sick were less likely to be infected with STIs as compared to those who had not (OR=0.551, p=0.004).

Additionally, the respondents who had in the past 12 months, had some health check-up at a health facility although they had no symptoms of STIs were less likely to be infected with STIs as compared to those who had not (OR=0.852, p=0.000). Moreover, the study established that those who normally (with exception to emergency cases) sought healthcare treatment from, traditional healers were 7.590 times more likely to contract STIs as compared to those who sought healthcare treatment from public healthcare facilities (OR=7.590, p=0.000).

**Table 4.28: Logistic analysis between health seeking behaviour and STIs prevalence**

| Independent Variables | Categories | Wald Statistics | OR | P-Value | 95% Confidence Interval (CI) Lower | Upper |
|---|---|---|---|---|---|---|
| In the past year, did you seek treatment for STIs? | No | Ref | | | | |
| | Yes | 33.444 | 0.551 | 0.004 | 2.878 | 28.261 |
| In the past 12 months, have you had any health check-up at a health facility although you had no health complaints? | No | Ref | | | | |
| | Yes | 22.152 | 0.852 | 0.000 | 1.209 | 15.321 |
| Have you ever refused to visit a health centre, although you were in need of care? | No | Ref | | | | |
| | Yes | 21.712 | 5.918 | 1.260 | 0.911 | 14.959 |
| Normally(with exception to emergency cases), where do you seek treatment from? | Public | Ref | | | | |
| | Private | 5.360 | 2.705 | 0.541 | 0.811 | 8.012 |
| | Pharmacist /Drugstore | 10.712 | 2.920 | 0.199 | 0.753 | 1.119 |
| | Self-medication | 15.035 | 4.355 | 0.081 | 0.892 | 2.059 |
| | Traditional healer | 22.205 | 7.590 | 0.000 | 1.911 | 2.771 |

# CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Introduction

This was an analytical cross-sectional study which aimed at establishing the magnitude of STIs among HIV-PrEP users in selected health facilities in Nairobi City County, Kenya. This chapter provides the summary of the findings, discussion, conclusions and recommendations of the study based on the research questions and objectives of the study.

## 5.2 Discussion

### 5.2.1 Socio-demographic characteristics of the study respondents

This study found out that majority (58.4%) of the study participants were male, compared to 41.6% who were female. This implies that majority of HIV-PrEP users in Nairobi County are male compared to female. This result concurs to a study conducted in United Stated which found out that males accounted for 95.3% of all HIV-PrEP users (Ya-lin *et al.*, 2018). However, this result is contrary to the findings of a study conducted in Kenya and Uganda which reported that 50% of HIV-PrEP users were female and also 50% were male, equal proportion of uptake (Koss *et al.*, 2020).

This study found that 39% of the study participants were aged between 25-34 years, while 25.1% were aged between 35-44 years. This implies most of the HIV-PrEP users in Nairobi County are within the age bracket of 25-44 years. This result is consistent to

a similar study done in New York which reported that the age group with the largest proportion of HIV-PrEP prescriptions (32.7%) was the age group 36-45 years old. The age groups with the lowest proportions of HIV-PrEP prescriptions were the youngest age groups, with 0.6% of those under 18 and 7.0% of those between 18 and 25 receiving HIV-PrEP prescription (Caponi *et al.*, 2019).

A study conducted in Kenya and Uganda also revealed that many (34%) of HIV-PrEP users were in the age bracket of 25 to 44 years (Koss *et al.*, 2020). According to a survey by Ya-lin *et al.* (2018) the annual number of PrEP users aged ≥16 years increased by 470%, from 13,748 in 2014 to 78,360 in 2016. In 2016, 65.0% of PrEP users were aged 25–44 years, and 0.1% were aged 16–17 years.

From the results it is evident that most (43.6%) of the respondents were holders of bachelor's degrees. This implies that most of the HIV-PrEP users in Nairobi County are well educated individuals who understand the importance of using HIV-PrEP to safeguard themselves against contracting HIV and AIDS. This finding is however inconsistent to the finding of a similar other study done in Kenya and Uganda which found out that 68% of the HIV-PrEP users did not study beyond primary school level (Koss *et al.*, 2020).

Based on the results presented, 37.9% were single, 31.3% were either divorced or separated, 20.8% widowed, while 10% either married or cohabiting. This is a clear indication that most of the HIV- PrEP users in Nairobi City County are single men and

women who have no commitment to particular sexual partner and may engage in risky sexual behaviours. This contrasts the findings of another study conducted in Kenya and Uganda whereby 51% of HIV-PrEP users were married (monogamous) (Koss *et al.*, 2020). Further, the study found that majority (49.3%) of the respondents had been using HIV-PrEP for a period of more than 5 years, 25.9% had been using HIV-PrEP for a period of between 4-5 years, 16.8% for a period of between 1-3 years, while the other 8% indicated that they had been using PrEP for just less than 1 year. This implies that most of the HIV-PrEP users visiting the targeted facilities had experience in using HIV-PrEP and so were in a position to provide the information sought by the researcher.

On the occupations, the results show that majority (53%) were self-employed, followed by 27.6% who were employed, while 19.4% were unemployed. This is inconsistent to a study conducted by Ginindza *et al.* (2017) who found that majority (52.8%) of respondents were unemployed, 39.3% were employed and 13.8% of them were self-employed.

Bivariate analysis revealed a significant association between gender and STIs prevalence among HIV-PrEP users in Nairobi ($\chi^2$=18.011, $p$=0.021<0.05), significant association between level of education and STIs prevalence ($\chi^2$=32.912, $p$=0.000<0.05), duration of using HIV-PrEP was also significantly against STIs prevalence ($\chi^2$=9.846, $p$=0.009<0.05). The study also established significant association between occupation and STIs prevalence ($\chi^2$=45.910, $p$=0.001<0.05). There was however, no significant

association between age and STIs prevalence ($\chi^2$=11.892, $p$=0.102>0.05) and between marital status and STIs prevalence ($\chi^2$=0.903, $p$=0.761>0.05).

Logistics regression analysis revealed that female HIV-PrEP users were more likely to contract STIs as compared to their male counterparts (OR=12.440, $p$=0.000); respondents with degrees were less likely to contract STIs compared to those with primary level of education (OR=0.883, $p$=0.009); those who had used PrEP for a period of between 4-5 years were less likely to contract STIs as compared to those who had been using it for less than 1 year (OR=0.917, $p$=0.000); the employed were less likely to contract STIs compared to the unemployed ones (OR=0.981, $p$=0.000).

### 5.2.2 Prevalence of STIs among HIV-PrEP users

The findings of this study established that 161 (45.8%) of the HIV-PrEP users had at least one curable STI. The prevalence of STIs among this groups was; 13.4% for gonorrhea, 9.7% for chlamydia, 7.4% for syphilis, 6.0% for trichomoniasis, 5.1% for herpes (Genital herpes), 3.7% for HIV and 0.5% for Genital warts. These results are slightly different from the findings of a study conducted in Nairobi, Kenya which found that prevalence among STIs was low, ranging from 0.9 % for syphilis, 1.1 % for gonorrhea, and 3.1 % for Chlamydia (Musyoki *et al.,* 2015). The results are also inconsistent with another similar study done in Nairobi which reported that the prevalence of CT was 13 %, TV 0.4 % and GC 0 % (Maina *et al.,* 2016).

However, the current findings are consistent with a study conducted in Uganda that found the prevalence of curable STIs was 39% [CT (21.4%), NG (5.9%), active syphilis (1.4%), multiple infections (10.3%)] and higher among females than males (75% vs 25%) (Mayanja *et al.*, 2021).

Similarly, the study findings are also consistent with a study conducted by Winston *et al*. (2015) in western Kenya which reported 28% (STIs prevalence) had at least one positive test; 14% had more than one positive test. Females were more affected than males. The predominant infection was HSV-2 (5% of males, 35% of females,), followed by chlamydia (3% of males, 16% of females), gonorrhoea (0% of males, 15% of females), HIV (0% of males, 15% of females), trichomoniasis (3% of males, 15% of females) and Syphilis (0% of males, 6% of females) (Winston *et al*, 2015). Whereas, a cross sectional study conducted in Kisumu, among women aged between the age of 18-24 years, showed that herpes simplex virus type 2 was the most prevalent STI at 30.4%, HIV was 6.7%, in addition, non-classical STIs such as bacterial vaginosis and yeast infection were diagnosed in 19.9% and 10.6% of the women respectively; Neisseria gonorrhoea and syphilis had a prevalence of 0.6% while Chlamydia trachomatis was 4.5% (Ombati *et al*…).

A study conducted by Ginindza *et al.* (2017) found that the overall STIs' weighted prevalence (excluding HIV and HPV) was 19.4% and individual for TV, NG, CT, Syphilis and genital warts was 8.4%, 6.0%, 7.0%, 1.4% and 2.0% respectively. The

overall weighted hr-HPV prevalence and HIV prevalence was 46.2% and 42.7% respectively.

### 5.2.3 Attitudes toward HIV-PrEP

Regarding attitudes toward HIV-PrEP the study established that majority (89.8%) of the users believed HIV-PrEP works for them, 89.2% were found to be less worried about HIV infection because they were on HIV-PrEP, while 89.7% were less worried about STIs since they were on HIV-PrEP. The study also found that majority (88.7%) of the HIV-PrEP users believed that HIV-PrEP makes people less likely to contract HIV. This is in disagreement with the conclusion made by Jansen *et al.* (2020) that pre-exposure prophylaxis can reduce the chance of getting HIV from sex or injection drug use and that when taken as prescribed, PrEP is highly effective for preventing HIV. The difference may be attributed to age group.

Moreover, most (88%) of the study participants agreed that they were of the belief that if people take HIV PrEP, they would probably stop using condoms, while 87.2% were of the opinion that if people take HIV PrEP, they would have multiple sexual partners. It is further evident that most (90.9%) of the respondents believed that HIV-PrEP would encourage people to take sexual risks, 59.8% disagreed with the statements that HIV-PrEP has serious side effects, while 58.4% of the respondents did not believe that HIV-PrEP is more dangerous than good.

Furthermore, the study established that majority (72.6%) of the respondents believed most STIs can be prevented with condom, while 27.4% had contrary opinion. Most of the respondents (75.5%) believed that most STIs could be cured with treatment, 61.5% were positive that STIs can be transmitted through kissing. The results further show that majority (73.8%) of the study participants were of the belief that STIs could only be transmitted sexually, while 64.1% strongly believed that HIV-PrEP could protect an individual against other STIs other than HIV.

The bivariate analysis results revealed a significant association between beliefs that HIV-PrEP works and prevalence of STIs ($\chi 2=12.110$, $p=0.000<0.05$); significant association between being less worried about HIV infection when on HIV PrEP and prevalence of STIs ($\chi 2=19.245$, $p=0.000<0.05$); significant association between being less worried about STIs while on HIV PrEP and prevalence of STIs ($\chi 2=23.104$, $p=0.003<0.05$).

Additionally, the study found significant association between the beliefs that if people take HIV PrEP, they would probably stop using condoms and prevalence of STIs ($\chi 2=11.346$, $p=0.031<0.05$), the belief that if people take HIV PrEP, they would probably stop using condoms was found to be significant against prevalence of STIs ($\chi 2=38.261$, $p=0.000<0.05$). Moreover, the study established a significant association between the beliefs that if people take HIV PrEP, they would have multiple sexual partners and prevalence of STIs ($\chi 2=20.446$, $p=0.001<0.05$).

Furthermore, significant association was established between beliefs that HIV-PrEP would encourage people to take sexual risks and prevalence of STIs ($\chi 2=12.897$, $p=0.020<0.05$). However, there was no significant association between the beliefs that HIV-PrEP has serious side effects and prevalence of STIs ($\chi 2=1.774$, $p=0.091>0.05$). Finally, the analysis results revealed an insignificant association between believing that HIV-PrEP is more dangerous than good and STIs prevalence ($\chi 2=0.923$, $p=1.253>0.05$).

Binary logistics regression analysis results revealed that those who strongly agreed HIV-PrEP works for them were less likely to contract STIs compared to those who strongly disagreed (OR=0.990, $p=0.001$); the respondents who agreed that they were less worried about HIV infection, since they were on HIV-PrEP were more likely to contract STIs compared to those who strongly disagreed with the statement (OR=8.355, $p=0.008$).

Moreover, those who were less worried about STIs since they were on HIV-PrEP were more likely to be infected by STIs compared to those who disagreed (OR=43.717, $p=0.000$) and (OR=21.383, $p=0.030$). It is further evident that respondents who strongly believed that I believe that if people take HIV-PrEP, they will have multiple sexual partners were more likely to contract STIs compared to those who believed otherwise (OR=5.721, $p=0.023$). Finally, the respondents who agreed with the statement that HIV-PrEP will encourage people to take sexual risks were more likely to contract STIs compared to those who strongly disagreed with the statement (OR=2.945, p=0.012).

### 5.2.4 STIs related level of knowledge among HIV-PrEP users

Regarding knowledge of transmission of STIs, the study revealed that 76.4% of the respondents had heard about STIs, 56.7% of the respondents knew that STIs could be transmitted through sex without using condom and 43.3% knew that sex with sex workers whether male or female could make one get STIs. Additionally, 58.7% of the respondents were aware that STIs could be transmitted through sexual contact with multiple partners; and 53.3% of respondents knew that receiving infected blood could be a channel of STIs. This compares with Folasayo *et al.* (2017) who found that the majority of respondents (86.6%) had heard about STIs. The study findings also concur with a study conducted by Mansor *et al.* (2020) in Malaysia revealed that 80% heard about STIs and could name the majority of them, Majority of the respondents (90%) were aware of the mode of transmission of STIs, which was non-use of condom (62.1%), sex with multiple partners (59.3%), sex with either male or female sex workers (59.1%) and blood transfusion (37%). The finding also agreed with the study conducted by Nigussie & Yosef (2020) that found out 47.7% of respondent mentioned unprotected sexual intercourse as modes of STIs transmission, 16.8% opted for unscreened blood transfusion and 12.8% of respondents were aware that multiple sex partners could contribute to STIs transmission. The study findings further are comparable with Folasayo *et al.* (2017) findings which show that the 92% of respondents were aware that route of transmission of STIs was unprotected sexual intercourse, 65.1% of respondents

mentioned that blood transfusion was one of the means of STIs transmission and 88.1% knew that having multiple sexual partners could increase the risk of infection.

The study looked at knowledge of prevention of STIs, the results of the study indicate 59.5% of the respondents were knowledgeable about the use of condom during sexual intercourse could prevent one from getting STIs and 59.8% were aware that STIs could be prevented by avoiding sexual contact with sex workers whether male or female. Similarly, 54.1% were aware that avoiding sexual contact with multiple partners was a prevention measure of STIs. Finally, 58.7% of the respondents were found to be aware of the fact that avoiding unscreened blood was a prevention measure of STIs. These findings are in contrast with a study conducted by Mansor *et al.* (2020) that revealed the top three control and preventive measures of STIs that the respondents were aware of (in a low rate) are: being faithful in an intimate relationship (23%), using condoms during sexual activity (15%), and vaccination against certain types of STIs (14%).

Also, the study disagrees with the findings reported by Nigussie & Yosef (2020) in which respondents mentioned some methods of STIs prevention: 33.1% for condom use, 26.9% for abstinence and 14.4% for being faithful to one sex partner. However, the study concurs with previous study conducted by Folasayo *et al.* (2017) which found that knowledge about STIs prevention was: 76.1% agreed that use of condoms can decrease the risk of being infected with an STI, 80% of respondents were in agreement that

monogamy can reduce one's chance of STIs and 71.4% of respondents mentioned that sexual abstinence is the most effective means of avoiding STIs.

In regard to source of STIs information, the study established that 38.2% of respondents received information about STIs from the internet specifically the social media platforms, 29.0% of respondents indicated that they received information from television or radio, 12.2% of respondents received information from friends, whereas 10.9% received STIs information from brochures, only 6.3% and 3.4% of the respondents received STIs information from magazines/ newspapers and books respectively. The finding concurs with Folasayo *et al.* (2017) who found most (77.3%) of the respondents identified the Internet as the main source. More than half of the students obtained it from the faculty curriculum. Only 34.0% of them obtained the information on STDs from their family members. However, the study finding is in contrast with a similar study conducted in South Western Nigeria found that the three major sources of information in decreasing order of importance were 68.7% for radio and television; 68.1% for teachers; and 44.9% for newspapers (Amu *et al.*,2015). Additionally, this also contrasts with reports of a study conducted in Borno state in Nigeria which found that majority of the respondents 72% acknowledged health education lesson as their source of information on STIs while 44% indicated friends as their source of information on STIs, 40% were informed from radio/television, 8.3% said they read about it on their own and 1.7% for other sources (Habu *et al.*, 2018). A study by Subbarao & Akhilesh (2017) found that teachers were the source of

information about STIs 58% students followed by internet 51.7%, newspaper/magazines 46.2%, TV/radio 45.1%, friends 40.5%, doctor/clinics 27.4%, parents 28 8%, and relatives 3.1%.

On the symptoms of STIs experienced during the past 12 months by HIV-PrEP Users in Nairobi, the findings revealed that 60.7% of the respondents had not experienced urethral discharge; 63.5% had not experienced any abnormal vaginal discharge with strong odour and 65.0% had not experienced genital ulcer or sore. Moreover, 56.4% of the respondents had not experienced genital itching; 72.6% also indicated that they had not experienced any pain during urination. Similarly, 65.8% of the respondents did not experience any swelling around the genital. Finally, 50.7% of the respondents indicated that they had not experienced frequent urination. This is in contrast with a similar study conducted in South Western Nigeria found that the three most commonly presented symptoms of STI were weight loss with 77.4% of respondents; 68.9% for painful micturition and 54.1% for genital ulcer (Amu *et al.*,2015). This also contrasts with that reported among Thai students in which the most commonly mentioned symptoms of STI were penile/vaginal discharge and genital itching (Svensson *et al.*, 2018).

Additionally, the finding disagrees with a study conducted among youths in North Central Nigeria in which the most popularly symptoms of STIs were rash, painful urination, and painful intercourse (Samkange-Zeeb *et al.*, 2016). Similarly, this study is in contrasts with a study conducted in Malawi found that in male patient's genital ulcer disease (GUD) was the most common STI (49%), followed by urethral discharge

(42%). In female patients, abnormal vaginal discharge with or without dysuria was the most common (50%), followed by genital ulcer disease (27%), and pelvic inflammatory disease (18%) (Zachariah *et al.*, 2015). The finding is inconsistent to a study conducted in Mpumalanga found that Urethral discharge was the STI symptom that was most reported by participants in the study (34.3%), this was followed by the combination of urethral discharge and painful micturition (16.3%), Vaginal discharge alone was reported with 13.3%, and a combination of vaginal discharge, lower abdominal pain and painful micturition with 12%, the remaining participants reported a combination of two or more signs or symptoms of an STI (Govender & Eche, 2017). Also, the finding disagrees with a study by Subbarao & Akhilesh (2017) found that Vaginal/urethral discharge was considered as a symptom of STIs by 38.8% of students followed by genital ulcer with 34.2%, fever on and off with 33.7%, 30.8% for pain while passing urine, 25.7% for swelling in the groin, and 29.7% of student experienced abdominal pain.

The study findings were inconsistent to Folasayo *et al.* (2017) who found that 62.6 % of respondent had ulcers in the genital organ, 65.4 % of respondent had pain while passing out urine, 53.6 % of respondent had swollen glands, fever and body ache, 63.7% of respondent had discharge from the penis, 62.4% of respondent had discharge from the vagina, 63% of respondent mentioned itching around the vagina and 50.4% of respondent had STIs without having any symptoms.

The findings of the bivariate analysis and binary logistic regression analysis established a statistically significant association between STIs related level of knowledge and STIs prevalence among HIV-PrEP users in Nairobi City County, Kenya.

### 5.2.5 Behavioural risk factors of STIs among HIV-PrEP users

The study established that 75.5% of the respondents started engaging in sexual intercourse way before they attained the age of 18 years, compared to 24.5% whose first time to engage in sexual relationship was after attainment of the age of 18 years. This implies that most of the HIV-PrEP users in Nairobi started having sexual intercourse before adulthood which amounts to risky sexual behaviour. This concurs with another study conducted in Tanzania which found out that reporting STI symptoms was statistically significant associated with age of first sex (OR 1.29, 95% CI (1.03–1.62) - those who initiated sex at age 16 or below reported more symptoms than those who delayed first sex until 17–19 years of age - and with STI knowledge (OR 1.25, 95% CI (1.004–1.54) (Abdul *et al.,* 2018). The finding is also consistent with Ayerdi *et al.* (2020) who found that the age of first sexual relations of majority (82.3%) of respondents was below 17 years old.

The study found that majority of the respondents (47.9%) were attracted to women. This is justified given that majority of the respondents were men, which naturally mean that they would be attracted to women. It is also clear from the results that slightly more than three tenths (31.30%) of the respondents were attracted to men, while 20.8% were

attracted to both men and women. This implies that among HIV-PrEP users in Nairobi City County, there are bisexuals who are attracted to both genders.

The study findings indicated that several behavioural factors are related to HIV-PrEP use among HIV-PrEP users in Nairobi City County. HIV-PrEP users were more likely to have had a recent STI diagnosis, have had condomless sexual intercourse, have used recreational drugs or practiced chemsex, have had sex with HIV positive sex partners, and have a greater number of sex partners.

The analysis results revealed that 55.8% of the respondents did not have a regular partner, with 44.2% having regular partners.

The results established 18.8% of the study participants were always using condoms with their regular partners. The finding agrees with Nyalela *et al.* (2018) who found that majority of respondents (72.4%) did not always use a condom when they had sex with their regular partner.

The study established that majority (52.1%) of the respondents did not use condom the last time they had sexual intercourse with their regular partners, only 47.9% of the respondents reported having been using condom the last time they had sexual intercourse with their regular. This is in consistent with a study conducted by Nyalela *et al.* (2018) who found that 64.5% of participant did not use condom the last time they sex with their regular partners.

The study revealed that majority (61%) of the respondents were found to have had non-regular partners (such as girlfriend/boyfriend, sex-workers, clients, Co – worker, etc.) in the previous 12 months. Additionally, the results show that majority (56.1%) of the respondents were not using condom the last time they had sexual intercourse with their non-regular partner This is in consistent with a study conducted by Nyalela *et al.* (2018) who found that 54.5% of participant did not use condom the last time they sex with their regular partners.

The findings show that most of the respondents (39.3%) were using condom just sometimes whenever having sexual intercourse with regular partners and most of respondents (26.2%) used condom most of the time with non- regular sexual partners. This implies that most of the HIV-PrEP users visiting health facilities in Nairobi City County are not consistent with the use of condom, which is a risky sexual behaviour. This concours with Jayawardena *et al.* (2018) who reported 27.5 % and 13.7% of respondent were using condom sometimes with regular sexual partner and most of the time while having sex with their non – regular sexual partners respectively.

The study was further corroborated by the study by Jayawardena *et al.* (2018) which found that most (92%) men reported having sexual intercourse during the past six months; of them, 40.8%had sex with multiple partners. Only 18.5% used condoms at the first premarital intercourse. The consistent use of condoms with non-marital partners during the past 6 months was only 13.7%. Common reasons for non-use of condoms were: belief that partner was faithful; poor knowledge about risk of unprotected sex;

view that condoms reduce pleasure and negatively affect intimacy; and inhibition in accessing condoms in public.

The study found that, more than half (54.10%) of the study participants had had more than 2 non-regular sexual partners while on HIV-PrEP. This is a clear indication that most of the HIV-PrEP users in Nairobi City County engages in very risky sexual behaviours that involve having multiple non-regular sexual partners. This concours with Ayerdi *et al*. (2020) who found more than half (68.5%) of respondent were engaged in sexual intercourse with multiple non-regular partners. This also consistent with Jayawardena *et al.* (2018) who found most (37.5%) of study participants had 2 or more non regular sexual partners during the past 6 months.

On varied reasons that were cited as reasons for not using or using condom with non-regular or regular sex partners, the findings revealed that majority (47.3%) of the respondents were using condom while having sexual intercourse with their regular partners as a way of protecting themselves from contracting STIs and HIV and AIDS. On the other hand, most (49.6%) of those found not to be using condom with regular partners cited being on HIV-PrEP as the reason for not using condom. The analysis outcome showed that most (23.4%) of the respondents were using condom with non-regular partners because their partners requested for it, 21.1% cited protection from STIs and HIV and AIDS as the reason. Further, the findings revealed that majority (24.5% and 21.9%) the respondents that were never using condom when having sexual

intercourse with non-regular partners, the reasons cited were: partner objection and being on HIV-PrEP respectively. This concours with Grant *et al.,* (2017) who conducted a similar study and found that 35 to 85% of respondents could tolerate unprotected sexual intercourse either with their regular or non-regular sexual partners while on HIV-PrEP.

Furthermore, logistics regression analysis indicated that respondent with regular sexual partners were less likely to contract STIs compared to those who did not have regular sexual partners (OR=0.771, p=0.000); respondents who had not been consistent with the use of condom with regular partners in the previous 6 months were found to be 15.123 times more likely to get infected with STIs than those who were using condom consistent in the same time period with regular partners (OR=15.123, p=0.011). In addition, the study established that those who had non-regular sex partners were 17.792 times more likely to be infected with STIs than their counterparts that did not have non-regular sex partners (OR=17.792, p=0.000).

The study in addition discovered that the respondents with two non-regular sex partners were 5.613 times more likely to contract STIs compared to those who had none (OR=5.613, p=0.005); similarly, those with more than two non-regular sex partners were found to be 8.959 times more likely to be infected with STIs as compared to those who had none (OR=8.959, p=0.008). Finally, respondents who were using condom just some of the times with their non-regular partners were 3.790 times more likely to be

infected with STIs compared with those who were always using condom with their non-regular partners (OR=3.790, p=0.001).

Regarding Substance use to influence sexual behaviour, the study found out that majority 191 (54.4%) were using alcohol, 140 (39.9%) were abusing drugs, 75(21.4%) were found to be using injectable drugs, whereas 62 (17.7%) were using recreational drugs such as marijuana. This implies that the substance commonly used by patients that took part in this study was alcohol. Alcohol use may contribute to engagement in sexual behaviours (e.g., sex without a condom) that increase one's risk for HIV and other sexually transmitted infections.

This finding is consistent with a study conducted in western Kenya revealed that most (77%) participants reported drug use and 41.2% of males and 51.9% of females reported alcohol use. Volatile substance misuse (glue or fuel inhalation) was common (84.9% of males, 50.6% of females) (Winston *et al.*, 2015). These findings also concur with a study conducted in Borno state in Nigeria in which drug abuse is likely factor that may influence the sexual behavior (Habu *et al.*, 2018). The study findings were supported by the conclusion made by Evers *et al*. (2019) who opined that the use of alcohol and drugs with sex reduces the perception of risk and tends toward unprotected sexual practices that increases STIs acquisition.

However, the study disagreed with Folasayo *et al.* (2017) who found 5.8% only injected drugs before having sex against 94.2% who did not; 9.4% only took drugs before

having sex against 90.6% who did not; only 17.4% drunk alcohol before having sex against 82.6% who did not. Folasayo *et al.* (2017) concluded that alcohol intake could not increase an individual's susceptibility to STIs with 38.6% of respondents, but intake of some drugs can increase an individual's susceptibility to STIs with 61.4% of respondents.

The results of the bivariate analysis established a statistically significant association between behavioral risk factors of STIs among HIV-PrEP and STIs prevalence for p values 0.000, 0.049 and 0.009 are all less than 0.05 at 95% level of significance.

### 5.2.6 Health seeking behaviour for STIs among HIV-PrEP users

The study found out that 59% of the respondents did not seek treatment for STIs in the past year, while only 41% having sought treatment for STIs in the past year. The finding concurs with Ngo *et al.* (2017) who opined that majority of HIV-PrEP users' decision to seek STIs treatment and HIV testing is influenced by the complex interplay of personal risk perceptions, social relationships and community discourse. However, the finding disagrees with a study conducted by Seidu *et al.* (2022) in sub-Saharan Africa that revealed that majority (66.1%) of respondents with STIs sought for treatment. Additionally, this finding disagrees with the findings of similar study conducted in Ghana which found that 72% of participant sought treatment for STIs while only 28% of them did not seek treatment for STIs (Abuosi *et al.*, 2022).

The study further established that majority (60.7%) of the respondents did not have any health check-up at a health facility because they did not have any symptoms of STIs. Furthermore, most (63%) of the respondents had had instances in their lives where they refused to visit health Centre, even although they were in serious need of care, this points to poor health seeking behavior for STIs among HIV-PrEP users in Nairobi City County.

The study established further that respondents were seeking healthcare from various places; majority of them (39.3%) indicated that they sought treatment from pharmacist at drugstore/pharmacy under normal circumstances with exception to emergency cases, 23.6% sought treatment from public health facility, 15.1% sought treatment from private health facility, while 19.1% indicated they visited traditional practitioners or healers under normal circumstances with exception to emergency cases. These findings concur with a study conducted in Tanzania by Abdul *et al.* (2018) who found out f that the majority of respondents reported the use of a private pharmacy (79.2%) in the past year for their general health care needs, followed by dispensaries or health facilities (49.1%). Fewer reported using inpatient or outpatient hospital services, 11.8 and 10.3% respectively. About 20% of those who reported STI symptoms were visited by home-based care or community health workers in the year prior to the survey. Some respondents reported the use of a traditional healer (13.2%). Only one third (34.4%) of respondents reporting STI symptoms in the past year had sought treatment; most of them did so at private clinics or pharmacies (27.3%), followed by government clinics

(26.0%). Consulting traditional healers or self-medication for STI symptoms was rare. Additionally, Ngo *et al.* (2017) reported that most of HIV-PrEP users sought treatment at pharmacies when they noticed symptoms of the genital tract. Their decision to seek care in health facilities and HIV testing was hampered by the high costs of treatment, judgmental attitudes of service providers, and lack of information on testing services. Abuosi *et al.* (2022) in his study reported that among the participants who sought treatment for STIs (n = 532), 34% sought treatment at a chemical shop/drug store, 26% sought treatment at a government hospital/polyclinic and 10% self-medicated.

However, this is in contrast with a similar study in Nigeria Desmennu *et al.* (2018) in which the major treatment regimen for STIs was traditional remedies and drugs obtained from patent medicine vendors. Traditional remedies were preferred by most of the participants and considered to be more effective.

The results of the bivariate analysis established a statistically significant association between health seeking behavior for STIs and STIs prevalence for p values 0.003, 0.000, 0.027 and 0.000 are all less than 0.05 at 95% level of significance. The findings on the most significant factor for STIs prevalence indicate that HIV-PrEP users' health seeking behavior for STIs is the most significant predictor for STIs prevalence. These results points to poor health seeking behavior for STIs among HIV-PrEP users in Nairobi City County. This means that a lot of effort needs to be put on changing the HIV-PrEP users' health seeking behavior for STIs if we are to reduce STIs prevalence.

## 5.3 Conclusions

The aim of this study was to assess the prevalence of STIs among HIV-PrEP users in selected health facilities in Nairobi City County, Kenya. Based on the results, it can be concluded that:

1. The prevalence of STIs among HIV-PrEP users in Nairobi City County is high at 45.8%. This indicates that STIs despite being treatable and curable, are a serious public health challenge in Nairobi City County.
2. Socio-demographic characteristics such as younger age (aged between 25-44 years), gender (more women than men), high education level (holders of Bachelor's degree), single women and divorced/separated women and self-employment may contribute to high prevalence of STIs among HIV-PrEP users in Nairobi City County.
3. HIV-PrEP users have positive attitude towards HIV-PrEP use as a protective measure against HIV. However, this leads to high risky sexual behaviour characterized by reduced condom use, increased number of sexual partners, increased use of recreational drugs, increased sexual intercourse with HIV positive sex partners etc... This could explain the high STIs prevalence observed in this study.
4. HIV-PrEP users in Nairobi City County are knowledgeable about STIs (awareness, transmission and prevention). However, this does not translate into safe sexual behaviour against STIs. Additionally, the majority of HIV-PrEP users were

asymptomatic. This could also explain the high prevalence of STIs among HIV-PrEP users reported in this study.

5. Health seeking behaviour for STIs among HIV-PrEP users in Nairobi City County is limited as the majority of the targeted cohort do not seek check-up from health facilities whenever they do not have any health complaints and do not visit health centre, even when they are in serious need of care. This could lead to late diagnosis and transmission of STIs among this cohort.

## 5.4 Recommendations

### 5.4.1 Recommendations from the study

Based on the study results and conclusions drawn from the study, the following are the recommendations:

1. As the syndromic approach to the management of STIs leads to an underestimation of the proportion of infected individuals, as a large majority tend to be asymptomatic; the County facilities visited offering HIV-PrEP services should implement a continuous comprehensive routine screening tests for STIs in CCC, FP clinics for prompt identification and treatment of asymptomatic cases in order to reduce high prevalence of STIs among HIV-PrEP users in Nairobi City County.
2. Socio-demographic characteristics such as age, gender, etc… being key drivers of curable STIs among HIV-PrEP users should be integral part of awareness creation trainings manual and guidelines on STIs control at the facility and county level.

3. Since positive attitude towards HIV-PrEP use leads to high risky sexual behaviour among the study cohort, the county government and facility management should:
    - Create awareness about STIs for risky sexual behaviour change among HIV-PrEP users.
    - Establish counselling unit within the facilities to provide health information that is basic, accurate in order to promote self-skill and knowledge among HIV-PrEP users.
4. STIs service providers should provide friendly environmental and non-judgmental services self-skill trainings to change the risky sexual behaviour among HIV-PrEP users in Nairobi City County.
5. Although HIV-PrEP users have high level of knowledge about curable STIs which does not translate into safe sexual behaviour and since majority of STIs were asymptomatic, they should be encouraged by both the facility management and service providers to undertake routine STIs screening tests and treatment as well as frequent safe sexual behaviour awareness creation education.

### 5.4.2 Recommendations for further research

1. The findings of the current study are limited to just five health facilities in Nairobi City County, there is need for a similar study to be replicated in a more large-scale researches whose findings can then be better generalized to the whole population.

2. Longitudinal study on impact of HIV-PrEP on STIs reported in this study, whether they lead to serious morbidity and mortality or even to determine the economic implications and quality of life of the infected individuals over time.

## REFERENCES


Abdul, R., Gerritsen, A. A., Mwangome, M., & Geubbels, E. (2018). Prevalence of self-reported symptoms of sexually transmitted infections, knowledge and sexual behaviour among youth in semi-rural Tanzania in the period of adolescent friendly health services strategy implementation. *BMC infectious diseases*, *18*(1), 1-10.

Abuosi, A. A., Ackon, S. K., & Anaba, E. A. (2022). Health-seeking behaviours of young women with sexually transmitted infections: Analysis of the 2014 Ghana Demographic and Health Survey. *Plos one*, *17*(11), e0277205.

Aggarwal, S., Singh, A. K., Balaji, S., & Ambalkar, D. (2022). Sexually Transmitted Infections (STIs) and Its Changing Scenario: A Scoping Review. *Combinatorial Chemistry & High Throughput Screening*, *25*(10), 1630-1638.

Ambaye, E. (2022). *Sero-Prevalence and associated Factors of sexually Transmitted Infections among Youths attending Youth Friendly Services at Selected Health Facilities in Hawassa, Ethiopia BY: Erdachew* (Doctoral dissertation, HU).

Amico, K. R., & Bekker, L. G. (2019). Global PrEP roll-out: recommendations for programmatic success. *The lancet HIV*, *6*(2), e137-e140.

Amu, E. O., & Adegun, P. T. (2015). Awareness and knowledge of sexually transmitted infections among secondary school adolescents in Ado Ekiti, South Western Nigeria. *Journal of sexually transmitted diseases*, *2015*.

Apiribu, F., Ncama, B. P., & Duma, S. E. (2020). Forms of and Factors Associated with Perpetration of Intimate Partner Violence by Men on Their Female Partners Following HIV Status Disclosure in the Ashanti Region of Ghana: A Qualitative Study. *Global Journal of Health Science*, *12*(6).

Arnold, T., Brinkley-Rubinstein, L., Chan, P. A., Perez-Brumer, A., Bologna, E. S., Beauchamps, L., & Nunn, A. (2017). Social, structural, behavioral and clinical factors influencing retention in Pre-Exposure Prophylaxis (PrEP) care in Mississippi. *PloS one*, *12*(2), e0172354.

Ayerdi Aguirrebengoa, O., Vera Garcia, M., Rueda Sanchez, M., D´ Elia, G., Chavero Mendez, B., Alvargonzalez Arrancudiaga, M., ... & Del Romero Guerrero, J. (2020). Risk factors associated with sexually transmitted infections and HIV among adolescents in a reference clinic in Madrid. *PLoS One*, *15*(3), e0228998.

Bae, S., & Lee, G. (2022). AAUS guidelines 2021 revision sexually transmitted infection (STIs) diagnostic strategy for STI. *Journal of Infection and Chemotherapy*, *28*(2), 135-141.

Balle, C., Lennard, K., Dabee, S., Barnabas, S. L., Jaumdally, S. Z., Gasper, M. A., ... & Jaspan, H. B. (2018). Endocervical and vaginal microbiota in South African

adolescents with asymptomatic Chlamydia trachomatis infection. *Scientific reports*, *8*(1), 11109.

Barreiro, P. (2018). Sexually Transmitted Infections on the Rise in PrEP Users. *AIDS reviews*, *20*(1), 71-71.

Bass, S. B., Kelly, P. J., Brajuha, J., Gutierrez-Mock, L., Koester, K., D'Avanzo, P., & Sevelius, J. (2022). Exploring barriers and facilitators to PrEP use among transgender women in two urban areas: implications for messaging and communication. *BMC public health*, *22*(1), 1-10.

Beymer, M. R., DeVost, M. A., Weiss, R. E., Dierst-Davies, R., Shover, C. L., Landovitz, R. J., ... & Bolan, R. K. (2018). Does HIV pre-exposure prophylaxis use lead to a higher incidence of sexually transmitted infections? A case-crossover study of men who have sex with men in Los Angeles, California. *Sexually transmitted infections*, *94*(6), 457-462.

Bhutto, A. Q., & Nisar, N. (2017). Health-seeking behaviour of people living with HIV/AIDS and their satisfaction with health services provided at a tertiary care hospital, Karachi, Pakistan. *Eastern Mediterranean Health Journal*, *23*(1).

Blumenthal, J., & Haubrich, R. (2016). Risk compensation in PrEP: an old debate emerges yet again. *The virtual mentor: VM*, *16*(11), 909.

Caponi, M., Burgess, C., Leatherwood, A., & Molano, L. F. (2019). Demographic characteristics associated with the use of HIV pre-exposure prophylaxis (PrEP) in an urban, community health center. *Preventive Medicine Reports*, *15*, 100889.

Centers for Disease Control and Prevention. (2014). Pre-exposure prophylaxis (PrEP) for HIV prevention. *Revised May*.

Centers for Disease Control and Prevention. Sexually transmitted disease surveillance 2015. Published October 2016. Accessed November 24, 2020.

Chan, P. A., Goedel, W. C., Nunn, A. S., Sowemimo-Coker, G., Galárraga, O., Prosperi, M., ... & Marshall, B. D. (2019). Potential impact of interventions to enhance retention in care during real-world HIV pre-exposure prophylaxis implementation. *AIDS patient care and STDs*, *33*(10), 434-439.

Chapin, J. R (2019). *Third Person Perception and Optimistic Bias among Urban Minority at Risk Youth.* Communication Research, 27 (1), 51-81. https://doi.org/101177/009365000027001003

Choudhri, Y., Miller, J., Sandhu, J., Leon, A., & Aho, J. (2018). Sexually transmitted infections: Gonorrhea in Canada, 2010–2015. *Canada Communicable Disease Report*, *44*(2), 37.

Cooper, D. R., & Schindler, P. S. (2011). Qualitative research. *Business research methods*, *4*(1), 160-182.

Craig-Kuhn, M. C., Schmidt, N., Lederer, A., Gomes, G., Watson, S., Scott Jr, G., ... & Kissinger, P. (2020). Sex education and STI fatalism, testing and infection among young African American men who have sex with women. *Sex Education*, 1-13.

Daka, H., Mugala, A., & Makowa, L. (2021). Health Care Seeking Behaviour and Utilization of Health Services by Kalingalinga Compound Residents aged between 16years and 60 years in Lusaka City, Zambia. *International Journal of Health Systems and Implementation Research*, *5*(2), 25-38.

Danielsson, M., Berglund, T., Forsberg, M., Larsson, M., Rogala, C., & Tydén, T. (2016). Sexual and reproductive health: Health in Sweden: The National Public Health Report 2012. *Scandinavian Journal of Public Health, 40*(9 Suppl.), 176–196.

Desmennu, A. T., Titiloye, M. A., & Owoaje, E. T. (2018). Behavioural risk factors for sexually transmitted infections and health seeking behaviour of street youths in Ibadan, Nigeria. *African Health Sciences*, *18*(1), 180-187.

Deuba, K. (2017). HIV trends, risk behaviours, social structural barriers and retention in HIV care among key populations in Nepal and the Asia-Pacific region.

Drake, A. L., Wilson, S. K., Kinuthia, J., Roxby, A. C., Matemo, D., Farquhar, C., & Rao, D. (2015). Health care-seeking behaviour of HIV-infected mothers and male partners in Nairobi, Kenya. *Global public health*, *10*(10), 1215-1226.

Dyer, T. V., Turpin, R. E., Stall, R., Khan, M. R., Nelson, L. E., Brewer, R., ... & Mayer, K. H. (2020). Latent Profile Analysis of a Syndemic of Vulnerability Factors on Incident Sexually Transmitted Infection in a Cohort of Black Men Who Have Sex With Men Only and Black Men Who Have Sex With Men and Women in the HIV Prevention Trials Network 061 Study. *Sexually Transmitted Diseases*, *47*(9), 571-579.

Emmanuel, G., Folayan, M., Undelikwe, G., Ochonye, B., Jayeoba, T., Yusuf, A., ... &Kalaiwo, A. (2020). Community perspectives on barriers and challenges to HIV pre-exposure prophylaxis access by men who have sex with men and female sex workers access in Nigeria. *BMC Public Health*, *20*(1), 1-10.

Evers, Y. J., Van Liere, G. A., Hoebe, C. J., & Dukers-Muijrers, N. H. (2019). Chemsex among men who have sex with men living outside major cities and associations with sexually transmitted infections: A cross-sectional study in the Netherlands. *PloS one*, *14*(5), e0216732.

Family Health International (2019). Assessment of Youth Reproductive Health and HIV Programs in Kenya. Nairobi, Kenya.

Folasayo, A. T., Oluwasegun, A. J., Samsudin, S., Saudi, S. N. S., Osman, M., & Hamat, R. A. (2017). Assessing the knowledge level, attitudes, risky behaviors and preventive practices on sexually transmitted diseases among university

students as future healthcare providers in the central zone of Malaysia: a cross-sectional study. *International journal of environmental research and public health*, *14*(2), 159.

Gamarel, K. E., Sevelius, J. M., Reisner, S. L., Richardson, R. L., Darbes, L. A., Nemoto, T., & Operario, D. (2020). Relationship stigma and HIV risk behavior among cisgender men partnered with transgender women: The moderating role of sexual identity. *Archives of sexual behavior*, *49*(1), 175-184.

Ginindza, T. G., Stefan, C. D., Tsoka-Gwegweni, J. M., Dlamini, X., Jolly, P. E., Weiderpass, E., ... & Sartorius, B. (2017). Prevalence and risk factors associated with sexually transmitted infections (STIs) among women of reproductive age in Swaziland. *Infectious agents and cancer*, *12*(1), 1-12.

Goodreau, S. M., Pollock, E. D., Wang, L. Y., Aslam, M. V., Barrios, L. C., Dunville, R. L., ... & Rosenberg, E. S. (2021). Impacts of changing sexual behavior on chlamydia and gonorrhea burden among US high school students, 2007–2017. *Sexually transmitted diseases*, *48*(9), 635.

Govender, I., & Eche, M. (2017). Health-seeking behaviour of people with sexually transmitted infections in the community of Nkomazi East, Mpumalanga. *Southern African Journal of Epidemiology and Infection*, *27*(4), 195-198.

Grant, H. (2020). *The scale-up of PrEP for HIV prevention in high-risk women in sub-Saharan Africa: use of mathematical modelling to inform policy making* (Doctoral dissertation, London School of Hygiene & Tropical Medicine).

Grant, H., Mukandavire, Z., Eakle, R., Prudden, H., B Gomez, G., Rees, H., & Watts, C. (2017). When are declines in condom use while using PrEP a concern? Modelling insights from a Hillbrow, South Africa case study. *Journal of the International AIDS Society*, *20*(1), 21744.

Grant, R. M., Lama, J. R., Anderson, P. L., McMahan, V., Liu, A. Y., Vargas, L., ... & Glidden, D. V. (2016). Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *New England Journal of Medicine*, *363*(27), 2587-2599.

Grey, J. A., Torrone, E. A., Sullivan, P. S., Weiss, K. M., & Aral, S. O. (2019). Population and individual-level effects of human immunodeficiency virus preexposure prophylaxis on sexually transmitted infection epidemics among men who have sex with men. *Sexually Transmitted Diseases*, *46*(12), 759-761.

Habu, H., Emmanuel, O. C., Inuwa, A., Dathini, H., Maigari, B., Lona, N., ... & Alih, F. I. (2018). Awareness and practice of prevention of sexually transmitted diseases among demonstration secondary school students, university of Maiduguri, Borno State. *Journal of Health Education Research and Development*, *6*(3), 266-271.

Höglund, A. T., Tydén, T., Hannerfors, A. K., & Larsson, M. (2016). Knowledge of human papillomavirus and attitudes to vaccination among Swedish high school students. *International journal of STD & AIDS*, *20*(2), 102-107.

Holloway, I. W., Tan, D., Bednarczyk, R. A., Fenimore, V. L., Randall, L., Lutz, C. S., & Frew, P. M. (2020). Concomitant utilization of pre-exposure prophylaxis (PrEP) and meningococcal vaccine (MenACWY) among gay, bisexual, and other men who have sex with men in Los Angeles County, California. *Archives of Sexual Behavior*, *49*(1), 137-146.

Holt, M., Lea, T., Mao, L., Kolstee, J., Zablotska, I., Duck, T., ... & Prestage, G. (2018). Community-level changes in condom use and uptake of HIV pre-exposure prophylaxis by gay and bisexual men in Melbourne and Sydney, Australia: results of repeated behavioural surveillance in 2013–17. *The lancet HIV*, *5*(8), e448-e456.

Hughes, Y., & Sawleshwarkar, S. (2023). Sexually Transmitted Diseases: An Overview. *Sexually Transmissible Oral Diseases*, 1-24.

Irungu, E. M., Ngure, K., Mugwanya, K. K., Awuor, M., Dollah, A., Ongolly, F., ... & Morton, J. F. (2020). "Now that PrEP is reducing the risk of transmission of HIV, why then do you still insist that we use condoms?" the condom quandary among PrEP users and health care providers in Kenya. *AIDS care*, 1-9.

Jansen, K., Steffen, G., Potthoff, A., Schuppe, A. K., Beer, D., Jessen, H., ... & MSM Screening Study group. (2020). STI in times of PrEP: high prevalence of chlamydia, gonorrhea, and mycoplasma at different anatomic sites in men who have sex with men in Germany. *BMC infectious diseases*, *20*(1), 110.

Jayawardena, K. A., Silva, K. T., Jayawardena, C. K., & Samarakoon, S. (2018). Behavioural risk factors of men associated with transmission of sexually transmitted infections (STIs) in Sri Lanka. *WHO South-East Asia Journal of Public Health*, *1*(1), 69-75.

Kavana, N. J. (2021). Assessment of knowledge, attitude and preventive practices towards sexually transmitted infections among secondary school students in Mlimba Division, Ifakara, Tanzania. *International Journal of Sexually Transmitted Diseases*, *1*(1), 20-27.

KHIS Aggregate . Kenya health information system (KHIS) for aggregate reporting and analysis. 2020. Available: https://hiskenya.org/dhis-web-commons/security/login.action [Accessed 08 Apr 2023].

Kiragu, K. (2018). Youth and HIV. *AIDS: Can we avoid catastrophe*? The John Hopkins University Bloomberg School of Public Health, Population Information Program. Population reports, 9(3), 1-39.

Koss, C. A., Havlir, D. V., Ayieko, J., Kwarisiima, D., Kabami, J., Chamie, G., ... & Balzer, L. B. (2021). HIV incidence after pre-exposure prophylaxis initiation

among women and men at elevated HIV risk: A population-based study in rural Kenya and Uganda. *PLoS medicine*, *18*(2), e1003492.

Kumar, S., Haderxhanaj, L. T., & Spicknall, I. H. (2020). Reviewing PrEP's Effect on STI Incidence Among Men Who Have sex with Men—Balancing Increased STI Screening and Potential Behavioral Sexual Risk Compensation. *AIDS and Behavior*, 1-9.

Kumar, S., Haderxhanaj, L. T., & Spicknall, I. H. (2021). Reviewing PrEP's effect on STI incidence among men who have sex with men—balancing increased STI screening and potential behavioral sexual risk compensation. *AIDS and Behavior*, *25*(6), 1810-1818.

Lal, L., Audsley, J., Murphy, D., Fairley, C. K., Stoove, M., Roth, N., ... & Wright, E. (2017). Medication adherence, condom use and sexually transmitted infections in Australian PrEP users: interim results from the Victorian PrEP Demonstration Project. *AIDS*, *31*(12), 1709-14.

Lemly, D., & Gupta, N. (2020). Sexually transmitted infections part 2: discharge syndromes and pelvic inflammatory disease. *Pediatrics in Review*, *41*(10), 522-537.

Lengen, C., Jäger, S., Kistemann, T. (2019) The knowledge, education and behaviour of young people with regard to chlamydia trachomatis in Aarhus, Denmark and Bonn, Germany: Do prevention concepts matter? Social Science & Medicine 70 1789- 1798.

Liu, Albert Y., Stephanie E. Cohen, Eric Vittinghoff, Peter L. Anderson, Susanne Doblecki-Lewis, Oliver Bacon, Wairimu Chege et al. "Preexposure prophylaxis for HIV infection integrated with municipal-and community-based sexual health services." *JAMA internal medicine* 176, no. 1 (2016): 75-84.

Maina, A. N., Kimani, J., & Anzala, O. (2016). Prevalence and risk factors of three curable sexually transmitted infections among women in Nairobi, Kenya. *BMC research notes*, *9*(1), 1-5.

Mansor, N., Ahmad, N., & Rahman, H. A. (2020). Determinants of knowledge on sexually transmitted infections among students in public higher education institutions in Melaka state, Malaysia. *Plos one*, *15*(10), e0240842.

Marcus, J. L., Hurley, L. B., Hare, C. B., Nguyen, D. P., Phengrasamy, T., Silverberg, M. J., ... & Volk, J. E. (2016). Preexposure prophylaxis for HIV prevention in a large integrated health care system: adherence, renal safety, and discontinuation. *Journal of acquired immune deficiency syndromes (1999)*, *73*(5), 540.

Masyuko, S., Mukui, I., Njathi, O., Kimani, M., Oluoch, P., Wamicwe, J., ... & Cherutich, P. (2018). Pre-exposure prophylaxis rollout in a national public sector program: the Kenyan case study. *Sexual health*, *15*(6), 578-586.

Mavhandu-Mudzusi, A. H., & tesfay Asgedom, T. (2016). The prevalence of risky sexual behaviours amongst undergraduate students in Jigjiga University, Ethiopia. *health sa gesondheid*, *21*, 179-186.

Mayanja, Y., Lunkuse, J., Kalungi, H., Senyonga, W., Kamacooko, O., & Ruzagira, E. (2021). P135 High prevalence of curable sexually transmitted infections among 14–19 year old adolescents at risk of HIV infection in Kampala, Uganda.

Mayer, K. H., Hosek, S., Cohen, S., Liu, A., Pickett, J., Warren, M., ... & Grant, R. (2015). Antiretroviral pre-exposure prophylaxis implementation in the United States: a work in progress. *Journal of the International AIDS Society*, *18*, 19980.

McCormack, S., Dunn, D. T., Desai, M., Dolling, D. I., Gafos, M., Gilson, R., ... & Gill, O. N. (2016). Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): effectiveness results from the pilot phase of a pragmatic open-label randomised trial. *The Lancet*, *387*(10013), 53-60.

Mcharo, R. D., Kisinda, A., Njovu, L., Mcharo, M., Mbwilo, F., Mihale, G., ... & Msuya, S. E. (2022). Prevalence of and risk factors associated with HIV, Herpes Simplex Virus-type 2, Chlamydia trachomatis and Neisseria gonorrhoeae infections among 18–24 year old students attending Higher Learning Institutions in Mbeya-Tanzania. *PloS one*, *17*(5), e0266596.

McManus, H., Grulich, A. E., Amin, J., Selvey, C., Vickers, T., Bavinton, B., ... & Guy, R. (2020). Comparison of trends in rates of sexually transmitted infections before vs after initiation of HIV preexposure prophylaxis among men who have sex with men. *JAMA network open*, *3*(12), e2030806-e2030806.

Micah, A. E., Su, Y., Bachmeier, S. D., Chapin, A., Cogswell, I. E., Crosby, S. W., ... & Moghadaszadeh, M. (2020). Health sector spending and spending on HIV/AIDS, tuberculosis, and malaria, and development assistance for health: progress towards Sustainable Development Goal 3. *The Lancet*, *396*(10252), 693-724.

Mirandola, M., Gios, L., Joanna Davis, R., Furegato, M., Breveglieri, M., Folch, C., ... & Stehlíková, D. (2017). Socio-demographic factors predicting HIV test seeking behaviour among MSM in 6 EU cities. *European journal of public health*, *27*(2), 313-318.

Moges, N. A., Adesina, O. A., Okunlola, M. A., Berhane, Y., & Akinyemi, J. O. (2020). Risky Sexual Practice, Sexually Transmitted Infection and Associated Factors Among Newly Diagnosed HIV-positive People in Northwest Ethiopia. *HIV/AIDS (Auckland, NZ)*, *12*, 431.

Montaño, M. A., Dombrowski, J. C., Dasgupta, S., Golden, M. R., Manhart, L. E., Barbee, L. A., ... &Khosropour, C. M. (2019). Differences in sexually transmitted infection risk comparing preexposure prophylaxis users and

propensity score matched historical controls in a clinic setting. *Aids*, *33*(11), 1773-1780.

Mugenda, O. M., & Mugenda, G. A.(2003). *Research methods*.

Mugwanya, K. K., Pintye, J., Kinuthia, J., Abuna, F., Lagat, H., Begnel, E. R. (2019). PrEP Implementation for Young Women and Adolescents (PrIYA) Program. Integrating preexposure prophylaxis delivery in routine family planning clinics: a feasibility programmatic evaluation in Kenya. *PLoS medicine*, *16*(9), e1002885.

Musyoki, H., Kellogg, T. A., Geibel, S., Muraguri, N., Okal, J., Tun, W., ... & Kim, A. A. (2015). Prevalence of HIV, sexually transmitted infections, and risk behaviours among female sex workers in Nairobi, Kenya: results of a respondent driven sampling study. *AIDS and Behavior*, *19*(1), 46-58.

Muttai, H., Guyah, B., Musingila, P., Achia, T., Miruka, F., Wanjohi, S., ... & Zielinski-Gutierrez, E. (2020). Development and Validation of a Sociodemographic and Behavioral Characteristics-Based Risk-Score Algorithm for Targeting HIV Testing Among Adults in Kenya. *AIDS and Behavior*, 1-14.

Mwangi, J. (2020). *Human Immunodeficiency Virus and Selected Coinfections in Kenya: An Investigation on Prevalence, Genotypes, CD4 Distribution and Testing Algorithms Among HIV Infected Individuals* (Doctoral dissertation, JKUAT-COHES).

Nacht, C., Agingu, W., Otieno, F., Odhiambo, F., & Mehta, S. D. (2020). Antimicrobial resistance patterns in Neisseria gonorrhoeae among male clients of a sexually transmitted infections clinic in Kisumu, Kenya. *International journal of STD & AIDS*, *31*(1), 46-52.

Naicker, C. L., Mansoor, L. E., Dawood, H., Naidoo, K., Singo, D., Matten, D., ... & Karim, Q. A. (2020). Importance of early identification of PrEP breakthrough infections in a generalized HIV epidemic: a case report from a PrEP demonstration project in South Africa. *BMC Infectious Diseases*, *20*(1), 1-6.

NASCOP. Framework for the implementation of pre-exposure prophylaxis of HIV in Kenya. http://www.prepwatch.org/wp-content/uploads/2017/05/Kenya_PrEP_Implementation_Framework-1.pdf. Accessed July 6 2017.

Naswa, S., & Marfatia, Y. S. (2019). Adolescent HIV/AIDS: Issues and challenges. *Indian journal of sexually transmitted diseases and AIDS*, *31*(1), 1.

Ndaga, A. E. A. (2020). *Socioeconomic Inequality in Hiv Prevention Amongst Female Sex Workers: an Analysis of Pre-exposure Prophylaxis Use* (Doctoral dissertation, University of Nairobi).

Nelson, L. E., Tharao, W., Husbands, W., Sa, T., Zhang, N., Kushwaha, S., ... & Kaul, R. (2019). The epidemiology of HIV and other sexually transmitted infections in African, Caribbean and Black men in Toronto, Canada. *BMC infectious diseases*, *19*(1), 294.

Newman, L., Rowley, J., Vander Hoorn, S., Wijesooriya, N. S., Unemo, M., Low, N., ... & Temmerman, M. (2015). Global estimates of the prevalence and incidence of four curable sexually transmitted infections in 2012 based on systematic review and global reporting. *PloS one*, *10*(12), e0143304.

Ngo, A. D., Ratliff, E. A., McCurdy, S. A., Ross, M. W., Markham, C., & Pham, H. T. B. (2017). Health-seeking behaviour for sexually transmitted infections and HIV testing among female sex workers in Vietnam. *AIDS care*, *19*(7), 878-887.

Nguyen, V. K., Greenwald, Z. R., Trottier, H., Cadieux, M., Goyette, A., Beauchemin, M., & Thomas, R. (2018). Incidence of sexually transmitted infections before and after preexposure prophylaxis for HIV. *AIDS (London, England)*, *32*(4), 523.

Nigussie, T., & Yosef, T. (2020). Knowledge of sexually transmitted infections and its associated factors among polytechnic college students in Southwest Ethiopia. *The Pan African Medical Journal*, *37*.

Nyaga, R. (2020). The HIV/AIDS pandemic in Kenya: an investigation into the perceptions of Kenyans toward people living with HIV/AIDS and government programmes. *African Journal of AIDS Research*, *19*(2), 117-122.

Nyalela, M., Dlungwane, T., Taylor, M., & Nkwanyana, N. (2018). Health seeking and sexual behaviour of men presenting with sexually transmitted infections in two primary health care clinics in Durban. *Southern African Journal of Infectious Diseases*, *33*(5), 1-6.

O'Halloran, C., Owen, G., Croxford, S., Sims, L. B., Gill, O. N., Nutland, W., &Delpech, V. (2019). Current experiences of accessing and using HIV pre-exposure prophylaxis (PrEP) in the United Kingdom: a cross-sectional online survey, May to July 2019. *Eurosurveillance*, *24*(48), 1900693.

O'Malley, G., Barnabee, G., &Mugwanya, K. (2019). Scaling-up PrEP Delivery in Sub-Saharan Africa: What Can We Learn from the Scale-up of ART?. *Current Hiv/aids Reports*, *16*(2), 141-150.

Ochonye, B., Folayan, M. O., Fatusi, A. O., Bello, B. M., Ajidagba, B., Emmanuel, G., ... &Jaiyebo, T. (2019). Sexual practices, sexual behavior and HIV risk profile of key populations in Nigeria. *BMC public health*, *19*(1), 1210.

Ogunbajo, A., Iwuagwu, S., Williams, R., Biello, K., &Mimiaga, M. J. (2019). Awareness, willingness to use, and history of HIV PrEP use among gay, bisexual, and other men who have sex with men in Nigeria. *PloS one*, *14*(12), e0226384.

Okello, S., Amir, A., Bloomfield, G. S., Kentoffio, K., Lugobe, H. M., Reynolds, Z., ... & Siedner, M. J. (2020). Prevention of cardiovascular disease among people living with HIV in sub-Saharan Africa. *Progress in cardiovascular diseases*, *63*(2), 149-159.

Oluoch, L. M., Roxby, A., Mugo, N., Wald, A., Ngure, K., Selke, S., ... & Casmir, E. (2020). Does providing laboratory confirmed STI results impact uptake of HIV pre-exposure prophylaxis (PrEP) uptake among Kenyan adolescents' girls and young women? A descriptive analysis. *Sexually Transmitted Infections*.

Ong, J. J., Baggaley, R. C., Wi, T. E., Tucker, J. D., Fu, H., Smith, M. K., ... & Mayaud, P. (2019). Global epidemiologic characteristics of sexually transmitted infections among individuals using preexposure prophylaxis for the prevention of HIV infection: a systematic review and meta-analysis. *JAMA network open*, *2*(12), e1917134-e1917134.

Orodho, J. A. (2009). Elements of education and social science research methods. *Nairobi/Maseno*, *2*(6), 26-133.

Ortblad, K. F., Stalter, R. M., Bukusi, E. A., Ngure, K., Mujugura, A., Celum, C., ... & Heffron, R. (2019). No Evidence of Sexual Risk Compensation Following PrEP Initiation Among Heterosexual HIV Serodiscordant Couples in Kenya and Uganda. *AIDS and Behavior*, 1-11.

Owoaje, E. T., & Uchendu, O. C. (2019). Sexual risk behaviour of street youths in south west Nigeria. *East African Journal of Public Health*, *6*(3).

Parker, A., Koegelenberg, C. F., Moolla, M. S., Louw, E. H., Mowlana, A., Nortjé, A., ... & Taljaard, J. J. (2020). High HIV prevalence in an early cohort of hospital admissions with COVID-19 in Cape Town, South Africa. *SAMJ: South African Medical Journal*, *110*(9), 0-0.

Paul Adepoju (2021) Africa's success in rapidly rolling out HIV prevention measure, PrEP

Puro, V., Palummieri, A., Carli, G., Piselli, P. and Ippolito, G. (2018). *Attitude towards antiretroviral pre-exposure prophylaxix (PrEP) prescription among HIV specialists. BMC Infections Diseases,* 13:217. https://doi.org/10.1186/11471-2334-13-217

Qian, H. Z., Wang, N., Dong, S., Chen, H., Zhang, Y., Chamot, E., ... & Shao, Y. (2007). Association of misconceptions about HIV transmission and discriminatory attitudes in rural China. *AIDS care*, *19*(10), 1283-1287.

Rao, S. G., Galaviz, K. I., Gay, H. C., Wei, J., Armstrong, W. S., del Rio, C., ... & Ali, M. K. (2019). Factors associated with excess myocardial infarction risk in HIV-infected adults: a systematic review and meta-analysis. *Journal of acquired immune deficiency syndromes (1999)*, *81*(2), 224.

Rathod, S. P., Padhiar, B., & Shah, B. (2020). Sexually transmitted infections and human immunodeficiency virus coinfection: Scenario in Western India. *Indian Journal of Sexually Transmitted Diseases and AIDS*, *41*(2), 162.

Saito, A., Karama, M., & Kamiya, Y. (2020). HIV infection, and overweight and hypertension: a cross-sectional study of HIV-infected adults in Western Kenya. *Tropical medicine and health*, *48*, 1-12.

Samkange-Zeeb, F., Mikolajczyk, R. T., & Zeeb, H. (2016). Awareness and knowledge of sexually transmitted diseases among secondary school students in two German cities. *Journal of community health*, *38*(2), 293-300.

Saunders, M., Lewis, P., & Thornhill, A. (2012). Research methods for business students (6. utg.). *Harlow: Pearson*.

Scott, H. M., & Klausner, J. D. (2016). Sexually transmitted infections and pre-exposure prophylaxis: challenges and opportunities among men who have sex with men in the US. *AIDS research and therapy*, *13*(1), 1-5.

Seidu, A. A., Aboagye, R. G., Okyere, J., Adu, C., Aboagye-Mensah, R., & Ahinkorah, B. O. (2022). Towards the prevention of sexually transmitted infections (STIs): Healthcare-seeking behaviour of women with STIs or STI symptoms in sub-Saharan Africa. *Sexually Transmitted Infections*.

Skaletz- Rorowski, A., Potthoff, A., Nambiar, S., Wach, J., Kayser, A., Kasper, A., & Brockmeyer, N. H. (2021). Sexual behaviour, STI knowledge and Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG) prevalence in an asymptomatic cohort in Ruhr- area, Germany: PreYoungGo study. *Journal of the European Academy of Dermatology and Venereology*, *35*(1), 241-246.

Solomon, M. M., Mayer, K. H., Glidden, D. V., Liu, A. Y., McMahan, V. M., Guanira, J. V., ... & Grant, R. M. (2016). Syphilis predicts HIV incidence among men and transgender women who have sex with men in a preexposure prophylaxis trial. *Clinical Infectious Diseases*, *59*(7), 1020-1026.

Subbarao, N. T., & Akhilesh, A. (2017). Knowledge and attitude about sexually transmitted infections other than HIV among college students. *Indian journal of sexually transmitted diseases and AIDS*, *38*(1), 10.

Svensson, L., & Waern, S. (2018). Knowledge of and attitudes to sexually transmitted diseases among Thai university students.

Torrone, E. A., Morrison, C. S., Chen, P. L., Kwok, C., Francis, S. C., Hayes, R. J., ... & STIMA Working Group. (2018). Prevalence of sexually transmitted infections and bacterial vaginosis among women in sub-Saharan Africa: an individual participant data meta-analysis of 18 HIV prevention studies. *PLoS medicine*, *15*(2), e1002511.

Tounkara, F. K., Téguété, I., Guédou, F. A., Keita, B., & Alary, M. (2020). Prevalence and Factors Associated With HIV and Sexually Transmitted Infections Among Female Sex Workers in Bamako, Mali. *Sexually Transmitted Diseases*, *47*(10), 679-685.

Traeger, M. W., Cornelisse, V. J., Asselin, J., Price, B., Roth, N. J., Willcox, J., ... &Vujovic, O. (2019). Association of HIV preexposure prophylaxis with incidence of sexually transmitted infections among individuals at high risk of HIV infection. *Jama*, *321*(14), 1380-1390.

Trost, S. L., Onwubiko, U. N., Wilson, D. B., Holland, D. P., & Chamberlain, A. T. (2020, May). Health Care–Seeking Behaviors and Perceptions of Provider-Initiated Discussion of Pre-exposure Prophylaxis Among PrEP-Naïve HIV-Negative Men Who Have Sex With Men in Atlanta, Georgia. In *Open Forum Infectious Diseases* (Vol. 7, No. 5, p. ofaa165). US: Oxford University Press.

Unemo, M., Bradshaw, C. S., Hocking, J. S., de Vries, H. J., Francis, S. C., Mabey, D., ... & Fairley, C. K. (2017). Sexually transmitted infections: challenges ahead. *The Lancet infectious diseases*, *17*(8), e235-e279.

United Nations Programme on HIV/AIDS. (2018). Outlook breaking News: *Young people are leading the HIV Prevention Revolution, Geneva: Joint United Nations programme on HIV/AIDS.* Retrieved from http://files.unaids.org/en/media/unaids/contentassets/documents/unaidspublication/2010/20100713_outlook_youngpeople_ en.pdf

United States Public Health Service. *Preexposure Prophylaxis for the Prevention of HIV Infection in the United States* 2018.

Van Dijk, M., Duken, S. B., Delabre, R. M., Stranz, R., Schlegel, V., Castro, D. R., ... & Jonas, K. J. (2020). PrEP Interest Among Men Who Have Sex with Men in the Netherlands: Covariates and Differences Across Samples. *Archives of Sexual Behavior*, 1-10.

Visalli, G., Picerno, I., Vita, G., Spataro, P., & Bertuccio, M. P. (2014). Knowledge of sexually transmitted infections among younger subjects of the city of Messina (Sicily). *Journal of Preventive Medicine and Hygiene*, *55*(1), 17.

Volk, J. E., Marcus, J. L., Phengrasamy, T., Blechinger, D., Nguyen, D. P., Follansbee, S., & Hare, C. B. (2017). No new HIV infections with increasing use of HIV preexposure prophylaxis in a clinical practice setting. *Clinical infectious diseases*, *61*(10), 1601-1603.

Wahome, E. W., Graham, S. M., Thiong'o, A. N., Mohamed, K., Oduor, T., Gichuru, E., ... & Sanders, E. J. (2020). PrEP uptake and adherence in relation to HIV-1 incidence among Kenyan men who have sex with men. *EClinicalMedicine*, *26*.

Wand, H., Reddy, T., Dassaye, R., Moodley, J., Naidoo, S., &Ramjee, G. (2020). Estimating prevalence and incidence of sexually transmitted infections among

South African women: Implications of combined impacts of risk factors. *International journal of STD & AIDS*, 0956462420915388.

Were, D., Musau, A., Mutegi, J., Ongwen, P., Manguro, G., Kamau, M., ... & Reed, J. (2020). Using a HIV prevention cascade for identifying missed opportunities in PrEP delivery in Kenya: results from a programmatic surveillance study. *Journal of the International AIDS Society*, *23*, e25537.

Wildsmith, E., Schelar, E., Peterson, K., & Manlove, J. (2020). Sexually transmitted diseases among young adults: Prevalence, perceived risk, and risk-taking behaviors. *Child Trends Research Brief, 10*, 1-8.

Winston, S. E., Chirchir, A. K., Muthoni, L. N., Ayuku, D., Koech, J., Nyandiko, W., ... & Braitstein, P. (2015). Prevalence of sexually transmitted infections including HIV in street-connected adolescents in western Kenya. *Sexually transmitted infections*, *91*(5), 353-359.

Witzel, T. C., Nutland, W., & Bourne, A. (2019). What are the motivations and barriers to pre-exposure prophylaxis (PrEP) use among black men who have sex with men aged 18–45 in London? Results from a qualitative study. *Sexually transmitted infections*, *95*(4), 262-266.

World Health Organization. (2012). *Global incidence and prevalence of selected curable sexually transmitted infections-2008*. World Health Organization.

World Health Organization. (2016). *Global health sector strategy on sexually transmitted infections 2016-2021: toward ending STIs* (No. WHO/RHR/16.09). World Health Organization.

World Health Organization. (2019). *Guidelines for sexually transmitted infections surveillance* (No. WHO/CHS/HSI/99.2). World Health Organization.

World Health Organization. (2023). Regional action plans for ending AIDS and the epidemics of viral hepatitis and sexually transmitted infections 2022–2030.

Xia, Y., Greenwald, Z. R., Milwid, R. M., Trottier, C., Boissonnault, M., Gaul, N., ... & Thomas, R. (2020). Pre-exposure Prophylaxis Uptake among Men Who Have Sex with Men Who Used nPEP: A Longitudinal Analysis of Attendees at a Large Sexual Health Clinic in Montréal (Canada). *JAIDS Journal of Acquired Immune Deficiency Syndromes*, *85*(4), 408-415.

Ya-lin, A. H., Zhu, W., Smith, D. K., Harris, N., & Hoover, K. W. (2018). HIV preexposure prophylaxis, by race and ethnicity—United States, 2014–2016. *Morbidity and Mortality Weekly Report*, *67*(41), 1147.

Zablotska, I. B., Selvey, C., Guy, R., Price, K., Holden, J., Schmidt, H. M., ... & Grulich, A. E. (2018). Expanded HIV pre-exposure prophylaxis (PrEP) implementation in communities in New South Wales, Australia (EPIC-NSW):

design of an open label, single arm implementation trial. *BMC public health*, *18*(1), 1-10.

Zachariah, R., Nkhoma, W., Harries, A. D., Arendt, V., Chantulo, A., Spielmann, M. P., ... & Buhendwa, L. (2018). Health seeking and sexual behaviour in patients with sexually transmitted infections: the importance of traditional healers in Thyolo, Malawi. *Sexually transmitted infections*, *78*(2), 127-129.

# APPENDICES

## Appendix I: Informed Consent Form

### Introduction

My name is **Emmanuel K. Kibala** a master's student undertaking my Master of Public Health in Epidemiology and disease control at Kenyatta University. I am conducting a study on 'Prevalence of Sexually transmitted infections among HIV pre-exposure prophylaxis users in selected health facilities in Nairobi city county, Kenya'.

### Purpose

The purpose of this study is to assess the prevalence of STIs among HIV-PrEP users in selected health facilities in Nairobi City County, Kenya. This will help in improving and enhancing access and utilization of HIV-PrEP service and designing appropriate programs and services for HIV-PrEP users in Nairobi and the whole Country.

### Procedure to be followed

Participation in this study will require you answer questions in the questionnaire that you will be given. Your participation in this study is entirely voluntary. Please read the information below and ask questions about anything you do not understand, before deciding whether or not to participate.

### Confidentiality

The interviews will be conducted in a private place. Your study data will be handled as confidentially as possible. If results of this study are published or presented, individual names and other personally identifiable information will not be used. To minimize the risks to confidentiality, we will use codes to represent the participants of the study and at no time will the names be used.

**Discomforts and risks**

Some of the questions you will be asked are on intimate subject and maybe embarrassing or make you uncomfortable. If this happens you may choose not to answer specific questions or stop participating at any time without penalty. It will take you about 20 minutes to complete the questionnaire.

**Benefits and compensation**

If you participate in this study, you will help us to learn how to provide effective services that can improve on programs and services for HIV-PrEP users. You will also benefit by knowing more about Sexually transmitted infections while on HIV-PrEP. Also, if you can't afford to pay for the test, you will be helped by getting the test done free of charge.

**Rights**

You have the right to decline to participate or to withdraw at any point in this study without any penalty.

**Contact information**

If you have any questions about the study, you may contact Dr. Orinda on +254722433529 or Dr. Kimani on +254725552475 or the Kenyatta University Ethical Review Committee Secretariat on chairman.kuerc@ku.ac.ke, secretary.kuerc@ku.ac.ke

**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/ responses and identity will be treated with confidentiality and that I can leave the study at any time without any penalty.

_____ _____ _____

Code participant Signature of participant Date

**Investigator statement**

I, the undersigned, have explained to the volunteer in a language she/he understands and confirm she has agreed to participate in the study.

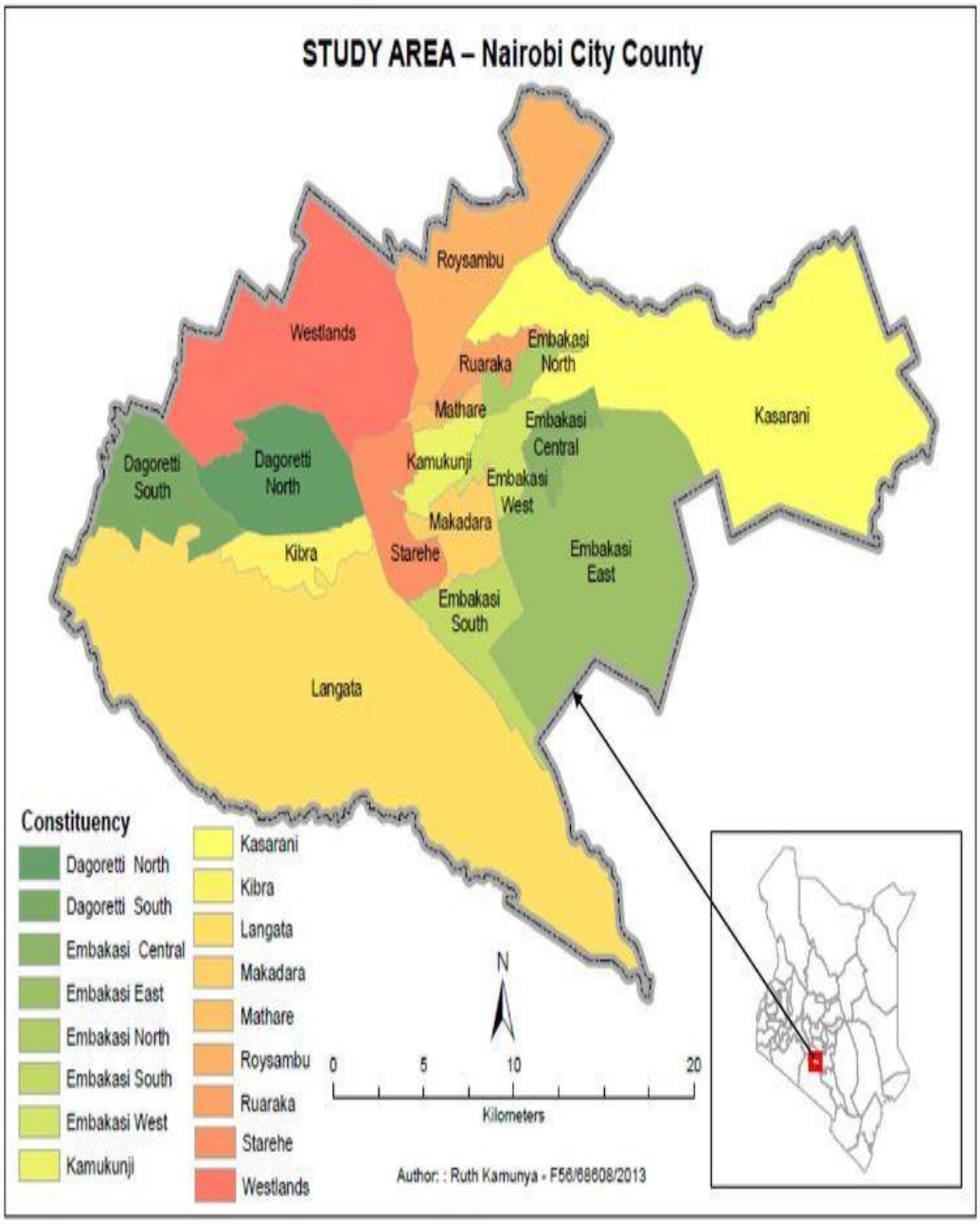
Interviewer Name …….

_____ _____

Signature of researcher Date

**Appendix II: Map of Study Area (Nairobi County)**

# Study Area




Study Area – Nairobi City County

**Appendix III: Questionnaire**

Respondents will participate on the basis of informed consent which will be sought from each of the participants with that their participation is on voluntary basis and that they will be at liberty to withdraw from the study (or participation) at any stage if they wish to without losing their rights to quality care in the participating institution.

This questionnaire is divided short sections that should take only a few moments of your time to complete. Please respond appropriately in the blanks provided. This is an academic exercise and all information collected from respondents will be treated with strict confidentiality.

**SECTION A: BASIC INFORMATION**

1. Kindly indicate your gender

   Male [ ] Female [ ]

2. How old are you? ……
   a. 18-24 years [ ]
   b. 25-34 years [ ]
   c. 35-44 years [ ]
   d. 45-54 years [ ]
   e. 55 years and above [ ]
3. What is your highest level of Education?

   a. Primary [ ]
   b. Secondary [ ]
   c. Diploma [ ]
   d. Bachelors [ ]
   e. Others [ ]
   f. None [ ]

4. For how long have you been using HIV PrEP? ……..
   a. Less than 1 year [ ]
   b. 1-3 years [ ]
   c. 4-5 years [ ]
   d. More than 5 years [ ]
5. What is your marital status?
   a. Single [ ]
   b. Married/Cohabitating [ ]
   c. Divorced/Separated [ ]
   d. Widower [ ]
   e. Other (Specify :……)
6. Kindly select your occupation status from the choices below
   a. Employed [ ] b. Self-employed [ ] c. Unemployed [ ]

## SECTION B: ATTITUDES TOWARD HIV-PrEP

This section is concerned with ascertaining attitudes toward HIV-PrEP and beliefs about STIs among HIV-PrEP users in Nairobi City County, Kenya. Kindly respond to the questions presented under this section.

### 1. Attitudes toward HIV PrEP:

| | **Strongly Disagree (1)** | **Disagree (2)** | **Agree (3)** | **Strongly agree (4)** |
|---|---|---|---|---|
| I believe that HIV-PrEP works for me | | | | |
| I am less worried about HIV infection, now that I am on HIV-PrEP | | | | |
| I am less worried about STIs now that I am on HIV-PrEP | | | | |
| I believe that HIV-PrEP makes people less likely to contract HIV | | | | |
| I believe that if people take HIV-PrEP, they will probably stop using condoms | | | | |
| I believe that if people take HIV-PrEP, they will have multiple sexual partners | | | | |
| I believe that HIV-PrEP will encourage people to take sexual risks | | | | |
| I believe that HIV-PrEP has serious side effects | | | | |
| I believe that HIV-PrEP is more dangerous than good | | | | |

## 2. BELIEFS ABOUT STIs

1. Most STIs can be prevented with condom
    a. Agree b. Disagree
2. Most STIs can be cured with treatment
    a. Agree b. Disagree
3. STIs can be transmitted through kissing
    a. Agree b. Disagree
4. STIs can only be transmitted sexually
    a. Agree b. Disagree
5. PrEP can protect against other STIS other than HIV
    a. Agree b. Disagree

## SECTION C: STIs RELATED LEVEL OF KNOWLEDGE

This section is concerned with establishing STIs related level of knowledge among HIV-PrEP users in Nairobi City County, Kenya. Kindly respond to the questions presented under this section.

### 1. Knowledge

| Knowledge | | Response | Tick here |
|---|---|---|---|
| Awareness | Have you ever heard about STI | Yes | |
| | | No | |
| | | I don’t Know | |
| Knowledge of Transmission | Sex without Condom | Yes | |
| | | No | |
| | | I don’t Know | |
| | Sex with Sex workers (M or F) | Yes | |
| | | No | |
| | | I don’t Know | |
| | Sex with Multiple Partners | Yes | |
| | | No | |
| | | I don’t Know | |
| | Receiving Infected Blood | Yes | |
| | | No | |
| | | I don’t Know | |
| Knowledge of Prevention | Use of Condom | Yes | |
| | | No | |
| | | I don’t Know | |
| | Avoid sex with | Yes | |

| | | | |
|---|---|---|---|
| | Sex workers (M or F) | No | |
| | | I don’ t Know | |
| | Avoid Sex with Multiple Partners | Yes | |
| | | No | |
| | | I don’ t Know | |
| | Avoid Unscreened Blood | Yes | |
| | | No | |
| | | I don’ t Know | |

**2. <u>Source of STIs information</u>**

| | | |
|---|---|---|
| Source of STIs information | TV/radio | |
| | Internet (social media) | |
| | Friends | |
| | Brochure | |
| | Books | |
| | Magazine and newspapers | |

**3. <u>Symptoms of STIs experienced</u>**

| | | |
|---|---|---|
| Urethral discharge during the past 12 months | Yes | |
| | No | |
| | I Don’ t Know | |
| Abnormal vaginal discharge with strong odour during the past 12 months | Yes | |
| | No | |
| | I Don’ t Know | |
| Genital ulcer or sore during the past 12 months | Yes | |
| | No | |
| | I Don’ t Know | |
| Genital itching during the past 12 months | Yes | |
| | No | |
| | I Don’ t Know | |
| Pain during urination during the past 12 months | Yes | |

| | | |
|---|---|---|
| | No | |
| | I Don't Know | |
| Swelling around the genital during the past 12 months | Yes | |
| | No | |
| | I Don't Know | |
| Frequent Urination during the past 12 months | Yes | |
| | No | |
| | I Don't Know | |

**SECTION D: BEHAVIOURAL RISK FACTORS OF STIs**

This section is concerned with identify STIs behavioural risk factors among HIV-PrEP users in Nairobi City County, Kenya. Kindly respond to the questions presented under this section.

| | | |
|---|---|---|
| At what age did you first have sexual intercourse? | Before age of 18 years (1)<br>After age of 18 years (2) | |
| Whom are you attracted to? | Men (1) | |
| | Women (2) | |
| | Both (3) | |
| Do you have a **regular partner** (spouse/living together)? | Yes (1) | |
| | No (2) | |
| Have you or your regular partner ever used a condom? | Yes (1) | |
| | No (2) | |
| If **YES**, for what purpose have you used a condom while having sexual intercourse with your **regular partner** | To avoid pregnancy | |
| | To protect myself from STIs and HIV/AIDS | |
| | To protect my partner from STIs and HIV/AIDS | |

| | | |
|---|---|---|
| | My partner requested it | |
| | For pleasure | |
| | Other (Please specify……….……..) | |
| If **NO**, for what purpose have you used a condom while having sexual intercourse with your **regular partner**? | I am on PrEP | |
| | Not available | |
| | Too expensive | |
| | Partner objected | |
| | Don’t like/reduce sexual pleasure | |
| | Partner might think I don't trust him/her | |
| | Trust my partner | |
| | Other (Please specify…….…) | |
| How consistently did you use condom with your regular partner in the last 12 months? | Always (1) | |
| | Most of the time (2) | |
| | Sometimes (3) | |
| | Never in the past 12 months (4) | |
| Did you use a condom the last time you had sexual intercourse with your **regular partner**? | Yes (1) | |
| | No (2) | |
| Have you had a **non-regular partner** (girlfriend/boyfriend, Sex workers, clients, Co‐worker, etc.) in the last 12 months | Yes (1) | |
| | No (2) | |

| | | |
|---|---|---|
| How many **non-regular partner(s)** (e.g. girlfriend/boyfriend; sex workers; clients; etc.) in the last 12 months? | None(1)<br>1(2)<br>2(3)<br>More than 2(4) | |
| How consistently did you use condom with your regular partner in the last 12 months? | Always (1) | |
| | Most of the time (2) | |
| | Sometimes (3) | |
| | Never in the past 12 months (4) | |
| Did you use a condom the last time you had sexual intercourse with your **non-regular partner**? | Yes (1) | |
| | No (2) | |
| If **YES**, for what purpose have you used a condom while having sexual intercourse with your **non-regular partner** | To avoid pregnancy | |
| | To protect myself from STIs and HIV/AIDS | |
| | To protect my partner from STIs and HIV/AIDS | |
| | My partner requested it? | |
| | For pleasure | |
| | Other (Please specify……….…) | |
| If **NO**, for what purpose have you used a condom while having sexual intercourse with your **non-regular partner**? | I am on PrEP | |
| | Not available | |
| | Too expensive | |
| | Partner objected | |
| | Don’t like/reduce sexual | |

| | | |
|---|---|---|
| | pleasure | |
| | Partner might think I don't trust him/her | |
| | Trust my partner | |
| | Other (Please specify……….…) | |

- **Substance use**:

| | | |
|---|---|---|
| Alcohol | YES | |
| | NO | |
| Drug abuse | YES | |
| | NO | |
| Drugs by injection | YES | |
| | NO | |
| Recreational drug (e.g. marijuana) | YES | |
| | NO | |

1. **HIV/STI risk perceptions**:

Do you think you are 'now' at risk of any of these; HIV and STIs? Circle the number accordingly

| | High risk (1) | Moderate risk (2) | Low risk (3) | No risk (4) |
|---|---|---|---|---|
| HIV infection | 1 | 2 | 3 | 4 |
| STIs | 1 | 2 | 3 | 4 |

2. **Partner(s) related information**:

| | | |
|---|---|---|
| Have you had partner(s) who are HIV positive or have any STIs? | Yes (1) | |
| | No (2) | |

| | | |
|---|---|---|
| Do you ever bother to know the status of your sex partners before you have intercourse with them? | Yes (1) | |
| | No (2) | |
| How often do you engage in an unprotected mouth-to-genital contact with your partner(s)? | All the time (1) | |
| | Most of the time (2) | |
| | Whenever my partner asks for it (3) | |
| | Never (4) | |

3. Do you think your **regular partner** at risk of any of these; HIV and STIs? Circle the number accordingly

| | High risk (1) | Moderate risk (2) | Low risk (3) | No risk (4) |
|---|---|---|---|---|
| HIV infection | 1 | 2 | 3 | 4 |
| STIs | 1 | 2 | 3 | 4 |

4. On average, do you think your **non-regular partner(s)** at risk of any of these; HIV and STIs? Circle the number accordingly

| | High risk (1) | Moderate risk (2) | Low risk (3) | No risk (4) |
|---|---|---|---|---|
| HIV infection | 1 | 2 | 3 | 4 |
| STIs | 1 | 2 | 3 | 4 |

**SECTION E: HEALTH SEEKING BEHAVIOUR FOR STIs**

This section is concerned with determining health seeking behaviour among HIV-PrEP users in Nairobi City County, Kenya. Kindly respond to the questions presented under this section by filling the blank spaces which best describes your opinion.

| | | |
|---|---|---|
| In the past year, did you seek treatment for STIs? | Yes (1) | |
| | No (2) | |
| In the past year, have you had any health check-up at a health facility although you had no symptoms of STIs? | Yes (1) | |
| | No (2) | |
| Have you ever refused to visit a health centre, although you were in need of care? | Yes (1) | |
| | No (2) | |
| Normally (with exception to emergency cases), where do you seek treatment from? (**You can select more than one option**) | Public health facility | |
| | Private health facility | |
| | Pharmacist at Drugstore/pharmacy | |
| | Self-medication | |
| | Traditional practitioner/healer | |
| | Other (please specify.....) | |

**Appendix IV: Most Common, Clinical Symptoms and Lab Tests**

| MOST COMMON STIS | CLINICAL SYMPTOMS | LABORATORY TESTS |
|---|---|---|
| Chlamydia | • Asymptomatic<br>• Pain or a burning sensation during sex, unusual discharge<br>• Men: Pain or tenderness in the testicles<br>• Women: Pain in the lower abdominal during or after sex, bleeding after sex | • PCR<br>• Urinalysis<br>• Swabs<br>• Serum chlamydia<br>• Urine using geneXpert |
| Gonorrhea | Asymptomatic<br>• Pain or a burning sensation during sex, unusual discharge<br>• Less common symptoms in women: pain in the lower gut and bleeding between periods or after sex<br>• In men: Swelling in the foreskin, rarely pain in the testicles | • PCR<br>• Swabs (urethral for men and HVS for women)<br>• Urinalysis<br>• Urine using geneXpert |
| Herpes (Genital herpes) | Small, painful blister which itch or tingle and can make it difficult to urinate | • PCR test<br>• Herpes 1&2 IGM |
| Syphilis | Painless, Sores on the genitals and around the mouth<br>• $2^{nd}$ stage: rash, flu-like illness, patchy hair loss | • PCR<br>• VDRL<br>• RPR (Rapid Plasma Reagin/TP Particle Agglutination Assay)<br>• Khan test<br>• TPHA |
| HIV | Various | • PCR<br>• Antibody tests for HIV 1&2 |
| Genital warts | • Itching or discomfort in the genital area | • PCR<br>• Pap tests |

| | | |
|---|---|---|
| | • Bleeding with intercourse<br>• A cauliflower-like shape<br>• Whitish bumps that show up on the vulva, vagina, Cervix, penis, scrotum or anus | |
| Trichomoniasis | • Women: Foul-smelling vaginal discharge, genital itching, painful urination or sexual intercourse<br>• Men: No symptoms generally, Irritation inside the penis, Burning with urination or after ejaculation, discharge from penis. | • PCR test by using vaginal and urethral swab samples<br>• Urinalysis |

**Appendix V: Request for Laboratory Services**

Participant's name……Age…… Sex…….
Clinic:……...Residence:…….

Clinical notes and provisional diagnosis

Specimen and Investigations required

Requested by…….. signature……. Date……

## Appendix VI: Approval of Research from Graduate School

KENYATTA UNIVERSITY
GRADUATE SCHOOL

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

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 020-8704150

Internal Memo

**FROM:** Dean, Graduate School **DATE:** 18th May, 2022

**TO:** **Mr. Emmanuel Kibala Kadianga** **REF:** Q57F/CTY/PT/26254/19
**C/o Department of Community Health & Epidemiology**

**SUBJECT: APPROVAL OF RESEARCH PROPOSAL**

This is to inform you that Graduate School Board, at its meeting on 4th **May, 2022**, approved your Research Proposal for the M.P.H. Degree entitled, **"Magnitude of Sexually Transmitted Infections among HIV Pre-Exposure Prophylaxis Users in Selected Sites in Nairobi City County, Kenya."**

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

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

KENYATTA UNIVERSITY * OFFICE OF DEAN * 19 MAY 2022 GRADUATE SCHOOL P.O. Box 43844 00100 NAIROBI

Thank you.

**DR. HARRIET ISABOKE**
**FOR: DEAN, GRADUATE SCHOOL**

CC. Chairman, Community Health & Epidemiology Department

**Supervisors:**

1. Dr. Harun Kimani
   C/o Department of Community Health & Epidemiology
   **Kenyatta University**

2. Dr. George Orinda
   C/o Biochemistry, Microbiology & Biotechnology Dept.
   **Kenyatta University**

**Appendix VII: Research Authorization from Graduate School**

KENYATTA UNIVERSITY
GRADUATE SCHOOL

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

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 020-8704150

Our Ref: Q57F/CTY/PT/26254/2019 DATE: 18th May, 2022

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

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MR. EMMANUEL KIBALA KADIANGA REG. NO. Q57F/CTY/PT/26254/19

I write to introduce Mr. Emmanuel Kibala Kadianga who is a Postgraduate Student of this University. He is registered for M.P.H. degree programme in the **Department of Community Health & Epidemiology.**

Mr. Kadianga intends to conduct research for a M.P.H. thesis Proposal entitled, **"Magnitude of Sexually Transmitted Infections among HIV Pre-Exposure Prophylaxis Users in Selected Sites in Nairobi City County, Kenya."**

Any assistance given will be highly appreciated.

Yours faithfully,

KENYATTA UNIVERSITY OFFICE OF DEAN 19 MAY 2022 GRADUATE SCHOOL P.O. Box 43844-00100 NAIROBI

PROF. ELISHIBA KIMANI
DEAN, GRADUATE SCHOOL

## Appendix VIII: Ethical Approval

**KENYATTA UNIVERSITY**
**CENTRE FOR RESEARCH ETHICS AND SAFETY**

**Fax: 8711242/8711575** **P. O. Box 43844,**
**Email: chairman.kuerc@ku.ac.ke**
**Nairobi, 00100**

Tel: 8710901/12

Website: www.ku.ac.ke
Our Ref: **KU/ERC/APPROVAL/VOL.1** Date: 22nd /06/2022

Emmanuel Kibala
P.O Box 43844, 00100
Nairobi.

Dear Mr. Kibala,

**APPLICATION NUMBER: PKU/2534/I1661- MAGNITUDE OF SEXUALLY TRANSMITTED INFECTIONS AMONG HIV –PRE-EXPOSURE PROPHYLAXIS USERS IN SELECTED SITES IN NAIROBI CITY COUNTY, KENYA**

This is to inform you that ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE*** has reviewed and approved your above research proposal. Your application approval number is **PKU/2534/I1661.** The approval period is **22nd/*06/2022 to 22nd/06/2023.***

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE***
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE*** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE*** within 72 hours

v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE***

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed.

To serve you better, researchers are kindly requested to access and complete a customer feedback form and sent it back online as you continue with research and upon completion of data collection found on the following website link; ;(https://docs.google.com/forms/d/1ytWefDwvyz5h1oz_VIn0xbxg3uGdlDzMXFWNDsMrRPQ/edit?usp=sharing

Yours sincerely


**Prof. Judith Kimiywe**

**Director: Centre for Research Ethics and Safety**

## Appendix IX: Research Permit

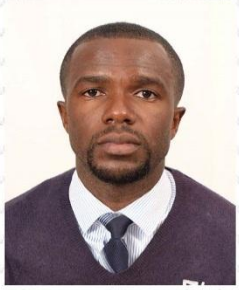
REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **299875**

Date of Issue: **13/July/2022**

**RESEARCH LICENSE**



**This is to Certify that Mr.. Emmanuel Kadianga Kibala of Kenyatta University, has been licensed to conduct research in Nairobi on the topic: MAGNITUDE OF SEXUALLY TRANSMITTED INFECTIONS AMONG HIV PRE-EXPOSURE PROPHYLAXIS USERS IN SELECTED SITES IN NAIROBI CITY COUNTY, KENYA for the period ending : 13/July/2023.**

License No: **NACOSTI/P/22/18716**

**299875**

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

## Appendix X: Research Authorization from Nairobi County

REPUBLIC OF KENYA

**EXECUTIVE OFFICE OF THE PRESIDENT**
**NAIROBI METROPOLITAN SERVICES**

**Telegraphic Address**
**Telephone +3313002/4**
**When replying please quote**

**Kenyatta International Convention Centre**
**P. O. Box 49130-00100**
**NAIROBI**

**REF: EOP/NMS/HS/190**

**DATE: 21st July, 2022**

EMMANUEL KADIANGA KIBALA
KENYATTA UNIVERSITY,
NAIROBI.

Dear Mr. Emmanuel,

**RE: RESEARCH AUTHORIZATION**

This is to inform you that the Nairobi Metropolitan Services - Health Directorate's Research Ethics Committee (REC) reviewed the documents on the study titled " MAGNITUDE OF SEXUALLY TRANSMITTED INFECTIONS AMONG HIV PRE-EXPOSURE PROPHYLAXIS USERS IN SELECTED SITES IN NAIROBI CITY COUNTY, KENYA."

I am pleased to inform you that you have been authorized to carry out the study at Mbagathi Referral Hospital, Mama Lucy Hospital, Lang'ata Health Centre and STC Casino Health Centre in Nairobi County. The researcher will be required to adhere to the ethical code of conduct for health research in accordance to the Science Technology and Innovation Act, 2013 and the approval procedure and protocol for research for Nairobi.

On completion of the study, you will submit one hard copy and one copy in PDF of the research findings to the REC. In addition, you will disseminate recommendations of the research at a virtual meeting organized by the REC. By copy of this letter, the Medical Superintendent – Mbagathi, Mama Lucy Kikaki, Sub County Medical Officers of Health – Langata, Starehe and Head – HIV/AIDS Unit are to accord you the necessary assistance to carry out this research study.

Yours sincerely,

**DR. ANDREW TORO**
**CHAIR – RESEARCH ETHICS COMMITTEE**

Cc: Director Health Services,
Medical Superintendent – Mbagathi, Mama Lucy Kikaki,
Sub County Medical Officers of Health – Langata, Starehe and
Head – HIV/AIDS Unit