VIRAL SUPPRESSION AMONG MEN WHO HAVE SEX WITH MEN LIVING WITH HIV WHO WERE ON RISK REDUCTION INTERVENTIONS AND CONTROL GROUP IN MVITA SUB-COUNTY, MOMBASA COUNTY, KENYA

JANE WANGUI KARANJA

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Viral Suppression among Men Who Have Sex with Men Living with HIV Who Were on Risk Reduction Interventions and Control Group in Mvita Sub-County, Mombasa County, Kenya

Jane Wangui Karanja

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DECLARATION

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

Signature……...Date……

Jane Wangui Karanja

This thesis has been submitted for examination with our approval as University Supervisors:

Signature……...Date……

Prof. Kenneth Ngure, PhD

JKUAT, Kenya

Signature……...Date……

Dr. Aggrey Adem, PhD

TUM, Kenya

DEDICATION

This study is dedicated to my late parents Baba Joseph Kamau and Mama Dorothy Muthoni. Thank you for igniting in me the spirit of education and perseverance. How I wish you were alive to see me climb the ladder of success!

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ABREVIATIONS AND ACRONYMS

AIDS	Acquired Immunodefiency Syndrome
AMP	Amphetamine
ART	Antiretroviral Therapy
ARV	Antiretroviral
BZO	Benzodiazepines
CCC	Comprehensive Care Clinic
CDC	Centre for Disease Control and Prevention
FSW	Female Sex Worker
GBM	Bisexual and Other Men Who Have Sex with Men
GBMSM	Gay, Bisexual, and other Men Who Have Sex With Men
HEP.B	Hepatitis B Screening
HIV	Human Immunodeficiency Virus
HTC	HIV testing and Counselling
IDU	Intravenous Drug Users
KAIS	Kenya AIDS Indicator Survey
KII	Key Informant Interview
LGBT	Lesbian, Gay, Bisexual, and Transgender
MARPs	Most at Risk Population

MOH	Ministry of Health
MOR	Morphine
MSM	Men Who Have Sex with Men
MTD	Methadone
NACC	National AIDS Control Council
NASCOP	National AIDS/STI Control Programme
PCP	Phencyclidine
PEP	Post Exposure Prophylaxis
PrEP	Pre-Exposure Prophylaxis
STI	Sexually Transmitted Infections
TGW	Transgender Women
THC	Tetrahydrocannabinol
TP	Transgender Persons
TR	Transgender
UD	Undetectable Viral Load
UNAIDS	United Nations Programme on HIV/AIDS
VDRL	Syphilis Screening
WHO	World Health Organization
YLWH	Young People Living with HIV

DEFINITION OF OPERATIONAL TERMS

Adherence to ART	Taking HIV medicine ≥ 95% correctly and consistently as prescribed.
Detectable viral load	Indicates the virus has not been fully supressed by the HIV medicine hence increasing the risk of HIV transmission.
Discrimination	To treat a person unfairly, or unjustly including healthcare denial either due to their sexuality or based on their real or perceived HIV status.
Global targets of 95-95-95	One of the strategies to end HIV/AIDS epidermic by 2030 by ensuring that 95% of all people living with HIV know their HIV status, 95% among those who know their status are on ART and 95% of those on ART have achieved viral suppression hence drastically reducing transmission of HIV.
Insertive anal sex	Also known as 'topping'. It is the act of penetrating a partner's anus with a penis or sex toys. It is considered a risky sexual behaviour of transmitting HIV and other STI.
Heterosexuality	It is romantic attraction, sexual attraction, or sexual behaviour between people of the opposite sex or gender
HIV risk reduction interventions	Combines biomedical approaches such as use of Pre-Exposure Prophylaxis and Post Exposure Prophylaxis (PrEP/PEP), and Antiretroviral therapy. Behavioural approaches such as use of condom correctly and consistently, behaviour change and counselling on substance use. Structural approaches

	such as frequent screening for HIV and STI, prompt treatment of STI, and prompt linkage to HIV care.
Homophobia	It is the harmful or unfair things a person does based on fear or dislike of homosexual people. People who are perceived not to fit a society's traditional ideas about gender or sexuality.
Homosexuality	It is a person who is sexually or romantically attracted to people of the same sex.
Receptive anal sex	Commonly referred as 'bottoming' is a sexual act, where someone's anus is penetrated by a partner's penis, finger or a toy.
Risky sexual behaviours	Refers to sexual activities that increases the possibility of adverse health effects such as sexually transmitted infection and unplanned pregnancy. Examples of these behaviours includes condomless sex, many sex partners and indulging in sex while under the influence of alcohol or drugs.
Sickly and Frail	Having severe illness with many comorbidities or being too weak with low energy.
Stigma	It is an act of identifying, fearing, isolating, labelling undesirable qualities targeted towards those perceived as being shamefully different from social ideal. It is an attribute that discredits affected and infected people from the normalized social ideal.
Undetectable viral load	There is zero risk of HIV transmission during sex since the amount of HIV is so low such that the test cannot detect any HIV. It is sometimes referred to as 'Undetectable equals to Untransmittable'.

Versatile anal sex	Refers to a person who engages in both insertive (topping) and receptive (bottoming) sex.
Viral suppression	Antiretroviral therapy has reduced the amount of the virus to low levels (<200-1000 copies/mL) minimising the risk of transmission.

ABSTRACT

Globally, men who have sex with men (MSM) are more vulnerable to HIV as compared to men in the general population. However, if commenced promptly on ART and adherence to treatment is observed their viral load can be suppressed hence unable to transmit the virus to their partner. The aim of this study was to determine the effectiveness of the risk reduction interventions on viral load suppression levels among men who have sex with men (MSM) living with HIV versus those in the control group in Mvita sub-County, Mombasa County, Kenya between December 2020 and June 2021. A quasi-experimental study design using quantitative methods was adopted and the study population was the MSM residing in Mvita sub-County in Mombasa County. Inclusion criteria were, being biological male-sex assigned at birth, 18 years and above, had anal sex with at least one male partner in the past 3 months, a resident of Mvita sub-County, and willingness to give informed consent in writing. Exclusion criteria were those who declined to give consent or were intoxicated with alcohol or drugs. The respondent-driven sampling (RDS), a semi-probabilistic method, in the absence of a sampling frame was used to obtain the sample of respondents. A total of 114 HIV positive MSM participated in the study. Half (57) of MSM living with HIV were actively followed and risk reduction interventions (adherence to ARVs, general counseling and nutritional care), and HIV prevention measures (prompt treatment of STI/OI and condom use) were offered after every 2 months for six months. The control group (57) received no risk reduction interventions. Semi-structured questionnaire and laboratory investigations were employed to collect data. Log-binomial univariate and the multivariate regression analysis model were used to identify the variables which were associated with undetectable viral load. Undetectable viral load was defined as having an HIV viral load of less than 50 copies/ml. Data collected was cleaned, coded and analysed using STATA software, Version 17. Level of significance was fixed at 5%. Ethical approval was received from the relevant bodies. Majority of MSM were between ages 19 to 29 (54%), were single (77%), were Christian (61%), never married to a female (39%) and had an income of <5,000 ksh (65%). MSM in the control group, who reported ever use of PEP/PrEP (44%), were likely to have detectable viral load while MSM who received interventions, who reported condom break more than once during anal sex (61%), who had more than one regular anal sex partners (61% both groups), and who drunk more than 2 bottles of beer (33% both groups) were likely to have undetectable viral load. MSM in the control group who reported being always high on alcohol during anal sex (19%), were likely to have detectable viral load. MSM who received interventions and reported feeling uneasy while seeking health services (75%) had detectable viral load while those in the control group who attended private clinics (42%), had undetectable viral load. Overall, after six months, the proportion of MSM achieving viral load suppression was significantly higher in the intervention group as compared to control group by 60% (95% CI= 49–70, $p <$ 0.001). In conclusion, MSM in the control group had low knowledge of HIV prevention hence detectable viral load. However, high risk behaviours such as condom break were associated with undetectable viral load in the group that received risk reduction interventions. MSM in the control group who were attended in private clinics received better HIV care, thus had undetectable viral load. MSM who received risk reduction intervention had better treatment outcome with many MSM

achieving undetectable viral load. From the study it is recommended that peer-led HIV services to be integrated in all HIV programmes targeting MSM, effective substance use intervention program be re-designed to rehabilitate the MSM on alcohol and drugs, improvement on HIV care in public health facilities and risk reduction interventions to be offered to all MSM.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In 2023, approximately, 39.9 million people in the world were living with HIV, nearly 86% of people knew their HIV status, 89% were on antiretroviral therapy while 93% had attained viral suppression (UNAIDS, 2024). However, about 5.4 million people were unaware of their HIV status and approximately 630,000 people died of HIV related infection (UNAIDS, 2024). Many countries in the world were committed towards attaining the global targets of achieving '95-95-95' treatment goals by 2025 and ending HIV by 2030 (Frescura *et al.,* 2022). However, lack of political good will, emergence of COVID-19, punitive laws instituted against same sex relationships, insecurity, dwindling resources from the donor countries among other factors, might reverse the progress gained and hence the targets might be unattainable (UNAIDS, 2022). Globally, 71 countries have criminalized same sex relationship and 32 of these countries are in Africa. Punitive laws have been passed, including death penalty in countries like, Iran, Saudi Arabia, Nigeria, Mauritania, Sudan and Somalia (Cohen *et al.,* 2023). Consequently, HIV prevalence was higher in the countries where criminalization of same relationships existed, as compared to the countries which did not criminalize same sex relationship (Lyons *et al.,* 2023). In the world, the risk of contracting HIV among men who have sex with men (MSM) was 28 times greater than in the general population (UNAIDS, 2023).

World wide, MSM were more vulnerable not only to STI but also HIV than other population groups (Chingombe *et al.,* 2022) and in the year 2019 these accounted for 23% new HIV infection among the adults (Bao *et al.,* 2021). Moreover, MSM who were older, who had other underlying diseases, who were HIV positive and not on treatment were likely to be very sick once they contract COVID-19 (UNAIDS, 2022). Sub-Saharan Africa accounted for about two thirds of PLHIV despite having approximately 10% of global population (Hlongwa *et al.,* 2023). A study by Stannah *et al.* (2023) on MSM in Africa, indicated that viral suppression was at 62% which was lower than the UNAID set targets which required at least 90% of all MSM who

test HIV positive and on ART; 86% should be virally suppressed. In another study conducted in three South African cities by Giovenco *et al.* (2025), HIV prevalence was estimated to be very high among MSM/TG but only half of those who were HIV positive had undetectable viral load. Majority of African countries strategic plans did not mention transgender people and very few offered them interventions. Even though the UNAIDS expects to achieve its targets by 2030, such data was not included in many national HIV programmes. This data is crucial in identifying gaps in HIV responses if HIV epidemic has to end by 2030 (Chakrapan, 2021). The spread of HIV in sub-Saharan Africa is mostly through heterosexual relationships, both in the context of transactional and commercial sex and in longer-term relationships, including marriage (WHO, 2024).

The HIV infection and transmission could be prevented and viral suppression achieved, if many HIV positive MSM were promptly linked to care (Kerr *et al.,* 2026). However, treatment outcome could be hindered if there was limited access to healthcare, homelessness, and poverty (Ogunbajo *et al.,* 2023). Majority of MSM were unable to seek HIV services either because of fear of negative reaction from health care workers or breach of confidentiality (Correia *et al.,* 2025), hence increasing the risk of HIV. In a study conducted in Tshwane North, South Africa, common risky behaviours among MSM included having condomless anal sex, multiple sex partners, indulgence in alcohol, and drugs (Malefo *et al.,* 2023). In another study conducted in Mozambique by Ribeiro Banze *et al.* (2024) there was a significant rise in HIV among MSM who were not circumcised and those who had many partners. According to a study conducted by Mbita *et al.* (2022) in Tanzania, being uncircumcised, presence of STI and excessive intake of alcohol before sex was associated with HIV. A study conducted in rural Uganda among MSM, indicated, inaccessibility to condom and feeling that condomless sex was more pleasurable deterred many MSM from using condom (Nakiganda *et al.,* 2021). In another study conducted in Uganda, on impact of the anti-homosexuality act, majority of MSM attending public health facilities started concealing their sexuality and noted the key HIV services offered to them were significantly reduced as compared to the general population (Nsubuga *et al.,* 2025).

Criminalization of same sex relationship may lead to fewer MSM taking HIV test, higher HIV prevalence and fewer still achieving viral suppression (Lyons *et al.,* 2023). Approximately, 1.4 million Kenyans were living with HIV in 2023 and mode of transmission was mainly heterosexual (UNAIDS, 2023). About 94% of all people living with HIV knew their status, 98% were on ART, and 95% had achieved viral suppression (UNAIDS, 2023). HIV prevalence among MSM was high (18.9%) as compared to that of general male population (15-49 years) which was 3.1 (NASCOP, 2020). In Kenya MSM population was approximately 32,600 with ART coverage of about 38.8% (UNAIDS (2023), however, data was seldom available (Musyoki *et al.,* 2021). HIV prevalence among MSM in Nairobi was 25% (Smith *et al.,* 2021), however, in the country, MSM accounted for 15.2% of all new HIV infection (NASCOP, 2020). A study conducted in Nairobi, Kenya among men and transgender persons who had sex with men, 76% knew their HIV status, 65.3% were on antiretroviral therapy (ART), and 47.4% had achieved viral suppression (<50 copies/mL) (Smith *et al.,* 2021). However, younger participants 18-22 years, were unlikely to be aware of their HIV status, and unlikely to be on ART or have suppressed viral load. The participants were also likely to have bacterial sexually transmitted infection both in the rectal and urethral sites (Smith *et al.,* 2021).

A study conducted in Coastal town of Kenya among gay, bisexual, and other men who have sex with men (GBMSM) living with HIV indicated, the group that received *Shikamana* peer-and-provider intervention had an improved adherence to HIV and better mental health as compared to the group that received standard care only (Graff *et al.,* 2023). Similar results were found in this study where, risk reduction interventions such as adherence to ARV, general counselling, and HIV prevention were offered to one group. After six months of follow up, viral load suppression was significant in intervention group as compared to the control group. Study conducted by Nyongesa *et al.* (2022), on viral load suppression among young people living with HIV (YLWH) in Mombasa and Kilifi, indicated high levels of unsuppressed viral load which was attributed to non-adherence to ART, lack of support among others. Thus, emphasizing the need to address the challenges affecting the YLWH to avert HIV drug resistance. In Kenya, the former Coast Province had the second highest (1686) estimated number of MSM in the country

and Mvita Sub-County in Mombasa County was chosen because it had the highest (341) estimated number of MSM (NASCOP/MOH, 2013).

1.2 Statement of Problem

Globally, gay men and other men who have sex with men (GMSM) are 28 times more likely to be infected by HIV as compared to men in the general population despite advances in HIV treatment (UNAIDS, 2024). By 2050 it is projected that more than 46 million people will be living with HIV if effort is not made for MSM to access HIV prevention and treatment (UNAIDS, 2024). Despite the HIV vulnerability, only 40% reported accessing HIV prevention services in the last three months in 2023 (UNAIDS, 2024). The number of new HIV cases among MSM in the world increased by 11% between 2010 and 2022 and was approximately 210,000 (UNAIDS, 2024), however, only half of MSM in the world were aware of PrEP (Sun et al., 2022). Programmes for key population including MSM are extremely underfunded with only 1.3% and 4.4% funding coming from the national government and international donors respectively (UNAIDS, 2024). It is impossible to estimate the population size of MSM due to limited data, hence difficult for the programme managers to plan, monitor and control effectively the HIV epidemic (Tuyishime *et al.,* 2023). A study done in 10 sub-Saharan Africa countries indicated HIV prevalence among MSM to be more than 5 times in the countries that criminalized same sex relationships and 12 times higher where there was a report of recent prosecutions, as compared to the countries where there were no persecutions (Lyons *et al.,* 2023).

Death penalty and long prison sentence is still being carried out in almost two third of African countries which criminalizes same sex relationships (Mofolorunsho *et al.,* 2024). Studies have shown 58% of MSM in eastern Africa and 50% in western Africa in the past three and six months respectively, have also had sex with women (Fiorentino *et al.,* 2024). According to Stannah *et al.* (2023), key population including MSM were at a high risk of acquiring and transmitting HIV. The study indicated 82% of MSM took the HIV test, 73% were on ART in the past one year in 2020; however, only 69% had achieved viral suppression in Africa. However, due to

healthcare related stigma and discrimination majority of MSM shunned away from the services meant for them for fear of breech of confidentially and incompetency of the healthcare workers, hence many avoided disclosing their sexuality or HIV status (Algarin et al., 2022). In Kenya, HIV prevalence among MSM was found to be approximately 6 times that of the general male population (15-49 years) (NASCOP, 2020). Same sex relationship in Kenya is illegal, and punitive laws have been passed (Kenya Constitution 2010), making the group to go underground. Ratified and perceived sexual stigma among MSM (Korhonen *et al.,* 2022; Smith *et al.,* 2021) has deterred the MSM from accessing HIV services and some also maintained heterosexual relationships to conceal their identity (Beagan *et al.,* 2022).

Stigma among MSM prevented majority from accessing HIV service, either due lack of information, fear of being discriminated, fear of positive results or lack of trained professionals (Lewis *et al.,* 2023). In Kenya, antiretroviral therapy (ART) coverage among MSM living with HIV was still low (38.8%) (UNAIDS, 2022). According to the study by Smith *et al.* (2021) conducted in Nairobi, Kenya, more than 40% of gay, bisexual and other men who have sex with men (GBMSM) and transgender persons (TP) reported having condomless anal sex, poor uptake of PrEP, hence more than a quarter were HIV positive. Nearly 77% GBMSM/TP had taken HIV test, 85% were on ART while 73% had achieved viral suppression in Nairobi which was lower than that of PLHIV in the Kenyan general population (Smith *et al.,* 2021). In another study conducted by Wang *et al.* (2022) in China, more than half of MSM who used drugs and alcohol, were likely to have multiple sex partners and engage in condomless anal sex. Highly risky behaviours were associated with lower viral load suppression (Edun *et al.,* 2024). Prompt initiation of ART to people who have just tested HIV positive, regardless of their CD4 cell count and viral load (universal test and treat) was key in increasing ART coverage, thus reducing the risk of transmission of HIV (Wamuti *et al.,* 2024).

However, poor adherence, being on treatment for a longer period, having no family, lack of social support, presence of other diseases, lower CD4 cell count, combination of HIV drugs and advancement of HIV disease were associated with viral load non-suppression among people living with HIV on ART (Mosha *et al.,* 2024) and

emergence of life-threatening opportunistic infections (Vo *et al.,* 2025). A study carried in Mombasa and Kilifi by Nyongesa *et al.* (2022) indicated that participants had high level of viral non- suppression due to sub-optimal adherence to ART, which was attributed to non-disclosure of HIV status, anticipated stigma, lack of social support and substance use among others which may eventually lead to ART resistance. This notwithstanding, the donor countries have reduced funding and Kenya has to increase domestic funding to fight HIV (UNAIDS, 2023). Insufficient funding may reverse the gains made (McDade *et al.,* 2021) and resurgence in HIV may be experienced with fewer MSM attaining viral load suppression (Garnett, 2021). The study sought to determine viral suppression between the HIV positive MSM who received risk reduction intervention and the control group.

1.3 Justification of the Study

In Kenya, men who have sex with men are more vulnerable to HIV as compared to the men in the general population (NASCOP, 2020). However, ART coverage in Kenya among MSM has also been low (38.8%) (UNAIDS, 2022). Majority of MSM did not access HIV services meant for them for fear of their sexual orientation being known or because of unfriendly healthcare providers (Correia *et al.,* 2025). Behaviours such as condomless anal sex (He *et al.,* 2022), multiple sex partners, substance use (Mbunge *et al.,* 2024), poor accessibility to health care and absence of initial STI screening tools in some countries increased the vulnerability of MSM in contracting HIV (Dzinamarira *et al.,* 2023). In order to achieve UNAIDS goals of '95-95-95' and eradicate HIV by 2030, MSM needs must be identified, prioritized, and addressed. The study advocates for re-designing MSM programmes in the country and supporting peer-led HIV services. Advocacy will lead to increased number of MSM assessing HIV services, re-training the healthcare workers, incorporating peers in re-designing rehabs for alcohol/drugs, and lobbying for increased domestic funding to sustain the programmes after donor withdrawal.

A study by Berg *et al*. (2021) showed that PLHIV who were supported by peers were able to be linked to HIV care, retained in care and had an improved adherence to ART, thus able to achieve viral load suppression. With at least 95% adherence to

ART, treatment failure and drug resistance can be prevented (Panayi *et al.*, 2024). Significant improvement in quality of life and health outcome is possible in PLHIV after restoration of their immunity (Panayi *et al.*, 2024). The gains made in reduction of HIV prevalence in the general population can only be sustained if many MSM attained viral load suppression since some also maintained heterosexual relationships (Beagan *et al.*, 2022) to conceal their identities. Data on MSM is hardly available in Kenya (Musyoki *et al.*, 2021) and this study will provide additional data on treatment outcomes. The study results may inform the policy makers on the interventions to be put in place so that many MSM can attain viral load suppression which is a desirable outcome for people living with HIV since they cannot effectively transmit the virus to their partners (Chang *et al.*, 2025).

1.4 Objectives

1.4.1. Broad Objectives

The aim of this study was to determine the effectiveness of the risk reduction interventions on viral load suppression levels among men who have sex with men (MSM) living with HIV versus those in the control group in Mvita sub-County, Mombasa County, Kenya between December 2020 and June 2021.

1.4.2. Specific Objectives

1. To determine the effect of interventions on the knowledge of HIV among men who have sex with men living with HIV in Mvita sub-County, Mombasa County
2. To determine the effect of interventions on the individual behaviours among men who have sex with men living with HIV in Mvita sub-County, Mombasa County
3. To determine the effect of interventions on the health system utilization among men who have sex with men living with HIV in Mvita sub-County, Mombasa County

4. To determine the effect of interventions on HIV treatment outcome among men who have sex with men living with HIV in Mvita sub-County, Mombasa County

1.5 Research Question

1. What is the effect of interventions on the knowledge of HIV among men who have sex with men living with HIV in Mvita sub-County, Mombasa County?
2. What is the effect of interventions on the individual behaviours among men who have sex with men living with HIV in Mvita sub-County, Mombasa County?
3. What is the effect of interventions on the health system utilization among men who have sex with men living with HIV in Mvita sub-County, Mombasa County?
4. What is the effect of interventions on HIV treatment outcome among men who have sex with men living with HIV in Mvita sub-County, Mombasa County?

1.6 Hypotheses

The study was guided by four hypotheses;

H_o1: There is no significant difference in the knowledge of HIV between men who have sex with men living with HIV who received risk reduction interventions such as adherence to ARVs, general counselling and HIV prevention measures and the control group.

H_o2: There is no significant difference in the individual behaviours between men who have sex with men living with HIV who received risk reduction interventions such as adherence to ARVs, general counselling and HIV prevention measures, and the control group.

H_o3: There is no significant difference in the health system utilization between men who have sex with men living with HIV who received risk reduction

interventions such as adherence to ARVs, general counselling and HIV prevention measures and the control group.

H_o4: There is no significant difference on HIV treatment outcomes between men who have sex with men living with HIV who received risk reduction interventions such as adherence to ARVs, general counselling and HIV prevention measures and the control group.

1.7 Conceptual Framework

The conceptual framework of the study (Figure 1.1) was based on the literature review and the objectives of the study. It indicated the relationship between the independent variables and dependent variable of the study.

The independent variables were;

1. Socio-demographic which included, age, relationship status, religion, level of education, ever married to a female.
2. Knowledge of HIV which included, importance of screening of STI, sex preference, use of lubricants, and use of PReP/PEP.
3. Behaviours of MSM which included, unprotected sex, multiple sex partners, alcohol and drug use and presence of STI.
4. Health system utilization which included, lack of confidentiality, incompetency, unfriendly healthcare workers, stigma and discrimination, lack of HIV commodities.

The dependent variable was undetectable viral load after 6 months of the study.

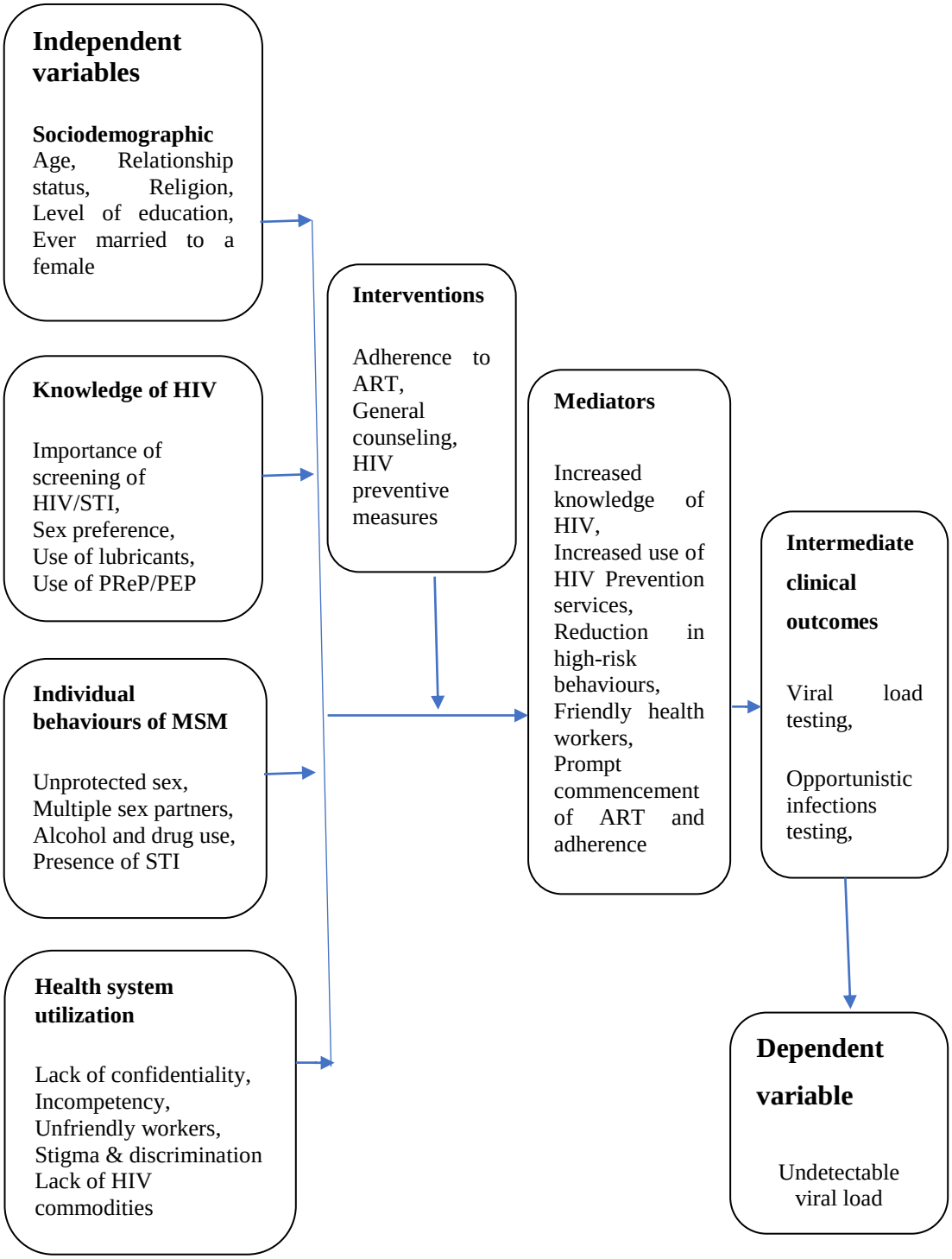


Figure 1.1: Conceptual Framework of the Study (Source: Researcher, 2020).

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Men who have sex with men (MSM) are more vulnerable to HIV as compared to men in the general population (UNAIDS, 2023). Globally, about 85% of people living with HIV knew their HIV status, 88% were on antiretroviral therapy while 92% had attained viral suppression (UNAIDS, 2023). According to a study conducted by Queiroz *et al.* (2024) in Brazil among MSM on awareness of PEP and PrEP, the MSM who were low-income earners were likely to be more aware on PEP and PrEP. This trend could be attributed to the fact that, the MSM were likely to be exposed to risky HIV behaviours hence prompt access to the service. People who felt stigmatised or discriminated were unlikely to seek or receive information on HIV preventive services including access and utilization of PEP and PrEP (Sallam *et al.,* 2022). According to the study conducted by Danwang *et al*. (2022), ending of HIV by 2030 might not be attainable due to challenges such COVID-19. People living with HIV were more vulnerable to COVID-19 hence increasing the risk of mortality and severity of the disease. In Africa, despite increase in HIV testing and ART use, decrease in HIV incidences has not been observed and 1 in 3 HIV positive MSM have not achieved undetectable viral load (Nardell *et al.,* 2022).

In Kenya, HIV prevalence among MSM was 18.9% while that of male in general population (15-49 years) was 3.1% (NASCOP, 2020). Despite MSM engaging in high-risk behaviours such as having condomless anal sex, multiple sex partners, alcohol, and drugs use, majority did not seek HIV services, for fear of their sexual orientation being revealed or because of hostile healthcare workers (Correia *et al.,* 2025). Criminalization of same sex relationship has also made the group to go underground (Kavanaugh *et al.,* 2021), however, accurate data was seldom available (Musyoki *et al.,* 2021). In order to achieve the global targets of 95-95-95 and ending AIDS epidermic in 2030, MSM and other key population must be kept in check (UNAIDS, 2022).

2.2 Knowledge on HIV/AIDS among MSM

A study on HIV/AIDS knowledge among MSM conducted by Jing *et al.* (2025) in China indicated, HIV positive students had adequate knowledge on HIV, however, HIV negative students were likely to disclose HIV status, and reported using condom consistently with casual partner. MSM in the rural areas were less likely to have information on HIV and were likely to be stigmatised by their communities which led to substance use or abuse in a study conducted in Southeast China (Chen *et al.,* 2024). In another study on MSM by Qin *et al.* (2023) in China, receptive and versatile anal sex carried a higher risk of contracting HIV as compared to the insertive anal sex. MSM who were insertive (top) were considered more masculine than the receptive (bottom) and decided whether to use condom or not during anal sex leaving receptive MSM (bottom) with no say (Nakiganda *et al.,* 2021). MSM also reported loose and low-quality condom which could slip during anal sex (Nakiganda *et al.,* 2021) hence the risk of HIV. Majority of the participants (87%) used lubricants during anal, however water-based lubricant was used more (63%) as compared to Vaseline (30%). Condom was also used with lubricant by MSM according to a study by Abdulai *et al.* (2024).

In another study by He *et al.* (2024), MSM who took HIV test for the first time in a large internet survey in Zhejiang Province - China, were young, in school, had a low income, practiced insertive anal sex, some were bisexual, had fewer sex partners and used drugs like rush poppers. Major barriers to HIV reduction among MSM were lack of information and easy access to HIV services (Nakiganda *et al.,* 2021). For instance, some MSM did not know where they could get condoms and some reported not knowing how to use condoms, while some MSM were aware of PrEP but could not easily access it because of either adverse side effects or fear of being labelled as HIV positive (Nakiganda *et al.,* 2021). Approximately 70% of new HIV infection globally, occurred among the key population (UNAIDS, 2022). However, some MSM and TGW were unaware if they were HIV positive, and fewer had taken the HIV test (Nanthaprut *et al.,* 2021). A study conducted in Uganda on knowledge of HIV, indicated, majority of the participants had inaccurate information on HIV (93.2%), some had not disclosed their HIV status (20.8%) and a few never took the

HIV test (3.3%) (Nakalembe *et al.,* 2025). MSM shunned taking HIV test because they feared being discriminated and stigmatized regardless of the outcome of the test (Thapa *et al.,* 2024).

Receptive positioning during anal sex, irregular use of condom and use of drugs were associated with HIV infection (Song *et al.,* 2023). According to Cota *et al.* (2021), other barriers to HIV testing among MSM were low perception risk of HIV, fear of seroconverting, fear of stigma and discrimination and acceptance of their sexuality. In a similar study conducted by Peters *et al.* (2022), in the Netherlands among male sex workers who have sex with men, majority of MSM did not take the HIV test regularly because they did not consider themselves at risk of contracting HIV. According to a study by Kalu *et al.* (2024) conducted in sub-Saharan African countries, fewer MSM could access HIV testing in the countries that criminalized same sex relationships. In another study by Carter *et al*. (2022), conducted among MSM US military service, despite high risk of HIV infection, very few accessed PrEP and due to stigma and outdated military policies, MSM concealed their sexual identity. Fear of positive results, rejection by family and friends deterred gay, bisexual, and other men who have sex with men (GBMSM) from taking the HIV test and those who took the test were viewed as being sexually promiscuous (Iott *et al.,* 2022). According to a study by MacGregor *et al.* (2021), majority of men who have sex with men or trans persons who have sex with men (MSM/TPSM) reported having screened for STI, however, they were more likely to have unprotected sex with a partner on PrEP.

A similar study was conducted by van Wees *et al.* (2024) in the Netherlands which showed, MSM who were on PrEP were likely to have condomless sex during anal sex hence likely to contract STI/HIV due multiple sex partners (Basten *et al.,* 2021) and use of drugs including injectable (De Baetselier *et al.,* 2021; Flores Anato *et al.,* 2022; Knoops *et al.,* 2022).

Use of PrEP increased enjoyment and engagement in sexual activities as indicated in the past studies (Zimmermann *et al.,* 2021) and reduced fear of contracting HIV (Nakiganda *et al.,* 2024) (Mpirirwe *et al.,* 2024). Nevertheless, majority of men were

unaware of their HIV status and visited the health facilities when they contracted HIV related illness due to weakened immune system (Mahmoud *et al.,* 2024). A study conducted in west Africa among MSM showed, awareness of HIV risk was inadequate and young MSM were at a higher risk of acquiring HIV since they did not perceive themselves to be at risk. The young MSM had less fear of HIV hence, they engaged in high-risk sexual behaviours (Reyniers *et al.,* 2023). Other reasons why men to did not access HIV testing early was due to barriers such congestion in the clinic, hostile healthcare workers, unfavourable clinic working hours, stigma and lack of privacy (Davey *et al.,* 2022) (Moolla *et al.,* 2024). It was also noted that some MSM hid the pill to avoid stigmatisation since PrEP was associated with HIV or homosexuality hence predisposing themselves to HIV when they forgot to take the pill in a study conducted in west Africa (Reyniers *et al.,* 2023).

Globally, about 10% of those at risk of HIV were on PrEP despite it being highly effective in HIV prevention (Mgodi *et al.,* 2023; Ross *et al.,* 2024). Other studies on PrEP indicated adherence was higher on the participants who purchased PrEP online (Edeza *et al.,* 2021; Guimarães *et al.,* 2023) than those who received from standard care (Saldarriaga *et al.,* 2024). However, for event driven users of PrEP, adherence was poor according to the study conducted in China (Li *et al.,* 2026). An opportunity to screening gay, bisexual, and other men who have sex with men (GBMSM) for PrEP eligibility was often missed, consequently, they did not benefitted from PrEP (King *et al.,* 2025). Novel ways of assessing adherence to PrEP have emerged and urine is now used instead of blood because of its availability and affordability (Okello *et al.,* 2025). Dispensing PrEP and HIV self-testing (HIVST) for 6-month was found to increase adherence, testing for HIV and retention as compared to the participants in the standard care (Ngure *et al.,* 2022). Home delivery for PrEP/HIV self testing kit was preferred more than designated service delivery places. Teleconsultation was associated with higher education and acceptability of PrEP (Hoagland *et al.,* 2021).

Prompt HIV testing and linkage to HIV care for those who tested HIV positive and preventive care for those who tested HIV negative were key in achieving sustainable development goals (SDGs) by 2030. HIV self-test kits in HIV testing was preferred

because it was convenient and provided privacy as compared to HIV clinic testing (Jamil *et al.,* 2021; Eshun *et al.,* 2021). MSM and transgender women in sub-Saharan Africa had a remarkably high HIV prevalence as compared to that of general population (Kloek *et al.,* 2022). Even though studies have indicated a sharp increase in HIV testing among MSM in the past ten years, only a quarter of MSM living with HIV were on treatment (Kloek *et al.,* 2022). In order to achieve UNAIDS target, and to contain the HIV epidermic, it is imperative that these vulnerable populations have to be reached to access HIV testing and treatment (Rocha *et al.,* 2023). To reduce new HIV infections to less than 560,000 by 2025, and achieve WHO targets, it is crucial to improve the diagnosis of HIV and STI among MSM (Dzenga *et al*., 2023).

2.3 Individual Behaviour of MSM

2.3.1 Alcohol and Substance Abuse

Globally, approximately 34 million people were living with HIV and 68% were in sub-Saharan Africa (Moyo *et al.,* 2023). Unfortunately, the sub-Saharan Africa had also the highest prevalence of unhealthy alcohol use in the world (Belete *et al.,* 2024) which was associated with increased sexual risky behaviours, non-adherence to ART and detectable viral load (Goma *et al.,* 2024) hence the risk of HIV. According to a study conducted in Tanzania by Mbita *et al.* (2022), alcohol consumption led to reduced inhibition and hence increased exposure to risky sexual behaviours such as condomless sex, violence and transactional sex. Similarly, a study by Chen *et al.* (2025), conducted in China indicated, MSM who indulged in alcohol were more likely to engage in sexual risk behaviours while MSM who used injectable drugs were at higher risk of contracting HIV because of shared needles and syringes (McFall *et al.,* 2024). In Southern United States, Fang *et al.* (2026) found that substance use among MSM was associated with lower viral load suppression. According to another study by Rose *et al.* (2022), conducted in Cape Town, South Africa, daily intake of alcohol was associated with non-use of ART on that day.

Alcohol use has been theorized as a coping mechanism for stigma and discrimination which lesbian, gay, bisexual, transgender and queer experienced (Stoudemire *et al.,* 2025). In another study conducted in China by Wang *et al.* (2022), more than half of

MSM were found to use drugs than alcohol but both groups were likely to have multiple sexual partners, engage in condomless anal sex while sexual drug users were likely to be HIV positive. Armstrong *et al.* (2021) found that bisexual and other men who have sex with men (GBM) in Vancouver, Canada, who reported transactional sex were likely to be lonely and anxious, engage in high risky sexual behaviours such as non-condom use with partners of unknown HIV status, have multiple sex partners and abuse drugs such as injectables and crystal methamphetamine. In a similar study, use of chemsex was associated with increased sexual risk behaviours in a study conducted in Stockholm, Sweden (Elin *et al.,* 2025). In Kenya and Uganda, Puryear *et al.* (2023) reported that alcohol use among MSM resulted in no significant difference in viral load suppression between MSM who received counselling on alcohol and those who did not.

However, MSM who received counselling on alcohol reduced alcohol intake and their health generally improved. According to a study by Sullivan *et al.* (2021), among black MSM in Atlanta Georgia, the drugs that were mostly abused were marijuana (62%) and cocaine (60%). The most common STI among the black MSM was syphilis (34%) in a study conducted by Sullivan *et al.* (2021). Higher internalized stigma among MSM was associated with higher depressive signs, increased alcohol and drug use and hence increased probability of having condomless anal sex (Taggart *et al.*, 2021). According to a study conducted by Cyrus *et al.* (2023) among transwomen and men who have sex with men in Peru, MSM in the past three month were likely to report having had sex with HIV positive partner and were likely to be using marijuana. In a study conducted among men who have sex with men living with HIV in Chongqing, China, indicated inconsistent sub-optimal condom use, use of alcohol and poppers (Chen *et al.,* 2025). Substance use among MSM, was higher than in the heterosexuals, and predisposed them to high-risk sexual behaviours such condomless anal sex hence risk of HIV transmission (Compton *et al.,* 2021).

Another study by Perez *et al.* (2022) indicated the risk of hazardous or harmful alcohol drinking was higher in MSM than men in general population. On the same breath, MSM who were well educated and more affluent, were at higher risk of

harmful drinking and binge drinking (Perez *et al.,* 2022). A study conducted in China among young men who have sex with men indicated a recreational drug known as rush was commonly used since it was cheap, it increased sexual pleasure and it eased the uneasiness during anal sex (Fei *et al.,* 2024), however use of chemsex did not affect the adherence to PrEP (Maxwell *et al.,* 2022). According to a study conducted among MSM in Zimbabwe by Mapingure *et al.* (2023), MSM on drugs were likely to have poor treatment outcome due sub-optimal ART adherence hence increased risk of resistance. Compared to men in the general population, MSM were 3 to 4 times more likely to report the use of substance use and other STI (Murphy *et al.,* 2021). The study further indicated, MSM who used social media platforms to meet sexual partners were likely to report substance use (Murphy *et al.,* 2021).

2.3.2 Condom Use

A study conducted in rural Uganda by Nakiganda *et al.* (2021), on men who have sex with men (MSM), showed that condomless anal sex was preferred because it was more erotic and easier to maintain an erection. These findings were in line with a study conducted in China which indicated barriers to condom use were lack of condom or preference to condomless anal sex due to erotic pleasure (Chen *et al.,* 2024). According to a Brazilian study by Hentges *et al.* (2023), over 50% of MSM inconsistently used condoms for anal sex with the casual partners, however old age was negatively associated with inconsistent condom use. In another study by Mitchell *et al.* (2021) in USA, on effects of COVID -19 on HIV among MSM, there was increased use of condomless sex, reduced HIV testing, initiation of ART, adherence, and reduced undetectable viral load which led to increased new cases of HIV. A study on gay, bisexual and other men who have sex with men (GBM), conducted by Doyle *et al.* (2021) in Montreal, Canada, GBM who used condom, seroadaptive behaviour and biomedical prevention were likely to have multiple anal sex partners and were more predisposed to STI. Majority of GBM were on ART but only 53% had attained viral suppression (Doyle *et al.,* 2021).

A study conducted in Germany indicated 81% insertive and 66% receptive MSM reported inconsistent condom use (Moreland *et al.,* 2025). HIV infection was noted

to be high due to increased risky sexual behaviours such as having condomless anal sex with serodiscordant, individuals with high viral loads and exposure to sexually transmitted infection (Harris *et al.,* 2024). A study on effects of mobile health on HIV risk reduction on long distance truck drivers in Kenya conducted by Mutie *et al.* (2025), indicated the interventions were effective in reducing HIV risk. According to a study conducted in Zimbabwe among MSM, being drunk, fearing a partner, being given money, and partner trust were factors that were associated with condomless anal sex (Mapingure *et al.,* 2024). In another study conducted in Turkey among people living with HIV, prevalence of syphilis was higher among MSM than in the heterosexuals' men and risk factors were being MSM and single, having condomless sex, and having multiple sex partners (Sen *et al.,* 2023). A study by Mi *et al.* (2021), conducted in Beijing China indicated, MSM were likely to have more than five sex partners and were also likely to have sex with a partner who was HIV positive

According to a study conducted by Shen *et al.* (2022), barrier to condom use among MSM included unavailability, unaffordability, physical discomfort, inadequate knowledge on HIV prevention, condom stigma, lack of trust and lack of knowledge on substance use. These findings were in line with a study conducted in Bamako, Mali among MSM which showed factors associated with unprotected anal sex to be; unavailability of condom, lack of knowledge and inconsistent condom use in some circumstances (Knox *et al.,* 2021). MSM who were on PrEP were unlikely to use condom either because they felt not at risk of HIV or they wanted to maintain sexual pleasure or they had regular sex partner (Yu *et al.,* 2021; Tan *et al.,* 2021; Punchihewa *et al.,* 2023). In another study, gonorrhoea and chlamydia were common STI among MSM and it was also noted consistency in condom use alone without the use of PrEP may not be sufficient in curbing STI including HIV hence the need to combine condom and PrEP (LeeVan *et al.,* 2022) (Stover *et al.,* 2022). MSM who were at a high risk of HIV infection were likely to be on recreational drugs and engage in condomless anal sex according to a study conducted in China (Fei *et al.,* 2024).

A similar study conducted in China indicated men who have sex with men and women (MSMW) were found to be at a higher risk of HIV infection than men who

have sex with men only (MSMO). MSMW were likely to have group sex, use stimulants, engage in condomless anal sex after alcohol consumption than MSMO (Ge *et al.,* (2024). Men who have sex with men and engaged in transactional sex (MSM-TS) were likely to be young, less educated, married and more likely to transmit HIV to the female in general population (Rosário *et al.,* 2024). MSM-TS who were naive and could not easily access information on safe sex, were more vulnerable to HIV since they were likely to engage in condomless sex and have multiple male sex partners (Hong *et al.,* 2024). According to a study conducted by Qin *et al.* (2023), MSM who had many partners, were receptive or versatile and had casual partners were likely to acquire HIV while MSM who had a monthly income, were educated and used condom frequently were less likely to acquire HIV. Use of alcohol and substances among gay, bisexual, and other men who have sex with men (GBMSM) was found to be a barrier to condom use according to a study conducted in Toronto, Canada (Shuper *et al.,* 2022).

A similar study conducted in the sub-Saharan Africa, indicated low consistent condom use among PLHIV (Endeshaw *et al.,* 2024), however, risky sexual behaviours were associated with non-disclosure of their HIV status and alcohol consumption (Wondmeneh *et al.,* 2023). In a study that was conducted along coastal Kenya, rectal swabs for gonorrhoea and chlamydia were collected among MSM who reported having engaged in receptive anal intercourse. The results indicated majority of MSM who had been paid for sex or were formally employed were at risk of being infected with symptomless rectal gonorrhoea and chlamydia (Ngetsa *et al.,* 2020). In another study conducted in Kisumu, Kenya MSM provided urine and rectal swab specimens for neisseria gonorrhoeae and chlamydia testing. Most of the infection was found in the urine as compared to rectal and were asymptomatic. MSM who reported being versatile or receptive were a higher risk of contracting urogenital neisseria gonorrhoeae/chlamydia than insertive MSM (Otieno *et al.,* 2020), hence at the risk of HIV, however, in the study this was not significant.

2.4 Health System Utilization by MSM

The study by Nakiganda *et al.* (2021) in Uganda, showed, MSM avoided seeking HIV services including discussing sex health issues, for fear of being stigmatized and discriminated, especially in areas where same sex was criminalized. MSM who were not counselled on sexually transmitted infections were likely to have inconsistent condom use (Hentges *et al.,* 2023). In Canada, a study conducted by Moore *et al.* (2021), in the three largest cities, among gay, bisexual, and other men who have sex with men (GBMSM) indicated, that GBMSM who were HIV and had a primary care giver were likely to have suppressed viral load while those who participated in the emotional wellbeing, had reduction in anxiety, depressive symptoms and viral load (Barrington *et al.,* 2023), hence the importance of holistically handling all issues affecting the MSM. According to the study conducted in Mexico by Jiménez-Rivagorza *et al.* (2024), GBMSM who experienced stigma while accessing HIV care were likely to be non-adherent to ART and also felt that the HIV services were tailored to meet the needs of the heterosexual who might not present STI infection in the anal region.

In a similar study by Chimwaza *et al.* (2022), conducted in the sub-Saharan Africa, the lesbian, gay, bisexual, and transgender who participated in the study, felt the HIV services did not address their needs hence many lacked important information on where to take the HIV test, and management thereafter, for those who tested HIV positive. MSM could not disclose their issues to the healthcare providers for fear of breach of confidentiality and being stigmatized (Ravele *et al.,* 2025). Some of the healthcare providers were not competent to deal with the MSM issues hence preferred to refer them to non-Governmental Organizations (NGOs) for assistance (Matlapeng *et al.,* 2022). Some of the MSM could not take the HIV test as a couple either because they had short term casual relationships, or did not trust their partners or because they experienced homophobia both perceived or actual while attending public testing facilities (Gumindega & Maharaj, 2022), hence couple counselling was shunned by MSM since they did not find the sessions helpful (Tuan Abdullah *et al.,* 2022). MSM could also not disclose their sex preference to the health care providers for fear of being exposed and stigmatised (Moyo *et al.,* 2021) while some MSM

reported being mistreated by the healthcare providers and some reported lengthy waiting times (Matlapeng *et al.,* 2023; Matlapeng *et al.,* 2022).

However, private facilities and NGO were preferred sites by MSM because their service was perceived to be private and confidential and they were friendly but at a cost (Moyo *et al.,* 2021).

MSM reported that the healthcare providers lacked necessary competencies such as knowledge and skills to handle their issues because they discussed and disclosed their private matters including HIV information to their family members and they could not attend to their unique health requirements (Matlapeng *et al.,* 2022). Thus, MSM withheld important information to the healthcare providers that could assist in their treatment (Gumindega & Maharaj, 2022). According to the study conducted in Zimbabwe among MSM by Moyo *et al.* (2021), healthcare providers who were either lesbian, gay, bisexual, and transgender (LBGT) or HIV positive or both were reported to offer better HIV testing and counselling, were friendly and ensured privacy maintenance and confidentiality of MSM information, hence preferred by MSM. Private clinics were also preferred by MSM because the healthcare providers were more accommodating, thus, MSM felt free to share very private information and they brought their partners for counselling and testing (Moyo *et al.,* 2021).

MSM who tested HIV positive were promptly linked to HIV care and were commenced on ART (Moyo *et al.,* 2021). However, some MSM who were HIV positive shunned the public health facilities for fear of being harassed by straight men and they also interrogated the competences of the health care workers (Bourne *et al.,* 2022). Societal and cultural perception on same sex relationship hindered the healthcare workers from offering effective care to the MSM. Some MSM were meted with sexual and physical violence and denied service in Kenya due to illegality of same sex relationship (Bourne *et al.,* 2022). A study conducted by Pal *et al.* (2024) in India indicated MSM, with sexually related complains, or portrayed feminine characteristics (receptive role), reported being abused verbally, physically and discriminated by healthcare workers. MSM who disclosed their HIV positive status to their male sex partners, generally had better quality of life, thus the healthcare

workers should encourage the MSM to reveal their seropositive status (Jia *et al.,* 2022). Despite potential benefits, majority of MSM did not reveal their sexuality to the healthcare workers and only slightly more than half reported disclosing. This notwithstanding, the MSM who disclosed their sexuality were likely to take the HIV test (Algarin *et al.,* 2022).

According to study conducted by Crossman *et al.* (2025) among men who have sex with men and women, participants who were not identified with LGBT, missed out on health promotion interventions and were unlikely to receive HIV interventions. In another study conducted in Ethiopia among community-based health insurance members indicated, lengthy waiting time, technical incompetence, being rude, demanding a bribe were negatively associated with trust and utilization of the healthcare services (Akafu *et al.,* 2023). Access to healthcare was limited to participants of both racial/ethnic and sexual minority, however, bisexuals experienced more sexuality-based discrimination which included societal and interpersonal prejudice from heterosexuals (Turpin *et al.,* 2021). Gender and sexual minorities access to health care was poor, were likely to miss the clinic appointments and did not have regular health care providers (Gilmore *et al.,* 2024). Participants residing in the rural areas who used drugs could not easily access healthcare services due to stigma, maltreatment, breech of confidentiality and law enforcers involvement. Thus, even when they had taken an overdose of a certain drug, they were unable to utilize emergency medical service for fear of possible arrest (Byles *et al.,* 2024).

2.5 HIV Treatment Outcome

According to a study on black MSM by Sullivan *et al.* (2021) conducted in Atlanta Georgia, black MSM who were younger, who had lower income, unstable housing, on drugs such as marijuana were likely to have unsuppressed viral load at the baseline visit. However, MSM who tested HIV positive 10 years ago were likely to have viral suppression as compared to those who recently seroconverted. This notwithstanding, black MSM who were not on ART, those who reported side effects of ART and those non-adherent to ART for 2 days or more were likely to have

unsuppressed viral load (Sullivan *et al.,* 2021). Viral suppression was a desirable outcome for people living with HIV since they could not effectively transmit the virus to their partners, however, in this study only 67% of black MSM were virally suppressed (Sullivan *et al.,* 2021). A study conducted in Brazil among MSM by de Araújo *et al.* (2024), indicated that MSM engaged in sex with someone whom they knew was HIV positive but were unaware if they were virally suppressed. MSM who had poor uptake of HIV services, were likely to have poor treatment out comes as compared to other adults in sub-Saharan African (Atakorah-Yeboah *et al.,* 2025). A study on the trends in HIV testing among MSM in Africa conducted by Stannah *et al.* (2022), indicated despite improvement on HIV testing, and linkage to HIV care, viral suppression was still low at 69% below the UNAIDS set target of 95%.

In order for majority of MSM to access and remain in care, HIV services have to be diversified. Services such HIV self testing and virtual services among others, could improve knowledge on HIV and increase the number of MSM who will be linked into care in Africa (WHO, 2023). HIV prevention should be a combination of interventions such as structural for instance environmental, social, and economic factors, behavioural, for instance abstinence, never sharing needles, and using condoms correctly and consistently before sex, and biomedical for instance PEP/PrEP, male circumcision, barrier methods and treatment of STI (Inghels *et al.,* 2022). Such approaches were desirable since they would attract more MSM, retain them into care and reduce the transmission/acquisition of HIV (Inghels *et al.,* 2022) and eventually achieve viral suppression (Stannah *et al.,* 2022). Discriminatory and punitive laws have deterred many MSM from accessing HIV treatment and care hence predisposing them to HIV (Hoogar *et al.,* 2026). To reduce HIV related mortality during COVID-19, it was imperative to step up access and adherence ART in order for MSM to maintain viral suppression (Mitchell *et al.,* 2021). MSM who were more optimistic about ART were more likely to be adherent to treatment and hence likely to be virally suppressed (Armstrong *et al.,* 2022), however, younger MSM who were on stimulants such as ecstasy and crystal methamphetamine were unlikely to be virally suppressed (Armstrong *et al.,* 2021).

A study on transgender people who were living with HIV showed the need for optimal access HIV services in order to be linked to care, retention and adherence ART (Sofimajidpour *et al.,* 2024) hence achieving undetectable viral load. In another study conducted in Nairobi among MSM indicated, MSM understanding of STI was low thus healthcare workers had to relentlessly educate them on STI (Nyasani *et al.,* 2023) so that many could protect themselves or take the test if exposed to HIV. A study conducted in Australia among bisexual and other men who have sex with men (GBM) using PrEP, indicated, only slightly more than half were willing to engage in condomless anal sex with partners who had achieved viral load suppression. However, gay and bisexual men (GBM) who believed in the efficacy of PrEP in HIV prevention were willing to have unprotected anal sex with partners (Dowell-Day *et al.,* 2023). Another study by Daniels *et al.* (2021), conducted in rural South Africa indicated, a high prevalence of HIV and low viral suppression among MSM. One of the interventions to address their issues was the role play by the MSM. The role play was based on their healthcare experiences. The MSM describe the role play as cathartic and a future HIV educational tool for other MSM (Daniels *et al.,* 2021). MSM who were supported by Non-Governmental Organization (NGO) dealing with HIV/AIDS were more likely to have better treatment outcome since they were able to access HIV prevention and treatment services (Trickey *et al.,* 2021).

In a study conducted among men who have sex with men, transgender women, and genderqueer individuals on HIV care in Zimbabwe showed 48% of MSM were HIV positive, 94% were on ART and 79% had achieved viral load suppression by Harris *et al.* (2022). However, younger MSM were less likely to be aware of their HIV status or virally suppressed but those who had peer support were likely to be aware of their statues (Harris *et al.,* 2022). Other studies indicated low level viraemia (LLV) of less than 200 copies/ml and viral blip in PLHIV were associated with virologic failure (Elvstam *et al.,* 2023) and at a higher risk of AIDS related mortality as compared to those who had viral suppression of less than 50 copies/ml (Yu *et al.,* 2023). The risk of LLV was high in men, people who contracted HIV by using intravenous drugs and those who were taking protease inhibitor-based ART regimen (Brattgård *et al.,* 2022). In a similar study, conducted in Dehong, Southwest China

indicated, PLHIV who were on ART and who had low-level viremia of 50–999 copies/ml were at risk of having CD4 cell count of less than 500 cells/µl (Yu *et al.,* 2024) and more than four times likely to have unsuppressed viral load and hence virological failure as compared to those with undetectable viral load (Nanyeenya *et al*., 2023). A lower CD4 T cell count of ≤ 200 cells/mm3 and poor adherence to ART in people living with HIV led to virological failure which was associated with life threatening opportunistic infections.

In order to increase adherence to ART and reduce treatment failure, in the low-income countries, national HIV programme should be strengthened (Magura *et al.,* 2025). Prompt initiation of ART to people who have just tested HIV positive, regardless of their CD4cell count and viral load (universal test and treat) is key in increasing ART coverage, thus reduce the risk of HIV transmission HIV (Muhula *et al.,* 2022) and reduce the number of new HIV cases and mortality (Wamuti *et al.,* 2024). It is crucial to support PLHIV who are on ART for instance by using peer counsellors, healthcare worker to improve on retention of HIV patients on care (Muhula *et al.,* 2022). In summary, in order to achieve UNAIDS target, and to contain the HIV epidermic, it is imperative that these vulnerable populations have to be reached to access HIV testing and treatment (Rocha *et al*., 2023). According to Cota *et al*. (2021), barriers to HIV testing among MSM were low perception risk of HIV, fear of seroconverting, fear of stigma and discrimination and acceptance of their sexuality. Despite MSM engaging in high-risk behaviours such as having condomless anal sex, multiple sex partners, alcohol, and drugs use, majority did not seek HIV services, for fear of their sexual orientation being revealed or because of hostile healthcare workers. Criminalization of same sex relationship has also made the group to go underground; however, accurate data was seldomly available. In order to achieve the global targets of 95-95- 95, by 2025 and ending AIDS epidermic in 2030, MSM and other key population must be kept in check.

Some of the gaps which were identified in the study included, scanty information on sex education especially among the MSM, new treads that lure men to risky sexual behaviours, the role of healthcare workers in reducing HIV infection among MSM

and increasing MSM utilization of available HIV services. Reduced donor funding with little or no domestic funding to sustain the HIV programmes is also a concern.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Study Sites

The study was conducted in Mvita sub-county, which was one of the six sub-counties in Mombasa County, in Kenya. Mvita sub-county had a population of 143,128, out of these 107,091 were over 18 years and the area was estimated to be 14.80 square kilometres (IEBC, 2017). The map of Mombasa County is presented in Figure 3.1 below.

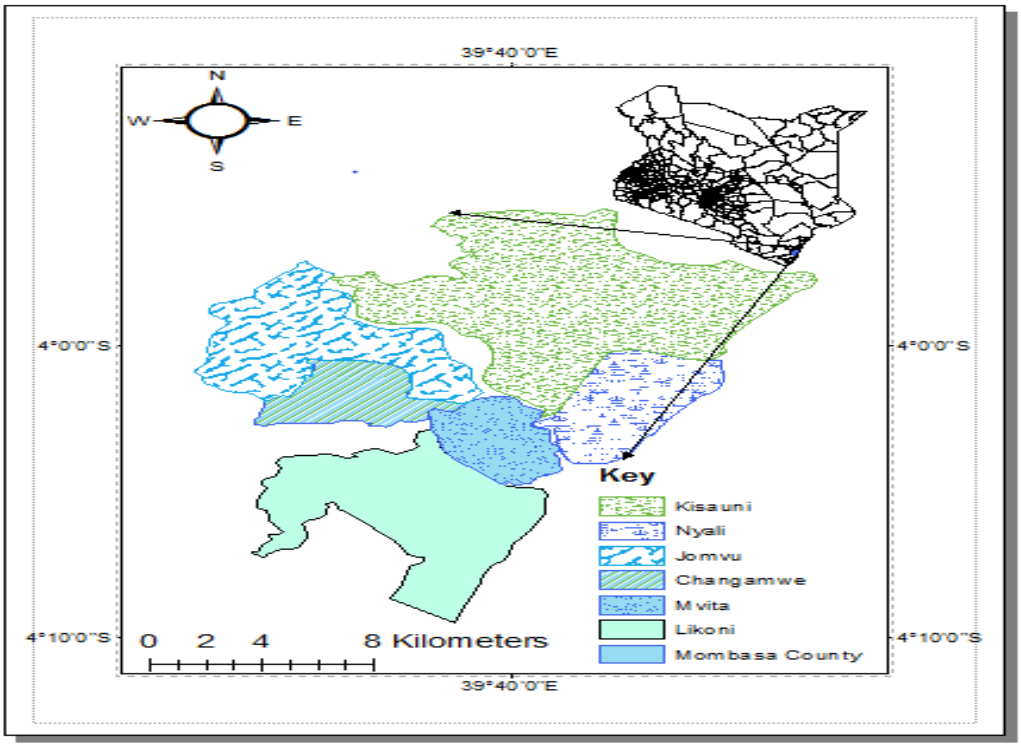


Figure 3.1: Map of Mombasa County

Mvita sub-County had five wards, namely Mji wa Kale/Makadara, Tudor, Tononoka, Majengo and Ganjoni/Shimanzi as shown in Figure 3.2.

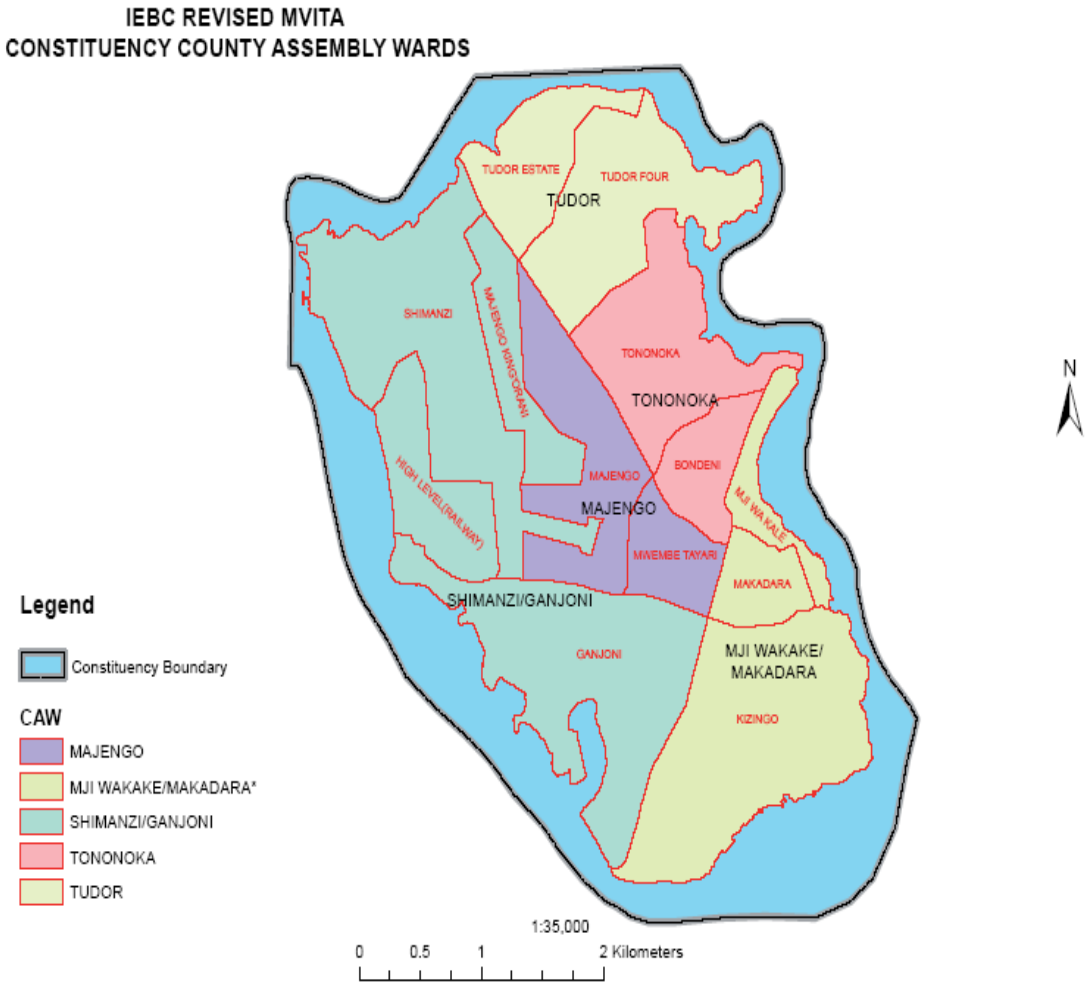


Figure 3.2: Mvita Sub-County

3.2 Study Design

A quasi-experimental study design using quantitative methods was conducted among MSM living with HIV from December 2020 to June 2021. The group that received risk reduction interventions and the control group were not formed by random assignment but instead participants were assigned to groups by the researcher based on their preexisting characteristics which was being HIV positive.

3.3 Study Population

The study was conducted in Mvita sub-County in Mombasa County, Kenya (Figure 3.2). The target population was MSM living with HIV residing in the five (5) wards of Mvita sub-county. A total of 114 HIV positive MSM who participated in the study were divided into two groups. Half of the participants (57) were actively followed up and risk reduction interventions were conducted after every two months for a period of 6 months while the other 57 participants (control group) interacted with the researcher only at the beginning and at the end of the study and no risk reduction interventions was offered.

3.3.1 The Inclusion Criteria

i. A biological male-sex assigned at birth,
ii. 18 years and above,
iii. Documented HIV positive- comprehensive care clinic card or laboratory report
iv. Owned or accessible mobile phone,
v. Had anal sex with at least one male partner in the past 3 months,
vi. A resident of Mvita sub-County and intended to reside in Mvita for 6 months,

viii. Willingness to give informed consent in writing

3.3.2 Exclusion Criteria

i. Unwillingness to give consent
ii. Those who were sickly and frail-unable to communicate on phone, cognitive impairment or currently enrolled in similar study
iii. Unable to provide informed consent at baseline due to intoxication

3.4 Sample Size Determination

The sample size was calculated using Chow, S.C., Wang, H. & Shao, J. (2007) method as given in the equation below;

$$n = \frac{\left(Z_{\alpha/2} + Z_{\beta}\right)^2 \left(P_1(1-P_1) + P_2(1-P_2)\right)}{\left(P_1 - P_2\right)^2} \qquad (3.1)$$

Where:

$Z_{\alpha/2}$ is the critical value of the Normal distribution at α/2 (e.g., for a confidence level of 95%, α is 0.05 and the critical value is 1.96),

Z_{β} is the critical value of the Normal distribution at β (e.g., for a power of 86.86%, β is 0.1314 and the critical value is 1.08), and

p_1 and p_2 are the expected sample proportions of the two groups.

In South Africa, the proportion of MSM living with HIV with suppressed viral load was 46.9% (Fearon *et al.*, 2020). The researcher estimated the risk reduction interventions being offered would improve the proportion of suppressed viral load from 46.9% to 75% (by 60%) then used this to compute the sample size as P_1=46.9% and P_2=75%.

With expected 46% patients with suppressed viral load at baseline active follow-up by the researcher was hypothesised to increase the proportion of suppressed viral load by 60% to 75% after six months of follow-up. Assuming 80% power, and a two-tailed alpha of 0.05, a sample size of 102 patients was obtained as given by equation 3.4, 51 on active follow-up and 51 in the control group.

$$n = \frac{\left(1.96 + 1.08\right)^2 \left(0.469 \times 0.531) + (0.75 \times 0.25)\right)}{\left(0.469 - 0.75\right)^2} \approx 51 \qquad (3.2)$$

To account for lost-to-follow-up during the six months, the sample size was inflated by 10% to 114 (57 in each arm). The 10% attrition was anticipated since some participants may withdraw consent, be unreachable during the follow up or provide incomplete or unusable data. This attrition might reduce effective sample size potentially undermining the study's statistical power. Therefore, there was a need to inflate the sample size. No continuity correction/1- or 2-sided test was applied because the hypothesis tested was a two-tailed. The total N (i.e. all MSM) was not known to apply the continuity correction. The effect of applying continuity correction would be to reduce the sample size, therefore this approach provides the most optimal sample size.

3.5 Sampling Techniques

The Respondent-driven sampling (RDS), a semi-probabilistic method was used to collect sample in order to overcome biases for instance selection bias which was associated with chain-referral/snowballing sampling method (Goel *et al*., 2010). A peer–referral sampling was used to collect data in hard-to-reach populations, in the absence of sampling frame, such as men who have sex with men (Heckathorn, 1997). Convenient sampling was used to select the initial 5 'seeds' from the 5 wards in Mvita sub-county. Each 'seed' was given 3 coupons to recruit 3 participants randomly from their social networks which ensured sampling continued even when some 'seeds' did not recruit. Oversampling of the recruits with similar characteristics was limited by issuing 3 coupon per 'seed', thus reducing recruitment bias. The aim and objectives of the study was explained to respondents and written voluntary informed consent form was filled before the study. The recruits were encouraged to present the coupon for enrolment at Ganjoni clinic. The recruits who lost their coupon were excluded from the study and were not replaced. The first recruitment by the 'seeds' formed the '0^{th}' wave while the recruits of the 'seeds' who gave consent in writing to participate in the study, were given 3 coupon each and their recruits formed the '1^{st}' wave. The recruitment and formation of waves continued until a desired sample size of respondents was achieved.

3.6 Data Collection Process

Semi-structured, self-developed questionnaires both in English and Kiswahili were used to collect the quantitative data. The participants took about 45 minutes to answer the questionnaires, which were pretested prior to the study at HIV & AIDS People Alliance of Kenya (HAPA-Kenya), in Kisauni, since the residents did not participate in the study. The study was used to review the tools and also ensure the validity and reliability of the data. All the participants who were living with HIV, were subjected to a battery of tests which included drug test done using cypress diagnostics drug screen card which was a urine dip-and-read test strip. Drugs such as amphetamine, tetrahydrocannabinol, morphine, methadone, phencyclidine, benzodiazepines, 6-mam heroin (metabolite) and cocaine were tested. Blood was drawn for alcohol, syphilis, hepatitis B, and viral load tests, while urine was used to screen for gonorrhoea. These tests were done at the beginning and at the end of the study in June 2021. Half of the MSM were actively followed by the researcher. Risk reduction interventions such adherence to ARVs, general counselling and HIV prevention measures such as prompt treatment of STI/OI, condom usage were conducted after every two months to the group that was followed up by the researcher while the other half (control group) interacted with the researcher only at the beginning of the study and at the end of the study and no interventions were offered. Thereafter both groups were asked to respond to the questions in the questionnaire. To minimize COVID-19 transmission, risk reduction interventions were conducted by phone. The interview over the phone took about 45 minutes. Undetectable viral load was defined as having an HIV viral load of less than 50 copies/ml.

3.7 Pre-Testing of Data Collection Tools

The questionnaire was pre-tested on the residence of Kisauni at HIV & AIDS People Alliance of Kenya (HAPA Kenya) who did not participate in the study before the actual data collection in order to ensure the validity and reliability of the data. Kisauni was chosen because it had the second highest number of the MSM (258) in the Mombasa County (NASCOP & MOH, 2013). The results were used to review

the tool and the items which were not clear were rephrased while irrelevant ones were removed. The information collected assisted in determining the feasibility of the study.

3.7.1 Validity

The accuracy of data collected largely depended on data collection instruments in terms of validity and reliability. Validity was noted by Robinson (2002) as the degree to which results obtained from the analysis of the data represents the phenomenon under study. Validity was assured by having objective questions included in the questionnaires and by pre-testing the instruments through a pilot study. Cooper and Schindler (2003) stated that pre-testing the data collection instruments through a pilot study assisted in detecting ambiguous, awkward, or offensive questions and use of appropriate technique. Questions not understood were corrected to include a wider variety of options for the informants.

3.7.2 Reliability

Reliability on the other hand referred to the measure of degree to which research instruments yielded consistent results (Mugenda & Mugenda, 2003). In this study, reliability was assured by pre-testing the questionnaires in Kisauni sub-County whose results were not included in the final analysis. The measure that was used to test for reliability was test-retest method whereby a questionnaire was administered to respondents at two different times and the responses checked for consistency. If most of the questions were answered relatively the same, this indicated a high stability and consequently a high degree of reliability meaning that the results would be repeatable.

3.8 Data Analysis

Study data were collected using standard questionnaire at baseline and after six months of follow-up. Data errors were detected in the statistical software. All data errors flagged were corrected by checking correct values in patient records. Data were assumed not to be missing at random, an extra category `missing' was added to

each variable with missing values to ensure all patients were included in the regression models.

At baseline, continuous variables were reported as mean (sd) or median (IQR) depending on underlying distribution stratified by intervention status. Categorical variables were reported as counts with their respective percentages. The main outcome was undetectable viral load (UD) after six months of follow-up reported as a binary variable. UD was reported as proportion at baseline and after six months. UD proportion difference was calculated as difference in month six and baseline proportion in each arm (intervention and control). The difference in UD proportion from baseline to month six between the intervention and control group were compared using McNemar's test.

To determine the individual level and health system correlates of achieving undetectable viral load at month six log-binomial regression models were used and reported both crude and adjusted coefficients transformed to risk ratios and their respective 95% confidence intervals (CI). Due to the imbalance in UD at baseline, all the regression models were adjusted for baseline viral load status as recommended. Univariate log-binomial regression analysis was first conducted, with the intervention status as the only independent variable. To perform multivariable regression analysis, all the independent variables were included as shown in the in-result tables. Statistical analysis was conducted using STATA software Version 17 with level of significance fixed at 5%.

3.9 Ethical Considerations

The ethical review committee (ERC) of Pwani University and National Commission for Science, Technology and Innovation (NACOSTI) gave approval to conduct the research. Permission was also sought from Department of Public Health, Mombasa County and the local administrative authority in Mvita sub-County. The participants were fully informed about the nature and the scope of the study; the benefits and risk of harm associated with the study. Informed consent was in writing for the participants willing to participate in the study and were allowed to voluntarily exit the study at any stage without being penalized. To maintain anonymity, personal

identifiers were removed from data and pseudonyms were used. Passwords were used to protect electronic data and also to maintain confidentiality and privacy.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the findings and the discussions of the research. Descriptive statistics and inferential statistics were obtained to help measure the objectives of the study. Proportions and frequencies were computed to help describe the data while Chi square tests of independence and homogeneity were used to carry out the hypothesis of the research. The results obtained were presented in tables.

4.2 Response Rate

In this research a total of 114 participants were recruited into the study. There were no attrition and data was collected from all of them giving a response rate of 100% as presented in Table 4.1.

Table 4.1: Response Rate

Response	Frequency	Percentage
Responded	114	100
Non-response	0	0
Total	114	100

Table 4.1 shows that the response rate was 100% which is way above the threshold of 50% proposed by Mugenda and Mugenda (2003).

4.3 Socio-Demographic Characteristics of Participants

This study considered a number of socio- demographic characteristics such as; age in years, relationship status, occupation, religion, level of education, marital status and income per month. A comparison was done between the control and the intervention groups with regard to these socio demographic characteristics as presented in the succeeding sections.

4.3.1 Baseline Characteristics of the Participants who Completed Six Months of Follow-Up

A total of 114 HIV positive MSM completed the study. Out of these, 57 participants were on active follow up and risk reduction interventions were offered every two months for six months. The other half (control group) interacted with the researcher only at the beginning of the study in December 2020 and at the end of the study in June 2021 with no interventions offered. However, their baseline demographics characteristics were not significantly different (all *p*-values >0.05) as shown in Table 4.2.

Table 4.2: Baseline Characteristics of the Participants Who Completed Six Months of Follow-Up

Variable	Control (N=57)	Intervention (N=57)	Chi-square value	Degrees of freedom	P-value
Age in years					
<18	4 (7.0)	3 (5.3)	2.552	3	0.47*
19 to 29	31 (54)	28 (49)			
30 to 40	16 (28)	23 (40)			
≥41	6 (11)	3 (5.3)			
Relationship status					
Single	44 (77)	40 (70)	2.030	2	0.36*
Married	12 (21)	13 (23)			
Cohabiting/casual	1 (1.8)	4 (7.0)			
Religion					
Christian	35 (61)	33 (58)	0.903	2	0.63*
Muslim	16 (28)	20 (35)			
Others	6 (11)	4 (7.0)			
Level of education					
No education/Primary	30 (53)	30 (53)	0.33	3	0.85
Secondary	19 (33)	17 (30)			
Middle level college/university	8 (14)	10 (18)			
Occupation					
Student	8 (14)	7 (12)	1.11	2	0.58
Working	36 (63)	32 (56)			
Not working	13 (23)	18 (32)			
Ever married to a female					
No	35 (61)	36 (63)	0.04	1	0.85
Yes	22 (39)	21 (37)			
Income per month (KSh)					
<5000	33 (58)	37 (65)	0.672	3	0.88*
5000 to 10000	20 (35)	17 (30)			
10000 to 20000	3 (5.3)	2 (3.5)			
20000 to 30000	1 (1.8)	1 (1.8)			

*P-values from fisher's exact test, all other P-values are from Chi-square test of association

4.3.2 The Effect of Intervention on Viral Load Suppression after Six Months Adjusted for Baseline Demographics

The results are as shown in Table 4.3 below. Having an income between 20,000 to 30,000 (aRR=1.58, 95% CI =1.04–2.39) was positively associated with undetectable viral load, while not being a Christian or Muslim (others) (aRR= 0.51, 95%CI= 0.35-0.75) and having an income between 5,000 to 10,000 per month (aRR= 0.80, 95% CI =0.66–0.97) was negatively associated with undetectable viral load after six months of follow-up. No other demographic features were significantly associated with undetectable viral road. Others were respondents who neither ascribe to Christianity nor Islam and lack of religious identity might have contributed to this negative association with undetectable viral load.

Table 4.3: Effect of Interventions on Viral Load Suppression after Six Months Adjusted for Baseline Demographics

Variables		Control (N=57)	Interventions (N=57)	Adjusted Risk ratios (95% CI)	P-value
Age in years					
	<18	4 (7.0)	3 (5.3)	Reference	
	19 to 29	31 (54)	28 (49)	0.83 (0.66-1.04)	0.10
	30 to 40	16 (28)	23 (40)	0.82 (0.64-1.04)	0.10
	≥41	6 (11)	3 (5.3)	0.97 (0.68-1.40)	0.88
Relationship status					
	Single	44 (77)	40 (70)	Reference	
	Married	12 (21)	13 (23)	1.18 (0.86-1.62)	0.31
	Cohabiting/casual	1 (1.8)	4 (7.0)	0.56 (0.20-1.55)	0.26
Religion					
	Christian	35 (61)	33 (58)	Reference	
	Muslim	16 (28)	20 (35)	0.92 (0.69-1.23)	0.59
	Others	6 (11)	4 (7.0)	0.51 (0.35-0.75)	0.001
Level of education					
	No education/Primary	30 (53)	30 (53)	Reference	
	Secondary	19 (33)	17 (30)	1.04 (0.87-1.25)	0.67
	Middle level college/university	8 (14)	10 (18)	0.99 (0.80-1.24)	0.99
Occupation Student		8 (14)	7 (12)	Reference	
	Working	36 (63)	32 (56)	0.76 (0.55-1.04)	0.09
	Not working	13 (23)	18 (32)	0.77 (0.47-1.27)	0.30
Ever married to a female					
	No	35 (61)	36 (63)	Reference	
	Yes	22 (39)	21 (37)	0.90 (0.67-1.22)	0.51
Income per month (KSh)					
	<5000	33 (58)	37 (65)	Reference	
	5000 to 10000	20 (35)	17 (30)	0.80 (0.66-0.97)	0.03
	10000 to 20000	3 (5.3)	2 (3.5)	0.89 (0.73-1.09)	0.26
	20000 to 30000	1 (1.8)	1 (1.8)	1.58 (1.04-2.39)	0.03
In past 6 months, no enough money for:					
Rent	No	52 (91)	50 (88)	Reference	
	Yes	5 (8.8)	7 (12)	0.54 (0.22-1.35)	0.19
Food	No	32 (56)	27 (47)	Reference	
	Yes	25 (44)	30 (53)	1.11 (0.93-1.31)	0.24
Others	No	56 (98)	55 (96)	Reference	
	Yes	1 (1.8)	2 (3.5)	1.54 (0.69-3.44)	0.29

Adjusted risk ratio (95% confidence intervals) are from multivariable log-binomial regression model

4.4 The Effect of Intervention on Viral Load Suppression after Six Months Adjusted for Knowledge of HIV/AIDS

Only "not knowing if being faithful to uninfected partner" can reduce risk of HIV (aRR=0.55, 95%CI= 0.40–0.75) and use of PEP/PrEP for HIV prevention (aRR= 0.76, 95%CI =0.64–0.91) were negatively associated with risk of undetectable viral load after six months of follow-up as shown in Table 4.4 and Table 4.5.

Table 4.4: The Effect of Interventions on Viral Load Suppression after Six Months Adjusted for Knowledge of HIV/AIDS

Variable	Control (N=57)	Interventions (N=57)	Adjusted Risk ratios (95% CI)	P-value
Motivation to take HIV test[$]				
Know HIV status	42 (74)	44 (77)	0.79 (0.44-1.42)	0.43
Poor health	25 (44)	20 (35)	0.75 (0.50-1.14)	0.18
Had unprotected sex	19 (33)	23 (40)	0.87 (0.59-1.28)	0.47
Coerced by Health workers	5 (8.8)	3 (5.3)	0.69 (0.34-1.40)	0.30
Ever declined to take HIV test[$]				
HIV has no cure				
No	34 (60)	35 (61)	Reference	
Yes	23 (40)	22 (39)	1.25 (0.88-1.78)	0.21
Fear of positive results				
No	21 (37)	29 (51)	Reference	
Yes	36 (63)	28 (49)	1.07 (0.91-1.24)	0.41
Stigma attached to HIV				
No	16 (28)	18 (32)	Reference	
Yes	41 (72)	39 (68)	0.98 (0.77-1.28)	0.93
Frequency of HIV screening in last year				
Once	16 (28)	6 (11)	Reference	
More than once	6 (11)	3 (5.3)	1.21 (0.83-1.78)	0.32
Never	10 (18)	9 (16)	0.98 (0.83-1.15)	0.79
No response	25 (44)	39 (68)	0.98 (0.56-1.73)	0.96
Frequency of STI screening in last year				
Once	25 (44)	27 (47)	Reference	
More than once	17 (30)	17 (30)	0.76 (0.56-1.05)	0.10
Never	15 (26)	13 (23)	0.75 (0.54-1.04)	0.08
HIV services are free				
Yes	39 (68)	45 (79)	0.70 (0.45-1.09)	0.12
No	5 (8.8)	2 (3.5)	Reference	
Don't know	13 (23)	10 (18)	0.51 (0.22-1.16)	0.11
HIV transmitted				
Unprotected sex				
No	4 (7.0)	3 (5.3)	Reference	
Yes	53 (93)	54 (95)	1.18 (0.76-1.83)	0.47
Sharing utensils				
No	45 (79)	47 (82)	Reference	
Yes	12 (21)	10 (18)	0.89 (0.51-1.57)	0.70
Insect bites				
No	46 (81)	50 (88)	Reference	
Yes	11 (19)	7 (12)	0.77 (0.46-1.28)	0.31
Sharing of needles and syringes				
No	24 (42)	20 (35)	Reference	
Yes	33 (58)	37 (65)	1.12 (0.89-1.41)	0.34

Table 4.5: The Effect of Interventions on Viral Load Suppression after Six Months Adjusted for Knowledge of HIV/AIDS (Continuation)

Variable	Control (N=57)	Interventions (N=57)	Adjusted Risk ratios (95% CI)	P-value
Sex preference				
Insertive	12 (21)	14 (25)	Reference	
Receptive	14 (25)	12 (21)	1.24 (0.80-1.92)	0.33
Both	31 (54)	31 (54)	1.14 (0.81-1.59)	0.45
MSM likely to contact HIV				
Insertive	9 (16)	6 (11)	Reference	
Receptive	23 (40)	20 (35)	1.40 (0.64-3.08)	0.40
Both	25 (44)	31 (54)	1.52 (0.60-3.81)	0.38
Faithfulness to uninfected partner reduces the risk of HIV				
Yes	39 (68)	45 (79)	0.89 (0.58-1.39)	0.61
No	7 (12)	4 (7.0)	Reference	
Don't know	11 (19)	8 (14)	0.55 (0.40-0.75)	<0.001
A healthy-looking person could be HIV positive				
Yes	35 (61)	40 (70)	1.15 (0.77-1.73)	0.49
No	7 (12)	10 (18)	Reference	
Don't know	15 (26)	7 (12)	1.09 (0.88-1.34)	0.43
Condom use reduces transmission of HIV				
Yes	43 (75)	55 (96)	0.48 (0.09-2.48)	0.38
No	2 (3.5)	0	Reference	
Don't know	12 (21)	2 (3.5)	0.64 (0.19-2.10)	0.46
Use lubricant during anal sex				
Yes	54 (95)	55 (96)	2.53 (0.64-10.1)	0.19
No	3 (5.3)	2 (3.5)	Reference	
Ever accessed PEP/PrEP				
Yes	42 (74)	43 (75)	0.94 (0.55-1.61)	0.81
No	14 (25)	13 (23)	Reference	
Ever used PEP/PrEP for HIV prevention				
Yes	25 (44)	18 (32)	0.76 (0.64-0.91)	0.003
No	32 (56)	38 (67)	Reference	
Circumcision reduces HIV				
Yes	32 (56)	37 (65)	1.03 (0.57-1.87)	0.91
No	10 (18)	8 (14)	Reference	
Don't know	15 (26)	12 (21)	1.27 (0.75-2.12)	0.37
ARVs boost immunity				
Yes	52 (91)	50 (88)	1.50 (0.70-3.21)	0.30
No	0	2 (3.5)	Reference	
Don't know	5 (8.8)	5 (8.8)	1.56 (0.51-4.81)	0.44
Sharing sex toys increases risk of HIV				
Yes	32 (56)	28 (49)	1.08 (0.71-1.64)	0.74
No	13 (23)	14 (25)	Reference	
Don't know	12 (21)	15 (26)	1.06 (0.75-1.49)	0.75
Attended training on HIV/AIDs prevention among MSM				
Yes	36 (63)	37 (65)	0.94 (0.71-1.24)	0.65
No	19 (33)	16 (28)	Reference	
Cannot remember	2 (3.5)	4 (7.0)	1.24 (0.65-2.37)	0.51

Adjusted risk ratio (95% confidence intervals) are from multivariable log-binomial regression model, -no enough data to be included in the multivariable regression model

4.5 The Effect of Interventions on Viral Load Suppression after Six Months Adjusted for Individual Behaviours of MSM

In the multivariate model, undetectable viral load after six months of follow-up was positively associated with declining to answer if one had anal sex after being drugged/alcohol (aRR=1.51,95%CI=1.12–2.03); having anal sex with more than one regular partner (aRR=1.22, 95%CI=1.01–1.48), having no regular anal sex partner (aRR 2.20 (95%CI 1.33–3.64)), condom break more than once during anal sex (aRR =1.17, 95%CI =1.08–1.26); drinking more than 2 bottles of alcohol daily (aRR= 3.37, 95%CI= 1.14–9.98), started abusing drugs after being influenced by adults (aRR =1.51,95%CI =1.16–1.97); and use of *muguka* (type of khat) (aRR=3.07, 95%CI =1.85–5.10). Being raped (aRR=0.48, 95%CI = 0.23–0.97), always having anal sex while high on alcohol (aRR = 0.58, 95%CI= 0.38–0.88), injecting with non-prescribed drugs 1 to 2 times in a week (aRR =0.40, 95%CI =0.32–0.51), and declining to answer if injectable drugs have been used (aRR =0.46, 95%CI =0.25–0.85) were negatively associated with undetectable viral load after six months of follow-up (Tables 4.6 to 4.9).

Table 4.6: The Effect of Interventions on Viral Load Suppression after Six Months Adjusted for Individual Behaviours of MSM

Variable	Control (N=57)	Interventions (N=57)	Adjusted Risk ratios (95% CI)	P-value
Anal sex debut				
< 18 years	35 (61)	30 (53)	Reference	
19 to 29 years	21 (37)	24 (42)	0.92 (0.73-1.16)	0.49
30 to 40 years	1 (1.8)	3 (5.3)	1.01 (0.52-1.96)	0.98
Engaged in anal sex due to[$]			No reference	
Peer pressure				
No	29 (51)	26 (46)	Reference	
Yes	28 (49)	31 (54)	0.87 (0.75-1.01)	0.07
Money				
No	15 (26)	28 (49)	Reference	
Yes	42 (74)	29 (51)	1.10 (0.78-1.56)	0.58
Curiosity				
No	40 (70)	38 (67)	Reference	
Yes	17 (30)	19 (33)	0.93 (0.72-1.20)	0.57
Rape				
No	55 (96)	53 (93)	Reference	
Yes	2 (3.5)	4 (7.0)	0.48 (0.23-0.97)	0.04
Gifts given in exchange of sex[$]				
Money				
No	5 (8.8)	9 (16)	Reference	
Yes	52 (91)	48 (84)	0.87 (0.53-1.42)	0.57
Drugs				
No	39 (68)	44 (77)	Reference	
Yes	18 (32)	13 (23)	0.67 (0.40-1.11)	0.12
Food				
No	35 (61)	39 (68)	Reference	
Yes	22 (39)	18 (32)	0.87 (0.68-1.11)	0.26
Accommodation				
No	43 (75)	41 (72)	Reference	
Yes	14 (25)	16 (28)	0.84 (0.69-1.02)	0.08
Paid a man to have anal sex				
No	24 (43)	21 (37)	Reference	
Yes	32 (57)	36 (63)	0.99 (0.77-1.26)	0.91
Had anal sex after being drugged/alcohol				
No	23 (40)	23 (40)	Reference	
Yes	34 (60)	31 (54)	0.93 (0.72-1.21)	0.61
Declined to answer	0	3 (5.3)	1.51 (1.12-2.03)	0.006
Anal sex with regular male partner				
One partner	20 (35)	22 (39)	Reference	
More than one partner	35 (61)	35 (61)	1.22 (1.01-1.48)	0.04
No regular partner	2 (3.5)	0	2.20 (1.33-3.64)	0.002
Anal sex with casual male partner				
One partner	22 (39)	19 (33)	Reference	
More than one partner	33 (58)	35 (61)	0.75 (0.52-1.07)	0.11
No casual partner	2 (3.5)	3 (5.3)	0.97 (0.59-1.59)	0.91
Group sex with male sex partners				
1 to 2 partners	18 (32)	24 (42)	Reference	
More than 2 partners	19 (33)	18 (32)	1.20 (0.88-1.62)	0.25
Never	20 (35)	15 (26)	1.23 (0.97-1.56)	0.09

Table 4.7:The Effect of Interventions on Viral Load Suppression after Six Months Adjusted for Individual Behaviours of MSM (Continuation)

Variable	Control (N=57)	Interventions (N=57)	Adjusted Risk ratios (95% CI)	P-value
Condomless insertive sex with a regular male partner				
Sometimes	16 (28)	15 (26)	Reference	
Always	22 (39)	26 (46)	1.00 (0.82-1.23)	0.96
Never	19 (33)	16 (28)	1.10 (0.87-1.39)	0.44
Condomless receptive sex with a regular male partner				
Sometimes	19 (33)	22 (39)	Reference	
Always	24 (42)	18 (32)	1.00 (0.82-1.23)	0.96
Never	14 (25)	17 (30)	1.09 (0.87-1.39)	0.44
Condomless insertive sex with a casual male partner				
Sometimes	30 (53)	26 (46)	1.00 (0.71-1.40)	0.99
Always	4 (7.0)	7 (12)	Reference	
Never	23 (40)	24 (42)	0.99 (0.64-1.56)	0.98
Condomless receptive sex with a casual male partner				
Sometimes	29 (51)	26 (46)	0.92 (0.68-1.23)	0.57
Always	3 (5.3)	7 (12)	Reference	
Never	25 (44)	24 (42)	1.02 (0.69-1.53)	0.91
Condomless virginal sex				
Sometimes	27 (47)	16 (28)	0.75 (0.51-1.11)	0.15
Always	11 (19)	12 (21)	Reference	
Never	19 (33)	29 (51)	0.66 (0.42-1.02)	0.06
Condom break				
Once	24 (42)	16 (28)	Reference	
More than once	27 (47)	35 (61)	1.17 (1.08-1.26)	<0.001
Never	6 (11)	6 (11)	1.12 (0.69-1.83)	0.64
Experience after anal sex [$]		No reference		
Anal bleeding				
No	30 (53)	31 (54)	Reference	
Yes	27 (47)	26 (46)	1.07 (0.62-1.86)	0.80
Sore penis/anus				
No	13 (23)	15 (26)	Reference	
Yes	44 (77)	42 (74)	0.99 (0.50-1.99)	0.99
Anal warts				
No	53 (93)	47 (82)	Reference	
Yes	4 (7.0)	10 (18)	1.05 (0.49-2.28)	0.89
Urethral discharge				
No	45 (79)	44 (77)	Reference	
Yes	12 (21)	13 (23)	0.81 (0.40-1.64)	0.56
Alcohol debut				
< 18 years	15 (26)	18 (32)	Reference	
19 to 29 years	27 (47)	22 (39)	0.81 (0.54-1.23)	0.33
30 to 50 years	4 (7.0)	3 (5.3)	0.90 (0.40-2.03)	0.81
Never	11 (19)	14 (25)	2.76 (0.83-9.19)	0.09
Reasons for drinking alcohol [$]			No reference	
Peer pressure				
No	28 (49)	33 (58)	Reference	
Yes	29 (51)	24 (42)	0.91 (0.62-1.33)	0.62
Influenced by adults				
No	39 (68)	37 (65)	Reference	
Yes	18 (32)	20 (35)	0.98 (0.76-1.25)	0.86
Curiosity				
No	43 (75)	50 (88)	Reference	
Yes	14 (25)	7 (12)	0.81 (0.50-1.32)	0.39
Never				
No	46 (81)	41 (72)	Reference	
Yes	11 (19)	16 (28)	0.38 (0.06-2.33)	0.29

Table 4.8:The Effect of Interventions on Viral Load Suppression after Six Months Adjusted for Individual Behaviours of MSM (Continuation)

Variable	Control (N=57)	Interventions (N=57)	Adjusted Risk ratios (95% CI)	P-value
Had anal sex while high on alcohol				
Once	11 (19)	9 (16)	Reference	
More than once	23 (40)	24 (42)	1.03 (0.58-1.82)	0.93
Always	11 (19)	7 (12)	0.58 (0.38-0.88)	0.01
Never	12 (21)	17 (30)	0.75 (0.38-1.47)	0.40
Drunk alcohol to enhance sex performance				
Once	5 (8.8)	13 (23)	Reference	
Sometimes	22 (39)	15 (26)	0.82 (0.27-2.47)	0.72
Always	16 (28)	10 (18)	0.72 (0.24-2.17)	0.56
Never	14 (25)	19 (33)	0.64 (0.20-2.03)	0.45
Alcohol intake				
1 to 2 bottles daily	13 (23)	15 (26)	Reference	
More than 2 bottles	19 (33)	19 (33)	3.37 (1.14-9.98)	0.03
Occasionally	13 (23)	10 (18)	2.82 (0.84-9.45)	0.09
Never	12 (21)	13 (23)	2.22 (0.81-6.07)	0.12
Drug use before anal sex				
Once	10 (18)	8 (14)	Reference	
Sometimes	18 (32)	17 (30)	1.05 (0.45-2.44)	0.91
Always	19 (33)	19 (33)	0.97 (0.34-2.82)	0.96
Never	10 (18)	13 (23)	1.13 (0.46-2.77)	0.79
Reason for abusing drugs[$]			No reference	
Peer pressure				
No	25 (44)	30 (53)	Reference	
Yes	32 (56)	27 (47)	0.78 (0.57-1.07)	0.12
Influenced by adults				
No	49 (86)	48 (84)	Reference	
Yes	8 (14)	9 (16)	1.51 (1.16-1.97)	0.002
Curiosity				
No	45 (79)	44 (77)	Reference	
Yes	12 (21)	13 (23)	1.42 (0.92-2.21)	0.12
Never				
No	46 (81)	42 (74)	Reference	
Yes	11 (19)	15 (26)	1.36 (0.53-3.46)	0.53
Drugs used in the last 6 months[$]			No reference	
Marijuana				
No	32 (56)	23 (40)	Reference	
Yes	25 (44)	34 (60)	0.93 (0.81-1.06)	0.28
Cocaine				
No	44 (77)	49 (86)	Reference	
Yes	13 (23)	8 (14)	0.65 (0.32-1.31)	0.22
Club drugs				
No	45 (79)	49 (86)	Reference	
Yes	12 (21)	8 (14)	0.59 (0.24-1.45)	0.25
Viagra				
No	54 (95)	53 (93)	Reference	
Yes	3 (5.3)	4 (7.0)	1.04 (0.51-2.13)	0.91
Prescription drugs				
No	55 (96)	54 (95)	Reference	
Yes	2 (3.5)	3 (5.3)	1.18 (0.63-2.19)	0.60
Methamphetamine				
No	56 (98)	55 (96)	Reference	
Yes	1 (1.8)	2 (3.5)	1.11 (0.31-3.92)	0.87
Muguka				
No	12 (21)	14 (25)	Reference	
Yes	45 (79)	43 (75)	3.07 (1.85-5.10)	<0.001
Miraa				
No	20 (35)	23 (40)	Reference	
Yes	37 (65)	34 (60)	1.15 (0.78-1.68)	0.48
Never				
No	48 (84)	44 (77)	Reference	
Yes	9 (16)	13 (23)	2.84 (0.85-9.53)	0.09

Table 4.9:The Effect of Interventions on Viral Load Suppression after Six Months Adjusted for Individual Behaviours of MSM (Continuation)

Use of non-prescribed Injectable drugs				
Daily	7 (12)	5 (8.8)	Reference	
1 to 2 times in a week	5 (8.8)	9 (15)	0.40 (0.32-0.51)	<0.001
Decline to answer	26 (46)	21 (37)	0.46 (0.25-0.85)	0.01
Never	19 (33)	22 (39)	1.03 (0.85-1.24)	0.78
Drug use to enhance sex performance				
Once	5 (8.8)	6 (11)	Reference	
Sometimes	21 (37)	15 (26)	0.68 (0.23-2.02)	0.49
Always	21 (37)	20 (35)	0.98 (0.46-2.08)	0.95
Never	10 (18)	16 (28)	0.89 (0.41-1.89)	0.75
Have you disclosed your HIV status?				
No	30 (53)	40 (70)	Reference	
Yes	25 (44)	17 (30)	1.29 (0.68-2.46)	0.43
Decline to answer	2 (3.5)	0	1.25 (0.14-11.2)	0.84
Disclosure of sex preference				
No	37 (65)	47 (82)	Reference	
Yes	19 (33)	10 (18)	0.73 (0.33-1.60)	0.43
Decline to answer	1 (1.8)	0	0.86 (0.09-8.41)	0.89
Ever been assaulted?			No reference	
Verbally				
No	10 (18)	6 (11)	Reference	
Yes	47 (82)	51 (89)	0.98 (0.42-2.32)	0.97
Physically				
No	32 (56)	27 (47)	Reference	
Yes	25 (44)	30 (53)	1.12 (0.61-2.03)	0.72
Sexually				
No	39 (68)	38 (67)	Reference	
Yes	18 (32)	19 (33)	1.00 (0.56-1.78)	0.98
Experienced rejection by			No reference	
Family				
No	36 (63)	28 (49)	Reference	
Yes	21 (37)	29 (51)	0.87 (0.51-1.50)	0.62
Friends				
No	32 (56)	33 (58)	Reference	
Yes	25 (44)	24 (42)	0.85 (0.50-1.45)	0.56
Society				
No	25 (44)	20 (35)	Reference	
Yes	32 (56)	37 (65)	1.04 (0.58-1.85)	0.89
Colleagues				
No	49 (86)	48 (84)	Reference	
Yes	8 (14)	9 (16)	1.04 (0.49-2.21)	0.91
Denied opportunity for business, education or employment				
No	30 (53)	30 (53)	Reference	
Yes	25 (44)	25 (44)	0.90 (0.51-1.57)	0.70
Decline to answer	2 (3.5)	2 (3.5)	1.16 (0.35-3.79)	0.81
Participation in religious activities				
No	18 (32)	9 (16)	Reference	
Yes	35 (61)	44 (77)	0.86 (0.45-1.66)	0.66
Decline to answer	4 (7.0)	4 (7.0)	1.07 (0.35-3.31)	0.90

4.6 The Effects of Interventions on Participants Viral Load Suppression after Six Months Adjusted for Health System Utilization

In the multivariate model, undetectable viral load after six months of follow-up was also positively associated with attending check-ups in private clinic (aRR= 1.32, 95%CI =1.04–1.66), given information on how to disclose HIV status by healthcare workers (aRR =1.81, 95%CI =1.07–3.06) and being sent away due to lack of ARVs (aRR 1.27 (95%CI 1.01–1.60)) were positively associated with undetectable viral load while feeling uneasy while seeking health services (aRR =0.70, 95%CI =0.55–0.90), not knowing whether to feel uneasy while seeking health services, (aRR =0.66, 95%CI =0.52–0.83), not knowing if the healthcare workers were friendly to MSM (aRR= 0.76, 95%CI =0.60–0.96), were negatively associated with undetectable viral road after six months of follow-up (Table 4.10 and Table 4.11).

Table 4.10: Effect of Interventions on Participants Viral Suppression after Six Months Adjusted for Health System Utilization

Variables	Control (N=57)	Interventions (N=57)	Adjusted Risk ratios (95% CI)	P-value
Preferred hospital for MSM				
Public hospital	33 (58)	36 (63)	Reference	
Private hospital/clinics	24 (42)	21 (37)	1.32 (1.04-1.66)	0.02
Facility that offers better care				
Public hospital	25 (44)	35 (61)	Reference	
Private hospital/clinics	32 (56)	22 (39)	0.94 (0.84-1.05)	0.29
Feel uneasy seeking health services				
No	16 (28)	10 (18)	Reference	
Yes	35 (61)	43 (75)	0.70 (0.55-0.90)	0.004
Don't know	6 (11)	4 (7.0)	0.66 (0.52-0.83)	0.001
Healthcare workers are competent to handle MSM issues				
No	16 (28)	9 (16)	Reference	
Yes	34 (60)	42 (74)	0.85 (0.69-1.05)	0.13
Don't know	7 (12)	6 (11)	1.05 (0.61-1.82)	0.86
Friendly healthcare workers				
No	15 (26)	15 (26)	Reference	
Yes	32 (56)	37 (65)	0.99 (0.66-1.48)	0.96
Don't know	10 (16)	5 (8.8)	0.76 (0.60-0.96)	0.02
Time taken to reach healthcare facility				
Minutes	16 (28)	19 (33)	Reference	
Hours	41 (72)	38 (67)	1.25 (0.94-1.67)	0.12
Flexible operating clinic hours				
No	15 (27)	11 (19)	Reference	
Yes	25 (45)	33 (58)	0.94 (0.72-1.22)	0.63
Don't know	16 (29)	13 (23)	0.99 (0.48-2.05)	0.98
Have been denied HIV services				
No	34 (60)	39 (68)	Reference	
Yes	21 (37)	16 (28)	0.99 (0.78-1.26)	0.94
Don't know	2 (3.5)	2 (3.5)	0.81 (0.44-1.48)	0.49
Pre- and Post-HIV counselling done				
No	5 (8.8)	2 (3.5)	Reference	
Yes	48 (84)	55 (96)	1.52 (0.87-2.67)	0.14
Declined to answer	4 (7.0)	0	1.38 (0.87-2.19)	0.17

Table 4.11: Effect of Interventions on Participants Viral Suppression after Six Months Adjusted for Health System Features (Continuation)

Variables	Control (N=57)	Interventions (N=57)	Adjusted Risk ratios (95% CI)	P-value
Given information on how to disclose HIV status				
No	17 (30)	12 (21)	Reference	
Yes	35 (61)	38 (67)	1.31 (0.83-2.07)	0.25
Declined to answer	5 (8.8)	7 (12)	1.81 (1.07-3.06)	0.03
Given information on ARVs/PEP/PrEP				
No	1 (1.8)	2 (3.5)	Reference	
Yes	54 (95)	55 (96)	0.87 (0.60-1.26)	0.46
Declined to answer	2 (3.5)	0	1.31 (0.33-5.24)	0.70
Maintenance of confidentiality				
No	14 (25)	14 (25)	Reference	
Yes	31 (54)	34 (60)	1.05 (0.85-1.30)	0.64
Don't know	12 (21)	9 (16)	0.81 (0.61-1.06)	0.12
MSM right for quality healthcare				
No	6 (11)	10 (18)	Reference	
Yes	51 (89)	47 (82)	0.89 (0.68-1.17)	0.40
Received assistance from government/NGO				
No	24 (42)	32 (56)	Reference	
Yes	31 (54)	24 (42)	0.97 (0.85-1.11)	0.66
Declined to answer	2 (3.5)	1 (1.8)	1.62 (0.95-2.77)	0.08
Lack of HIV commodities[$]				
HIV testing kits				
No	48 (84)	54 (95)	Reference	
Yes	9 (16)	3 (5.3)	0.88 (0.52-1.47)	0.62
ARVs				
No	41 (72)	40 (70)	Reference	
Yes	16 (28)	17 (30)	1.27 (1.01-1.60)	0.04

Adjusted risk ratio (95% confidence intervals) are from multivariable log-binomial regression model, -no enough data to be included in the multivariable regression model.

4.7 HIV Treatment Outcome

4.7.1 Changes in Undetectable Viral Load from Baseline to Month Six

Among the intervention groups, 51/57 (89%, 95%CI= 82–97) MSM achieved viral suppression at month 6 from 8/57 (14%, 95%CI =5.0–23), a proportion difference of 75% (95%CI =63–87). While among the controls, the proportion with viral suppression increased from 39% (95%CI= 26–51) at baseline to 51% (95%CI= 38–64) at month 6, a proportion difference of 12% (95%CI= 5.8–30). Overall, after six months, the proportion of MSM achieving viral suppression was significantly

higher in the intervention compared to control group by 60% (95%CI =49–70, p<0.001) (Table 4.12). In the intervention group 43/57 MSM achieved viral load suppression while in the control group only 7/57 MSM achieved viral load suppression from baseline to month 6 (Figure 4.1).

Table 4.12: Changes in Undetectable Viral Load among Participants from Baseline to Month Six

Arm	Baseline, % (95% CI)	Month 6, % (95% CI)	Proportion difference between Month 6 & baseline, % (95% CI)	Proportion difference between the intervention and control group, % (95% CI)	P-value
Intervention	14 (5.0–23)	89 (82–97)	75 (63–87)	60 (49–70)	<0.001
Control	39 (26–51)	51 (38–64)	12 (5.8–30)		

#P-value from McNemar's test, McNemar's test chi-square value=50.0 and degree of freedom of 1

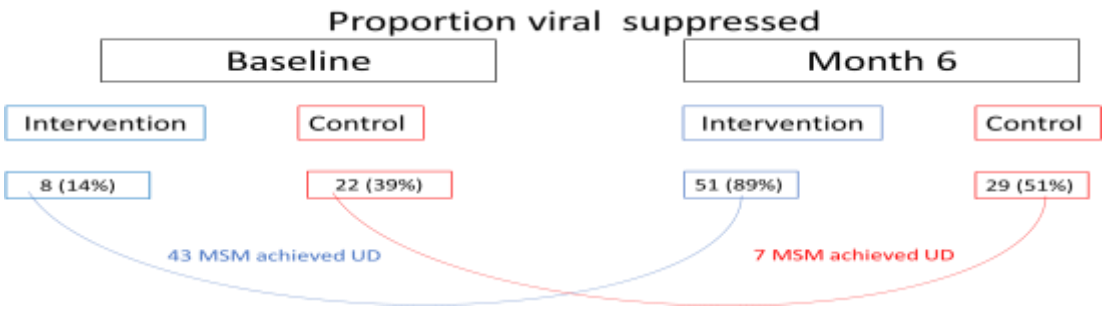


Figure 4.1: Proportion of Undetectable Viral Load Change from Baseline to Month Six Stratified by Intervention

4.7.2 Effect of Interventions on the Tests Subjected to MSM after Six Months

At baseline, the proportion with undetectable viral load was significantly higher among those on active follow-up (39% versus 14% in the control group, p=0.003). However, all other tests were not significantly different at baseline. After six months follow-up, the proportion with undetectable viral load was significantly higher among those on active follow-up (89% versus 51% in the control group, p<0.001).

The proportion of participants with Hepatitis B, VDRL and urine positive results were not significantly different after six months of follow-up between the two methods of follow-up. However, the proportion of abnormal alcohol range was significantly higher (p=0.005) in the control group (n=21 or 37%) compared to those actively followed up (n=8, or 14%). MOP (morphine) and THC-tetrahydrocannabinol (*marijuana*) were the most common individual drugs which tested positive. Slightly more than half of all the participants were negative for all the drugs tested (Table 4.7). The distribution of individual drugs between the two methods of follow-up were not different save for THC and MOP after six months of follow-up (Table 4.13). The proportion on THC (p=0.03) and MOP (p=0.001) were higher among patients in the control group.

Table 4.13: Effect of Interventions on the Tests Subjected to MSM after Six Months

Variables	Baseline				After six months			
	Intervention (N=57)	**Control (N=57)**	**Chi-square value**	**P-value**	**Interventions (N=57)**	**Control (N=57)**	**Chi-square value**	**P-value**
Viral load								
Undetectable	8 (14)	22 (39)	8.9	0.003	51 (89)	29 (51)	20.3	<0.001
Detectable	49 (86)	35 (61)			6 (11)	28 (49)		
Hepatitis B								
Negative	49 (86)	51 (89)	0.33	0.57	49 (86)	52 (91)	0.78	0.38
Positive	8 (14)	6 (11)			8 (14)	5 (8.8)		
VDRL#								
Negative	51 (89)	49 (86)	0.33	0.57	56 (98)	57 (100)	1.01	0.32
Positive	6 (11)	8 (14)			1 (1.8)	0		
Alcohol								
Normal range (5-40U/L)	43 (75)	36 (63)	2.02	0.16	49 (86)	36 (63)	7.8	0.005
Abnormal range	14 (25)	21 (37)			8 (14)	21 (37)		
Urine test								
Negative	53 (93)	50 (96)	0.53	0.47	55 (96)	56 (98)	1.33	0.51
GC positive	4 (7.0)	2 (3.9)			2 (3.5)	1 (1.8)		
Individual Drugs*								
AMP	22 (39)	21 (37)	0.04	0.85	22 (39)	21 (37)	0.04	0.85
COC	1 (1.8)	5 (8.8)	2.81	0.09	1 (1.8)	5 (8.8)	2.81	0.09
THC	18 (32)	21 (37)	0.35	0.55	10 (18)	20 (35)	4.52	0.03
MTD	0	1 (1.8)	1.01	0.32	0	1 (1.8)	1.01	0.32
PCP	0	1 (1.8)	0.32	0.32	0	1 (1.8)	1.01	0.32
BZO	2 (3.5)	5 (8.8)	1.37	0.24	2 (3.5)	5 (8.8)	1.37	0.24
MOP	6 (11)	6 (11)	008	0.91	1 (1.8)	6 (11)	8.43	0.001
MAM	2 (3.5)	3 (5.3)	0.21	0.65	2 (3.5)	3 (5.3)	0.21	0.65

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Socio-Demographic Characteristics of MSM

The study indicated that the young MSM were less likely to have undetectable viral load but this was not significant (p=0.10). The MSM who had a higher income were more likely to have undetectable viral load while those having lower income or who were neither Christian nor Muslim were less likely to have undetectable viral load. Contrary to the findings, a study conducted in Lilongwe, Malawi indicated prayers had an important role in management of HIV and AIDS (Banda-Kamanga *et al.*, 2023) (Bukhori *et al.*, 2022). In a similar study carried out by Azia *et al.* (2023), on Pentecostal Christians living with HIV and on ARV indicated that religious beliefs influenced adherence to ART positively and negatively. Some Christians were able to access psychosocial support from other members of the church and had good adherence to ART, hence, achieved good clinical outcomes. However, some Pentecostal Christian had strong religious beliefs that God would heal them and not ART; this led to poor adherence of ART and hence poor clinical outcome (Azia *et al.*, 2025). In line with the study, people suffering from chronic conditions such as HIV, who did not adhere to ARVs and opted for spiritual power to heal them as advised by their leaders ended up defaulting in ARVs (Mutambara *et al*., 2021).

According to Bąk-Sosnowska *et al.* (2022) study, people who believed to be in control of their health were likely to have better lifestyle habits and less stressful, hence more likely to adhere to medication. Consistent with our findings were reports by Belete *et al.* (2024) which indicated that, PLHIV who were Orthodox Tewahido Christians were unlikely to achieve viral load suppression after enhanced adherence counselling because they were more likely to discontinue ART in favour of other remedies offered in church such as holy water. In line with this study, the study by Harp *et al.* (2023), conducted in Washington, D.C. which indicated that, MSM who

were living with HIV, who were unstably housed, were likely to experience financial difficulties and were also unlikely to adhere to ART and hence less likely to achieve viral load suppression. Similar findings were in study conducted by Leiva-Escobar *et al.* (2025) in Chile, which indicated that not having a full-time job was associated with a high viral load. Contrarily to the findings, a study conducted in Zimbabwe by Mukwenha, *et al.* (2024) which indicated that participants who were employed were likely to have unsuppressed viral load which was similar to what was found in the study, however, this was not significant.

Another study by Bantie *et al.* (2020) indicated that clients from high-income settings were likely to be initiated on ART on the same day after being diagnosed with HIV unless they had life threatening opportunistic infections such cryptococcal meningitis or tuberculosis where initiation of ART may be delayed. However, it was paramount to offer adherence and support to the clients before same day ART has been initiated to reduce the number of clients lost to follow up after initial visit. Low income and educational level were singled out as the main socio-economic risk factors for STI and hence predisposition to HIV (Kevlishvil *et al.,* 2023). In congruence with the study were findings by Mugurungi *et al.* (2024) in Zimbabwe, which showed MSM who accessed STI testing and prevention services, were well off and readily obtain necessary health care services. In a similar study conducted in Uganda, incidences of low HIV were associated with people who had a higher socio-economic status since they were likely to access better health and had greater access to information on HIV (Santelli *et al.,* 2021). In the study, MSM who had higher income were more likely to have undetectable viral load because they were more likely to have better nutrition, accommodation, HIV information, and better access to healthcare.

5.1.2 Knowledge on HIV/AIDS among MSM

The MSM in the control group, who reported to have ever used PEP/PrEP were unlikely to have undetectable viral load. This is in line with the study conducted by Laurent *et al.* (2023) in West Africa which indicated that HIV seroconversions occurred in HIV negative MSM who took PrEP when they felt at risk of acquiring

HIV. In a similar study conducted in China by Yang *et al.* (2025), MSM who were on either PrEP/PEP were likely to have condomless anal sex and hence at risk of HIV transmission. According to a study by Olugo *et al.* (2025), in Western Kenya, people on PrEP were thought to be concealing their HIV status and hence inconsistent use. A study carried in Kisumu, Kenya, among gay, bisexual, and other men who have sex with men (GBMSM) indicated majority (GBMSM) reported PrEP use; however, only 14.6% of the participants had protective Tenofovir diphosphate (TFV-DP) which was a biomarker (in this case found in blood) used to assess adherence to PrEP (Graham *et al.*, 2023). In a similar study on PrEP adherence conducted in coastal town of Malindi - Kenya, none of the 34 participants who reported being on PrEP had protective TFV-DP (Kimani *et al.,* 2021). In the study, inadequacy in knowledge on HIV acquisition and transmission in the control group was associated with the likelihood of having unsuppressed viral load.

In agreement with the study, was a study conducted in in southwestern Uganda, which indicated that lack of knowledge on HIV was one of contributing factors to non-adherence to ART and high viral load among the participants (Pius *et al.*, 2021). Scarcity in knowledge of HIV among patients on ART in Nigeria was also associated with the possibility of having viral load non-suppression (Adedoyin *et al.*, 2021). Consistent with the findings, was a study conducted in Nyaruguru District, Rwanda, which indicated being unaware of HIV information among other reasons, resulted in non-suppressed viral load (Hakizayezu *et al.,* 2022). In a similar study conducted in Zimbabwe, PLHIV who did not have adequate knowledge on HIV were likely to be in denial after seroconversion and were unlikely to linked to HIV care, hence unsuppressed viral load (Dziva *et al.,* 2024). Contrarily to the findings, is a study conducted by Shrestha *et al.* (2023) in Nepal, whereby majority of PLHIV who had adequate knowledge on HIV including ART were adherent to ART and had achieved viral suppression. MSM felt PrEP/PEP could prevent them from contracting HIV and forgot that these preventive measures could not stop them from contracting other STI which made them more vulnerable to HIV. Correct knowledge on HIV is key since it will prevent super-infection and the spread of HIV.

5.1.3 Individual Behaviour of MSM

MSM in both intervention and control group, who had anal sex with more than one regular partner and who drunk more than 2 bottles of alcohol daily were likely to have undetectable viral load. This could have been because the MSM were adherent to ARVs and were faithful in their relationships. Consistent with the study, were findings by Bertholet *et al.* (2023) in three cohorts' studies of the Uganda, Russia and Boston which indicated PLHIV with alcohol use disorder could achieve HIV viral suppression with optimal adherence to ART. Previous studies also indicated majority of MSM used alcohol as compared to drugs, and alcohol use was associated with being older, lower education, being open about the sexuality, having a paid or casual male partner, and having multiple sex partners (Bhambhani *et al.*, 2021). In this study, MSM in the control group who reported being always high on alcohol while having anal sex were likely to have detectable viral load. These findings were in congruence with another study conducted by Wynn *et al.* (2024) among PLHIV in rural Uganda which indicated, PLHIV who consumed high or very high amount of alcohol were less likely to be on ART or achieve viral suppression. These finding were also in line with a study conducted in East Africa among PLHIV who had a history of hazardous drinking (Alcohol Use Disorders Identification Test score more or equal to 8) at initiation of ART.

PLHIV were likely to have viral rebound, viral resistance and unsuppressed viral load (Monroy *et al.,* 2024). Prior studies indicated consuming alcohol daily or weekly was negatively associated with retention to HIV care (Carlos *et al.*, 2021). Similar findings were found in the study by van der Mannen *et al.* (2025), conducted in South Africa, which indicated MSM who drunk excessive alcohol were likely to have detectable viral load; this is because they were likely to have inconsistent condom use while engaging in anal sex (Fu *et al.,* 2023). Consistent with these study findings was a study by van der Mannen *et al.* (2025) conducted in South Africa which indicated that excessive alcohol intake was associated with missing of more than four ART dosages in a month hence MSM were unlikely to achieve viral load suppression. In the study, MSM who had condom break more than once during anal sex and who received risk reduction interventions, were likely to have viral load

suppression. Contrarily to the study by Fu *et al.,* (2023) conducted in China, MSM who engaged in unprotected anal sex had unsuppressed viral load. However, in line with the current study, MSM who had achieved viral suppression were unlikely to transmit HIV to their partner in unprotected anal sex (Xi *et al.,* 2025). According to a study conducted in South Africa, inability to achieve viral suppression among PLHIV was associated with risky sexual behaviours such as having many sex partners and low condom use (Mapiye *et al.*, 2024).

According to Peter *et al.* (2023) in a study conducted in Netherlands, male sex workers who have sex with men (MSW-MSM) used condom consistently but had low use when they trusted their partners, or when engaging in oral sex or wanted to feel intense pleasure during anal sex. Condomless anal sex among MSM was associated with having sex with a partner of unknown HIV status and always or sometimes being high on alcohol/drugs before sex (Prabhu *et al.,* 2022). Consistent condom use and being on ART, improved the health of PLHIV by increasing the likelihood of viral load suppression, hence reducing HIV mortality and morbidity leading PLHIV living a longer healthier life (Yeshaneh *et al.,* 2021). Apart from alcohol use and having many sex partners, inconsistent condom use was also associated with transactional sex (Nabayinda *et al.,* 2023). In this study, MSM who received risk reduction interventions, who used non-prescription injectable drugs, 1-2 times in a week were less likely to achieve undetectable viral load. In line with the study, were findings from a study conducted in Canada, the use of drugs was associated with non-adherence to ARVs and detectable viral load (Armstrong *et al.,* 2022). However, MSM in this study, who were in the control group, who chewed *muguka* (type of *khat),* whose leaves contained natural amphetamine (stimulant) were likely to achieve viral load suppression. *Muguka* was chewed in a *maskani* (dwelling places especially for men), hence members could offer support to one another especially during COVID 19 where movement was restricted and hence adherence to ARVs.

In line with the study findings, a study conducted in the USA found that PLHIV who were using opioids such as morphine, and stimulants such as *khat* were likely to have durable viral suppression (viral load $\leq$ 200 copies/mL) if they were in fulltime

employment and had stable housing (Paschen-Wolff *et al.,* 2022). Contrarily to these study findings, Moitra *et al.* (2025) found out that MSM who were on drugs/alcohol, were not only likely to have detectable viral load but were also likely to be homeless, and lacked transport during their appointments. MSM who were on drugs were also likely to engage in risky sexual behaviour, such as having long anal sex encounters, which could lead to genital and anal trauma, hence increased risk of HIV (Wang, *et al.,* 2022). In a study conducted in Tianjin municipality in China indicated that MSM who contracted syphilis were more vulnerable to HIV (Guo *et al.,* 2024). Contrary to the current study, many MSM who used amphetamine derivatives were predisposed to HIV, perhaps due to its ability to suppress the immune system (Luo *et al.,* 2024). This study took place during Covid 19, and due to partial lockdown in the country and lockdown in the world, there was less movement of people and less resources thus making it difficult for MSM to negotiate for safer sex when they found a client. Drugs and alcohol use propagated condomless sex and multiple sex partners and thus increasing the risk of HIV.

5.1.4 Health Systems Feature Reported by MSM

Majority of MSM in the control group who attended private clinics for checkup were likely to have undetectable viral load. These findings were consistent with the study conducted in Nairobi-Kenya by Mwaniki *et al.* (2024), which indicated that, private and MSM friendly facilities were preferred because they offered better care to MSM as compared to the public institutions. These findings are also in line with a study conducted in Burkina Faso, West Africa which indicated that PLHIV who attended private clinics were satisficed with the service offered such as receiving update information on HIV and reduced waiting time (Ouédraogo *et al.,* 2023). Healthcare workers in the public hospital were likely to be hostile to the PLHIV who missed clinic which led to disengagement on HIV care. Moreover, the PLHIV felt the contact time with healthcare provider was inadequate; hence, all their issues could not be sorted out (Iseselo *et al.,* 2024). Sexual minority such as MSM were likely to delay in accessing healthcare due to poor prior experiences with the health care providers, and engage in risky sexual behaviours resulting in poor health outcomes (MacCarthy *et al.,* 2024; Green *et al.,* 2022). In the study, MSM who received risk

reduction intervention who declined to answer whether, they had received information on how to disclose their HIV statues were likely to have undetectable viral load.

These findings were in agreement with a study conducted in Eastern Cape, South Africa, where PLHIV who had not attained viral suppression were likely not to have disclosed their HIV status and were non-adhere to ART (May *et al.,* 2025). On the contrarily, PLHIV who did not disclose their HIV status to the family members were likely to have detectable viral load since they would miss the support they needed to adhere to ART (Chinogurei *et al.,* 2024). However, in similar studies, disclosures due to stigma attached to HIV was made mainly to non-family members because PLHIV felt more secure to disclose to them (Alhassan *et al*., 2023; Mugo *et al.,* 2023). In the study, MSM who received risk reduction interventions, who felt uneasy while seeking health services were likely to have detectable viral load. According to the study conducted by Matlapeng *et al.* (2023) in Botswana, MSM who sought HIV services, reported being discriminated and stigmatized in public institutions and being kept in the queue longer than other patients. Similar results were found by Bourne *et al.* (2022), in a study conducted in Nairobi-Kenya, which indicated that some staff in the public institution lacked relevant skills in handling MSM issues, and stigma and discrimination in the institutions deterred the MSM from attending these institutions where they could benefit and sometimes withheld important information that would help in diagnosing their problems (Gumindega & Maharaj, 2022).

A prior study conducted by Manga, *et al.* (2025) among MSM in the Eastern Cape, South Africa, indicated barriers to HIV prevention and treatment were fear of family rejection, non-disclosure of HIV status, healthcare providers attitude towards MSM, stigma and substance abuse. A study conducted in Kenya, Malawi and South Africa indicated in order to contribute towards ending HIV, interventions which aim at reducing MSM related stigma in healthcare facilities have to be intensified (Hamilton *et al.,* 2025). Some MSM indicated disclosing their sexual orientation could influence their readiness to engage in HIV preventive discussions in a study conducted among Latin American immigrant (da Cruz *et al.,* 2023). MSM who

received risk reductions interventions, who reported lack of HIV commodities such as ARVs were likely to achieve viral suppression. This could be because the institutions could easily share the commodities with the other institutions that lacked or MSM could afford buying the ARVs. A study conducted in Ghana indicated that healthcare infrastructures, availability of ART and adherence counselling may contribute towards the achievement of viral suppression (Kyere *et al.,* 2024). In a sub-population of MSM made of transsexual or transgender individuals assigned male at birth reported being verbally, physically abused by the healthcare providers because of their sexuality; however, those who portrayed more female characteristics were abused more than those who did not (Kashiha *et al.,* 2022).

MSM were at a higher risk of contracting STI such as HIV, *Neisseria gonorrhoeae* and *Chlamydia trachomatis* in sub-Saharan Africa, more so due to poor access to quality healthcare and denial of service, stigma and discrimination, hence they attended the healthcare when they were severely ill (Isano *et al.,* 2023). Presence of STI increased the risk of acquiring and transmitting of HIV in a study conducted in sub-Saharan Africa (Mofolorunsho *et al.,* 2024). According to a study conducted in Egypt by Aziz *et al.* (2023) among healthcare workers on stigma and discrimination against PLHIV, majority of health care workers believed those who contracted HIV indulged in risky sexual behaviours and PLHIV should be ashamed of their immoral behaviour. Phobia of contracting HIV made the healthcare worker to don 2 pairs of gloves and declining to perform some medical procedures. Some of the discriminatory practices included, refusal to attend to PLHIV, verbal abuse and lack of confidentiality (Fauk *et al.,* 2021). In another study in Rwanda, the healthcare providers exhibited negative attitudes towards PLHIV such as believing that they were sinners since they went against cultural norms and religious values (Igihozo *et al*., 2022). According to Mekonnen *et al.* (2023), barriers to HIV testing in East and Southern Africa, were lack of trust from healthcare workers in maintenance of confidentiality, stigma and discrimination emanating from high-risk behaviours observed.

Healthcare workers who had previously worked with PLHIV and had received education on HIV/AIDS were less likely to be fearful of PLHIV hence lower

stigmatization (Saricicek *et al.,* 2025). However, majority of health workers expressed fear of contracting HIV when handling wounds or body fluids (Esan *et al.,* 2022). In order to provide quality care to the sexual minorities, the healthcare providers as a requirement, must be confident, competent and knowledgeable to their issues (Streed *et al.,* 2023; Gilmore, 2024). In summary, healthcare providers were expected to understand precise healthcare requirements of sexual minorities and appropriate interventions indeed 'one size does not fit all' (Bakker, 2023). Better health behaviour and utilization of healthcare services is likely to be experienced if the patients trust their healthcare providers. To built the trust, the healthcare providers should be empathetic and competent in their work (Greene *et al.,* 2021). To reduce stigma among healthcare providers, education on HIV pathogenesis, transmission and care of PLHIV was key. Thus, the healthcare providers will be able to implement HIV prevention and promote provision of quality healthcare (Spence *et al.,* 2022).

5.1.5 HIV Treatment Outcomes

In the study, MSM who received risk reduction interventions, were able to achieve overall a significant higher viral load suppression as compared to the control group. Similar findings were found in a study on uptake of ARVs and viral suppression conducted by Palumbo *et al.* (2021), in sub-Saharan Africa on MSM and transgender women who were followed for 12 months. Risk reduction intervention such as adherence to ARVs, HIV prevention was offered to the participants. Consequently, the number of participants on ARVs increased two folds while the number of those who achieved viral suppression increased almost three folds. Consistent with study, were the findings by Sewell *et al.* (2022) in a study conducted in United Kingdom on effectiveness of interventions aimed at reducing HIV acquisition and transmission among bisexual men who have sex with men (GBMSM), which indicated, the participants who received interventions such as behaviour change were able to reduce the acquisition and transmission of HIV. However, PLHIV who had a viral load of more than 2000 copies/ml and those who had past history of detectable viral load were less likely to have unsuppressed viral load even after intensified adherence counselling (Ndikabona *et al.,* 2021).

In line with the study, is a study conducted in East-Central Uganda among PLHIV who previously had unsuppressed viral load. After intense adherence counseling, more than half of the participants achieved viral suppression (Ejalu *et al.,* 2026); (Mundamshimu *et al.,* 2022).

The importance of linkage to care cannot be re-emphasised since it ensures prompt access to HIV care including ART to PLHIV, thus improving quality of life (Opio *et al.,* 2022). However, some PLHIV were not linked to care after testing HIV positive since they felt not likely to receive quality health services (Nicol *et al.,* 2023). For near perfect adherence to ART of 95% or higher, was desirable since it was associated with better treatment outcome and reduced to morbidity and mortality (Manalel *et al.,* 2024); (Buh *et al.,* 2022). Consistent with the study findings was a revelation in a study conducted in sub-Saharan African countries which indicated interventions such as counselling, engaging a treatment buddy, sending medicine reminders by using a phone, food aid, engagement of peers in behaviour change, strict monitoring of adherence could boost adherence to ART (Buh *et al.,* 2023; Pius *et al.,* 2021).

According to Mugenyi *et al.* (2022) study, mortality was significantly reduced in people who were commenced on ART immediately after testing HIV positive in the universal “test and treat” program. However, people in the differed program were commenced on ART when in the late WHO clinical stages or after developing life threating opportunistic infections, hence poor treatment outcome and high mortality. Factors that were associated with viral non-suppression among people living with HIV on ART included suboptimal adherence, being on treatment for a longer period, having no family, lack of social support, presence of other diseases, lower CD4 cell count, combination of HIV drugs and advancement of HIV disease (Mosha *et al.,* 2024). However, according to a study conducted by Mango *et al.* (2024) in Manzini - Eswatini, factors that affected adherence to ART by HIV positive people who were yet to be commenced on treatment were similar to those who were already on treatment. According to the study conducted by Buju *et al.* (2022) in Bunia, Democratic Republic of Congo, PLHIV who had detectable viral load were likely to

be in HIV stage III and IV, and had a high baseline viral load of more than 1000 copies/ml.

This notwithstanding, clients who were commenced on ART under universal test and treat (UTT) guidelines regardless of CD4 cell count or world health organisation staging, were more likely to have poor treatment outcome (Bekolo *et al.,* 2023). Clients on UTT on overall were likely to have poor treatment outcome with a high non-retention rate and low rates of viral load suppression since they were commenced on HIV treatment immediately after testing positive without much preparation (Kimanga *et al.,* 2022). To retain PLHIV in HIV care, services such as health education, HIV support, adherence to ART had to be offered during rapid initiations of ART (Wu *et al.,* 2023). However, barriers to adherence were sharing of ART with members of the family and non disclosure of HIV status (Kilapilo *et al.,* 2022). In the current study, MSM in the control group, who did not receive risk reduction interventions were likely to have abnormal alcohol range (above normal), use cannabis/marijuana (THC) and morphine. In line with the findings, are revelations in a study conducted in New York city among young black MSM which indicated that past use of marijuana and other hard drugs was associated with alcohol misuse.

MSM were also more likely to have many casual male sex partners and due to intoxication, engaged in condomless sex, thus increasing the risk of HIV and STI infection (Lu *et al.,* 2024; Firkey *et al.,* 2021). PLHIV who consumed alcohol were less likely to achieve optimal ART adherence and hence unsuppressed viral load as compared to those who abstained from alcohol (Woolf-King *et al.,* 2022). Excessive alcohol intake was associated with the likelihood of forgetting to take ART or deliberately missing a dose to avoid mixing alcohol with ART believing the interaction could lead to toxicity (El-Krab *et al.,* 2021) or to avoid unwanted disclosure of HIV status (Kalichman et al., 2021). Contrary to the study, was a study by Sheinfil *et al.* (2022) conducted in USA which indicated there was no significant trend between excessive alcohol consumption and non adherence to ART. In another study conducted in Ireland by Daly *et al.* (2021), prevalence of alcohol use disorder

was higher among MSM as compared to that of men in the general population, however, bisexual MSM were more likely to experience alcohol use disorder.

Consistent with the findings, was a study conducted among PLHIV in low- and middle-income countries which showed excessive alcohol use was widespread in this population resulting in poor treatment outcome such as suboptimal adherence, low suppressed viral load and disease progression (Odokonyero *et al.,* 2023). A study conducted in Kilimanjaro Tanzania indicated majority of PLHIV had alcohol use disorder which was not associated with lack of social support or perceived HIV stigma (Ghaimo *et al.,* 2025) as indicated in the previous studies. A study carried out in East Baltimore, Maryland, United States indicated, majority of PLHIV used cocaine or opioid. Current use of the substance was linked with unsuppressed viral load (Lesko *et al.,* 2023). In line with the study, use of substance such as cocaine, opioids, marijuana and harmful alcohol use was associated with unsuppressed viral load (Moges *et al.,* 2021; Cachay *et al.,* 2023). Contrary to the study, regular cannabis use among PLHIV who used cocaine was associated with viral load suppression according to a study conducted in Bronx in New York (Slawek *et al.,* 2021). However, in another study conducted by Bahji *et al.* (2022) indicated, though cannabis was linked to decline in adherence to ART, it did not significantly affect viral load suppression.

In agreement with a study, was a study conducted in USA in the AIDS Clinical Trials Group which indicated PLHIV who were using cannabis were likely to be non-adherent to ART and hence unable to achieve viral suppression (Manuzak *et al.,* 2023). Consistent with the study, was a study conducted by Langdon *et al.* (2023) which indicated PLHIV who were on morphine had a high mobility and mortality due to increased risk of HIV transmission hence were less likely to attain HIV viral load suppression. Alcohol use was associated with less likelihood of being commenced on ART, was linked to ART non adherence, delayed viral suppression, reduced likelihood being retained in HIV care leading to treatment failure and ART resistance (Myers *et al.,* 2021); (Wynn *et al.,* 2024). UNAIDS target of achieving 95%-95%-95% may be far fetched if excessive alcohol use was not addressed since

fewer PLHIV will be achieving viral load suppression hence the risk of HV transmission and acquisition (Heath *et al.,* 2021).

On limitation of the study, MSM may not have fully disclosed some of the behaviours that make them not to achieve viral load suppression. Due to stigma and discrimination, the study may have inadvertently recruited the non-Mvita residents, since MSM preferred attending HIV providing centres that are far from where they resided. During screening, MSM who had recently taken a viral load test, were not re-tested. The study took place during COVID-19, due to lock down, there was restriction of movement and hence some of the MSM may not have been able to access HIV services. On the delimitation of the study, MSM who were below 18 years could not be recruited for lack of proper identification and involvement of guardian who would provide an insight of homosexuality among the youth. On strengths, this is the first study in Mvita sub-County and presents unique data which will enable the relevant bodies take action so that all MSM can access HIV testing, be commenced on ARVs promptly, and achieve viral load suppression, hence accelerate the achievement of set targets of 95:95:95 by 2025 and end HIV by 2030.

5. 2 Conclusions

1. MSM in the control group who had inadequate knowledge of HIV prevention had detectable viral load.
2. On individual behaviour, high risk behaviours such as condom break were associated with undetectable viral load in the group that received risk reduction interventions while MSM in the control group who reported being high always on alcohol during anal sex had detectable viral load.
3. On the health systems, MSM in the control group who attended private clinics received better HIV care and were able to achieve undetectable viral load.
4. HIV treatment outcomes, after 6 months of the study indicate MSM who received risk reduction intervention had better treatment outcome with many MSM achieving undetectable viral load as compared to the control group.

5.3 Recommendations

1. Based on the findings, the study recommends peer-led HIV services. Peers will continuously share new knowledge on HIV with MSM.
2. Peers to support their peers emotionally and act as role models. In a safe environment, explore risky sexual behaviours in order to promote safer sex practices. Incorporating peers in re-designing effective substance use intervention programs to rehabilitate the MSM on alcohol and drugs.
3. Government policies should be reviewed and fundings increased to run HIV programmes especially in the public institutions. Adequate fundings, will increase availability of HIV commodities and continuously training healthcare workers in handling MSM issues.
4. Risk reduction interventions such as adherence to ARVs, general counselling and HIV prevention measures such as prompt treatment of STI/OI and condom use should be offered to all MSM living with HIV.

REFERENCES

Abdulai, R., Phalane, E., Atuahene, K., Kwao, I. D., Afriyie, R., Shiferaw, Y. A., & Phaswana-Mafuya, R. N. (2025). Consistency of Condom Use with Lubricants and Associated Factors Among Men Who Have Sex with Men in Ghana: Evidence from Integrated Bio-Behavioral Surveillance Survey. *International journal of environmental research and public health, 22*(4), 599. https://doi.org/10.3390/ijerph22040599

Adedoyin, A., Fadahunsi, G.S., Osinubi, M.O., Ahmed, A., Imhonopi, G.B., Soyannwo, T., & Akinbode, P.A. (2021). *Factors associated with viral non-suppression among patients on antiretroviral therapy (ART) at the Federal Medical Centre, Abeokuta, Ogun State, Nigeria.* https://doi.org/10.38029/bumj.v4i1.49

Akafu, W., Daba, T., Tesfaye, E., Teshome, F., & Akafu, T. (2023). Determinants of trust in healthcare facilities among community-based health insurance members in the Manna district of Ethiopia. *BMC public health, 23*(1), 171. https://doi.org/10.1186/s12889-023-15124-w

Algarin, A. B., Wiginton, J. M., Sanchez, T. H., Hernandez-Avila, M., Baruch-Dominguez, R., & Smith, L. R. (2022). Patient sexuality disclosure experience and associations with clinical sexual health outcomes among HIV-negative men who have sex with men in Mexico. *Preventive medicine, 163*, 107225. https://doi.org/10.1016/j.ypmed.2022.107225

Alhassan, R. K., Nutor, J. J., Gyamerah, A., Boakye-Yiadom, E., Kasu, E., Acquah, E., & Doe, E. (2023). Predictors of HIV status disclosure among people living with HIV (PLHIV) in Ghana: the disclosure conundrum and its policy implications in resource limited settings. *AIDS research and therapy, 20*(1), 84. https://doi.org/10.1186/s12981-023-00569-1

Armstrong, H.L., Gitelman, J., Cui, Z., Bacani, N., Sereda, P., & Lachowsky, N.J. (2022). Virological suppression among gay, bisexual, and other men who

have sex with men living with HIV in Vancouver, Canada. A longitudinal cohort study from 2012–2017. *PLoS ONE 17*(10), e0276596. https://doi.org/10.1371/journal.pone.0276596Bourne, et al. (2021).

Armstrong, H. L., Sang, J. M., Skala, A., Wang, L., Zhu, J., Lachowsky, N. J., …. & Roth, E. A. (2021*).* Factors associated with transactional sex among a cohort of gay, bisexual, and other men who have sex with men in Vancouver, Canada. *Sexual Health, 18*(6), 487–497. https://doi.org/10.1071/SH21128

Atakorah-Yeboah, K., Phalane, E., Agyarko-Poku, T., & Atuahene, K. (2025). *Interventions for improving the uptake of HIV testing among men who have sex with men in sub-Saharan Africa: A systematic review.* Retrieved from. https://www.researchgate.net/publication/395320969

Azia, I. N., Nyembezi, A., Carelse, S., & Mukumbang, F. C. (2025). Beliefs of Pentecostal pastors on the use of antiretroviral treatment among Pentecostal Christians living with HIV in a suburb of Cape Town-South Africa: a community health systems lens. *Health policy and planning, 40*(1), 13–22. https://doi.org/10.1093/heapol/czae089

Azia, I. N., Nyembezi, A., Carelse, S., & Mukumbang, F. C. (2023). Understanding the role of religious beliefs in adherence to antiretroviral therapy among Pentecostal Christians living with HIV in sub-Saharan Africa: a scoping review. *BMC public health, 23*(1), 1768. https://doi.org/10.1186/s12889-023-16616-5

Aziz, M. M., Abdelrheem, S. S., & Mohammed, H. M. (2023). Stigma and discrimination against people living with HIV by health care providers in Egypt. *BMC health services research, 23*(1), 663. https://doi.org/10.1186/s12913-023-09676-1

Bahji, A., Li, Y., Vickers-Smith, R., Crystal, S., Kerns, R. D., Gordon, K. S., … & Edelman, E. J. (2022). Self-Reported Cannabis Use and HIV Viral Control among Patients with HIV Engaged in Care: Results from a National Cohort Study. *International journal of environmental research and public health, 19*(9), 5649. https://doi.org/10.3390/ijerph19095649

Bakker, M. M. (2023). *One size does not fit all: moving towards health literacy responsive rheumatology care.* Unpublished PhD Thesis, Maastricht: Maastricht University.

Bąk-Sosnowska, M., Gruszczyńska, M., Wyszomirska, J., & Daniel-Sielańczyk, A. (2022). The Influence of Selected Psychological Factors on Medication Adherence in Patients with Chronic Diseases. *Healthcare (Basel, Switzerland), 10*(3), 426. https://doi.org/10.3390/healthcare10030426

Banda Kamanga, T. M., Chirambo, L., Valeta, M., & Nyondo-Mipando, A. L. (2023). “We Reach to People Through Different Means”: Factors That Influence HIV Counseling and Testing Among Religious People in Lilongwe, Malawi. *Sage Open, 13*(2). https://doi.org/10.1177/21582440231184854

Bantie, B., Kassaw Yirga, G., Abate, M. W., Amare, A. T., Nigat, A. B., Tigabu, A., … & Kassaw, A. (2022). Delayed ART initiation in "Test and Treat era" and its associated factors among adults receiving antiretroviral therapy at public health institutions in Northwest Ethiopia: A multicenter cross-sectional study. *PloS one, 17*(7), e0271127. https://doi.org/10.1371/journal.pone.0271127

Bao, Y., Medland, N. A., Fairley, C. K., Wu, J., Shang, X., Chow, E. P. F., … & Zhang, L. (2021). Predicting the diagnosis of HIV and sexually transmitted infections among men who have sex with men using machine learning approaches. *The Journal of infection, 82*(1), 48–59. https://doi.org/10.1016/j.jinf.2020.11.007

Barrington, C., Davis, D.A., & Angeles, G. (2023). HIV Treatment and Mental Health Outcomes Among Gay, Bisexual, and Other Men Who Have Sex with Men Living with HIV in a Pilot Multicomponent Intervention in Guatemala City. *Health Education & Behavior. 2023;50*(6), 758-769. doi:10.1177/10901981231164598

Basten, M. G. J., van Wees, D. A., Matser, A., Boyd, A., Rozhnova, G., den Daas, C., Kretzschmar, M. E. E., & Heijne, J. C. M. (2021). Time for change: Transitions between HIV risk levels and determinants of behavior change in men who have sex with men. *PLoS ONE, 16*(12), e0259913. https://doi.org/10.1371/journal.pone.0259913

Beagan, B. L., Bizzeth, S. R., Pride, T. M., & Sibbald, K. R. (2022). LGBTQ+ identity concealment and disclosure within the (heteronormative) health professions:"Do I? Do I not? And what are the potential consequences?". *SSM-Qualitative Research in Health, 2*, 100114.

Bekolo, C. E., Ndeso, S. A., Moifo, L. L., Mangala, N., Yimdjo, T. D., Ateudjieu, J., … & Choukem, S. P. (2023). Universal test and treat in Cameroon: a comparative retrospective analysis of mortality and loss to follow-up before and after a strategic change in approach to HIV care. *The Pan African medical journal, 45*, 191. https://doi.org/10.11604/pamj.2023.45.191.40448

Belete, H., Yimer, T. M., Dawson, D., Espinosa, D. C., Ambaw, F., Connor, J. P., Chan, G., Hides, L., & Leung, J. (2024). Alcohol use and alcohol use disorders in sub-Saharan Africa: A systematic review and meta-analysis. *Addiction (Abingdon, England), 119*(9), 1527–1540. https://doi.org/10.1111/add.16514

Belete, M. B., Bitew, A., & Mulatu, K. (2024). *Viral load suppression and its predictor among HIV seropositive people who* receive enhanced adherence counseling at public health institutions in Bahir Dar,

Northwest Ethiopia. Retrospective follow-up study. *PloS one, 19*(5), e0303243. https://doi.org/10.1371/journal.pone.0303243

Berg, R. C., Page, S., & Øgård-Repål, A. (2021). The effectiveness of peer-support for people living with HIV: A systematic review and meta-analysis. *PloS one, 16*(6), e0252623. https://doi.org/10.1371/journal.pone.0252623

Bertholet, N., Saitz, R., Hahn, J. A., Heeren, T. C., Emenyonu, N. I., Freiberg, M., … & Samet, J. H. (2023). Impact of alcohol use disorder severity on human immunodeficiency virus (HIV) viral suppression and CD4 count in three international cohorts of people with HIV. *Alcohol, clinical & experimental research, 47*(4), 704–712. https://doi.org/10.1111/acer.15031

Bhambhani, Y., Rawat, S., Norton, B.L., Patel, V.V. (2021). Alcohol and Drug Use Surrounding Sex Among Men Who Have Sex with Men in India. *Sex Cult. 25*, 1383–96. https://doi.org/10.1007/s12119-021-09814-z

Bourne, A., Carman, M., Kabuti, R., Nutland, W., Fearon, E., Liku, J., ... & Smith, A. D. (2022). Experiences and challenges in sexual health service access among men who have sex with men in Kenya. *Global Public Health, 17*(8), 1626-1637.

Brattgård, H., Björkman, P., Nowak, P., Treutiger, C. J., Gisslén, M., & Elvstam, O. (2022). Factors associated with low-level viraemia in people with HIV starting antiretroviral therapy: A Swedish observational study. *PloS one, 17*(5), e0268540. https://doi.org/10.1371/journal.pone.0268540

Buh, A., Deonandan, R., Gomes, J., Krentel, A., Oladimeji, O., & Yaya, S. (2023). Barriers and facilitators for interventions to improve ART adherence in Sub-Saharan African countries: A systematic review and meta-analysis. *PloS one, 18*(11), e0295046. https://doi.org/10.1371/journal.pone.0295046

Buh, A., Deonandan, R., Gomes, J., Krentel, A., Oladimeji, O., & Yaya, S. (2022). Adherence barriers and interventions to improve ART adherence in Sub-Saharan African countries: A systematic review protocol. *PloS one, 17*(6), e0269252. https://doi.org/10.1371/journal.pone.0269252

Buju, R. T., Akilimali, P. Z., Kamangu, E. N., Mesia, G. K., Kayembe, J. M. N., & Situakibanza, H. N. (2022). Predictors of Viral Non-Suppression among Patients Living with HIV under Dolutegravir in Bunia, Democratic Republic of Congo: A Prospective Cohort Study. *International journal of environmental research and public health, 19*(3), 1085. https://doi.org/10.3390/ijerph19031085

Bukhori, B., Hidayanti, E., & Situmorang, D. D. B. (2022). Religious coping strategies for people with HIV/AIDS (PLWHA) Muslims in Indonesia: A qualitative study with a telling-the-stories. *Heliyon, 8*(12), e12208. https://doi.org/10.1016/j.heliyon.2022.e12208

Byles, H., Sedaghat, N., Rider, N., Rioux, W., Loverock, A., Seo, B… & Ghosh, S. M. (2024*).* Barriers to calling emergency services amongst people who use substances in the event of overdose: A scoping review. *The International journal on drug policy, 132*, 104559. https://doi.org/10.1016/j.drugpo.2024.104559

Cachay, E. R., Moges, T. S., Qin, H., Bamford, L., Grelotti, D. J., & Mathews, W. C. (2023). Effects of drug and hazardous alcohol use on having a detectable HIV viral load: An adherence mediation analysis. *Addictive behaviors reports, 17*, 100486. https://doi.org/10.1016/j.abrep.2023.100486

Carlos, S., Burgueño, E., Ndarabu, A., Reina, G., Lopez-Del Burgo, C., Osorio, A., Makonda, B., & de Irala, J. (2021). Predictors of retention in the prospective HIV prevention OKAPI cohort in Kinshasa. *Scientific reports, 11*(1), 5431. https://doi.org/10.1038/s41598-021-84839-w

Carter, G., Staten, I.C., Woodward, B., Mahnke, B., & Campbell, J. (2022). PrEP Prescription Among MSM U.S. Military Service Members: Race and Sexual Identification Matter. *American Journal of Men's Health. 16*(6). doi:10.1177/15579883221133891

Chakrapani V. (2021). Need for transgender-specific data from Africa and elsewhere. *The lancet. HIV, 8*(5), e249–e250. https://doi.org/10.1016/S2352-3018(20)30344-1

Chang, G. C., Bingham, T., Patel, H. K., Mungai, E., Sleeman, K., Benech, I., … & Voetsch, A. C. (2025). Brief Report: Undetectable HIV-1 Viral Load Among Virally Suppressed People Living With HIV: Implications for Undetectable Equals Untransmittable (U=U) in Resource-Limited Settings Using Dried Spot Testing. *Journal of acquired immune deficiency syndromes (1999), 100*(4), 289–293. https://doi.org/10.1097/QAI.0000000000003745

Chen, H., Fan, H., Yang, P., Luo, Y., & Chen, J. (2025). Alcohol consumption patterns and risk of HIV transmission among men who have sex with men living with HIV in Chongqing, southwestern China. *Frontiers in public health, 13*, 1629368. https://doi.org/10.3389/fpubh.2025.1629368

Chen, W., Chen, L., He, L., & Chai, C. (2024). Urban-rural disparity in risky sexual behavior, HIV knowledge, and healthy practices among men who have sex with men: A cross-sectional study in Southeast China. *PloS one, 19*(11), e0312006. https://doi.org/10.1371/journal.pone.0312006

Chimwaza, M., Yamikani, R., Dadabhai, S. S., Nyondo Mipando, A. L., Mbeda, C., Panchia, R., … & Sandfort, T. G. M. (2022). HIV risk perception and sexual behavior among HIV-uninfected men and transgender women who have sex with men in sub-saharan Africa: Findings from the HPTN 075 qualitative sub-study. *PLoS Global Public Health, 2*(12), e0001408. https://doi.org/10.1371/journal.pgph.0001408

Chingombe, I., Dzinamarira, T., Cuadros, D., Mapingure, M. P., Mbunge, E., Chaputsira, S., … & Musuka, G. (2022). Predicting HIV Status among Men Who Have Sex with Men in Bulawayo & Harare, Zimbabwe Using Bio-Behavioural Data, Recurrent Neural Networks, and Machine Learning Techniques. *Tropical medicine and infectious disease*, *7*(9), 231. https://doi.org/10.3390/tropicalmed7090231

Chinogurei, C., Manne-Goehler, J., Kahn, K., Kabudula, C. W., Cornell, M., & Rohr, J. K. (2024). Socio-Behavioural Barriers to Viral Suppression in the Older Adult Population in Rural South Africa. *AIDS and behavior*, *28*(7), 2307–2313. https://doi.org/10.1007/s10461-024-04328-9

Chow, S.C., Wang, H. & Shao, J. (2007). *Sample Size Calculations in Clinical Research*. Boca Raton: CRC Press. https://doi.org/10.1201/9781584889830

Cohen, C., & Maunganidze, O. A. (2023). *Anti-gay laws: Africa's human rights regression. ISS Today.* Institute for Security Studies.

Cooper, D. R., & Schindler, P. S. (2003). *Business Research Methods* (8th edition). USA: McGraw-Hill.

Compton, W. M., & Jones, C. M. (2021). Substance Use among Men Who Have Sex with Men. *The New England journal of medicine, 385*(4), 352–356. https://doi.org/10.1056/NEJMra2033007

Correia, F., Camargo, K., Nossa, P., Aboim Horta, A., Correia-Neves, M., & Delerue-Matos, A. (2025). Attitudes and behaviours associated with HIV transmission in men who have sex with men in Portugal – a qualitative study. *Global Public Health, 20*(1). https://doi.org/10.1080/17441692.2025.2480645

Cota, L. V., & Cruz da Marques, M. (2021). Access barriers for Men who have Sex with Men for HIV testing and treatment in Curitiba (PR*). Saúde Debate. 45*, 393–405

Crossman, J., & Richardson, D. (2025). Barriers to HIV pre-exposure prophylaxis uptake for men who have sex with both men and women: A global scoping review. *International journal of STD & AIDS, 36*(6), 450–468. https://doi.org/10.1177/09564624251321564

Cyrus, E., Lama, J.R., Sanchez, J., Sullivan, D.S., Leon, S., ... & Villaran, M.V. (2023) Substance use and other correlates of HIV infection among transwomen and men who have sex with men in Perú: Implications for targeted HIV prevention strategies for transwomen. *PLOS Glob Public Health 3*(1), e0001464. https://doi.org/10.1371/journal.pgph.0001464

da Cruz, A. X. F., Berté, R., Oliveira, A. D. B. L., de Oliveira, L. B., Neto, J. C., Araújo, A. C., … & de Sousa, Á. F. L. (2023). Barriers and Facilitators to HIV/AIDS Testing among Latin Immigrant Men who have Sex with Men (MSM): A Systematic Review of the Literature. *Open AIDS Journal, 17, Article e187461362307030. https://doi.org/10.2174/18746136-v17-230720-2023-12*

Daly, F. P., O'Donnell, K., Davoren, M. P., Noone, C., Weatherburn, P., Quinlan, M., Foley, B., Igoe, D., & Barrett, P. M. (2021). Potential alcohol use disorder among MSM in Ireland - Findings from the European MSM internet survey (EMIS 2017). *Drug and alcohol dependence, 223*, 108698. https://doi.org/10.1016/j.drugalcdep.2021.108698

Daniels, J., Struthers, H., Soler, J., Ricco, E., Blackmon, J., Teklehaimanot, S., McIntyre, J., & Coates, T. (2021). Building self-advocacy in HIV care: the use of role-play to examine healthcare access for HIV-positive MSM in rural South Africa. *Global health promotion, 28*(3), 32–40. https://doi.org/10.1177/1757975920974008

Danwang, C., Noubiap, J.J., Robert, A. & Yombi, J.C. (2022). Outcomes of patients with HIV and COVID-19 co-infection: a systematic review and meta-analysis. *AIDS Res Ther 19,* 3. https://doi.org/10.1186/s12981-021-00427-y

Davey, J. D. L., Wall, K. M., Naidoo, N., Naidoo, D., Xaba, G., Serao, C., Malone, T., & Dovel, K. (2022). HIV testing and linkage to ART following secondary distribution of HIV self-test kits to male partners of women living with HIV: a pilot randomized control trial in Mpumalanga, South Africa. *Journal of the International AIDS Society, 25*(6), e25937. https://doi.org/10.1002/jia2.25937

de Araújo, T.M.E., Costa Chaves, F.R., ... & de Oliveira, M.G.F.U. (2024). Sexual Practices and HIV Risk Perception Among Men Who Have Sex with Men in Brazil. *Journal of the International Association of Providers of AIDS Care (JIAPAC). 23*. doi:10.1177/23259582241283196

De Baetselier, I., Reyniers, T., Platteau, T., Wouters, K., Nöstlinger, C., Cuylaerts, V., … & Vuylsteke, B. (2021). Recurrent sexually transmitted infections among a cohort of men who have sex with men using pre-exposure prophylaxis in Belgium are highly associated with sexualized drug use. *Sexually Transmitted Diseases, 48*(10), 726–732. https://doi.org/10.1097/olq.0000000000001424

Dowell-Day, A., Dobbins, T., & Chan, C. (2023). Attitudes Towards Treatment as Prevention Among PrEP-Experienced Gay and Bisexual Men in Australia. *AIDS Behav 27*, 2969–2978. https://doi.org/10.1007/s10461-023-04019-x

Doyle, C.M., Maheu-Giroux, M., ... & Lambert, G. (2021). Combination HIV Prevention Strategies Among Montreal Gay, Bisexual, and Other Men Who Have Sex with Men in the PrEP Era: A Latent Class Analysis. *AIDS Behav 25*, 269–283. https://doi.org/10.1007/s10461-020-02965-4.

Dzenga, T., Moyo, E., Moyo, P., Kamangu, J., & Dzinamarira, T. (2023). Factors influencing the retention of clients in oral pre-exposure prophylaxis (PrEP) care at 3 months after initiation in the Omusati region of Namibia. *Int J Africa Nurs Sci.;19*, 100623. doi: 10.1016/J.IJANS.2023.100623

Dzinamarira, T., Moyo, E., Murewanhema, G. (2023). *"*A case for the inclusion of Doxycycline post-exposure prophylaxis for sexually transmitted infections among men who have sex with men in sub-Saharan African countries' guidelines for the management of sexually transmitted infections" by "Dzinamarira et al." *Sex Transm Infect.; sextrans-055943*. doi: 10.1136/SEXTRANS-2023-055943

Dziva Chikwari, C., Kranzer, K., Simms, V., Patel, A., Tembo, M., Mugurungi, O., … & Ferrand, R. A. (2024). Differentiated care for youth in Zimbabwe: Outcomes across the HIV care cascade. *PLOS global public health, 4*(2), e0002553. https://doi.org/10.1371/journal.pgph.0002553

Edeza, A., Karina Santamaria, E., Valente, P. K., Gomez, A., Ogunbajo, A., & Biello, K. (2021). Experienced barriers to adherence to pre-exposure prophylaxis for HIV prevention among MSM: a systematic review and meta-ethnography of qualitative studies. *AIDS care, 33*(6), 697–705. https://doi.org/10.1080/09540121.2020.1778628

Edun, O., Okell, L., Chun, H., Bissek, A. Z., Ndongmo, C. B., Shang, J. D., … & Imai-Eaton, J. W. (2024). HIV risk behaviour, viraemia, and transmission across HIV cascade stages including low-level viremia: Analysis of 14 cross-sectional population-based HIV Impact Assessment surveys in sub-Saharan Africa. *PLOS global public health, 4*(4), e0003030. https://doi.org/10.1371/journal.pgph.0003030

Ejalu, D. L., Okello, P. S., Puleh, S. S., Nangendo, J., Izudi, J., Bakeera-Kitaka, S., … & Kamya, M. R. (2026). Viral Load Suppression After Intensive Adherence Counselling Among Previously Non-Suppressed Adolescents and Young People with HIV in East-Central Uganda. *HIV/AIDS - Research and Palliative Care, 18*. https://doi.org/10.2147/HIV.S588885

Elin, R., Victor, W., Yauheni, L., Ekström, A. M., & Daniel, L. (2025). Chemsex and sexual risk behavior among MSM on PrEP in Stockholm, Sweden. *Drug*

and alcohol dependence reports, 16, 100367. https://doi.org/10.1016/j.dadr.2025.100367

Endeshaw, D., Dessie, G., Kasa, A. S., Endalamaw, A., Tesfaye, T. D., Birhanu, S., … & Workineh, Y. (2024). Consistent condom utilization among sexually active HIV positive individuals in Sub-Saharan Africa: systematic review and meta-analysis. *Scientific reports, 14*(1), 5837. https://doi.org/10.1038/s41598-024-56574-5

El-Krab, R., & Kalichman, S. C. (2021). Alcohol-Antiretroviral Therapy Interactive Toxicity Beliefs and Intentional Medication Nonadherence: Review of Research with Implications for Interventions. *AIDS and behavior, 25*(Suppl 3), 251–264. https://doi.org/10.1007/s10461-021-03285-x

Elvstam, O., Malmborn, K., Elén, S., Marrone, G., García, F., Zazzi, M., … & Björkman, P. (2023). Virologic Failure Following Low-level Viremia and Viral Blips During Antiretroviral Therapy: Results From a European Multicenter Cohort. *Clinical infectious diseases: an official publication of the Infectious Diseases Society of America, 76*(1), 25–31. https://doi.org/10.1093/cid/ciac762

Esan, A. J., Osime, E. O., Kolawole, F., & Titilayo, O. E. (2022). Attitudes and behaviors of healthcare professionals toward HIV positive patients in a tertiary hospital. *Biomedical Research and Clinical Reviews, 6*(3). doi.org.

Eshun-Wilson, I., Jamil, M. S., Witzel, T. C., Glidded, D. V., Johnson, C., Le Trouneau, N., … & Geng, E. H. (2021). A Systematic Review and Network Meta-analyses to Assess the Effectiveness of Human Immunodeficiency Virus (HIV) Self-testing Distribution Strategies. *Clinical infectious diseases: an official publication of the Infectious Diseases Society of America, 73*(4), e1018–e1028. https://doi.org/10.1093/cid/ciab029

Fang, R., Steggerda, J. C., Konkle-Parker, D., & Voluse, A. C. (2026). Age and Race Disparities in Viral Suppression and the Moderating Effect of Substance Use Among Men Who Have Sex with Men Living with HIV. *The journal of behavioral health services & research, 53*(1), 131–141. https://doi.org/10.1007/s11414-025-09948-0

Fauk, N. K., Ward, P. R., Hawke, K., & Mwanri, L. (2021). HIV Stigma and Discrimination: Perspectives and Personal Experiences of Healthcare Providers in Yogyakarta and Belu, Indonesia. *Frontiers in medicine, 8*, 625787. https://doi.org/10.3389/fmed.2021.625787

Fei, L. P., Zhao, H. H., Yang, Z. N., Wang, S., Guo, Y., Gong, H., … & Lv, F. (2024). HIV incidence and recreational drug use among men who have sex with men aged 18-24 years in Tianjin, China: a retrospective cohort study. *BMC infectious diseases*, *24*(1), 1295. https://doi.org/10.1186/s12879-024-10184-8

Fiorentino, M., Yanwou, N., Gravier-Dumonceau Mazelier, R., Eubanks, A., Roux, P., Laurent, C., & Spire, B. (2024). Sexual behaviours and risk with women in MSM in sub-Saharan Africa. *AIDS (London, England), 38*(3), 273–287. https://doi.org/10.1097/QAD.0000000000003787

Firkey, M., Sheinfil, A., Ramos, J., & Woolf-King, S. E. (2021). Cannabis and Alcohol Co-Use and Condomless Anal Sex Among Men Who have Sex with Men Living with HIV: An Event-Level Analysis. *AIDS and behavior*, *25*(11), 3770–3781. https://doi.org/10.1007/s10461-021-03228-6

Flores Anato, J. L., Panagiotoglou, D., Greenwald, Z. R., Blanchette, M., Trottier, C., Vaziri, M., … & Maheu-Giroux, M. (2022). Chemsex and incidence of sexually transmitted infections among Canadian pre-exposure prophylaxis (PrEP) users in the l'Actuel PrEP Cohort (2013–2020). *Sexually Transmitted Infections*, *98*, 549–556. https://doi.org/10.1136/sextrans-2021-055215

Frescura, L., Godfrey-Faussett, P., Feizzadeh A, A., El-Sadr, W., Syarif, O., Ghys, P. D., & on and behalf of the 2025 testing treatment target Working Group (2022). Achieving the 95 95 95 targets for all: A pathway to ending AIDS. *PloS one, 17*(8), e0272405. https://doi.org/10.1371/journal.pone.0272405

Fu, L., Wang, B., Tian, T., Zhou, X., Lu, Z., Sun, Y., Zheng, W., Gao, Y., Lin, Y., Li, H., & Zou, H. (2023). *Sexual Risk Behaviour and Satisfaction Among Men Who Have Sex with Men* Living with Detectable HIV Viral Loads: A Nationwide Online Survey in China. *Infectious Microbes & Diseases 5*(3), 137-144. | DOI: 10.1097/IM9.0000000000000124

Garnett G. P. (2021). Reductions in HIV incidence are likely to increase the importance of key population programmes for HIV control in sub-Saharan Africa. *Journal of the International AIDS Society, 24* Suppl 3(Suppl 3), e25727. https://doi.org/10.1002/jia2.25727

Ge, R., Chen, L., Chen, W., He, L., Chai, C., Zhu, G., & Chen, Z. (2024*).* Comparison of human immunodeficiency virus-related risky sexual behaviors between men who have sex with men only and men who have sex with men and women: A cross-sectional study in Eastern China. *Preventive medicine reports, 48*, 102923. https://doi.org/10.1016/j.pmedr.2024.102923

Ghaimo, F. E., Mzilangwe, E. S., Chacha, S., & Kuganda, S. B. (2025). Prevalence and factors associated with alcohol use disorders among people living with HIV attending care and treatment centers at Kilimanjaro, Tanzania: A cross-sectional study. *PloS one, 20*(2), e0318120. https://doi.org/10.1371/journal.pone.0318120

Gilmore, P. J. (2024). *Healthcare Rights for Gender and Sexual Minorities.* IntechOpen. doi: 10.5772/intechopen.111641

Giovenco, D., Mabuto, T., Manyuchi, A., Savva, H., McIntyre, A., Puren, A., … & Sanders, E. J. (2025). The treatment gap and the HIV care continuum for cisgender men who have sex with men in three South African cities: Findings from a biobehavioural survey, 2019. *PLOS global public health*, *5*(9), e0004874. https://doi.org/10.1371/journal.pgph.0004874

Goel,S., & Salganik, M. J. (2010). Assessing respondent-driven sampling. *PNAS. 107*, 6743– 6747.

Goswami, P., Rachakulla, H.K., Ramakrishnan, L., Mathew, S., & Ramanathan, S. (2013). An assessment of a large-scale HIV prevention programme for high-risk men who have sex with men and transgenders in Andhra Pradesh, India*:* using data from routine programme monitoring and repeated cross-sectional surveys. *BMJ Open*, *7*(9), 305–306.

Goma, M., Ng'ambi, W. F., & Zyambo, C. (2024). Predicting harmful alcohol use prevalence in Sub-Saharan Africa between 2015 and 2019: Evidence from population-based HIV impact assessment. *PloS one*, *19*(10), e0301735. https://doi.org/10.1371/journal.pone.0301735

Graff, N. R., Hong, C., Guthrie, B., Micheni, M., Chirro, O., Wahome, E., … & Graham, S. M. (2023). The Effect of the Shikamana Peer-and-Provider Intervention on Depressive Symptoms, Alcohol Use, and Other Drug Use Among Gay, Bisexual, and Other Men Who Have Sex with Men in Kenya. *AIDS and behavior*, *27*(9), 3053–3063. https://doi.org/10.1007/s10461-023-04027-x

Graham, S. M., Okall, D. O., Mehta, S. D., Obondi, E., Ng'ety, G., Ochieng, E., … & Otieno, F. O. (2023). Challenges with PrEP Uptake and Adherence Among Gay, Bisexual, and Other Men Who Have Sex with Men in Kisumu, Kenya. *AIDS and behavior*, *27*(4), 1234–1247. https://doi.org/10.1007/s10461-022-03860-w

Green, D. C., Parra, L. A., & Goldbach, J. T. (2022). Access to health services among sexual minority people in the United States. *Health & social care in the community, 30*(6), e4770–e4781. https://doi.org/10.1111/hsc.13883

Greene, J., & Ramos, C. (2021). A Mixed Methods Examination of Health Care Provider Behaviors That Build Patients' Trust. *Patient education and counselling, 104*(5), 1222–1228. https://doi.org/10.1016/j.pec.2020.09.003

Guimarães, N.S., Magno, L., & Monteiro, G.M.B. (2023). Demand creation and retention strategies for oral pre-exposure prophylaxis for HIV prevention among men who have sex with men and transgender women: a systematic review and meta-analysis. *BMC Infect Dis 23*, 793. https://doi.org/10.1186/s12879-023-08693-z

Gumindega, G. C., & Maharaj, P. (2022). Challenges with couples HIV counselling and testing among black MSM students: Perspectives of university students in Durban, South Africa. *Sahara J-Journal of Social Aspects of Hiv-Aids, 19*(1), 22–31. https://doi.org/10.1080/ 17290376.2022.2101511

Guo, Y., Chen, F., Gong, H., Wu, Z., Zhang, X., Ning, T., … & Tang, H. (2024). Trends in Incidence of HIV and Syphilis Among Men Who Have Sex with Men - Tianjin Municipality, China, 2013-2022. *China CDC weekly, 6*(27), 651–657. https://doi.org/10.46234/ccdcw2024.121

Hakizayezu, F., Biracyaza, E., Niyompano, H., & Umubyeyi, A. (2022). The Frequency and Predictors of Unsuppressed HIV Viral Load Among People with HIV in Nyaruguru District, Rwanda. *HIV/AIDS (Auckland, N.Z.), 14*, 381–395. https://doi.org/10.2147/HIV.S376053

Hamilton, erica l., Guo, X., Dadabhai, S., Panchia, R., Ogendo, A., & Reynolds, D. (2025). Stigma and other correlates of self-esteem and depression in cisgender men and transfeminine persons with HIV who have sex with

men in Kenya, Malawi, and South Africa (HPTN 075). *AIDS Care, 37*(7), 1181–1193. https://doi.org/10.1080/09540121.2025.2488874

Harp, R., Byrne, M., Monroe, A., & Castel, A. D. (2023). Housing, HIV outcomes, and related comorbidities in persons living with HIV in Washington, DC. *AIDS care, 35*(12), 1874–1884. https://doi.org/10.1080/09540121.2022.2151557

Harris, C. L., Blair, C. S., Segura, E. R., Gutiérrez, J., Lake, J. E., Cabello, R., & Clark, J. L. (2024*).* Sexual network characteristics, condomless anal intercourse, and the HIV care cascade among MSM living with controlled versus uncontrolled HIV infection in Lima, Peru: a population-based cross-sectional analysis. *Lancet regional health. Americas, 32*, 100722. https://doi.org/10.1016/j.lana.2024.100722

Harris, T. G., Wu, Y., Parmley, L. E., Musuka, G., Mapingure, M. P., Chingombe, I., … & Rogers, J. H. (2022). HIV care cascade and associated factors among men who have sex with men, transgender women, and genderqueer individuals in Zimbabwe: findings from a biobehavioural survey using respondent-driven sampling. *The lancet. HIV, 9*(3), e182–e201. https://doi.org/10.1016/S2352-3018(21)00297-6

Heath, K., Levi, J., & Hill, A. (2021). The Joint United Nations Programme on HIV/AIDS 95-95-95 targets: worldwide clinical and cost benefits of generic manufacture. *AIDS (London, England), 35*(Suppl 2), S197–S203.

https://doi.org/10.1097/QAD.0000000000002983

He, J., Li, J., Jiang, S., Cheng, W., Jiang, J., Xu, Y., Yang, J., Zhou, X., Chai, C., & Wu, C. (2022). Application of machine learning algorithms in predicting HIV infection among men who have sex with men: Model development and validation. *Frontiers in public health, 10*, 967681. https://doi.org/10.3389/fpubh.2022.967681

He, L., Jiang, T., Chen, W., Jiang, S., Zheng, J., Chen, W., Wang, H., Ma, Q., & Chai, C. (2024). Examining HIV Testing Coverage and Factors Influencing First-Time Testing Among Men Who Have Sex with Men in Zhejiang Province, China: Cross-Sectional Study Based on a Large Internet Survey. *JMIR public health and surveillance, 10*, e56906. https://doi.org/10.2196/56906.

Heckathorn, D.D. (1997). Respondent Driven Sampling. A new approach to the study of hidden populations. *Social Problems 44*, 174-179.

Hentges, B., Knauth, D.R., Vigo, A., Teixeira, L.B., Leal, A.F., Kendall, C., Magno, L., Dourado, I., & Kerr, L. (2023). Inconsistent condom use with casual partners among men who have sex with men in Brazil: a cross-sectional study. *Rev Bras Epidemiol. 26*, e230019. doi: 10.1590/1980-549720230019.

Hlongwa, M., Moyo, E., & Dzinamarira, T. (2023). Approaches for improving linkage to HIV care among HIV self-testing individuals in sub-Saharan Afric*a*. *BMJ global health, 8*(7), e012664. https://doi.org/10.1136/bmjgh-2023-012664

Hoagland, B., Torres, T. S., Bezerra, D. R. B., Benedetti, M., Pimenta, C., Veloso, V. G., & Grinsztejn, B. (2021). *High acceptability of PrEP teleconsultation and HIV self-testing among PrEP users during the COVID-19 pandemic in Brazil. The Brazilian journal of infectious diseases: an official publication of the Brazilian Society of Infectious Diseases, 25*(1), 101037. https://doi.org/10.1016/j.bjid.2020.11.002

Hong, H., Shi, X., Liu, Y., Feng, W., Fang, T., Tang, C., & Xu, G. (2024). HIV Incidence and Transactional Sex Among Men Who Have Sex with Men in Ningbo, China: Prospective Cohort Study Using a WeChat-Based Platform. *JMIR public health and surveillance, 10*, e52366. https://doi.org/10.2196/52366

Hoogar P. (2026). From criminalization to care: a comparative rights-based policy review of HIV responses in South Asia. *Frontiers in public health, 13*, 1658981. https://doi.org/10.3389/fpubh.2025.1658981

Igihozo, G., Sichali, J.M., Medhe, S. & Wong, R. (2022) Exploring the Perspectives of Healthcare Providers on Providing HIV Prevention and Treatment Services for Key Populations in Rwanda: A Qualitative Study. *World Journal of AIDS, 12*, 120-139. https://doi.org/10.4236/wja.122010

Inghels, M., Kouassi, A. K., Niangoran, S., Bekelynck, A., Carilon, S., Sika, L., ... & Larmarange, J. (2022). Preferences and access to community-based HIV testing sites among men who have sex with men (MSM) in Côte d'Ivoire. *BMJ open, 12*(6), e052536.

Iott, B.E., Loveluck, J., ... & Benton, A. (2022). The impact of stigma on HIV testing decisions for gay, bisexual, queer and other men who have sex with men: a qualitative study. *BMC Public Health 22*, 471. https://doi.org/10.1186/s12889-022-12761-5

Isano, S., Yohannes, T., Igihozo, G., Ndatinya, G. I., & Wong, R. (2023). A qualitative study to explore the healthcare-seeking experiences of men who have sex with men (MSM) and transgender women (TGW) in Rwanda. *BMC health services research, 23*(1), 291. https://doi.org/10.1186/s12913-023-09286-x

Iseselo, M. K., Ambikile, J. S., Lukumay, G. G., & Mosha, I. H. (2024). Challenges in the delivery of health services for people living with HIV in Dar es Salaam, Tanzania: a qualitative descriptive study among healthcare providers. *Frontiers in health services, 4*, 1336809. https://doi.org/10.3389/frhs.2024.1336809

Jamil, M. S., Eshun-Wilson, I., Witzel, T. C., Siegfried, N., Figueroa, C., Chitembo, L., … & Johnson, C. (2021). Examining the effects of HIV self-testing compared to standard HIV testing services in the general population: A

systematic review and meta-analysis. *EClinicalMedicine, 38,* 100991. https://doi.org/10.1016/j.eclinm.2021.100991

Jia, W., Jiao, K., & Ma, J. (2022). HIV infection disclosure, treatment self-efficacy and quality of life in HIV-infected MSM receiving antiretroviral therapy. *BMC Infect Dis 22,* 937. https://doi.org/10.1186/s12879-022-07932-z

Jiménez-Rivagorza, L., Orozco, R., ... & Medina-Mora, M.E. (2024). HIV-Related Stigma and Treatment Adherence Among Gay, Bisexual, and Other Men Who Have Sex with Men Who Use Crystal Meth in the Metropolitan Area of Mexico City. *Arch Sex Behav **53**,* 1561–1574. https://doi.org/10.1007/s10508-024-02816-6

Jing, Z., Chang, W., Wang, H., Zhou C., Cui, T., Xu, S., Liao, P., Li, F., Hesketh, T., Ning, Y., & Wang, Z. (2025). Differences in HIV-related knowledge, attitudes, and behaviors among men who have sex with men (MSM): Comparison between HIV-positive and HIV-negative college students. *Frontiers in Public Health, 13*,

Kalichman, S., Mathews, C., El-Krab, R., Banas, E., & Kalichman, M. (2021). *Forgoing antiretroviral therapy to evade stigma among people living with HIV, Cape Town, South Africa. Journal of behavioral medicine, 44*(5), 653–661. https://doi.org/10.1007/s10865-021-00212-2

Kalu, N., Ross, M.W., & Taegtmeyer, M. (2024). Association of same-sex criminalisation laws and national HIV policies with HIV testing in African MSM: an ecological single-level and multilevel cross-sectional study of sub-Saharan African countries. *Sexually Transmitted Infections 100*, 150-157

Kashiha, J., Ross, M., & Rider, N. (2022). Distinguishing trans women in men who have sex with men populations and their health access in East Africa: A

Tanzanian study. *African journal of primary health care & family medicine, 14*(1), e1–e8. https://doi.org/10.4102/phcfm.v14i1.3428.

Kavanaugh, M., Agbla, S., & Pillinger, M. (2021). *Law, criminalization and HIV in the world: Have countries that criminalised achieved more or less successful AIDS pandemic response?* [Pre-print white paper]. O'Neill Institute. Kenya: The Constitution of Kenya [Kenya], Retrieved from: https://www.refworld.org/docid/4c8508822.

Kerr, L., Leal, M., .&. da Silva, A.Z. (2026). *HIV treatment cascade and associated factors among men who have sex with men in Brazil: a cross-sectional study. Sci Rep 16,* 3676. https://doi.org/10.1038/s41598-025-27909-7

Kevlishvili, S., Kvlividze, O., Kvirkvelia, V., Tananashvili, D., & Galdava, G. (2023). *socio-economic features of sexually transmitted infections among MSM in Georgia. Georgian medical news,* (338), 78–86

Kilapilo, M. S., Sangeda, R. Z., Bwire, G. M., Sambayi, G. L., Mosha, I. H., & Killewo, J. (2022). Adherence to Antiretroviral Therapy and Associated Factors Among People Living with HIV Following the Introduction of Dolutegravir Based Regimens in Dar es Salaam, Tanzania. *Journal of the International Association of Providers of AIDS Care, 21*, 23259582221084543. https://doi.org/10.1177/23259582221084543

Kimani, M., van der Elst, E.M., Chirro, O., Wahome, E., Ibrahim, F., Mukuria, N., … & Sanders, E.J. (2021). "I wish to remain HIV negative": pre-exposure prophylaxis adherence and persistence in transgender women and men who have sex with men in coastal Kenya. *PLoS ONE. 16*, e0244226. doi: 10.1371/journal.pone.0244226.

Kimanga, D. O., Oramisi, V. A., Hassan, A. S., Mugambi, M. K., Miruka, F. O., Muthoka, K. J., … & Ngugi, C. N. (2022). Uptake and effect of universal test-and-treat on twelve months retention and initial virologic

suppression in routine HIV program in Kenya. *PloS one, 17*(11), e0277675. https://doi.org/10.1371/journal.pone.0277675

King, H., Thornton, N., Evans, K. N., Tadfor, Y., German, D., Flynn, C., Jennings, J., & Fields, E. L. (2025). Factors Associated with the Awareness of and Willingness to Use HIV Pre-exposure Prophylaxis Among Gay, Bisexual, and Other Men Who Have Sex with Men, Baltimore, MD, 2017-2019. *Journal of racial and ethnic health disparities, 12*(2), 1202–1215. https://doi.org/10.1007/s40615-024-01954-w

Kloek, M., Bulstra, C. A., van Noord, L., Al-Hassany, L., Cowan, F. M., & Hontelez, J. A. C. (2022). HIV prevalence among men who have sex with men, transgender women and cisgender male sex workers in sub-Saharan Africa: a systematic review and meta-analysis. *Journal of the International AIDS Society*, *25*(11), e26022. https://doi.org/10.1002/jia2.26022

Knoops, L., van Amsterdam, J., Albers, T., Brunt, T. M., & van den Brink, W. (2022). Slamsex in The Netherlands among men who have sex with men (MSM): use patterns, motives, and adverse effects. *Sexual health, 19*(6), 566–573. https://doi.org/10.1071/SH22140

Knox, J., Patnaik, P., & Hakim, A.J. (2021). Prevalence of condomless anal intercourse and associated risk factors among men who have sex with men in Bamako, Mali. *International Journal of STD & AIDS. 2021; 32*(3), 218-227. doi:10.1177/0956462420922446

Korhonen, C.J., Flaherty, B.P., & Wahome, E. (2022). Validity and reliability of the Neilands sexual stigma scale among Kenyan gay, bisexual, and other men who have sex with men. *BMC Public Health 22,* 754. https://doi.org/10.1186/s12889-022-13066-3

Kyere, G.A., Vechey, G.A., ... & Charles-Unadike, V.O. (2024). Trends in viral load suppression among HIV patients on antiretroviral therapy (ART) at

Asante Mampong Municipal Hospital, Ghana: 2019–2023. *BMC Infect Dis 24*, 1170. https://doi.org/10.1186/s12879-024-10072-1

Langdon, K. J., Hitch, A. E., Collins, A. B., Beckwith, C. G., Becker, S., Tashima, K., & Rich, J. D. (2023). *Integrating long-acting injectable treatment to improve medication adherence among persons living with HIV and opioid use disorder: study protocol. Addiction science & clinical practice, 18*(1), 60. https://doi.org/10.1186/s13722-023-00418-6

Laurent, C., Yaya, I., Cuer, B., Sagaon-Teyssier, L., Mensah, E., Dah, T. T. E., … & CohMSM-PrEP Study Group (2023). Human Immunodeficiency Virus Seroconversion Among Men Who Have Sex with Men Who Use Event-Driven or Daily Oral Pre-Exposure Prophylaxis (CohMSM-PrEP): A Multi-Country Demonstration Study from West Africa. *Clinical infectious diseases: an official publication of the Infectious Diseases Society of America, 77*(4), 606–614. https://doi.org/10.1093/cid/ciad221

LeeVan, E., Hu, F., Mitchell, A. B., Kokogho, A., Adebajo, S., Garges, E. C., … & TRUST/RV368 Study Group (2022). Associations of gender identity with sexual behaviours, social stigma and sexually transmitted infections among adults who have sex with men in Abuja and Lagos, Nigeria. *Journal of the International AIDS Society, 25*(7), e25956. https://doi.org/10.1002/jia2.25956

Leiva-Escobar, I., Cortes, C. P., & Lamadrid, A. (2025). Employment Status and HIV Viral Load in Chilean Adult Population: A Propensity Score Analysis. *AIDS and behavior, 29*(4), 1256–1265. https://doi.org/10.1007/s10461-024-04600-y

Lesko, C. R., Falade-Nwulia, O. O., Pytell, J. D., Hutton, H. E., Fojo, A. T., Keruly, J. C., Moore, R. D., & Chander, G. (2023). Joint effects of substance use disorders and recent substance use on HIV viral non-suppression among people engaged in HIV care in an urban clinic, 2014-2019. *Addiction*

(Abingdon, England), 118(11), 2193–2202. https://doi.org/10.1111/add.16301

Lewis, A. K., Jadwin-Cakmak, L., Walimbwa, J., Ogunbajo, A., Jauregui, J. C., Onyango, D. P., … & Harper, W. G. (2023). "You'll Be Chased Away": Sources, Experiences, and Effects of Violence and Stigma among Gay and Bisexual Men in Kenya. *Int. J. Environ. Res. Public Health 2023, 20*(4), 2825; https://doi.org/10.3390/ijerph20042825

Li, Q., Zhou, J., Xu, Y., Zou, H., ... Lin, C. (2026). Medication adherence and its associated factors among oral pre-exposure prophylaxis (PrEP) users in China: The Real-world E-consumer Cohort of PrEP study. *PLOS Medicine 23*(2), e1004733. https://doi.org/10.1371/journal.pmed.1004733

Lu, W., Vu, T.T., .& Wilton, L. (2024). Patterns and Factors Associated with Alcohol Misuse Among Young Black Men Who Have Sex with Men in New York City. *American Journal of Men's Health.18*(3), doi:10.1177/15579883231218580

Luo, D., Xu, J., & Luo, W. (2024). Psychoactive Substance Use and the Impact on the AIDS Epidemic Among the MSM Population: A Meta-Analysis. *Worldwide, 2014–2023[J]. China CDC Weekly, 2024, 6*(42), 1086-1092. doi: 10.46234/ccdcw2024.223

Lyons, C. E., Twahirwa Rwema, J. O., Makofane, K., Diouf, D., Mfochive Njindam, I., Ba, I., … & Baral, S. (2023). Associations between punitive policies and legal barriers to consensual same-sex sexual acts and HIV among gay men and other men who have sex with men in sub-Saharan Africa: a multicountry, respondent-driven sampling survey. *The lancet. HIV, 10*(3), e186–e194. https://doi.org/10.1016/S2352-3018(22)00336-8

Lyon, N. (2023). Value Similarity and Norm Change: Null Effects and Backlash to Messaging on Same-Sex Rights in Uganda. *Comparative Political Studies, 56*(5), 694–725. https://doi.org/10.1177/00104140221115173

MacCarthy, S., Miller, P., Ponce, N. A., & Elliott, M. N. (2024). *Assessing Narrative Patterns in Health Access, Outcomes, and Behaviors Across Three Data Sets from England, the United States, and California for Sexual Minority Adults.* Medical care research and review: MCRR, 10775587241285135. Advance online publication. https://doi.org/10.1177/10775587241285135

MacGregor, L., Speare, N., Nicholls, J., Harryman, L., Horwood, J., Kesten, J. M., … & Turner, K. M. E. (2021). Evidence of changing sexual behaviours and clinical attendance patterns, alongside increasing diagnoses of STIs in MSM and TPSM. *Sexually Transmitted Infections, 97*(7), 507–513. doi.org

McFall, A. M., Gunaratne, M. P., Ganapathi, L., Srikrishnan, A. K., Vasudevan, C. K., Anand, S., … & Lucas, G. M. (2024). Persistently high HIV incidence among men who have sex with men and people who inject drugs attending integrated care centres in India: a longitudinal assessment of clinic-based data. *Journal of the International AIDS Society, 27*(9), e26361. https://doi.org/10.1002/jia2.26361

Magura, J., Nhari, S. R., & Nzimakwe, T. I. (2025). Barriers to ART adherence in sub-Saharan Africa: a scoping review toward achieving UNAIDS 95-95-95 targets. *Frontiers in public health, 13*, 1609743. https://doi.org/10.3389/fpubh.2025.1609743

Mahmoud, M., Ballouz, T., Lahoud, C., Adnan, J., Habib, P. A., Saab, R., Farhat, H., Hussein, M. E., & Rizk, N. (2024). *Late presentations and missed opportunities among newly diagnosed HIV patients presenting to a specialty clinic in Lebanon. Scientific reports, 14*(1), 8296. https://doi.org/10.1038/s41598-024-55277-1

Malefo, M. A., Mokgatle, M. M., & Ayo-Yusuf, O. A. (2023). Common risky sexual behaviours among men who have sex with men using a modified delphi technique. *The Open Public Health Journal*, *16*(1).

Manalel, J. A., Kaufman, J. E., Wu, Y., Fusaris, E., Correa, A., Ernst, J., & Brennan-Ing, M. (2024). Association of ART regimen and adherence to viral suppression: an observational study of a clinical population of people with HIV. *AIDS research and therapy, 21*(1), 68. https://doi.org/10.1186/s12981-024-00657-w

Manga, V. (2025). Adherence barriers to antiretroviral therapy in men who have sex with men in O.R. Tambo District, Eastern Cape. *The Open Public Health Journal, 18*(1), e18749445333098.

Mango, T., Kasese-Hara, M., & Mulaudzi, M. (2024). Beliefs affecting ART adherence in newly diagnosed HIV-positive participants in Manzini, Eswatini. *Southern African journal of HIV medicine, 25*(1), 1601. https://doi.org/10.4102/sajhivmed.v25i1.1601

Manuzak, J. A., Granche, J., Tassiopoulos, K., Rower, J. E., Knox, J. R., Williams, D. W., … & AIDS Clinical Trials Group (ACTG) A5322 Study Team (2023). Cannabis Use Is Associated with Decreased Antiretroviral Therapy Adherence Among Older Adults With HIV. *Open forum infectious diseases, 10*(1), ofac699. https://doi.org/10.1093/ofid/ofac699

Mapingure, M. P., Chingombe, I., Dzinamarira, T., Cuadros, D., Murewanhema, G., Moyo, B., … & Musuka, G. (2024). Condomless anal intercourse among HIV-positive and HIV-negative men who have sex with men in Zimbabwe. *Southern African journal of HIV medicine, 25*(1), 1583. https://doi.org/10.4102/sajhivmed.v25i1.1583

Mapingure, M., Chingombe, I., Dzinamarira, T., Samba, C., Moyo, B., Mugurungi, O., & Musuka, G. (2023). Diminished health and social outcomes among men who have sex with men who use drugs in Zimbabwe. *Southern*

African journal of HIV medicine, 24(1), 1513. https://doi.org/10.4102/sajhivmed.v24i1.1513

Mapiye, M., Ravhuhali, K., de Voux, A., & Kufa, T. (2024). Factors associated with an unsuppressed viral load among HIV-positive individuals attending STI services in South Africa, 2019. *BMC infectious diseases, 24*(1), 148. https://doi.org/10.1186/s12879-023-08756-1

Matlapeng, K. M., Babatunde, G. B., Gwelo, N. B., & Akintola, O. (2023). Accessing HIV services in Botswana: perspectives of men who have sex with men and other stakeholders. *Global Health Action, 16*(1). https://doi.org/10.1080/16549716.2023.2262197

Matlapeng, K. M., Babatunde, G. B., & Akintola, O. (2022). Acceptability and accessibility of HIV testing and treatment among men who have sex with men in Botswana. *African Journal of AIDS Research, 21*(3), 261–269. https://doi.org/10.2989/16085906.2022.2077780

Maxwell, S., Shahmanesh, M., & Gafos, M. (2022). Pre-exposure prophylaxis (PrEP) uptake and adherence experiences of gay and bisexual men who engage in chemsex: A qualitative study. *International Journal of Drug Policy. 103*. 103630. 10.1016/j.drugpo.2022.103630.

May, N. S., Wagner, J. D., & Okafor, U. B. (2025). Factors Associated with Non-Adherence to Antiretroviral Therapy: A Health-Facility-Based Cross-Sectional Study in the Amahlathi Sub-District of the Eastern Cape, South Africa. *HIV/AIDS (Auckland, N.Z.), 17*, 385–397. https://doi.org/10.2147/HIV.S499721

Mbita, G., Komba, A.N., Casalini, C., Bazant, E., Curran, K., Christensen, A., … & van den Akker, T. (2022). Predictors of HIV Among 1 Million Clients in High-Risk Male Populations in Tanzania. *AIDS Behav*.3185-3198. doi: 10.1007/s10461-022-03667-9.

Mbunge, E., Batani, J., Chitungo, I., Moyo, E., Musuka, G., ... & Muchemwa, B. (2024). Towards Data-Driven Artificial Intelligence Models for Monitoring, Modelling and Predicting *Illicit Substance Use*. 361–379. https://doi.org/10.1007/978-3-031-54820-8_29

McDade, K.K., Munge, K., Kokwaro, G., & Ogbuoji, O. (2021). *Development finance in transition: Donor dependency and concentration in Kenya's health sector.* The Center for Policy Impact in Global Health. Duke Global Working, Retrieved from https://centerforpolicyimpact.org/ourwork/transition-donor-dependency-kenyas-health

Mekonnen, H., Manyazewal, T., Kajogoo, V. D., Getachew Assefa, D., Gugsa Bekele, J., & Tolossa Debela, D. (2023). Advances in HIV self-testing: Systematic review of current developments and the road ahead in high-burden countries of Africa. *SAGE open medicine*, *12*, 20503121231220788. https://doi.org/10.1177/20503121231220788

Mgodi, N. M., Murewanhema, G., Moyo, E., Samba, C., Musuka, G., Dzinamarira, T., & Brown, J. M. (2023). Advancing the use of Long-Acting Extended Delivery formulations for HIV prevention in sub-Saharan Africa: challenges, opportunities, and recommendations. *Journal of the International AIDS Society*, *26*(Suppl 2), e26115. https://doi.org/10.1002/jia2.26115

Mi, G.D., Zhang, B.B., & Yu, F. (2021). HIV incidence among men who have sex with men using geosocial networking smartphone application in Beijing, China: an open cohort study. *Infect Dis Poverty 10*, 27. https://doi.org/10.1186/s40249-021-00814-7

Mitchell, K.M., Dimitrov, D., Silhol, R., Geidelberg, L., Moore, M., Liu, A., … & Boily, M.C. (2021). *The potential effect of COVID-19-related disruptions on HIV incidence and HIV-related mortality among men who have sex with men in the USA: a modelling study. Lancet HIV. 2021 Apr;8*(4),

e206-e215. doi: 10.1016/S2352-3018(21)00022-9. PMID: 33617783; PMCID: PMC8045548

Mofolorunsho, K. C., Dorsamy, V., Bagwandeen, C., & Abbai, N. S. (2024). *Prevalence of gonococcal and chlamydial infections among men who have sex with men in sub-Saharan Africa: a systematic review and meta-analysis. Systematic reviews, 13*(1), 282. https://doi.org/10.1186/s13643-024-02704-z

Moges, T. S., Cachay, E. R., Qin, H., Bamford, L., Grelotti, D. J., & Mathews, W. C. (2021). *Effects of hazardous alcohol and drug use on antiretroviral adherence and HIV viral suppression: a mediation analysis.* medRxiv. https://doi.org/10.1101/2021.10.19.21265220

Moitra, E., Muñoz, P. J., Ramirez, J., & Pinkston, M. M. (2025). *Barriers and pathways to re-engage people with HIV and substance use in medical care: a qualitative study among persons with lived experience. AIDS research and therapy, 22*(1), 106. https://doi.org/10.1186/s12981-025-00803-y

Monroy, A., Goodrich, S., … & Brown, S.A. (2024). Effects of Alcohol Use on Patient Retention in HIV Care in East Africa. *AIDS Behav 28,* 4020–4028. https://doi.org/10.1007/s10461-024-04483-z

Moolla, A., Galvin, M., Mongwenyana, C., Miot, J., Magolego, W., Leshabana, P., Ngcobo, N., Naidoo, N., & Coetzee, L. (2024). Understanding HIV service preferences of South African women 30-49 years old missing from or linked to care: An exploratory study of Gauteng and Limpopo provinces. *Women's health (London, England), 20,* 17455057241277080. https://doi.org/10.1177/17455057241277080

Moore, D. M., Cui, Z., Skakoon-Sparling, S., Sang, J., Barath, J., Wang, L., … & Hart, T. A. (2021). *Characteristics of the HIV cascade of care and unsuppressed viral load among gay, bisexual and other men who have*

sex with men living with HIV across Canada's three largest cities. https://doi.org/10.1002/jia2.25699

Moreland, S., Vyas, K. J., Jessen, H., Esser, S., Duff, E., Broach, E., … & RV464 Study Group (2025). *Inconsistent Condom Use and Reasons for Non-Use in the Era of HIV Pre-Exposure Prophylaxis Among German Men Who Have Sex with Men*. *AIDS patient care and STDs*, *39*(12), 505–514. https://doi.org/10.1177/10872914251394785

Mosha, I. H., Nyondo, G. G., Munishi, C. G., Njiro, B. J., & Bwire, G. M. (2024). Prevalence and factors associated with viral non-suppression in people living with HIV receiving antiretroviral therapy in sub-Saharan Africa: A systematic review and meta-analysis. *Reviews in medical virology*, *34*(3), e2540. https://doi.org/10.1002/rmv.2540

Moyo, E., Moyo, P., Murewanhema, G., Mhango, M., Chitungo, I., & Dzinamarira, T. (2023*). Key populations and Sub-Saharan Africa's HIV response*. *Frontiers in public health*, *11*, 1079990. https://doi.org/10.3389/fpubh.2023.1079990

Moyo, I., Macherera, M., & Mavhandu-Mudzusi, A. H. (2021). *The lived experiences of men who have sex with men when accessing HIV care services in Zimbabwe. Health SA Gesondheid, 26*. https://doi.org/10.4102/hsag.v26i0.1462

Mpirirwe, R., Mujugira, A., Walusaga, H., Ayebare, F., Musanje, K., Ndugga, P., … & Katahoire, A. R. (2024). Perspectives of female sex workers on HIV pre-exposure prophylaxis delivery in Uganda: A qualitative study. *Research square*, *rs.3*.rs-4115528. https://doi.org/10.21203/rs.3.rs-4115528/v1

Mugenda, O., & Mugenda, A. (2003). *Research methods. Quantitative and Qualitative approaches.* Nairobi: ACTS

Mugenyi, L., Nanfuka, M., Byawaka, J., Agaba, C., Mijumbi, A., Kagimu, D., … & Etukoit, M. (2022). Effect of universal test and treat on retention and mortality among people living with HIV-infection in Uganda: An interrupted time series analysis. *PloS one, 17*(5), e0268226. https://doi.org/10.1371/journal.pone.0268226

Mugo, C., Firdawsi, O., Wang, J., Njuguna, I.N., Wamalwa, D.C., Slyker, J.A., & Wagner, A.D. (2023). "When they are all grown, I will tell them": Experience and perceptions of parental self-disclosure of HIV status to children in Nairobi, Kenya. *BMC Public Health. 2023 Mar;23*(1), 519. DOI: 10.1186/s12889-023-15387-3.

Mugurungi, O., Mbunge, E., Birri-Makota, R., Chingombe, I., Mapingure, M., Moyo, B., … & Musuka, G. (2024). Predicting sexually transmitted infections among men who have sex with men in Zimbabwe using deep learning and ensemble machine learning models. *PLOS digital health, 3*(7), e0000541. https://doi.org/10.1371/journal.pdig.0000541

Muhula, S., Gachohi, J., Kombe, Y., & Karanja, S. (2022). Interventions to improve early retention of patients in antiretroviral therapy programmes in sub-Saharan Africa: A systematic review. *PloS one, 17*(2), e0263663. https://doi.org/10.1371/journal.pone.0263663

Mukwenha, S., Dzinamarira, T., Mapingure, M., Chingombe, I., Makota, R. B., Mbunge, E., ... & Musuka, G. (2024). Predictors of unsuppressed HIV viral load and low CD4 count among ZIMPHIA 2020 survey participants.

Mundamshimu, J. S., Malale, K., Kidenya, B. R., Gunda, D. W., Bwemelo, L., Mwashiuya, M., … & Oramisi, V. A. (2022). Uptake and effect of universal test-and-treat on twelve months retention and initial virologic suppression in routine HIV program in Kenya. *PLoS ONE, 17*(11), e0277675. https://doi.org/10.1371/journal.pone.0277675

Murphy, M., Tao, J., & Goedell, W. C. (2021). Characterizing substance use among men who have sex with men presenting to a sexually transmitted infection clinic. *International Journal of STD & AIDS. 32*(4), 314-321. doi:10.1177/0956462420965076

Musyoki, H., Bhattacharjee, P., Sabin, K., Ngoksin, E., Wheeler, T., & Dallabetta, G. (2021). A decade and beyond: learnings from HIV programming with underserved and marginalized key populations in Kenya. *J Int AIDS Soc. 24*(Suppl 3), e25729–e25729

Mutambara, J., Sodi, T., Mtemeri, J., & Makomo, M. (2021). Harmonizing religion and health: an exploration of religious reasons for defaulting ARVs among people living with HIV and AIDS in Gweru, Zimbabwe. *AIDS care, 33*(3), 383–388. https://doi.org/10.1080/09540121.2020.1724255

Mutie, C., Gachohi, J., Kithuci, K. R., & Mbuthia, G. (2025). Effectiveness of an mHealth intervention in HIV/AIDS risk reduction among long-distance truckers in Kenya: A quasi-experimental study. *Digital health, 11*, 20552076251390322. https://doi.org/10.1177/20552076251390322

Mwaniki, S.W., Kaberia, P.M., .&.Mugo, P.M. (2024). "What if I get sick, where shall I go?": a qualitative investigation of healthcare engagement among young gay and bisexual men in Nairobi, Kenya. *BMC Public Health*, *24*, 52. https://doi.org/10.1186/s12889-023-17555-x

Myers, B., Lombard, C., Joska, J. A., Abdullah, F., Naledi, T., Lund, C., … & Sorsdahl, K. R. (2021). Associations Between Patterns of Alcohol Use and Viral Load Suppression Amongst Women Living with HIV in South Africa. *AIDS and behavior, 25*(11), 3758–3769. https://doi.org/10.1007/s10461-021-03263-3

Nabayinda, J., Kizito, S., Witte, S., Nabunnya, P., Kiyingi, J., Namuwonge, F., … & Ssewamala, F. M. (2023). Factors Associated with Consistent Condom Use Among Women Engaged in Sex Work: Lessons From the

Kyaterekera Study in Southwestern Uganda. *AIDS and behavior, 27*(3), 969–977. https://doi.org/10.1007/s10461-022-03833-z

Nakalembe, D., Tamale, B. N., Kyomugisha, T. S., Nalugya, A., Galiwango, J., Nakiggala, J., … & Bukenya, J. (2025*).* HIV-related misinformation, testing, and non-disclosure in selected urban and peri-urban areas of West Nile, Eastern, and Northern Uganda. *Journal of health, population, and nutrition, 44*(1), 411. https://doi.org/10.1186/s41043-025-01134-4

Nakiganda, L. J., Bavinton, B. R., Poynten, I. M., Serwadda, D., Bazaale, J. M., & Grulich, A. E. (2024). Sexual pleasure and HIV-related worry in female sex workers on oral pre-exposure prophylaxis in south-western Uganda*. Sexual health, 21,* SH23056. https://doi.org/10.1071/SH23056

Nakiganda, L.J., Bell, S., ... & Grulich, A.E. (2021). Understanding and managing HIV infection risk among men who have sex with men in rural Uganda: a qualitative study. *BMC Public Health* 21, 1309 (2021). https://doi.org/10.1186/s12889-021-11365-9

Nanthaprut, P., Manojai, N., Chanlearn, P., Mattawanon, N., Chiawkhun, P., Homkham, N., & Traisathit, P. (2021). Comparison of HIV-Positive Incidence Among Transgender Women and Men Who Have Sex with Men at Stand-Alone and Mobile Voluntary Counseling and Testing Facilities in Chiang Mai Province, Thailand. *AIDS patient care and STDs*, *35*(4), 116–125. https://doi.org/10.1089/apc.2020.0258

Nanyeenya, N., Chang, L. W., Kiwanuka, N., Nasuuna, E., Nakanjako, D., Nakigozi, G., … & Makumbi, F. (2023). The association between low-level viraemia and subsequent viral non-suppression among people living with HIV/AIDS on antiretroviral therapy in Uganda. *PloS one, 18*(1), e0279479. https://doi.org/10.1371/journal.pone.0279479

Nardell, M. F., Adeoti, O., Peters, C., Kakuhikire, B., Govathson-Mandimika, C., Long, L., Pascoe, S., Tsai, A. C., & Katz, I. T. (2022). Men missing from

the HIV care continuum in sub-Saharan Africa: a meta-analysis and meta-synthesis. *Journal of the International AIDS Society, 25*(3), e25889. https://doi.org/10.1002/jia2.25889

NASCOP/MOH (2013). *Geographic Mapping of Most at Risk Populations for HIV (MARPs) in Kenya, June 2012.* Nairobi: NASCOP?MOH.

NASCOP (2020). *Preliminary KENPHIA 2018 Report*. Nairobi: NASCOP

Ndikabona, G., Alege, J. B., Kirirabwa, N. S., & Kimuli, D. (2021). Unsuppressed viral load after intensive adherence counselling in rural eastern Uganda; a case of Kamuli district, Uganda. *BMC public health*, *21*(1), 2294. https://doi.org/10.1186/s12889-021-12366-4

Ngetsa, C. J., Heymann, M. W., Thiong'o, A., Wahome, E., Mwambi, J., Karani, C., … & Sanders, E. J. (2020). Rectal gonorrhoea and chlamydia among men who have sex with men in coastal Kenya. *Wellcome open research*, *4*, 79. https://doi.org/10.12688/wellcomeopenres.15217.4

Ngure, K., Ortblad, K. F., Mogere, P., Bardon, A. R., Thomas, K. K., Mangale, D., … & Baeten, J. M. (2022). Efficiency of 6-month PrEP dispensing with HIV self-testing in Kenya: an open-label, randomised, non-inferiority, implementation trial. *The lancet. HIV*, *9*(7), e464–e473. https://doi.org/10.1016/S2352-3018(22)00126-6

Nicol, E., Jama, N.A., ... & Mehlomakulu, V. (2023). Enhancing linkage to HIV care in the "Universal Test and Treat" era: Barriers and enablers to HIV care among adults in a high HIV burdened district in KwaZulu-Natal, South Africa. *BMC Public Health 23*, 1756. https://doi.org/10.1186/s12889-023-16576-w

Nsubuga, A., Mugisha, F., Ajonye, B., Mwehonge, K., Lankiewicz, E., Drake, P., Kilande, E. J., Kayongo, A., & Sharp, A. R. (2025). Impact of the Anti-Homosexuality Act on HIV service delivery in Uganda: Evidence from

community-led monitoring. *Journal of the International AIDS Society, 28*(9), e70030. https://doi.org/10.1002/jia2.70030

Nyasani, D. K., Ondora, O. M., Lunani, L. L., Ombati, G. O., Mutisya, E. M., Mutua, G. N., Price, M. A., & Osero, J. O. (2023). Sexually transmitted infection knowledge among men who have sex with men in Nairobi, Kenya. *PloS one, 18*(9), e0281793. https://doi.org/10.1371/journal.pone.0281793

Nyongesa, M.K., Mwatasa, M.H., & Kagonya, V.A. (2022). HIV virological non-suppression is highly prevalent among 18- to 24-year-old youths on antiretroviral therapy at the Kenyan coast. *BMC Infect Dis 22*, 449. https://doi.org/10.1186/s12879-022-07428-w

Odokonyero, R. F., Ocan, M., Kinengyere, A. A., Nakasujja, N., Muhwezi, W. W., Camlin, C. S., & Hahn, J. A. (2023). Prevalence of, and factors associated with, alcohol use disorder among young adults (aged 15-24 years) living with HIV/AIDS in low-income and middle-income countries: protocol for a systematic review. *BMJ open, 13*(1), e068108. https://doi.org/10.1136/bmjopen-2022-068108

Ogunbajo, A., Bogart, L. M., Mutchler, M. G., Klein, D. J., Lawrence, S. J., Goggin, K., & Wagner, G. J. (2023). Unmet Social Needs are Associated with Lower Adherence to Antiretroviral Therapy (ART) Medication Among a Sample of Black People Living with HIV (PLHIV). *AIDS and behavior, 27*(11), 3651–3660. https://doi.org/10.1007/s10461-023-04079-z

Okello, P., Velloza, J., Ogello, V., Owidi, E., Mogere, P., Gakuo, S., … & Ngure, K. (2025). Acceptability and feasibility of a urine-based tenofovir adherence assay for monitoring and providing feedback on PrEP adherence in Kenya. *AIDS care, 37*(2), 324–336. https://doi.org/10.1080/09540121.2024.2444556

Olugo, P., Nishimura, H., Thorp, M., Lewis-Kulzer, J., Ayieko, B., Agot, K., … & Gutin, S. A. (2025). Misconceptions and limited experience with HIV pre-exposure prophylaxis (PrEP) among fishermen in Western Kenya: a qualitative study. AIDS Care, 37(5), 728–737. https://doi.org/10.1080/09540121.2025.2480149

Opio, M., Akello, F., Twongyeirwe, D. K., Opio, D., Aceng, J., Namagga, J. K., & Kabakyenga, J. K. (2022). *Perspectives on linkage to care for patients diagnosed with HIV: A qualitative study at a rural health center in South Western Uganda. PloS one*, *17*(3), e0263864. https://doi.org/10.1371/journal.pone.0263864

Otieno, F., Ng'ety, G., Okall, D., Aketch, C., Obondi, E., Graham, S. M., … & Mehta, S. D. (2020). Incident gonorrhoea and chlamydia among a prospective cohort of men who have sex with men in Kisumu, Kenya. *Sexually transmitted infections*, *96*(7), 521–527. https://doi.org/10.1136/sextrans-2019-054166

Ouédraogo, S., Dah, T. T. E., Diallo, I., Sarigda, M., Dahourou, D. L., Romba, I., … & Savadogo, L. G. B. (2023). Sub-optimal satisfaction of people living with HIV and AIDS regarding their care in Burkina Faso, West Africa. *Journal of public health in Africa*, *14*(9), 2432. https://doi.org/10.4081/jphia.2023.2432

Pal, S., Pathak, P. K., Rahaman, M., & Tripathi, N. (2024). Men at risk: correlates of verbal, physical and sexual violence against men who have sex with men across selected cities in India. *BMC public health*, *24*(1), 3006. https://doi.org/10.1186/s12889-024-20493-x

Palumbo, P.J., Zhang, Y., Clarke, W., Breaud, A., Sivay, M., Cummings, V., … & Eshleman, S.H. (2021). Uptake of antiretroviral treatment and viral suppression among men who have sex with men and transgender women in sub-Saharan Africa in an observational cohort study: HPTN 075. *Int J Infect Dis. 2021 Mar; 104,* 465-470. doi: 10.1016/j.ijid.2020.12.085.

Panayi, M., Charalambous, G.K. & Jelastopulu, E. (2024). *Enhancing quality of life and medication adherence for people living with HIV: the impact of an information system.* J Patient Rep Outcomes. https://doi.org/10.1186/s41687-023-00680-x

Paschen-Wolff, M. M., Campbell, A. N. C., Tross, S., Choo, T. H., Pavlicova, M., Braunstein, S., Lazar, R., … & Des Jarlais, D. (2022). Durable Viral Suppression Among People with HIV and Problem Substance Use in the Era of Universal Antiretroviral Treatment. *AIDS and behaviour, 26*(2), 385–396. https://doi.org/10.1007/s10461-021-03392-9

Pérez-Romero, C., Guerras, J.M., Hoyos, J., Donat, M., Barrio, G., de la Fuente, L., . … & Belza, M.J. (2022). Methysos Project Group Excessive Drinking Among Men Who Have Sex with Men Recruited from Web-Based Resources: Cross-sectional Questionnaire Study. *JMIR Public Health Surveill;8*(10), e32888 doi: 10.2196/32888PMID: 36315235PMCID: 9664322

Peters, C. M. M., Evers, Y. J., Dukers-Muijrers, N. H. T. M., & Hoebe, C. J. P. A. (2023). Sexual (Risk) Behavior and Risk-Reduction Strategies of Home-Based Male Sex Workers Who Have Sex with Men (MSW-MSM) in The Netherlands: A Qualitative Study. *Archives of sexual behavior, 52*(8), 3329–3339. https://doi.org/10.1007/s10508-023-02648-w

Peters, C.M.M., Dukers-Muijrers, N.H.T.M., Evers, Y.J. & Hoebe, C.J.P.A. (2022). Barriers and facilitators to utilisation of public sexual healthcare services for male sex workers who have sex with men (MSW-MSM) in The Netherlands: a qualitative study. *BMC Public Health 22*, 1398. https://doi.org/10.1186/s12889-022-13799-1

Pius, A., Josephine, N. N., Erick, S., Winifred, A., Rita, M., Silverjoseph, O., Lucy, E., & Novatus, N. (2021). Influence of intensified adherence counselling on viral load suppression of people receiving antiretroviral therapy at a health centre IV in southwestern Uganda: a qualitative study. *AIDS*

research and therapy, *18*(1), 45. https://doi.org/10.1186/s12981-021-00372-w

Prabhu, S., Mehta, S.H., & McFall, A.M. (2022). Substance use is associated with condomless anal intercourse among men who have sex with men in India: a partner-level analysis. *BMC Public Health 22*, 722. https://doi.org/10.1186/s12889-022-13192-y

Punchihewa, T. M., Wiles, J., & Saxton, P. J. W. (2023). More than prevention: early adoption of HIV pre-exposure prophylaxis (PrEP) by gay and bisexual men in New Zealand. *Culture, Health & Sexuality*, *26*(2), 222–235. https://doi.org/10.1080/13691058.2023.2195474

Puryear, S. B., Mwangwa, F., Opel, F., Chamie, G., Balzer, L.B., Kabami, J., Ayieko, J., Owaraganise, A., Kakande, E.,...& Agengo, G. (2023). *Effect of a brief alcohol counselling intervention on HIV viral suppression and alcohol use among persons with HIV and unhealthy alcohol use in Uganda and Kenya: a randomized controlled trial.* https://doi.org/10.1002/jia2.26187

Qin, Qr., Qiao, Nn., ... & Zhu, Hb. (2023). HIV associated factors among men who have sex with men in Maanshan, China: a cross-sectional study. *AIDS Res Ther 20*, 45. https://doi.org/10.1186/s12981-023-00539-7

Queiroz, A. A. F. L. N., de Sousa, A. F. L., de Oliveira, L. B., Batista, O. M. A., Dias, S., & Mendes, I. A. Costa. (2024). Pre-exposure Prophylaxis and Post-exposure Prophylaxis Awareness among Men Who Have Sex with Men in Brazil: A National Survey. The Open AIDS Journal Research article DOI: 10.2174/0118746136283427240221105218

Ravele, T. T., Seretlo, R. J., & Mokgatle, M. M. (2025). We are treated differently: Experiences of men who have sex with men in South African clinics. *South African family practice: official journal of the South*

African Academy of Family Practice/Primary Care, 67(1), e1–e7. https://doi.org/10.4102/safp.v67i1.6050

Reyniers, T., Babo, S. A. Y., Ouedraogo, M., Kanta, I., Ekon Agbégnigan, L., Rojas, D., … & Laurent, C. (2023). Strategies to improve PrEP uptake among West African men who have sex with men: a multi-country qualitative study. *Frontiers in public health, 11*, 1165327. https://doi.org/10.3389/fpubh.2023.1165327

Ribeiro Banze, Á., Muleia, R., Nuvunga, S., Boothe, M., & Semá Baltazar, C. (2024). Trends in HIV prevalence and risk factors among men who have sex with men in Mozambique: implications for targeted interventions and public health strategies. *BMC public health, 24*(1), 1185. https://doi.org/10.1186/s12889-024-18661-0

Robinson, S. (2002). Research Methodology. Washington D.C: National Academics Press.Ross, M.W., Berg, R.C., Schmidt, A.J., Hospers, H.J., Breveglieri, M., Furegato, M. (2013). Internalised homonegativity predicts HIV-associated risk behavior in European men who have sex with men in a 38-country cross-sectional study: some public health implications of homophobia. *Int J STD AIDS. 24* (5), 409– 13.

Rocha, G.M., Cândido, R.C.F., … & de Carvalho, N.P. (2023). Strategies to increase HIV testing among men who have sex with men and transgender women: an integrative review. *BMC Infect Dis 23*, 240. https://doi.org/10.1186/s12879-023-08124-z

Rosário, R., Dourado, I., Pereira, M., Dezanet, L., Greco, D., Grangeiro, A., & Magno, L. (2024). Factors associated with condomless anal sex among adolescent men who have sex with men and transgender women in three Brazilian state capitals: a PrEP1519 study. *Revista de saude publica, 58*(suppl 1), 8s. https://doi.org/10.11606/s1518-8787.2020054005462

Rose, A. L., Belus, J. M., Ma, T., Lee, J. S., Wan, C., De Los Reyes, A., Joska, J. A., … & Magidson, J. F. (2022). *The Relationship Between Harmful Alcohol Use and Antiretroviral Non-adherence in People Accessing HIV Treatment in Cape Town, South Africa: An Event-Level Analysis. AIDS and behavior, 26*(6), 2055–2066. https://doi.org/10.1007/s10461-021-03552-x

Ross, J., Gasana, J., Zotova, N., Ndabakuranye, G., Mabano, F., Ingabire, C., Adedimeji, A., Murenzi, G., & Patel, V. V. (2024). *PrEP in the key population community: a qualitative study of perspectives on pre-exposure prophylaxis by men who have sex with men and female sex workers in Kigali, Rwanda*. medRxiv : the preprint server for health sciences, 2024, 08.20.24311545. https://doi.org/10.1101/2024.08.20.24311545

Saldarriaga, E. M., Chen, Y., Montaño, M. A., Thuo, N., Kiptinness, C., Terris-Prestholt, F., … & Sharma, M. (2024). *Preferences for pre-exposure prophylaxis delivery via online pharmacy among potential users in Kenya: a discrete choice experiment. Journal of the International AIDS Society, 27*(10), e26356. https://doi.org/10.1002/jia2.26356.

Sallam, M., Alabbadi, A. M., Abdel-Razeq, S., Battah, K., Malkawi, L., Al-Abbadi, M. A., & Mahafzah, A. (2022). HIV Knowledge and Stigmatizing Attitude towards People Living with HIV/AIDS among Medical Students in Jordan. *International journal of environmental research and public health, 19*(2), 745. https://doi.org/10.3390/ijerph19020745

Santelli, J. S., Chen, I., Makumbi, F., Wei, Y., Nalugoda, F., Lutalo, T., … & Serwadda, D. (2021). Household wealth and HIV incidence over time, rural Uganda, 1994-2018. *AIDS (London, England), 35*(11), 1835–1843. https://doi.org/10.1097/QAD.0000000000002989

Sen, E.T., Baştuğ, A., Aypak, A. (2023). The Prevalence of Sexually Transmitted Infections and Related Factors Among People Living with HIV in

Turkey. *Mediterranean Journal of Infection Microbes and Antimicrobials, 12*(1), 5-5. doi: 10.4274/mjima.galenos.2023.2022.5

Sewell, J., Fakoya, I., Lampe, F.C, Howarth, A., Phillips, A., … & Burns, F. (2022). Effectiveness of interventions aimed at reducing HIV acquisition and transmission among gay and bisexual men who have sex with men (GBMSM) in high income settings: A systematic review. *PLoS ONE 17*(10), e0276209. https://doi.org/10.1371/journal.pone.0276209

Sheinfil, A. Z., Foley, J. D., Moskal, D., Dalton, M. R., Firkey, M., Ramos, J., Maisto, S. A., & Woolf-King, S. E. (2022). Daily Associations Between Alcohol Consumption and Antiretroviral Therapy (ART) Adherence Among HIV-Positive Men Who Have Sex with Men. *AIDS and behavior, 26*(10), 3153–3163. https://doi.org/10.1007/s10461-022-03657-x

Shen, Y., Zhang, C., Valimaki, M. A., Qian, H., Mohammadi, L., Chi, Y., & Li, X. (2022). Why do men who have sex with men practice condomless sex? A systematic review and meta-synthesis. *BMC infectious diseases, 22*(1), 850. https://doi.org/10.1186/s12879-022-07843-z

Shrestha, S., Chataut, S., Kc, B., Acharya, K., Pradhan, S. K., & Shrestha, S. (2023). Knowledge, Attitude, Practice, and Adherence to Antiretroviral Therapy among People Living with HIV in Nepal. AIDS research and treatment, 7292115. https://doi.org/10.1155/2023/7292115

Shuper, P. A., Varatharajan, T., Kinitz, D. J., Gesink, D., Joharchi, N., Bogoch, I. I., Loutfy, M., & Rehm, J. (2022). *Perceived influence of alcohol consumption, substance use, and mental health on PrEP adherence and condom use among PrEP-prescribed gay, bisexual, and other men-who-have-sex-with-men: a qualitative investigation. BMC public health, 22*(1), 1875. https://doi.org/10.1186/s12889-022-14279-2

Slawek, D. E., Arnsten, J., Sohler, N., Zhang, C., Grossberg, R., Stein, M., & Cunningham, C. O. (2021). Daily and near-daily cannabis use is associated with HIV viral load suppression in people living with HIV who use cocaine. *AIDS care, 33*(10), 1350–1357. https://doi.org/10.1080/09540121.2020.1799922

Smith, A. D., Fearon, E., Kabuti, R., Irungu, E., Kungu, M., Babu, H., … & Kimani, J. (2021). Disparities in HIV/STI burden and care coverage among men and transgender persons who have sex with men in Nairobi, Kenya: a cross-sectional study. *BMJ Open, 11*(12), e055783. https://doi.org/10.1136/bmjopen-2021-055783

Smith, A.D., Kimani, J., Kabuti, R., Weatherburn, P., Fearon, E., & Bourne, A. (2021). HIV burden and correlates of infection among transfeminine people and cisgender men who have sex with men in Nairobi, Kenya: an observational study. *Lancet HIV. 2021 May;8*(5), e274-e283. doi: 10.1016/S2352-3018(20)30310-6.

Sofimajidpour, H., Moradi, G., Dehghanbanadaki, H., Mahboobi, M., Azami, M., Khodakhah, P., Rasouli, M. A. & Moradi, Y. (2024). *Investigating the needs and barriers for prevention, control, and treatment of HIV/AIDS in transgender population: a systematic review of literature.* HIV & AIDS Review, 23(3), 198–203. https://doi.org/10.5114/hivar/149266

Song, L., Yu, X., Su, B., Geng, W.K., Lan, G., & Zhang, X. (2023). HIV Prevalence and Risk Factors Among Young Men Who Have Sex With Men in Southwest China*: Cross-sectional Questionnaire Study JMIR Form Res 2023;7*, e37344 doi: 10.2196/37344PMID: 36630166PMCID: 9893886

Spence, A. B., Wang, C., Michel, K., Ocampo, J. M., Kharfen, M., Merenstein, D., Goparaju, L., & Kassaye, S. (2022). HIV Related Stigma among Healthcare Providers: Opportunities for Education and Training. *Journal*

of the International Association of Providers of AIDS Care, 21, 23259582221114797. https://doi.org/10.1177/23259582221114797

Stannah, J., Soni, N., Lam, J. K. S., Giguère, K., Mitchell, K. M., Kronfli, N., … & Maheu-Giroux, M. (2023). *Trends in HIV testing, the treatment cascade, and HIV incidence among men who have sex with men in Africa:* a systematic review and meta-analysis. The lancet. HIV, 10(8), e528–e542. https://doi.org/10.1016/S2352-3018(23)00111-X

Stannah, J., Soni, N., Keng, J., Lam, S., Giguère, K., Mitchell, K. M., … & Marie-Claude Boily, M. C. (2022). *Trends in HIV testing, the treatment cascade, and HIV incidence among men who have sex with men in Africa:* A systematic review and meta-regression analysis. medRxiv 2022.11.14.22282329; doi: https://doi.org/10.1101/2022.11.14.22282329

Stoudemire, D. M., Igonya, E. K., Otukpa, E., Kagaba, A., Twahirwa, G. L., Niyotwagira, E., & Stojanovski, K. (2025). Association between family and social support and alcohol consumption among LGBTQ + people in Kenya and Rwanda: a cross-sectional study. *BMC public health, 25*(1), 3131. https://doi.org/10.1186/s12889-025-24395-4

Stover, J., & Teng, Y. (2022). The impact of condom use on the HIV epidemic. *Gates open research, 5*, 91. https://doi.org/10.12688/gatesopenres.13278.2

Streed, C. G., Jr, Lett, E., & Restar, A. (2023). Assessing the Health Status of Sexual and Gender Minority Adults: What We Can Learn When We Include All of Us. *JAMA network open, 6*(7), e2324948. https://doi.org/10.1001/jamanetworkopen.2023.24948

Sullivan, P.S., Knox, J., Jones, J., Taussig, J., Valentine, G. M., Millett, G., … & Guest, J. L. (2021). *Understanding disparities in viral suppression among Black MSM living with HIV in Atlanta Georgia.* J Int AIDS Soc. (4):e25689. doi: 10.1002/jia2.25689. PMID: 33821554; PMCID: PMC8022103

Sun, Z., Gu, Q., Dai, Y., Zou, H., Agins, B., Chen, Q., Li, P., Shen, J., Yang, Y., & Jiang, H. (2022). Increasing awareness of HIV pre-exposure prophylaxis (PrEP) and willingness to use HIV PrEP among men who have sex with men: a systematic review and meta-analysis of global data. *Journal of the International AIDS Society, 25*(3), e25883. https://doi.org/10.1002/jia2.25883

Taggart, T., Mayer, K.H., Vermund, S.H., Huang, S., Hayashi, K., & Ransome, Y. (2021). Interaction of Religion/Spirituality with Internalized HIV Stigma, Depression, Alcohol Use, and Sexual Risk Among Black Men Who Have Sex with *Men*: The 6 City HPTN 061 Study. *J Acquir Immune Defic Syndr., 87*(2), e188-e197. doi: 10.1097/QAI.0000000000002667. PMID: 33633033; PMCID: PMC8131231

Tan, R. K. J., Wang, Y., Prem, K., Harrison-Quintana, J., Teo, A. K. J., Kaur, N., Cook, A. R., Chen, M. I., & Wong, C. S. (2021). *HIV Pre-Exposure Prophylaxis, Condoms, or Both? Insights on Risk Compensation Through a Discrete Choice Experiment and Latent Class Analysis Among Men Who Have Sex with Men. Value in health: the journal of the International Society for Pharmacoeconomics and Outcomes Research, 24*(5), 714–723. https://doi.org/10.1016/j.jval.2020.11.023#

Thapa, S., Ogunleye, T. T., Shrestha, R., Joshi, R., & Hannes, K. (2024). *Increased Stigma, and Physical and Sexual Violence Against Men Who Have Sex with Men and Transgender Women in Sub-Saharan Africa: A Qualitative Evidence Synthesis Analyzing Social and Structural Barriers to HIV Testing and Coping Behaviors*. *Journal of homosexuality*, 1–27. Advance online publication. https://doi.org/10.1080/00918369.2024.2320237

Trickey, A., Stone, J., Semchuk, N., Saliuk, T., Sazonova, Y., Varetska, O., Lim, A. G., Walker, J. G., & Vickerman, P. (2021). Is contact between men who have sex with men and non-governmental organizations providing harm reduction associated with improved HIV outcomes? *HIV medicine, 22*(4), 262–272. https://doi.org/10.1111/hiv.13010

Tuan Abdullah, T. N., Mat Min, R., Abdullah, S. S., & Hossain, M. (2022). Counselling experiences among men having sex with men and living with HIV in Malaysia. *PloS one*, *17*(9), e0274251. https://doi.org/10.1371/journal.pone.0274251

Turpin, R. E., Akré, E. L., Williams, N. D., Boekeloo, B. O., & Fish, J. N. (2021). *Differences in Health Care Access and Satisfaction Across Intersections of Race/Ethnicity and Sexual Identity*. *Academic medicine: journal of the Association of American Medical Colleges*, *96*(11), 1592–1597. https://doi.org/10.1097/ACM.0000000000004243

Tuyishime, E., Kayitesi, C., Musengimana, G., Malamba, S., Moges, H., Kankindi, I., … & Chukwu, A. (2023). *Population Size Estimation of Men Who Have Sex with Men in Rwanda: Three-Source Capture-Recapture Method.* JMIR public health and surveillance, 9, e43114. https://doi.org/10.2196/43114

UNAIDS. (2024) *Global AIDS Update Thematic briefing note. HIV and Gay men and other men who have sex with men.* Geneva: Switzerland.

UNAID. (2023). *Global HIV/AIDS overview*. Geneva: Switzerland.

UNAIDS. (2022). *Global AIDS Update: In Danger*; July 2022. UNAIDS, AIDSinfo Retrieved fromhttp://aidsinfo.unaids.org/. UNAIDS, 2022 Core epidemiology slides; July 2022. UNAIDS, Global HIV statistics 2022 fact sheet; July 2022; UNAIDS, UNAIDS data 2022; July 2022.

van der Mannen, J. S., Furamera, S., Pienaar, J., Komane, P., Shokota, L., Ramashala, B., & Sanders, E. J. (2025). *Predictors of unsuppressed viral load among MSM with HIV in South Africa.* AIDS, 39(9), 1290–1296. doi.org

van Wees, D., Coyer, L., & van den Elshout, M. (2024). The Best Predictor of Future Behavior May Be the Past: Exploring Behavior Change in Men Who Have Sex with Men Using Pre-exposure Prophylaxis in the

Netherlands. Arch Sex Behav 53, 2777–2793. https://doi.org/10.1007/s10508-024-02863-z

Vo, L. T., Phan, D. Q., Nguyen, P. H., Gyan, A., Vuong, N. M., Nguyen, T. N. L., Vo, L. Y., & Huynh, G. (2025). *Clinical characteristics and treatment outcomes of opportunistic infections in advanced HIV disease patients among men who have sex with men in Vietnam: A prospective cross-sectional study. BMC infectious diseases*, *25*(1), 271. https://doi.org/10.1186/s12879-025-10679-y

Wamuti, B., Jamil, M. S., Siegfried, N., Ford, N., Baggaley, R., Johnson, C. C., & Cherutich, P. (2024). *Understanding effective post-test linkage strategies for HIV prevention and care: a scoping review*. *Journal of the International AIDS Society, 27*(4), e26229. https://doi.org/10.1002/jia2.26229

Wang, J., Zhao, P., & Xu, W. (2022). Sexual uses of drug and alcohol among men who have sex with men in China: implications for HIV prevention. *BMC Infect Dis 22,* 895 (2022). https://doi.org/10.1186/s12879-022-07880-8

WHO. (2024). *Global and regional trends.* Geneva: Switzerland

WHO. (2023). *Updates on HIV testing guidance: more self-testing, integration, and prevention support*. Geneva: Switzerland

Wondmeneh, T. G., & Wondmeneh, R. G. (2023). Risky Sexual Behaviour among HIV-Infected Adults in Sub-Saharan Africa: A Systematic Review and Meta-Analysis. *BioMed research international*, *2023*, 6698384. https://doi.org/10.1155/2023/6698384

World Health Organization. (2020). *Consolidated guidelines on HIV testing services, 2019.* https://iris.who.int/bitstream/handle/10665/336323/9789241550581-eng.pdf?sequence=1

Woolf-King, S. E., Sheinfil, A. Z., Ramos, J., Foley, J. D., Moskal, D., Firkey, M., Kellen, D., & Maisto, S. A. (2022). *A conceptual model of alcohol use and adherence to antiretroviral therapy: systematic review and theoretical implications for mechanisms of action. Health psychology review, 16*(1), 104–133. https://doi.org/10.1080/17437199.2020.1806722

Wu, X., Wu, G., Ma, P., Wang, R., Li, L., Sun, Y., … & Zou, H. (2023). Immediate and long-term outcomes after treat-all among people living with HIV in China: an interrupted time series analysis. *Infectious diseases of poverty, 12*(1), 73. https://doi.org/10.1186/s40249-023-01119-7

Wynn, A., Sileo, K.M., … & Schmarje, C. K. (2024). Associations Between Alcohol Use, Antiretroviral Therapy Use, and Viral Load Suppression Among People Living with HIV in Rural Central Uganda. *AIDS Behav 28*, 2205–2215. https://doi.org/10.1007/s10461-024-04299-x

Xi, M., Bullock, S., Mendelsohn, J. B., Moravan, V., Burchell, A. N., Tan, D. H. S., … & Calzavara, L. (2025). *The impact of Undetectable=Untransmittable and viral suppression on condomless sex among mixed HIV-status couples in Canada. PloS one, 20*(10), e0332926. https://doi.org/10.1371/journal.pone.0332926

Yang, Z., Chen, J., Wei, L., Dai, D., Tang, H., Zhang, Y… & Zhao, J. (2025). Association Between Incorrect Use of Pre- and Post-Exposure Prophylaxis and HIV infection Among Men Who Have Sex with Men - Shenzhen City, Guangdong Province, China, 2021-2023. *China CDC weekly, 7*(8), 277–282. https://doi.org/10.46234/ccdcw2025.044

Yeshaneh, A., Lencha, A., Aweke, A. M., Dessalew, Y., Wale, T., Mekuriya, E., … & Asfaw, G. (2021). *Consistent condom utilization and associated factors among HIV positive clients attending ART clinic at Pawi general hospital, North West Ethiopia. PloS one, 16*(12), e0261581. https://doi.org/10.1371/journal.pone.0261581

Yu, H., Yang, Y., Cao, D., Zhao, Y., Jin, C., Sun, H., Cao, Y., Ye, R., Yao, S., Duan, S., & Wu, Z. (2023). *Association of low-level viremia with mortality among people living with HIV on antiretroviral therapy in Dehong, Southwest China: A retrospective cohort study*. *HIV medicine, 24*(1), 37–45. https://doi.org/10.1111/hiv.13320

Yu, H., Yang, Y., Cao, D., Cao, Y., Shi, Y., Xiao, G., ... & Jin, C. (2024). *Association between HIV low-level viremia and CD4+ cell count changes among people living with HIV during antiretroviral therapy in Dehong, Southwest China in 2008-2021: a longitudinal study.* https://doi.org/10.21203/rs.3.rs-4728431/v1

Yu, Y.F., Wu, H.J., Ku, S.W.W., Huang, P.H., Li, C.W., Huang, P., & Strong, C. (2021) Condomless Anal Sex Associated With Heterogeneous Profiles Of HIV Pre-Exposure Prophylaxis Use and Sexual Activities Among Men Who Have Sex With Men: A Latent Class Analysis Using Sex Diary Data on a Mobile App. *J Med Internet Res 2021, 23*(12), e33877 doi: 10.2196/33877PMID: 34941560PMCID: 8738983

Zimmermann, H. M. L., Postma, L. R., Achterbergh, R. C. A., Reyniers, T., Schim van der Loeff, M. F., Prins, M., … & Davidovich, U. (2021). The impact of pre-exposure prophylaxis on sexual well-being among men who have sex with men. *Archives of Sexual Behavior, 50,* 1829–1841. https://doi.org/10.1007/s10508-020-01833-5

APPENDICES

Appendix 1: Individual Participant Consent Form in English

I am **Jane Wangui Karanja,** a Ph.D. student from JKUAT. I am researching on the HIV issues among the men who have sex with men. Kindly fill this form to enable you to participate in the study if you are 18 years and above.

Title of the study

Viral suppression among men who have sex with men living with HIV who were on risk reduction interventions and control group in Mvita sub-County, Mombasa County, Kenya

Principal investigator: Jane Wangui Karanja

Co-Investigator : Prof. Kenneth Ngure, JKUAT

Co-Investigator : Dr. Aggrey Adem, TUM

Objective of the research study

The aim of this study is to compare viral load suppression levels among men who have sex with men living with HIV who were on risk reduction interventions and control group in Mvita sub-County. This will lead to increase funding by the Government, hence more programs targeting the MSM and more research since the data on MSM is limited. This study will eventually reduce the HIV transmission among MSM. You will be required to stay in the study for a period of 6 months. The respondent will be screened for STI, drugs and alcohol use and viral load at the beginning of the study and at the end 6 months.

Procedure of filling the form

You will be required to fill a questionnaire. The exercise will take 45 minutes. No names will be written on the questionnaire for anonymity purpose. The questionnaire will be coded.

Risks/discomfort

Venous blood will be drawn to test for alcohol, hepatitis B, syphilis, viral load while urine will be produced to screen for drug use and STIs. This will cause a bit of pain/discomfort but is not harmful.

Benefits of Being in the Study

There will be no direct benefits to the participants, but the study will result in the MSM needs being known and hence tailored into HIV programmes. This will enable MSM to easily gain access to healthcare without being discriminated.

Confidentiality

The participants' identifiers such as name, ID number, which will initially be provided to the investigator, will be discarded once the information has been recorded by using codes, thus participants' information will be anonymous in the record. To further maintain confidentiality, the investigator will not inform anyone of your participation. The venue of interview will be unmarked and in secluded place. There will be no written list of participants. Data will be stored securely in the server and the questionnaire will be stored securely in the cabinets for 5 years by the investigator and thereafter be destroyed. The information provided by the participant will be used purely for the purpose of research and will not be shared without consent.

Voluntary consent

Participation to the study is voluntary and no participant will be coerced or tricked to participate in the study. The participant will also not be penalized for not participating in the study and will be allowed to withdraw anytime during the study and this decision will not be contested.

Findings

The findings of this study will be disseminated in the conferences and during publications.

Right to ask questions and report any concern

The participants have a right to ask the investigator questions about the study and have these queries answered by **Jane Karanja**, **the principal investigator**, before, during and after the research.

For any inquiries, please feel free to contact:

Jane Karanja

|Cell phone Number 0722-369567

Or

The Chairman,

Ethics Review Committee

Pwani University

P.O. Box 195 -80108, Kilifi, Kenya

Tell: 0719 182218

Consent by Participants:

I hereby consent to participate in the study.

Participant's signature_____ Date: _____

Investigator's signature_____ Date: _____

Appendix II: Individual Participant Consent Form (Swahili)

HATI YA KUOMBA USHIRIKI KATIKA UTAFITI

Mimi Bi **Jane Wangui Karanja** ni mwanafunzi katika chuo kikuu cha Ukulima na Teknolojia cha Jomo Kenyatta. Ninaomba ujaze fomu ya kujisajili ndio uweze kushiriki katika utafiti huu na ni lazima uwe na umri wa miaka 18 au zaidi.

Andiko/Kichwa Cha Utafiti

Viral suppression among men who have sex with men living with HIV who were on risk reduction interventions and control group in Mvita sub-County, Mombasa County, Kenya

Mtafiti Mkuu: Jane Wangui Karanja

Mtafiti Msaidizi : Prof. Kenneth Ngure, JKUAT

Mtafiti Msaidizi : Dr. Aggrey Adem, TUM

Lengo la utafiti

Utafiti huu una dhamiria kubaini kikundi kipi kitaweza kupunguza mzigo wa virusi (viral load) kati ya wanaume wanaofanya ngono na wanaume (MSM) ambao wanaishi na virusi vya UKIMWI katika sub-County ya Mvita. Utafiti huu utawezesha serikari kuongeza ufadhili zaidi ambao utawezesha mikakati zaidi ipangwe ya kuwasaidia hawa wanaume. Pia, itawezesha utafiti zaidi ufanywe kwa vile kwa sasa hili jambo halijachangamkiwa ipasavyo. Utafiti huu utaweza kupunguza maambukizi ya UKIMWI kwa wanaume wanaofanya ngono na wanaume wenzao. Utahitajika kupiwa kama uko na magonjwa ya zinaa, madawa ya kulevya na pombe, na viral load mwanzoni na mwisho wa utafiti (baada ya miezi 6).

Utaratibu wa kujaza fomu

Kujaza fomu hii yenye maswali ya utafiti itachukua takriban dakika 45. Ili kuwe na usiri katika utafiti huu, hutahitajika kuandika jina lako kwenye fomu hii, badala yake zitapewa namba.

Mathara/ Usumbufu

Damu ambayo itapimwa pombe, kaswende, hepatitis B na viral load itatolewa kutoka kwenye mshipa mkubwa wa mkono. Kadhalika mshiriki atahitajika kutoa mkojo ambao utapimwa magonjwa ya zinaa na madawa ya kulevya. Jambo hili laweza kufanya mshiriki kuhisi uchungu kidogo, lakini hakuna mathara yatafanyika.

Faida za kushiriki katika utafiti

Kutakuwa hakuna faida ya moja kwa moja, lakini kushiriki kwako kutafaidi waume wanaofanya ngono na waume wenzao kwa vile matakwa yao yatatambulika na programu za UKIMWI zinazowalenga zitaongezwa ndiposa waweze kupata huduma murua za afya bila kubaguliwa.

Usiri

Washiriki katika utafiti watatumia vitambulisho kama majina, nambari za kitambulisho na kadhalika lakini vitambulisho hivi vitatengwa baada ya kumbukumbu kunakiliwa na badala yake nambari zitatumika. Hivyo itakuwa vigumu kugundua aliyeshiriki katika utafiti. Ili kuwe na usiri thabiti, watafiti hawatamwambia yeyote kuwa unashiriki katika utafiti na mahala pa utafiti patakuwa fiche na hakuna atakayeweza kung'amua kuwa utafiti unaendelea. Vile vile, hakutakuwa na orodha ilioandikwa majina ya washiriki. Majibu na jumbe zote zitakazokusanywa zitahifadhiwa salama na mtafiti mkuu na fomu za maswali zitahifadhiwa kwa muda wa miaka mitano halafu zitaharibiwa baada ya kipindi hiki kumalizika. Habari itakayokusanywa kutoka kwa mshiriki itatumika tu kwa minajili ya utafiti na haitashirikishwa kwa mtu yeyote bila idhini ya mshiriki.

Idhini ya hiari

Mshiriki katika utafiti ana hiari ya kushiriki au kutoshiriki na hakuna atakaye mlazimisha au kumdanganya ndiposa ashiriki. Hukuna mshiriki atakaye adhibiwa kwa kutoshiriki katika utafiti huu na ana uhuru wa kujiondoa wakati wowote utafiti utakapokuwa ukiendelea. Uamuzi huu hautapigwa na yeyote.

Matokeo

Matokeo ya utafiti huu yatasambazwa katika mikutano na wakati wa uchapishaji.

Haki ya kuuliza maswali na kuripoti wasiwasi wowote

Mshiriki ana haki ya kumuuliza mtafiti maswali kuhusu utafiti unapoendelea na baada ya utafiti. Maswali yeyote kuhusu utafiti huu yaweza kuwasilishwa kwa mtafiti mkuu:

Jane Karanja

Nambari ya simu 0722-369567 au

Mwenyekiti wa Kamati ya kuidhinisha Utafiti (Ethics Review Committee)

Chuo Kikuu cha Pwani,

P.O. Box 195 -80108, Kilifi, Kenya.

Kutoa Idhini

Mimi nimekubali kushiriki kwenye utafiti huu baada ya kuelezwa na kuelewa maswala yote.

Sahihi ya Mshiriki_____Tarehe_____

Sahihi ya Mtafiti_____Tarehe_____

Appendix III: Questionnaire for MSM (English)

STRUCTURED QUESTIONS

Kindly tick (√) against the appropriate answer.The questionnaire will take approximately forty five minutes. All responses collected will be put into a written report and codes will replace the participants' names hence it will not be possible to identify the participants. All the data collected will be kept secure and no other person besides the principal investigator and the supervisor will have access to the completed questionnaire. Respondents will have a right not give consent, they will not be penalized, and confidentiality will be maintained.

DATE OF INTERVIEW _____

SECTION I: SOCIO-DEMOGRAPHIC INFORMATION

1. Age of the respondents in years

a) Less than 18 ( ); b)19-29 ( ); c) 30-40 ( ); d) 41-51 ( );

e) more than 52 ( )

2. Relationship status

a) Single ( ); b) Married ( ); c) Cohabiting/casual ( )

3. Religion

a) Christian ( ); b) Muslim ( ); c) Others ( )

4. Level of education

a) Primary ( ); b) Secondary ( ); c) Middle level college ( );

d) University ( ); e) Illiterate ( )

5. Occupation

a) Student ( ); b) Working ( ); c) Not working ( )

6. Current residence

a) Tudor ( ); b) Tononoka ( ); c) Mji wa kale/Makadara ( );

d) Ganjoni/shimanzi ( ); e) Majengo ( )

7. Ever married to a female

a) Yes ( ); b) No ( )

8. Income per month (ksh)

a) Less than 5,000 ( ); b) 5,000-10,000 ( ); c) 10,000-20,000 ( );

d) 20,000-30,000 ( ); e) 30,000-50,000 ( ); f) 50,000-100,000 ( );

g) more than 100, 000 ( )

9. In the past 6 months, was there often enough money for utilities?

a) Rent Yes ( ) No ( ); b) Food Yes ( ) No ( );

c) Others Yes ( ) No ( )

SECTION II: KNOWLEDGE ON HIV AMONG MSM

10. Are you HIV positive?

a) Yes ( ); b) No ( )

11. What motivated you to take the HIV test?

a) To know HIV status ( ); b) due to poor health ( );

c) had unprotected sex ( ); d) coerced by the health workers ( ); e) others ( )

12. Why would you decline to take the HIV test?

a) No cure ( ); b) fear of positive results ( ); c) stigma attached to HIV ( );

d) no answer ( )

13. Frequency of screening for HIV in the past one year

a) Once ( ) ; b) more than once ( ); c) never ( ); d) No answer ( )

14. Frequency of screening for STIs in the past one year

a) Once ( ) ; b) more than once ( ); c) never ( )

15. Are the HIV services offered free of charge?

a) Yes ( ); b) No ( ); c) Don't know ( )

16. How is HIV transmitted?

a) Unprotected sex ( ); b) sharing of utensils ( ); c) insect bites ( );

d) sharing of needles and syringes ( )

17. Preference of Sex?

a) Insertive ( ); b) receptive ( ); c) both ( )

18. Which group of MSM is likely to contract HIV?

a) Insertive ( ); b) receptive ( ); c) both ( )

19. Being faithful to one uninfected sexual partner can reduce the risk of HIV transmission

a) Yes ( ); b) No ( ); c) Don't know ( )

20. Can a healthy-looking person be living with HIV?

a) Yes ( ); b) No ( ); c) Don't know ( )

21. Can condom use reduce the transmission of HIV?

a) Yes ( ); b) No ( ); c) Don't know ( )

22. Ever used lubricant during anal sex?

a) Yes ( ); b) No ( ); c) Declined to answer ( )

23. If yes to question 22 which type of lubricant?

a) KY gel ( ); b) saliva ( ); c) Vaseline ( ); d) cooking oil ( ); e) water ( );

f) all the above ( ); g) No answer ( )

24. Are you able to access PEP/PrEP?

a) Yes ( ); b) No ( ); c) No answer ( )

25. Ever used PEP/PrEP for HIV prevention?

a) Yes ( ); b) No ( ); c) No answer ( )

26. Can circumcision reduce the transmission of HIV?

a) Yes ( ); b) No ( ); c) Don't know ( )

27. Can ARVs boost immunity?

a) Yes ( ); b) No ( ); c) Don't know ( )

28. Can the communal use of sex toys increase the risk of contracting HIV?

a) Yes ( ); b) No ( ); c) Don't know ( )

29. Have you attended any training on HIV/AIDS prevention among the MSM?

a) Yes ( ); b) No ( ); c) Cannot remember ( )

SECTION III: INDIVIDUAL BEHAVIOUR OF MSM

30. At what age did you first engage in anal sex?

a) Less than 18 ( ); b) 19-29 ( ); c) 30-40 ( ); d) 41-51( );

e) More than 52 ( )

31. Why did you choose to have anal sex with another man?

a) Peer Pressure ( ); b) Money ( ); c) Curiosity ( ); d) Raped ( );

e) No answer ( )

32. What was given in exchange for sex?

a) Money Yes ( );No ( ); b) Drugs Yes ( ); No ( );

c) Food Yes ( ); No ( ); d) Accommodation Yes ( ); No ( ); e) No answer

33. Have you ever paid another man in order to have sex with him?

a) Yes ( ); b) No ( ); c) Declined to answer ( )

34. Ever had anal sex after being drugged or given alcohol?

a) Yes ( ); b) No ( ); c) No answer ( )

35. Ever had anal sex with a regular male partner?

a) One partner ( ); b) more than one partner ( ); c) no regular partner ( )

36. Ever had anal sex with a casual male sex partner?

a) One partner ( );b) more than one partner ( ); c) no casual partner ( )

37. Ever had anal sex with multiple male sex partners (*group sex*)?

a) 1-2 partners ( ); b) more than 3 partners ( );c) never ( )

38. Ever had condomless insertive anal sex with a regular male partner?

a) Sometimes ( ); b) always ( ); c) never ( )

39. Ever had condomless receptive anal sex with a regular male partner?

a) Sometimes ( ); b) always ( ); c) never ( )

40. Ever had condomless insertive anal sex with a casual male partner?

a) Sometimes ( ); b) always ( ); c) never ( )

41. Ever had condomless receptive anal sex with a casual male partner?

Sometimes ( ); always ( ); never ( )

42. Ever had condomless virginal sex?

a) Sometimes ( ); b) always ( ); c) never ( )

43. Condom break during anal sex?

a) Once ( ); b) more than once ( ); c) never ( )

44. When did you start drinking alcohol?

a) Less than 18 ( ); b) 19-29 ( ); c) 30-40( ); d) 41-51 ( );

e) more than 52 ( ); f) never ( )

45. Why did you start drinking alcohol?

a) Peer pressure ( ); b) influenced by adults ( );c) curiosity ( ); d) never ( )

46. Ever had anal sex while high on alcohol?

a) Once ( ); b) more than once ( ); c) always ( ); d) never ( )

47. Ever drunk alcohol in order to enhance sexual performance?

a) Once ( ); b) sometimes ( ); c) always ( ); d) never ( )

48. How many bottles of alcohol do you drink daily?

a) 1-2 bottles daily ( ); b) more than 3 bottles ( ); c) occasionally ( );

d) never ( )

49. Ever used drugs before engaging in anal sex?

a) Once ( ); b) sometimes ( ); c) always ( ); d) never ( )

50. Why did you start abusing drugs?

a) Peer pressure ( ); b) influenced by adults ( ); c) curiosity ( ); d) never ( )

51. Drug use in the last 6 months?

a) Marijuana Yes ( ); No( ); b) Cocaine Yes ( ); No ( );

c) Club drugs Yes ( ); No ( ); d) Viagra Yes ( ); No ( );

e) Prescription drugs Yes ( ); No ( );

f) Methamphetamine (Meth, blue, ice, crystal) Yes ( ); No ( );

g) Muguka Yes ( ); No( ); h) Miraa Yes ( ); No ( );

i) Other Yes( ); No ( ); j) Never ( )

52. How often did you injected yourself with non-prescribe drug in the past one month?

a) Daily ( ); b) 1 or 2 in a week ( ); c) 3-4 times in a week ( );

d) Often ( ); e) Decline to answer ( ); f) never ( )

53. Ever used drugs to enhance sexual performance?

a) Once ( ); b) sometimes ( ); c) always ( ); d) never ( )

54. Have you disclosed your HIV status?

a) Yes ( ); b) No ( ); c) No answer ( )

55. Have you disclosed your sexual preference?

b) Yes ( ); b) No ( ); c) No answer ( )

56. Have you ever been assaulted?

a) Verbally Yes ( ); No ( ); b) Physically Yes ( ); No ( );

c) Sexually Yes ( ); No ( ); d) No answer ( )

57. Ever experienced rejection by;

a) Family Yes( ) No( ); b) friends Yes( ) No( ); c) society Yes ( ) No( );

d) colleagues Yes( ) No( ); e) No answer ( )

58. Ever denied an opportunity for business, education or employment due to your sexuality?

a) Yes ( ); b) No ( ); c) Decline to answer ( )

59. Have you ever experienced the following after anal sex?

a) Anal bleeding ( ); b) sore penis/anus ( ); c) anal warts ( );

d) urethral discharge ( )

60. Can you freely participate in religious activities?

a) Yes ( ); b) No ( ); c) Decline to answer ( )

SECTION IV: HEALTH SYSTEMS

61. Where do you go for checkups?

a) Public Hospital ( ); b) Private Hospital/Clinics ( )

62. Which health facility offer better care to MSM?

a) Public Hospital ( ); b) Private Hospital/Clinics ( )

63. Is it possible for MSM to feel uneasy while seeking health services in a public hospital?

a) Yes ( ); b) No ( ); c) Don't know ( )

64. Do you feel that the healthcare workers have necessary competencies to handle MSM issues?

a) Yes ( ); b) No ( ); c) I do not know ( )

65. Are the healthcare providers friendly to MSM?

a) Yes ( ); b) No ( ); c) I do not know ( )

66. The time it took to reach the healthcare facility where HIV services will be offered?

a) Minutes ( ); b) Hours ( )

67. Are the clinic operating hours flexible?

a) Yes ( ); b) No ( ); c) I do not know ( )

68. Have you ever been denied HIV services because of your sexuality?

a) Yes ( ); b) No ( ); c) No answer ( )

69. Was pre and post counselling done before and after testing for HIV?

a) Yes ( ); b) No ( ); c) Decline to answer ( )

70. Did the health care worker talk to you about how to disclose your HIV status?

a) Yes ( ); b) No ( ); c) No answer ( )

71. Did the healthcare provider talk to you about the ARVs/ PEP/PrEP?

a) Yes ( ); b) No ( ); c) No answer ( )

72. Do you believe that the health care worker maintain confidentiality before and after the HIV test and that they do not share results with anyone outside clinic?

a) Yes ( ); b) No ( );c) I do not know ( )

73. Should the MSM with HIV/AIDS have the right for quality healthcare like other people in the society?

a) Yes ( ); b) No ( ); c) I do not know ( )

74. Have you ever received any assistance be it financial, food, emotional or social from the government or non-governmental dealing with HIV/AIDS?

a) Yes ( ); b) No ( );c) Declined to answer ( )

75. Have you ever been sent away from a healthy facility because of lack of HIV commodities?

a) HIV testing kits Yes ( ), No ( ); b) ARVs Yes ( ), No ( );

c) PEP/PrEP Yes ( ), No ( )

SECTION V: HIV TREATMENT OUTCOMES

76. Are you aware of laws that criminalize same sex relationships?

a) Yes ( ); b) No ( ); c) I do not know ( )

77. Can these laws prevent the MSM from accessing the HIV services?

a) Yes ( ); b) No ( ); c) I do not know ( )

78. Did the health care providers give you adequate information about HIV, mode of transmission and prevention?

a) Yes ( );b) No ( ); c) Declined to answer ( )

79. How long does it take to be served in a health care facility?

a) Less than 30 Minutes ( ); b) One hour ( ); c) Two hours ( );

d) More than two hours ( )

80. Is the screening and treatment of STI and other opportunistic infection accessible to the MSM?

a) Yes ( ); b) No ( ); c) Declined to answer ( )

81. Would you feel comfortable being attended to by someone you know?

a) Yes ( ); b) No ( ); c) Declined to answer ( )

82. After the HIV testing, what did the healthcare provider do?

Linked you to a heath facility where you will get ARVs a) Yes ( ); No ( );

b) PEP/PrEP Yes ( ); No ( ); c) No answer ( )

83. Have you ever missed taking a dose of ARVs/ PEP/PrEP because of lack of food in the past one month?

a) Yes ( ); b) No ( ); c) No answer ( )

84. Do you have someone to remind you to take the ARVs/ PEP/PrEP?

a) Yes ( ); b) No ( ); c) No answer ( )

85. Have you joined MSM support groups?

a) Yes ( ); b) No ( )

86. Should a person who has tested HIV positive disclose his status?

a) Yes ( ); b) No ( ); c) I don't know ( )

87. Do you know the HIV status of your most recent male partner?

a) Yes ( ); b) No ( );c) I don't know ( )

88. Has your health improved with ARVs/ PEP/PrEP?

a) Yes ( ); b) No ( ); c) No answer ( )

89. When you were commenced on ARVs/ PEP/PrEP did you feel sicker than before?

a) Yes ( ); b) No ( ); c) No answer ( )

90. Reasons for non-adherent to ARVs/ PEP/PrEP

a) Missing refill date ( ); b) Lack of transport ( ); c) Feeling better ( );

d) Alcohol consumption ( ); e) Drug consumption ( ); f) No answer ( )

91. How often have you been sick or admitted in the hospital in the past one year?

a) Once ( ); b) More than once ( );c) Often ( ); d) Cannot remember ( );

e) No answer ( )

92. It is hard to remember to swallow drugs every day. How often do you miss to take ARVs/ PEP/PrEP?

a) Once in a week ( ); b) Twice in a week ( ); c) Thrice in a week ( );

d) More than three times in a week ( ); e) No answer ( )

Appendix IV: Questionnaire for Msm (Swahili)

MPANGILIO WA MASWALI

Mshiriki wa utafiti unaombwa uweke alama ya tick (√) kwa kila jibu/majibu na itakuchukua dakika arobaini na tano kujibu maswali haya. Hakuna jibu/au majibu sahihi kwa hiyo mshiriki atajaza jibu/majibu kulingana na vile analielewa swali na majibu yote yataandikwa katika ripoti na nambari zitatumika ili kuwe na usiri. Majibu yatakayokusanywa yatathibitiwa kwa kutumia nywila katika tarakilishi zote zitakazotumika katika utafiti. Ushiriki katika utafiti huu ni wa hiari na hakuna mshiriki atalazimishwa kushiriki.

TAREHE YA USHIRIKI_____

SEHEMU I: HABARI ZA KIJAMII

1. Umri wa mshiriki (miaka)

a) Chini ya miaka 18 ( ); b) 19-29 ( ); c) 30-40 ( ); d) 41-51 ( ); e) zaidi ya miaka 52 ( )

2. Mahusiano

a) Sina mahusiano ( ); b) niko katika ndoa ( ); c) twaishi nje ya ndoa ( )

3. Dini

a) Mkristu ( ); b) Muislamu ( ); c) Dini nyingine ( )

4. Kiwango cha elimu

a) Shule ya msingi ( ); b) Shule ya upili ( ); c) Chuo cha kiufundi ( );

d) Chuo kikuu ( ); e) Sijasoma

5. Kazi unayofanya

a) Mwanafunzi ( ); b) Nafanya kazi ( ); c) Sifanyi kazi ( )

6. Unapoishi kwa sasa

a) Tudor ( ); b) Tononoka ( ); c) Mji wa kale/Makadara ( );

d) Ganjoni/shimanzi ( ); e) Majengo ( )

7. Ushawahi kuoa mke?

a) Ndio ( ); b) La ( )

8. Mapato kwa mwezi (ksh)

a) Chini ya 5,000 ( ); b) 5,000-10,000 ( ); c) 10,000-20,000 ( );

d) 20,000-30,000 ( ); e) 30,000-50,000 ( ); f) 50,000-100,000 ( );

g) zaidi ya 100,000 ( )

9. Miezi 6 iliyopita, ulikuwa na pesa za kutosha za matumizi?

a) Kodi Ndio ( ) la ( ); b) Chakula Ndio ( ) La ( );

c) Mengineyo Ndio ( ) La ( )

SEHEMU II: MAARIFA YA UGONJWA WA UKIMWI

10. Je, unaishi na virusi vya HIV?

a) Ndio ( ); b) La ( )

11. Kwa nini uliamua kupimwa kama uko na virusi vya UKIMWI?

a) Nijijue hali yangu ( ); b) Nilikuwa mgonjwa ( );

c) Nilifanya mapenzi bila kinga ( );

d) Nililazimishwa na wahudumu hospitalini ( ); e) Mambo mengine ( )

12. Kwa nini ukatae kupimwa kama una virusi vya UKIMWI?

a) Hakuna tiba ( ); b) Hofu ya matokeo chanya ( );

c) Kwa sababu ya unyanyapaa ( ); d) Sina jibu ( )

13. Mara ngapi umepimwa kama una UKIMWI mwaka mmoja uliopita?

a) Mara moja ( ); b) Zaidi ya mara moja( ); c) Sijawahi ( );

d) Hakuna jibu ( )

14. Mara ngapi umepimwa kama una magonjwa ya zinaa mwaka mmoja uliopita?

a) Mara moja ( ); b) Zaidi ya mara moja( ); c) Sijawahi ( );

15. Je huduma za UKIMWI ni bure?

a) Ndio ( ); b) La ( ); c) Sijui ( )

16. UKIMWI wasambazwa vipi?

a) Kwa kutotumia kinga wakati wakufanya ngono ( );

b) Kutumia vyombo pamoja ( ); c) Kuumwa na mdudu ( );

d) Kujidunga sindano moja na wenzako ( )

17. Upendeleo wa ngono?

a) Kukazana ( ); b) Kukazwa ( ); c) Kukazana na kukazwa ( )

18. Kikundi gani cha waume wafanyao ngono na waume wenzao kinaweza kuambukizwa UKIMWI?

a) Wanaokazana ( ); b) Wanaokazwa ( ); c) Wanaokazana na wanaokazwa ( )

19. Kuwa mwaminifu kwa mpenzi mmoja ambaye hana virusi vya HIV kunapunguza maambukizi ya HIV

a) Ndio ( ); b) La ( ); c) Sijui ( )

20. Je, mtu ambaye anaonekana akiwa mwenye afya anaweza kuwa anaishi na virusi vya UKIMWI?

a) Ndio ( ); b) La ( ); c) Sijui ( )

21. Utumiaji wa mpira wa kondomu unaweza kupunguza maambukizi ya UKIMWI?

a) Ndio ( ); b) La ( ); c) Sijui ( )

22. Ushawahi kutumia Mafuta (*lubricant*) unapofanya ngono?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

23. Kama jibu la swali la 22 ni ndio, ulitumia nini?

a) KY gel ( ); b) Mate ( ); c) Vaselini ( ); d) Mafuta ya uto ( ); e) maji ( );

f) Mbinu zote ambazo zimetajwa ( ); g) sina jibu ( )

24. Waweza kupata PrEP ama PEP kwa urahisi?

a) Ndio ( ); b) La ( ); c) Sijui ( )

25. Je, ushawahi kutumia PEP/PrEP kujikinga na maambukizi ya HIV?

a) Ndio ( ); b) La ( ); c) Sijui ( )

26. Je, kutahiriwa kunapunguza maambukizi ya UKIMWI?

a) Ndio ( ); b) La ( ); c) Sijui ( )

27. Je, ARVs zinaongeza kinga mwilini?

a) Ndio ( ); b) La ( ); c) Sijui ( )

28. Utumiaji wa '*sex toys'* kwa pamoja kwa weza kuongeza hatari ya kuambukizwa UKIMWI?

a) Ndio ( ); b) La ( ); c) Sijui ( )

29. Je, umehudhuria mafunzo yoyote ya vile unaweza kuzuia maambukizi ya UKIMWI kwa waume wanaofanya mapenzi na waume wenzao?

a) Ndio ( ); b) La ( ); c) Sijui ( )

SEHEMU YA III: TABIA ZA WANAOFANYA NGONO NA WAUME WENZAO

30. Ulifanya mapenzi na mume mwenzako kwa mara ya kwanza ukiwa na umri gani?

a) Chini ya miaka 18 ( ); b) Miaka 19-29 ( ); c) Miaka 30-40 ( );

d) Miaka 41-51( ); e) Zaidi ya miaka 52 ( )

31. Kwa nini uliamua kufanya ngono na mume mwenzako?

a) Shinikizo la rika ( ); b) Pesa ( ); c) Udadisi ( ); d) Kulawitiwa ( );

e) Sina jibu

32. Ulipatiwa zawadi gani ndio ukubali kufanya ngono?

a) Pesa ndio ( ); La ( ); b) Madawa ya kulevya Ndio ( ); La ( );

c) Chakula Ndio ( ); La ( ); d) Malazi Ndio ( ); La ( ); e) Sina jibu

33. Ushawahi kumlipa pesa mume mwenzako ndio mfanye ngono?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

34. Je ushawahi kufanya ngono na mume mwenzako baada ya kuleweshwa na pombe au madawa ya kulevya?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

35. Je ushawahi fanya ngono na mume mwenzako ambaye ni mpenzi wako wa kila siku? *(regular customer)*?

a) Mpenzi mmoja ( ); b) Zaidi ya mpenzi mmoja ( );

c) Sina mpenzi wa kila siku ( )

36. Je ushawahi fanya ngono na mume mwenzako ambaye si mpenzi wako wa kila siku *(casual partner)*?

a) Mpenzi mmoja ( ); b) Zaidi ya mpenzi mmoja ( );

c) Sina mpenzi (*no casual partner*) ( )

37. Je ushawahi fanya ngono na wanaume wengi kwa mara moja (*group sex)*?

a) 1-2 wapenzi ( ); b) Zaidi ya wapenzi 3 c) ( ); sijawahi ( )

38. Je, ushawahi kumkaza mume mwenzako ambaye ni mpenzi wako wa kila siku (*regular partner*) bila kutumia mpira wa kondomu?

a) Wakati mwingine (*Sometimes*) ( ); b) Kila wakati ( ); c) Sijawahi ( )

39. Je, ushawahi kukazwa na mume mwenzako ambaye ni mpenzi wako wa kila siku (*regular partner*) bila kutumia mpira wa kondomu?

a) Wakati mwingine (*Sometimes*) ( ); b) Kila wakati ( ); c) Sijawahi ( )

40. Je, ushawahi kumkaza mume mwenzako ambaye si mpenzi wako wa kila siku (*casual partner*) bila kutumia mpira wa kondomu?

a) Wakati mwingine (*Sometimes*) ( ); b) Kila wakati ( ); c) Sijawahi ( )

41. Je, ushawahi kukazwa na mume mwenzako ambaye si mpenzi wako wa kila siku (*casual partner*) bila kutumia mpira wa kondomu?

a) Wakati mwingine (*Sometimes*) ( ); b) Kila wakati ( ); c) Sijawahi ( )

42. Ushawahi kufanya ngono na mwanamke bila kutumia mpira wa kondomu

a) Wakati mwingine (*Sometimes*) ( ); b) Kila wakati ( ); c) Sijawahi ( )

43. Kondomu ishawahi kupasuka wakati wa kufanya ngono?

a) Mara moja ( ); b) Zaidi ya mara moja ( ); c) Haijawahi tokea ( )

44. Ulianza kunywa pombe ukiwa na umri gani?

a) Chini ya miaka 18 ( ); b) 19-29 ( ); c) 30-40 ( ); d) 41-51( );

e) Zaidi ya miaka 52 ( ); f) Sijawahi ( )

45. Kwa nini ulianza kunywa pombe?

a) Msukumo kutoka kwa rika langu ( );

b) Msukumo wa watu wasio wa rika langu ( ); c) Udadisi ( ); d) Sina jibu ( )

46. Ushawahi kufanya ngono na mume mwenzako ukiwa umelewa pombe ?

a) Mara moja ( ); b) Zaidi ya mara moja ( ); c) Kila wakati ( );

d) Sijawahi ( )

47. Je, ushawahi kulewa pombe ndio uweze kufanya mapenzi kwa ustadi?

a) Mara moja ( ); b) Wakati mwengine ( ); c) Kila wakati ( ); d) Sijawahi ( )

48. Je huwa unakunywa chupa ngapi za pombe kila siku?

a) Chupa 1-2 ( ); b) Zaidi ya chupa 3 ( );

c) Wakati mwingine (*occasionally*) ( ); d) Sijawahi ( )

49. Je ushawahi kutumia dawa za kulevya kabla ya kufanya ngono na mwanaume mwenzako?

a) Mara moja ( ); b) Wakati mwengine ( ); c) Kila wakati ( ); d) Sijawahi ( )

50. Kwa nini uliamua uanze kutumia dawa za kulevya?

a) Msukumo kutoka kwa rika langu ( );

b) Msukumo wa watu wasio wa rika langu ( ); c) Udadisi ( ); d) Sina jibu ( )

51. Ushawahitumia dawa za kulevya zipi kwa muda wa miezi sita iliyopita?

a) Marijuana Ndio ( ); La ( ); b) Cocaine Ndio ( ) La ( );

c) Club drugs Ndio ( ); La ( ); d) Viagra Ndio ( ); La ( );

e) Prescription drugs Ndio ( ); La ( ); f) Methamphetamine Ndio ( ); La ( ); g) Muguka ( ); h) Miraa ( ); i) Nyinginezo Ndio ( ); La ( ); j) Sijawahi

52. Mara ngapi umejidunga sindano na dawa ambazo hujaandikwa na daktari mwezi moja uliopita?

a) Kila Siku ( ); b) 1 au 2 kwa wiki ( ); c) Mara 3-4 kwa wiki ( );

d) Mara nyingi ( ); e) Sina jibu ( ); f) Sijawahi

53. Je, ushawahi kutumia dawa za kulevya ndio uweze kufanya mapenzi kwa ustadi?

a) Mara moja ( ); b) Wakati mwengine ( ); c) Kila wakati ( ); d) Sijawahi ( )

54. Ushamwambia mtu yeyote kuwa unaishi na virusi vya HIV

a) Ndio ( ); b) La ( ); c) Sina jibu( )

55. Ushamwambia mtu yeyote ngono ambayo unapendelea ?

a) Ndio ( ); b) La ( ); c) Sina jibu( )

56. Ushawahi kushambuliwa kwa sababu ya jinsia yako?

a) Kwa maneno Ndio ( ); La ( ); b) Kwa kupigwa Ndio ( ); La ( );

c) Kimapenzi Ndio ( ); La ( ); d) Sina Jibu ( )

57. Je, ushawahi kukataliwa na;

a) Familia Ndio ( ) La ( ); b) Marafiki Ndio ( ) La( );

c) Jamii Ndio( ) La( ); d) Wenzako Ndio ( ) La( ); e) Sina jibu

58. Je ushawahi kunyimwa nafasi ya kufanya biashara, masomo au kazi kwa sababu ya jinsia yako?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

59. Je, ushawahi kuhisi yafuatayo baada ya kufanya ngono na mwanaume mwenzako?

a) Kutokwa na damu kwenye mkundu ( );

b) Vidonda kwenye uume au mkundu ( ); c) Chunjua (warts) za mkundu ( );

d) Uchafu kutoka katika njia ya mkojo ( )

60. Je, waweza kushiriki kwenye mambo ya kidini bila pingamizi lolote? a) Ndio ( ); b) La ( ); c) Sina jibu( )

SEHEMU IV: MFUMO WA AFYA

61. Huwa watembelea kituo kitu kipi cha afya kupata huduma?

a) Hospitali za umma ( ); b) Hospitali au cliniki ya kibinafsi ( )

62. Kituo kipi cha afya kinatoa hudumu bora kwa waume wafanyao ngono na waume wenzao?

a) Hospitali za umma ( ); b) Hospitali au cliniki ya kibinafsi ( )

63. Kuna uwezekano wa waume wafanyao ngono na waume wenzao kuhisi kutengwa wanapokuwa wakitafuta huduma ya afya katika hospital za umma?

a) Ndio ( ); b) La( ); c) Sina jibu ( )

64. Je, wadhani wahudumu wa afya wanauwezo wa kuwahudumia waume wafanyao ngono na waume wenzao?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

65. Je, wahudumu wa afya wanawachangamkia *(friendly)* waume wafanyao ngono na waume wenzao?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

66. Ulichukuwa muda gani kufika katika kituo cha afya ambacho kinatoa huduma za HIV?

a) Dakika kadhaa ( ); b) Masaa kadhaa ( )

67. Je, masaa ya kufanya kazi yanaridhisha ?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

68. Ushawahi kunyimwa huduma za HIV kwa sababu ya jinsia yako?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

69. Je, ulipatiwa ushauri nasaha kabla na baada ya kupimwa virusi vya UKIMWI?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

70. Je, wahudumu wa afya walikushauri vile unaweza kufichua kuwa unaishi na virusi vya UKIMWI *(disclose your HIV status)*?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )
b)

71. Je, mhudumu wa afya alikushauri kuhusu dawa za kupunguza makali ya UKIMWI ARVs/ PEP/PrEP?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

72. Waamini kuwa wahudumu wa afya wamekuwa wakiweka siri kabla na baada ya kupimwa virusi vya UKIMWI na hawafichui majibu haya kwa mtu ambaye hafanyi kazi katika kituo hicho cha afya?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

73. Je, waume wanaofanya ngono na waume wenzao ambao wanaishi na virusi vya UKIMWI wana haki ya kupewa huduma bora ya afya kama watu wengine?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

74. Je, ushawahi kupata ufadhili wa chakula, pesa, kihemko (*emotional)* au wa kijamii kutoka kwa serikali au mashirika yasiyo ya kiserikari ambayo yanashughulikia UKIMWI?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

Je, ushawahi regeshwa nyumbani kwa vile kituo cha afya hakina vifaa vya kupima virusi vya UKIMWI au dawa za ARVs?

a) HIV test Kit or reagent Ndio( ); La( ); b) ARVs Ndio ( ); La ( );

c) PEP/PrEP Ndio ( ), La ( )

SEHEMU V: MATOKEO BAADA YA KUTUMIWA DAWA ZA KUPUNGUZA MAKALI VIRUSI VYA HIV

75. Je, wajua sheria ambazo zinawanyanyasa watu wanaofanya mapenzi na jinsia moja?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

76. Je, hizi sheria zaweza kuzuia waume ambao wanafanya ngono na waume wenzao wasipate huduma za HIV?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

77. Je, wahudumu wa afya wamekuhamasisha kuhusu UKIMWI, jinsi unavyosambaa na vile waweza kudhibitiwa?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

78. Inachukua muda gani kuhudumiwa katika kituo cha afya?

a) Chini ya dakika 30 ( ); b) Saa moja ( ); c) Masaa mawili ( );

d) Zaidi ya masaa mawili ( )

79. Je, waume wanaofanya ngono na waume wenzao wanachunguzwa na kutibiwa magonjwa ya zinaa na magonjwa mengine tegemezi?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

80. Je, waweza kukubali kupewa huduma za afya na mtu ambaye unamfahamu?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

81. Baada ya kupimwa HIV muhudumu wa afya alikuhudumiaje?

Alikuelekeza katika kituo cha afya ili upewe;

a) ARVs Ndio ( ); La ( ); b) PEP/PrEP Ndio ( ); La ( ); c) Sina jibu

82. Je, ushawahi kukosa kumeza dawa za ARVs/ PEP/PrEP kwa sababu ya kukosa chakula mwezi mmoja uliopita?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

83. Je, kuna mtu ambaye hukukumbusha kumeza dawa za ARVs/ PEP/PrEP?

a) Ndio ( ); b) La ( ); c) Sina jibu ( )

84. Je, ushajiunga na kikundi ambacho kinawasaidia waume wanaofanya ngono na waume wenzao?

a) Ndio ( ); b) La ( ); c) Sina Jibu ( )
b)

85. Je, kuna lazima ya mtu ambaye amepatikana na virusi vya UKIMWI amfichulie mtu yeyote siri hii?

a) Ndio ( ); b) La( ); c) Sina Jibu ( )

86. Je, wajua kama mpenzi wako wa kiume wa hivi karibuni amepimwa virusi vya UKIMWI?

a) Ndio ( ); b) La ( ); c) Sijui ( )

87. Afya yako imeimarika baada ya kuanza kutumia dawa za ARVs/ PEP/PrEP?

a) Ndio ( ); b) La ( ); c) Sina Jibu ( )

88. Je, wakati ulianza kutumia dawa za ARVs/ PEP/PrEP ulijihisi kuwa umekuwa mgonjwa zaidi?

a) Ndio ( ); b) La ( ); c) Sina Jibu ( )

89. Je, kwa nini humezi dawa za ARVs/ PEP/PrEP kama ulivyoagizwa na mhudumu wa afya?

a) Nilisahau siku ya kuja kujaliza dawa ( ); b) Sikuwa na usafiri ( );

c) Nilijihisi niko sawa ( ); d) Nilikuwa nimetumia pombe ( );

e) Nilikuwa nimetumia madawa ya kulevya ( ); f) Sina jibu

90. Je ni mara ngapi umekuwa mgonjwa au umelazwa hospitalini?

a) Mara moja ( ); b) Zaidi ya mara moja ( ); c) Mara nyingi ( );

d) Sikumbuki ( ); e) Sina jibu

91. Ni vigumu kukumbuka kumeza dawa za ARVs/ PEP/PrEP?kila siku. Mara ngapi umesahau kumeza dawa hizi?

a) Mara moja kwa wiki ( ); b) Mara mbili kwa wiki ( );

c) Mara tatu kwa wiki ( ); d) Zaidi ya mara tatu kwa wiki ( ); e) Sina jibu

AppendixV: JKUAT Approval Letter

JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY
OFFICE OF THE DIRECTOR - MOMBASA CAMPUS P.O Box 81310 – 80100, Mombasa. Tel: +254 735 628 272, 041 2315434 E-mail:director-mombasa@jkuat.ac.ke

24/09/2020

TO WHOM IT MAY CONCERN

SUBJECT: JANE WANGUI KARANJA REG.NO.HSH411-C005-2689/2017

RE: COLLECTION OF DATA

The above named is a Doctor of Philosophy Science in Public Health student in this campus. she is currently carrying out research on the topic: **Correlates of HIV Infection Among Men Who Have Sex With Men In Mvita, Mombasa County** as per her attached proposal.

Kindly allow her into your organization to collect relevant data that we believe will go a long way in helping her to meet the objectives of her study.

Yours faithfully,

24 SEP 2020

MARY KERICH
C.O.D. Public Health

Setting Trends in Higher Education, Research, Innovation and Entrepreneurship

Appendix VI: Research Certificate -NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **317940**

Date of Issue: **13/November/2020**

RESEARCH LICENSE

This is to Certify that Ms.. JANE WANGUI KARANJA of Jomo Kenyatta University of Agriculture and Technology, has been licensed to conduct research in Mombasa on the topic: Correlates of HIV infection among men who have sex with men in Mvita, Mombasa County, Kenya for the period ending : 13/November/2021.

License No: **BAHAMAS ABS/P/20/7648**

317940

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 VII: Certificate of Ethical Approval

NACOSTI ACCREDITED

ERC/PhD/007/2020

Pwani UNIVERSITY

ETHICS REVIEW COMMITTEE

ACCREDITTED BY THE NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION (NACOSTI, KENYA)

CERTIFICATE OF ETHICAL APPROVAL

THIS IS TO CERTIFY THAT THE PROPOSAL SUBMITTED BY:

JANE W. KARANJA

REFERENCE NO:
ERC/PhD/007/2020

ENTITLED:
Correlates of HIV infection among men who have sex with men in Mvita, Mombasa County

TO BE UNDERTAKEN AT:
MOMBASA COUNT, KENYA

FOR THE PERIOD
FROM: 9/09/2020 TO: 8/09/2021

HAS BEEN **APPROVED** BY THE ETHICS REVIEW COMMITTEE

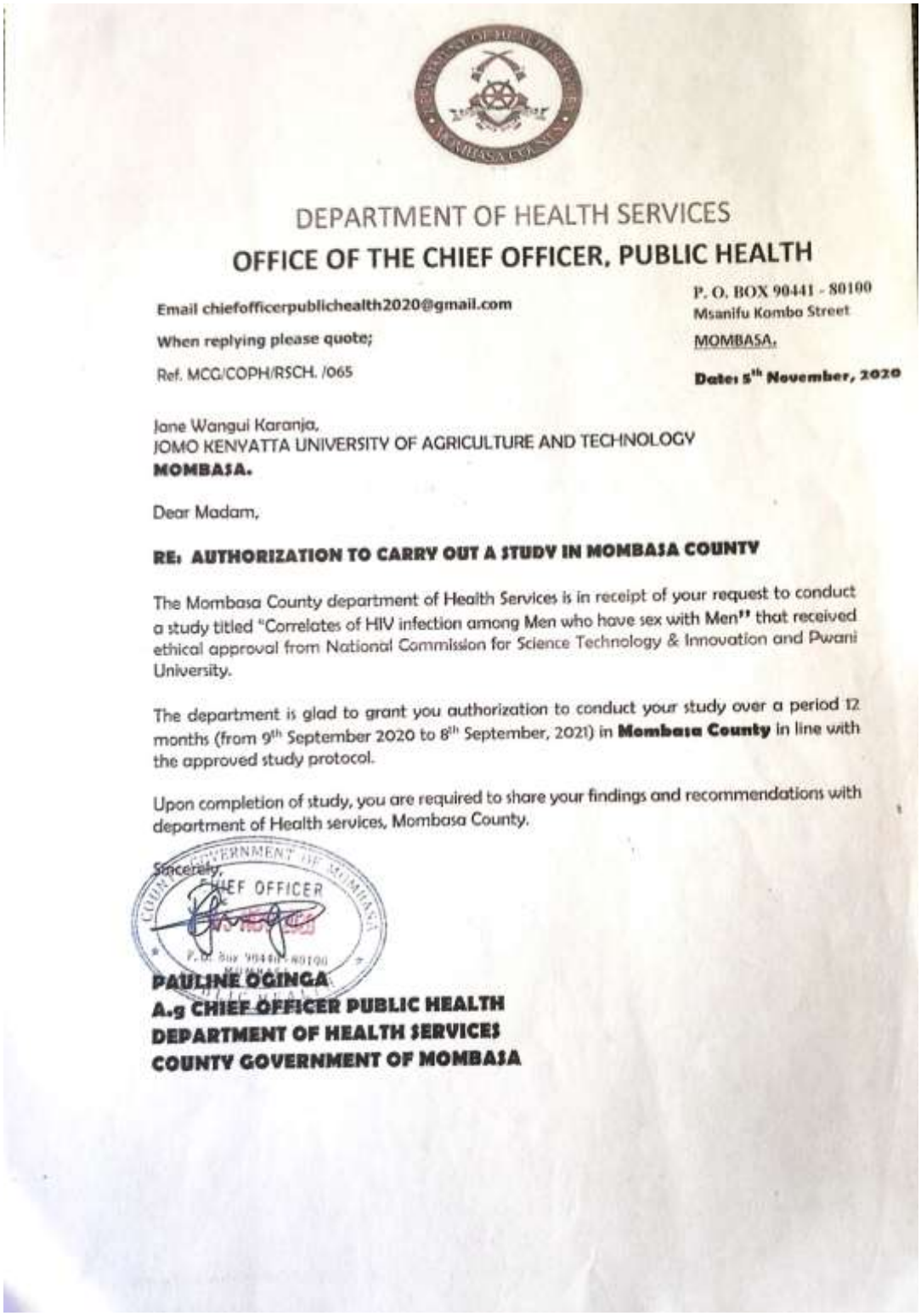
AT ITS SITTING HELD AT PWANI UNIVERSITY, KENYA

ON THE 8/09/2020

CHAIRMAN	SECRETARY	LAY MEMEBER

Pwani UNIVERSITY
Ethics Review Committee,
Pwani University, www.pu.ac.ke, email: t.rewer@pu.ac.ke, t.ndisa@pu.ac.ke tell: 0719 182218, 0720785791
The ERC, Giving Integrity to Research for Sustainable Development

Appendix VIII: Authorisation Letter from Mombasa County



DEPARTMENT OF HEALTH SERVICES

OFFICE OF THE CHIEF OFFICER, PUBLIC HEALTH

Email chiefofficerpublichealth2020@gmail.com

When replying please quote;

Ref. MCG/COPH/RSCH. /065

P. O. BOX 90441 - 80100
Msanifu Kombo Street
MOMBASA.

Date: 5th November, 2020

Jane Wangui Karanja,
JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
MOMBASA.

Dear Madam,

RE: AUTHORIZATION TO CARRY OUT A STUDY IN MOMBASA COUNTY

The Mombasa County department of Health Services is in receipt of your request to conduct a study titled "Correlates of HIV infection among Men who have sex with Men" that received ethical approval from National Commission for Science Technology & Innovation and Pwani University.

The department is glad to grant you authorization to conduct your study over a period 12 months (from 9th September 2020 to 8th September, 2021) in **Mombasa County** in line with the approved study protocol.

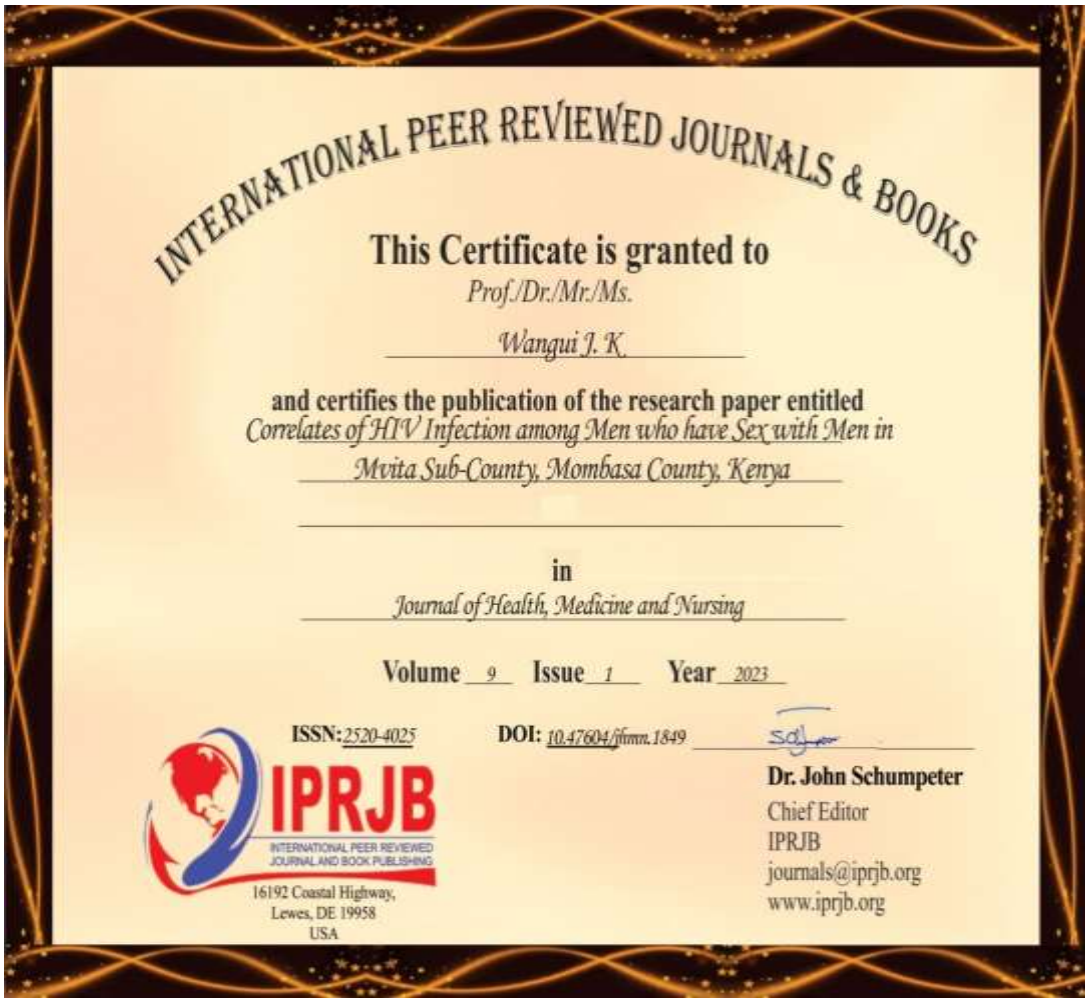
Upon completion of study, you are required to share your findings and recommendations with department of Health services, Mombasa County.

Sincerely,

CHIEF OFFICER

PAULINE OGINGA
A.g CHIEF OFFICER PUBLIC HEALTH
DEPARTMENT OF HEALTH SERVICES
COUNTY GOVERNMENT OF MOMBASA

Appendix IX: 1st Publication



INTERNATIONAL PEER REVIEWED JOURNALS & BOOKS

This Certificate is granted to

Prof./Dr./Mr./Ms.

Wangui J. K.

and certifies the publication of the research paper entitled

Correlates of HIV Infection among Men who have Sex with Men in Mvita Sub-County, Mombasa County, Kenya

in

Journal of Health, Medicine and Nursing

Volume 9 Issue 1 Year 2023

ISSN: 2520-4025 DOI: 10.47604/jhmn.1849

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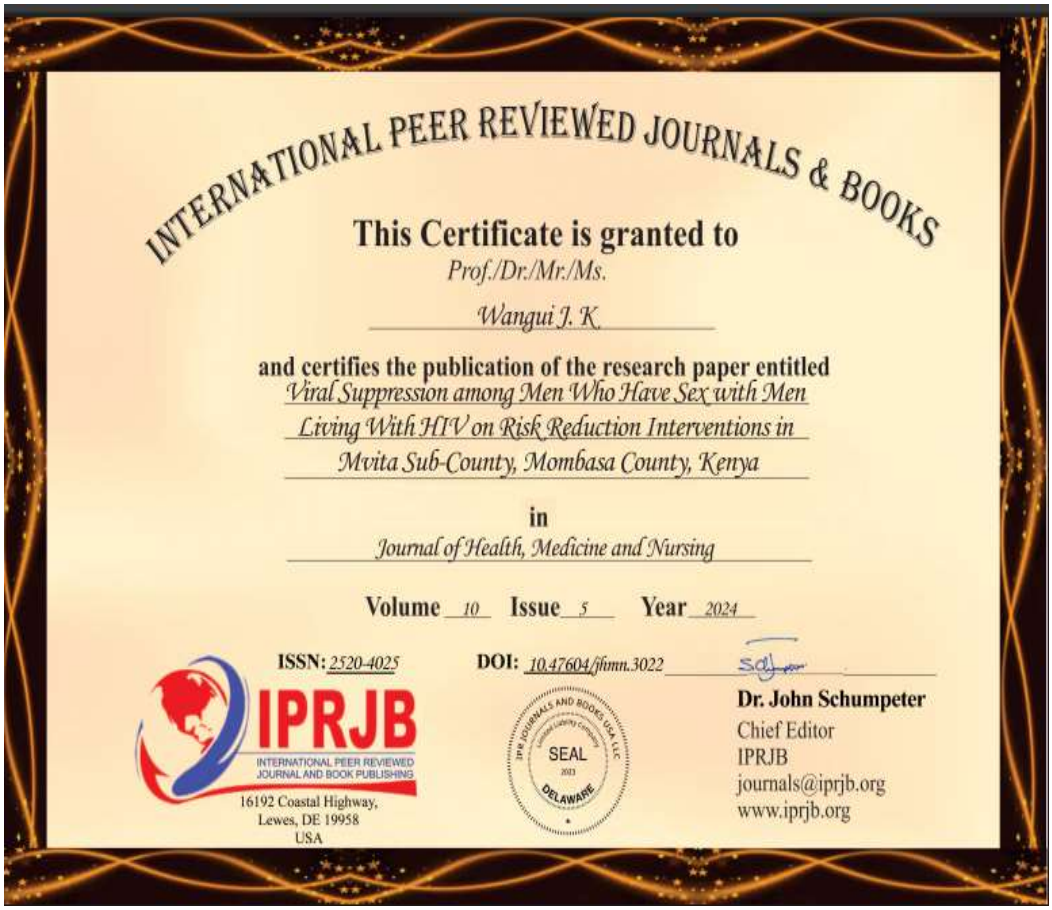
Appendix X: 2nd Publication



INTERNATIONAL PEER REVIEWED JOURNALS & BOOKS

This Certificate is granted to

Prof./Dr./Mr./Ms.

Wangui J. K.

and certifies the publication of the research paper entitled

Viral Suppression among Men Who Have Sex with Men Living With HIV on Risk Reduction Interventions in Mvita Sub-County, Mombasa County, Kenya

in

Journal of Health, Medicine and Nursing

Volume 10 Issue 5 Year 2024

ISSN: 2520-4025 DOI: 10.47604/jhmn.3022

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Appendix XI: Risk Reduction Interventions

Adherence to ART

- Taking your ART at the right time
- Following advice to take with or without food
- Avoiding any drug interactions
- Availability of ARVs
- Presence of a buddy
- Joining a support group

General counseling

- Importance of consent being sought by the healthcare workers
- Maintenance of confidentiality and privacy by healthcare workers
- Importance of receiving correct test results and connection to HIV prevention, treatment and care
- Nutritional care
- Disclosure of HIV status or sexuality
- Discordant couple
- Importance of regular laboratory tests in monitoring progress
- Importance of exercises, sleep
- Prompt screening for any opportunistic infection (O.I)

HIV preventive measures

Reduce the risk of HIV infection

- Condom use-correctly & consistently
- Alcohol & drugs use
- Multiple sex partners
- Voluntary medical male circumcision
- Use of sterile needles and syringes
- Prompt treatment of STI
- Use of PEP/PrEP