

**FACTORS ASSOCIATED WITH HIV STATUS  
DISCLOSURE AMONG INDIVIDUALS IN A SERO-  
DISCORDANT RELATIONSHIP AT THE DEFENCE  
FORCES MEMORIAL HOSPITAL IN NAIROBI, KENYA**

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**Factors Associated with HIV Status Disclosure among Individuals in  
a Sero-Discordant Relationship at the Defence Forces Memorial  
Hospital in Nairobi, Kenya**

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**A Thesis Submitted in Partial Fulfillment of the Requirements for  
the Degree of Master of Science in Public Health of the Jomo  
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## DECLARATION

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

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## **DEDICATION**

I dedicate this thesis to my wife Fatuma Dida and my children Levin, Adeel and Nadia for their encouragement and support that they have accorded me during my studies.

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## ABBREVIATIONS AND ACRONYMS

<b>ABC</b>	Abstinence, Being faithful and Condom use strategy
<b>AIDS</b>	Acquired Immune Deficiency Syndrome
<b>aOR</b>	Adjusted Odds Ratio
<b>ART</b>	Anti-Retroviral Therapy
<b>ARVs</b>	Anti-Retro Virals
<b>CBI</b>	Community Based Interventions
<b>CCC</b>	Comprehensive Care Centre
<b>CHCT</b>	Couple HIV Counselling and Testing
<b>CI</b>	Confidence Interval
<b>COR</b>	Crudes Odds Ratio
<b>CVCT</b>	Couple Voluntary Counselling and Testing
<b>DFMH</b>	Defence Forces Memorial Hospital
<b>DOD</b>	Department of Defence
<b>ELISA</b>	Enzyme Linked Immunosorbent Assay
<b>ERC</b>	Ethics Research Committee
<b>f.c.f.</b>	Finite Population Correction Factor
<b>FGD</b>	Focus Group Discussion
<b>HIV</b>	Human Immunodeficiency Virus
<b>IPV</b>	Intimate Partner Violence
<b>ITROMID</b>	Institute of Tropical Medicine and Infectious Diseases
<b>JKUAT</b>	Jomo Kenyatta University of Agriculture & Technology

<b>KAIS</b>	Kenya AIDS Indicator Survey
<b>KEMRI</b>	Kenya Medical Research Institute
<b>KMoT</b>	Kenya Modes of Transmission
<b>KNASP</b>	Kenya National AIDS Strategic Plan
<b>KNH</b>	Kenyatta National Hospital
<b>MAC</b>	Medical Advisory Committee
<b>MS</b>	Microsoft
<b>NASCOP</b>	National AIDS and STI Control Program
<b>OR</b>	Odds Ratio
<b>PEP</b>	Post-Exposure Prophylaxis
<b>PLWA</b>	People Living with AIDS
<b>PLWHA</b>	People Living with HIV and AIDS
<b>PLWHIV</b>	People Living with HIV
<b>PMTCT</b>	Prevention of Mother to Child Transmission
<b>PrEP</b>	Pre-Exposure Prophylaxis
<b>p-Value</b>	Probability Value
<b>QOL</b>	Quality of Life
<b>SDG</b>	Sustainable Development Goals
<b>SDV</b>	Standard Deviation
<b>SPSS</b>	Statistical Package for Social Studies
<b>SRI</b>	Sexually Related Infections
<b>SSA</b>	Sub-Saharan Africa
<b>STD</b>	Sexually Transmitted Disease

<b>STI</b>	Sexually Transmitted Infection
<b>UN</b>	United Nations
<b>UNAID</b>	Joint United Nations Program on HIV and AIDS
<b>UNDPKO</b>	United Nations Department for Peacekeeping Operations
<b>UoN</b>	University of Nairobi
<b>USA</b>	United States of America
<b>USAF</b>	United States Air Force
<b>VCT</b>	Voluntary Counseling and Testing
<b>WHO</b>	World Health Organization
<b>WHO</b>	World Health Organization



## ABSTRACT

The Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome stigma is a great public health concern in Sub-Saharan Africa (SSA) where majority of the infections and deaths occur. Human Immunodeficiency Virus status disclosure is likely to improve HIV testing uptake, increase HIV care enrollment, treatment and support services, and reduce stigma and psycho-socio-economic challenges. The study objective was to determine the factors associated with HIV status disclosure among individuals in a HIV sero-discordant relationship at Defence Forces Memorial Hospital (DFMH). A descriptive cross-sectional study was conducted at DFMH-Nairobi. A semi-structured researcher-administered questionnaire was used to collect quantitative data while Focus Group Discussion (FGD) guide was used to collect qualitative data. The data was entered in Microsoft Access and exported to Statistical Package for Social Sciences (SPSS) and results analyzed using SPSS 21.0. Binary logistic regression analysis was used to measure the association between independent variables on HIV status disclosure. Level of significance was fixed at 0.05 ( $p=0.05$ ) with a 95% confidence interval. Majority (55.2%) of the 315 study participants were male with more than half (63.8%) being above 40 years while the rest (36.2%) were below 40 years old. Adjusting for other factors, there was a significant association between sex of the participant and HIV status disclosure. Females were 4.55 [95% CI: 1.92 - 10.33,  $p<0.001$ ] times more likely to disclose their status compared to their male counterparts. Participants with high HIV transmission knowledge were 4.19[95% CI: 1.65 - 8.16,  $p<0.001$ ] times more likely to disclose their HIV status compared to those with low HIV transmission knowledge. Participants with high HIV prevention knowledge were 7.10[95% CI: 2.79 - 12.47,  $p=0.014$ ] times more likely to disclose their HIV status compared to those with low HIV prevention knowledge. Participants who used a condom regularly during sexual intercourse were 4.09[95% CI: 1.52 - 7.25,  $p=0.002$ ] times more likely to disclose their HIV status compared to those who didn't use a condom with their partners. This study concludes that factors associated with HIV status disclosure among sero-discordant individuals included age, sex, region of duty station and period of stay in a station, HIV prevention and transmission knowledge, risky sexual practices to include condom use and alcohol abuse. Human Immunodeficiency Virus status disclosure is a key intervention that would minimize the transmission of the virus in turn reducing the incidence and prevalence of HIV. The study recommends that healthcare workers increase HIV prevention interventions with emphasis on age, sex, region of duty station and period of stay in a station in addition to increasing awareness on the need for consistent and correct condom use and avoidance of sexual intercourse with multiple partners.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background Information

The Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) remains a major public health concern with the Sub-Saharan Africa (SSA) region as the home to almost 70% of all HIV infected. In Sub-Saharan Africa, a significant proportion of new HIV infections occur within cohabiting individuals (Guthrie *et al.*, 2007) and married HIV-discordant individuals (Matovu, 2010). However, a Uganda study showed that long marital duration was associated with reduced risk of HIV infection (Nabukenya *et al.*, 2020). A longitudinal study on HIV-1 transmission within marriage in Rural Uganda showed that 10.5% of the study participants were HIV sero-discordant (Biraro *et al.*, 2013). These relatively high rates of HIV infection among sero-discordant individuals is supported by findings from other studies in Rwanda and Zambia showing that about 55-93% of new heterosexually acquired HIV infections occurred within stable partnerships (Chemaitelly *et al.*, 2013; Dunkle *et al.*, 2008). Eastern and Southern African sites reported an estimated 12% and 18% HIV-1 discordance, respectively, with 15% HIV-1 discordance found across the whole study (Lingappa *et al.*, 2008).

Statistics from the Joint United Nations Program on HIV and AIDS (UNAIDS) Report of 2013 indicate that HIV infection is still a major public health concern with approximately 35.8 (32.2-38.8) million people infected globally, 2.3 (1.9-2.7) million newly infected and an estimated 1.6 million people dead due to AIDS-related illnesses by 2012. Further, findings show that SSA accounts for the greater burden of new infections at 70% of the global statistics. It is therefore evident that SSA continues to have the largest number of people living with HIV. This HIV burden in the SSA region has a direct effect on the number of persons living in HIV sero-discordant relationships. Studies from the region show that between 30-50% of married HIV infected individuals have an HIV uninfected partner, with new cases of HIV infection increasingly occurring among these relationships (Bunnell & Cherutich, 2008; de Walque, 2007; Wendo, 2009). According to the Kenya AIDS

Indicator Survey (KAIS) Preliminary Report of 2012, 5% of those individuals where both partners had HIV test results had a sero-discordant status which corresponded to an estimated 260,000 individuals. The statistics were lower compared to the KAIS report of 2007 that indicated the percentage of sero-discordant individuals at 6%.

An ecological analysis on HIV and AIDS in African militaries clearly indicated that the prevalence rates in most of these militaries are significantly elevated compared to their host communities (Ba *et al.*, 2008). Peacekeeping operations worldwide tend to exacerbate the spread of HIV whereby peacekeepers could be a source of infection to the local populations or be infected by them in turn, becoming a possible source of infection when they return home. This is supported by evidence of a study in 2001 that reported the HIV infection rate among Nigerian peacekeepers who returned home from duty in Sierra Leone and Liberia in 2000 to be 11%, when the rate in the civilian adult population in Nigeria was 5% (Obasi, 2006). This is a clear indication that the military plays a significant role in the spread of HIV among its personnel and to the general population. This could lead to an increased risk of infection to partners of military personnel and in turn an increase in number of HIV sero-discordant individuals. In the Kenyan military, HIV sero-discordant individuals face unique challenges due to the working environment. According to the UNAIDS series about engaging uniformed services in the fight against AIDS, one-third of the officers and soldiers from various nationalities under United Nations (UN) command were stationed in Africa, which is home to about 70% of people living with HIV (UNAIDS, 2003). The series further stated that conflict and post-conflict situations represent high-risk environments for the spread of HIV/AIDS.

## **1.2 Statement of the Problem**

In Kenya it is estimated that of all the HIV infected adults, only 16% correctly know their HIV status and 500,000 People Living with HIV (PLHIV) are currently enrolled and on follow-up in HIV care programs in the country with 200,000 of them on Anti-Retroviral Therapy (ART) (National AIDS and STI Control Program (NASCO), 2008). The HIV pandemic is a universal burden and a significant public health concern. It is difficult to determine the true extent of sero-discordance, although it is

acknowledged to be substantial and has been increasing in the recent years. Findings from a study in Kenya pointed to new patterns of infections, with a significant proportion of new infections arising from casual heterosexual sex and steady partners (Kenya Modes of Transmission (KMoT), 2009). The HIV status disclosure by PLHIV is a key pillar in “Prevention with Positives” due to increase in HIV awareness that aims to improve quality of life for those infected and reduce HIV transmission.

Previous studies on disclosure in Kenya have focused on females only (Farquhar *et al.*, 2000; Gaillard *et al.*, 2000) and for those that focused on both males and females, the approach used was qualitative and the sample size small (Neville & Rubin, 2007). The magnitude of HIV sero-discordance and HIV status disclosure within the Kenyan military hasn't been documented. However, the burden of HIV sero-discordance cannot be underestimated with Sub-Saharan region having high numbers of individuals living in sero-discordance relationship. It was concluded that there was a large number of sero-discordant relationships which supported the argument for incorporating couples' HIV testing and prevention into ART programs (Espino *et al.*, 2010). This therefore further underscores the magnitude of the HIV sero-discordance challenge in the region. Knowledge about the transmission, risky behaviour practices and poor attitudes portrayed amongst HIV sero-discordant individuals need to be explored. The limited information among HIV discordant couples is a major barrier to developing effective interventions. Such strategies can support positive behaviour and attitudes such as increased condom use, decreased unsafe sexual behaviour and decision making in relevant issues with regard to HIV prevention. Findings from this study will guide the formulation of policies for the HIV discordant couples in Kenya.

### **1.3 Study Justification**

The Sustainable Development Goal (SDG) 3, specifically Goal 3.3 aims to end HIV epidemic by 2030. In line with this, one of the four impact results by the Kenyan government that was to be achieved by the year 2013 was to reduce the number of new infections by at least 50% (Kenya National AIDS Strategic Plan (KNASP) III, 2009). Human Immunodeficiency Virus status disclosure, especially to sexual

partners is crucial but neglected yet it is a prevention standpoint in social support systems to help the partners avoid getting infected or re-infected, stigma and risk reduction.

Despite having limited data on HIV sero-discordance, there is also limited knowledge on how to deal with 'discordance'. Additionally, the HIV negative partner within the discordant couple is at an ever increasing risk of acquiring HIV infection from the HIV positive partner further compounding the situation. Human Immunodeficiency Virus status disclosure leads HIV testing of sexual partners and children and enables enrollment, access to care, treatment and support. The challenges faced by clients include acceptability, condoms use, family planning, sexuality, stigma and discrimination, cultural and economic aspect. Human Immunodeficiency Virus status disclosure can improve treatment outcomes resulting in better quality of life for the patients (Adam *et al.*, 2003; Waddell & Messeri, 2006). Better adherence to therapy delays onset of drug resistance. Risky sexual behaviors coupled with HIV status non-disclosure among sero-discordant individuals could further lead to the spread of the infection. Understanding reasons for or against disclosure and challenges faced by patients during disclosure will help the HIV prevention, care, treatment and support.

This study therefore seeks to provide evidence based data to policy makers to improve preventive strategies (HIV status disclosure included), care and management and further minimize the spread of HIV among military personnel and to the civilian population in general.

#### **1.4 Null Hypothesis**

There is no association between HIV status disclosure and socio-demographic characteristics, knowledge level on HIV and risky sexual behaviors among HIV sero-discordant individuals at DFMH.

## **1.5 Research Questions**

1. What are the socio-demographic factors associated with HIV status disclosure among sero-discordant individuals at the Defence Forces Memorial Hospital (DFMH)?
2. What is the level of knowledge on HIV among sero-discordant individuals at the Defence Forces Memorial Hospital (DFMH)?
3. What are the risky sexual behaviours associated with HIV status disclosure among HIV sero-discordant individuals attending Defence Forces Memorial Hospital (DFMH)?

## **1.6 Objectives**

### **1.6.1 General Objective**

To determine the factors associated with HIV status disclosure among individuals in a HIV sero-discordant relationship at the Defence Forces Memorial Hospital (DFMH).

### **1.6.2 Specific Objectives**

1. To establish the socio-demographic characteristics among sero-discordant individuals at the Defence Forces Memorial Hospital (DFMH).
2. To establish the level of knowledge on HIV among sero-discordant individuals at the Defence Forces Memorial Hospital (DFMH).
3. To determine risky sexual behaviours associated with HIV disclosure among HIV sero-discordant individuals attending the Defence Forces Memorial Hospital (DFMH).

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Background

Living in a sero-discordant relationship where one partner is HIV positive and the other is HIV negative presents them with challenges that affect their coping strategies. These relationships pose unique challenges both to the healthcare providers and the clients mainly because of the high risk of transmission of the virus to the HIV negative partner. In developing countries, this special group is increasingly being recognized as a priority for HIV prevention (UNAIDS, 2013).

Research findings from a study done in Kenya showed some of the coping strategies used by the individuals included abstinence (9%), condom use (74%), sleeping facing opposite sides in bed or separation of beds (11%) and living apart (Gitonga *et al.*, 2012).

The questions that abound in the individuals mind include disclosure of their status to their partner, the status of the partner, their sexual relationship, their fate in terms of child bearing, infant feeding options, longevity, duration of treatment, their relationship with friends, among others. Research findings from studies have shown that HIV sero-discordant individuals are faced with fear of HIV transmission, coping with uncertainty of potential illness, shifts in emotional intimacy, dilemmas regarding their reproductive health, stigma, negotiation for sexual relations among others (Beckerman, 2002; Bunnell *et al.*, 2005; Hailemariam *et al.*, 2012; Van Der Straten *et al.*, 1998).

Human Immunodeficiency Virus has for long been associated with stigma and discrimination compounded by the fact that it is a disease that lacks a cure. Subsequent psychological issues include accusations of unfaithfulness on the HIV positive partner by the HIV negative partner, issues of safe sex, child bearing and fear of transmitting infection to the negative partner and rejection by the partner. The challenges lead to separation or divorce, financial strain on the family resources due

to the chronic nature of the disease especially when the partner is unable to do his/her normal duties among others (Hailemariam *et al.*, 2012).

The military population is often considered a special at-risk group in regard to HIV transmission. Newly diagnosed HIV infections among servicemembers tested (also called the seroprevalence rate) was 23 per 100,000 in 2017, a lower rate than that of the general U.S. population (Okulicz *et al.*, 2017). The nature of duty in this occupation predisposes military personnel and their partners to contracting HIV from the possibility of engaging in sexual intercourse with other partners while away from family or partner, drugs and substance use/abuse, non-disclosure of HIV status, unprotected sexual intercourse, among others. A brief report in USA showed that in the HIV risk period, male soldiers commonly reported male–male sexual contact, civilian partners, online partner-seeking, unprotected anal sex, and expressed surprise at having a positive HIV result (Hakre *et al.*, 2015).

## **2.2 Burden of Human Immunodeficiency Virus Sero-discordance**

Sub-Saharan Africa accounts for the greater burden of HIV infections globally many of whom are in HIV sero-discordant relationships (Guthrie *et al.*, 2007; UNAIDS, 2013). Statistics further indicate that the rates of HIV sero-discordance range from 3% to 20% in the general population, and higher rates of 20% to 35% found in studies of those presenting to Voluntary Counseling and Testing (VCT) services (N’Gbichi *et al.*, 1995). In Kenya, about 11% of individuals were living with HIV and among married individuals who were HIV-infected, 45% had a partner who was not infected (Kenya HIV Prevention Response and Modes of Transmission Analysis, 2009). The high rate of HIV sero-discordance is a concern within the public health sector. However, results of a study in South Western Ethiopia showed that the prevalence of HIV sero-discordance was 8.4% in which male and female discordance accounted for 5.8% and 2.6%, respectively (Habte *et al.*, 2015). The male gender might be the most affected in terms of being HIV positive in most heterosexual relationships. This is supported by evidence from studies showing that there was low condom use by men, a greater burden of sexually transmitted infections (STI), male dominance in sex-related negotiations, greater number of sexual partners (including



polygamous marriages), more frequent alcohol consumption, transactional sex, intergenerational sex and gifts for sex (Dunkle *et al.*, 2004; Nattrass, 2006). The genetic sequencing of incident HIV infections in almost 600 HIV sero-discordant individuals in Zambia and Rwanda, confirmed that 79% of new infections were acquired from the partner whereby 75% of sero-conversions that occurred in men and 84% of sero-conversions that occurred in women (Dunkle *et al.*, 2008).

### **2.3 Psychosocial Factors**

Human Immunodeficiency Virus sero-discordance poses a threat to the psychosocial wellbeing of the individuals due to the terminal nature of the disease also associated with stigma and discrimination. The psychosocial dimension is a combination of psychological and social components that deal with the emotional well-being, behavior and interactions within the society (Wright, 2000). The knowledge about one's HIV status can lead to psychological trauma as an individual thinks about; "How did it happen?; How possible is it?; and Is there an element of unfaithfulness?" among others. Human Immunodeficiency Virus sero-discordant relationships are often riddled by stress, anxiety, fear and concern leading to separation (Cichocki, 2007). Findings from a study reported that the HIV positive partners constantly fear and are stressed about separation from their HIV-negative partners and this is a challenge dealing with HIV sero-discordance (Dano, 2007; Bravo *et al.*, 2010).

Disclosure of one's HIV status has enhanced the management of HIV clients due to uptake of preventive measures. Disclosure of HIV status to potential and current sex partners by HIV-positive people has received a significant amount of attention. The disclosure experiences lead to "identity impacts" that included identity challenges (i.e. interactions that challenge an individual's self-concept as a "normal" or non-deviant individual); and identity transformations (this implies the processes whereby an individual comes to embrace a new identity and reject behaviors and values of an old one, resulting in the conscious adoption of a social and/or public identity as an HIV-positive individual (Frye *et al.*, 2009).

The element of stigmatization can impact negatively on disclosure by HIV positive persons since there is fear associated with quality of life uncertainties. Study findings

have shown that stigma has a serious negative effect on the disclosure of one's HIV status and in turn the management and prevention of HIV transmission (Pulerwitz *et al.*, 2008; Wolitski *et al.*, 2009). The findings of a study in South India showed that 97% of the participants voiced stigmatization and this implied an association between stigma and disclosure of one's HIV status (Subramanian *et al.*, 2009; Thomas *et al.*, 2005). The belief of overestimating the effectiveness of antiretroviral therapies (ART) lead to lack of disclosure hence failure to identify HIV sero-discordant individuals (Loubiere *et al.*, 2009). Findings from a study in South India indicated an association between stigma, depression and quality of life (Charles *et al.*, 2012). Research findings from a study in Uganda indicated that marital status; use of anti-retro viral (ARVs); death of his/her child; being sexually active in the previous 6 months; and number of sexual partners to be associated with non-disclosure with fear of stigma as the main reason (Osinde *et al.*, 2012).

The choice of the best and safe sex practices could be difficult for sero-discordant due to desire to procreate and the need to fulfil their conjugal rights. Findings from a study done in Uganda showed that HIV sero-discordant individuals face a problem with risk of HIV transmission to partner and child, lack of negotiating power for safer sex (Beyeza-Kashesya *et al.*, 2009). Findings from studies showed that risky sexual behaviours was high among steady heterosexual partners either HIV negative or of unknown HIV status (Bouhnik *et al.*, 2008; Dia, *et al.*, 2010). Further, findings from a study in Alabama revealed that psychosocial health problems were significant predictors of HIV and AIDS risky behaviors in People Living with AIDS (PLWA) (Gerbi *et al.*, 2012).

The negative perception and attitudes of the general population towards patients suffering from HIV and AIDS can enhance the spread of the disease among those who are knowledgeable (Earnshaw *et al.*, 2012; Hossain & Kippax, 2011; Hosseinzadeh, Hossain, & Bazargan-Hejazi, 2012; Hosseinzadeha, Hossaina, & Niknamib, 2012; Kumar *et al.*, 2012; Lau & Tsui, 2005; Thanavanh *et al.*, 2013). A study in Nicaragua showed that females, rural residents, people with insufficient HIV-related transmission knowledge, those that had not been tested for HIV, those who reported an elevated self-perception of HIV risk, and those who were unwilling

to disclose their HIV status were associated with higher stigmatizing attitudes and higher discriminatory actions towards HIV-positive people (Ugarte *et al.*, 2013). Another study in South Africa showed that there was an association between HIV and AIDS-related stigma and HIV testing (Mall *et al.*, 2013). Interventions to reduce stigma among the discordant individuals would greatly influence choices to access HIV testing and its benefits.

#### **2.4 Socio-economic Factors**

Human Immunodeficiency Virus infection has brought about many socio-economic challenges to the HIV negative partner and relatives of the infected. The stress brought about by the economic burden of HIV on either HIV sero-concordant or sero-discordant individuals may not be shared evenly among the partners (de Walque, 2007; Rispel *et al.*, 2012). The financial strain on families could result to stress, separation, stigmatization, discrimination and isolation among others. The studies conducted in Thailand showed that female participants had higher levels of depressive symptoms related to fears about the economic future (Li *et al.*, 2012; Manopaiboon *et al.*, 1998).

The highest level of depressive symptoms occurred more in infected males than females because the men's illness could directly affect family productivity and income and in turn quality of life (Russell, 2004). Also the economic burden caused by HIV included financial difficulties and reduced family income (Krishna *et al.*, 2005; Manopaiboon *et al.*, 1998). The results from a study in Kolkata (India) found that prolonged duration and severity of disease can lead to loss of jobs, decreased family income, increased expenditure for care seeking and greater economic consequences reflected by selling of their assets (Taraphdar *et al.*, 2011).

#### **2.5 Sero-discordance and Risk of Human Immunodeficiency Virus Transmission**

The chances of transmitting HIV in a sero-discordant relationship are likely to be high considering that the individuals may engage in unprotected sex regularly. Findings of a study showed that people in HIV sero-discordant relationships are at an

especially high risk of becoming infected (Hugonnet *et al.*, 2002). Research findings of another study in Southern India further showed that partners of HIV-infected index patients were at increased risk for HIV infection thereby requiring further preventive measures (Kumarasamy *et al.*, 2010a). Married individuals do not find any reason to use protected sex thereby increasing HIV transmission from the infected partner. Findings of a study in rural Uganda showed that HIV negative partners in sero-discordant individuals have a high incidence of HIV if the index partner is not on ART (Biraro *et al.*, 2013). There are various factors associated with increased chances of HIV transmission such as sex, non-disclosure, unprotected sexual intercourse and the presence of sexually transmitted infections (Dunkle *et al.*, 2008; Fideli *et al.*, 2001; Guthrie *et al.*, 2007; Kumarasamy *et al.*, 2010b; Marfatia *et al.*, 2013; Quinn *et al.*, 2000; Wawer *et al.*, 2005). Findings from a study in Zambia and Rwanda estimated that 55.1% to 92.7% of new heterosexually acquired HIV infections among adults occurred within sero-discordant marital or cohabiting relationships (Dunkle *et al.*, 2008).

## **2.6 Knowledge on HIV Prevention and Transmission**

Behavioral changes in an individual's sexuality could best be improved through increased knowledge on HIV transmission and preventive measures. These high risk behavioral factors such as delayed sexual initiation, reducing multiple sexual partners, avoiding substance use/abuse and sex, increased consistent and correct condom use are significant in the control of the spread of HIV. A cross-sectional study in Ecuador showed that 49.1% (95%CI: 46.6-51.6) had incorrect knowledge on HIV transmission and 32.9% (95%CI: 30.6-35.2) with incorrect knowledge on preventive measures with these proportions increasing those with lower education (OR=2.28[1.52-3.43]) and those with previous exposure to HIV intervention programs (OR=1.44[1.14-1.83]) (Cabezas *et al.*, 2013).

Human Immunodeficiency Virus prevention programs that include behavioral strategies are key interventions that aim to halt the transmission of HIV. Knowledge on the behavioral strategies can be improved through HIV-focused educational intervention, CVCT, public awareness campaigns, community based interventions

(CBIs), among others. In South Africa, 30% of individuals thought sero-discordance between couples was possible pre-CVCT compared to 95% post-CVCT with overall positive changes in knowledge about HIV transmission and prevention (Kilembe *et al.*, 2015). Further, a systematic review showed that CBIs to increase HIV awareness and risk reduction were effective in improving knowledge, attitudes, and practice outcomes as evidenced by the increased knowledge scores for HIV/AIDS (SMD: 0.66, 95% CI: 0.25, 1.07), protected sexual encounters (RR: 1.19, 95% CI: 1.13, 1.25), condom use (SMD: 0.96, 95% CI: 0.03, 1.58), and decreased frequency of sexual intercourse (RR: 0.76, 95% CI: 0.61, 0.96) (Salam *et al.*, 2014).

## **2.7 Human Immunodeficiency Virus Prevention Practices**

Human Immunodeficiency Virus sero-discordant individuals are currently recognized as a priority area for HIV prevention interventions/practices. The need for a combination of various approaches such as biomedical interventions, behavioral and structural interventions is to reduce the transmission of HIV. The antiretroviral-based prevention strategies that include the use of antiretroviral treatment (ART) and post-exposure prophylaxis (PEP) have traditionally been used to reduce the spread of HIV. Several randomized clinical trials have shown that the pre-exposure prophylaxis (PrEP) reduces the risk of acquiring HIV in high-risk individuals including people in sero-discordant relationships, men who have sex with men, heterosexual individuals and other high risk men and women (Baeten *et al.*, 2012; Okwundu *et al.*, 2012; Plosker, 2013; Thigpen *et al.*, 2012).

However, another randomized, double-blind, placebo-controlled trial done in Kenya, South Africa, and Tanzania concluded that PrEP with TDF-FTC did not significantly reduce the rate of HIV infection and was associated with increased rates of side effects, as compared with placebo (Van Damme *et al.*, 2012). The choice and willingness to embrace either of these practices among the individuals varies. Results of a cross-sectional study done in Kenya showed that when the individuals are given a hypothetical choice of early ART or PrEP for HIV-1 prevention, 52.5% of HIV-1-infected participants would prefer to initiate ART early and 56.9% of HIV-1-uninfected participants would prefer to use PrEP (Heffron *et al.*, 2012). Another

study in South Africa on the optimal uses of anti-retrovirals for prevention in HIV-1 sero-discordant heterosexual individuals concluded that strategic use of PrEP and ART could substantially and cost-effectively reduce HIV-1 transmission among these individuals (Hallett *et al.*, 2011). Other studies have also shown that the early initiation of ART greatly reduced the transmission of HIV among HIV sero-discordant individuals since this led to the reduction of viral load in the infected partner and that HIV negative partners in sero-discordant individuals had a high incidence of HIV if the index partner was not on antiretroviral therapy (Biraro *et al.*, 2013; Donnel *et al.*, 2010; Reynolds *et al.*, 2011).

Other practices that can be used to help minimize the transmission of the HIV infection among HIV sero-discordant individuals include couple HIV counseling and testing (CHCT), condom use, voluntary medical male circumcision, and behavior change interventions among others. Studies conducted in Africa and the United States showed that HIV-1 sero-discordant individuals who had received CHCT reported increased condom use, contraceptive use, and uptake of prevention of mother-to-child transmission (PMTCT) services (Allen *et al.*, 2003; Burton *et al.*, 2010; El-Bassel *et al.*, 2010; Farquhar *et al.*, 2004; Roth *et al.*, 2001). Results of a comparative study in Southern India showed that HIV sero-discordant patients were more likely to use condoms with their partners than concordant patients (49% versus 28.8%;  $P=0.01$ ) (Kumarasamy *et al.*, 2011a).

## **CHAPTER THREE**

### **MATERIALS AND METHODS**

#### **3.1 Study Site**

The study was conducted at the Defence Forces Memorial Hospital's Comprehensive Care Centre (CCC) located approximately 15 kilometers from the city centre, Nairobi (which is the Kenyan capital city), along Mbagathi Road off Ngong Road. The facility provides services to approximately 1,400 registered HIV sero-discordant individuals. The services offered include diagnostic counseling and testing, antiretroviral therapy, tuberculosis treatment, continued counseling, nutritional support, PMTCT, and mentor mother support groups, social and group support. These services are provided on a daily basis (Monday to Friday) as from 8.00am to 5.00pm by qualified healthcare providers that include medical officers, clinical officers, nutritionists, counselors, pharmaceutical technologists, laboratory technicians and social workers, among others.

#### **3.2 Study Design**

This was a cross-sectional descriptive study that adopted both quantitative and qualitative approaches to data collection, analysis and presentation.

#### **3.3 Study Population**

The study involved approximately 1,400 HIV sero-discordant clients recruited from the CCC at DFMH and who were recruited as individuals into the study.

##### **3.3.1 Inclusion Criteria**

The study subjects eligible for the recruitment were individuals in a HIV sero-discordant relationship confirmed by Enzyme Linked Immunosorbent Assay (ELISA) test, attending the CCC at the DFMH. In addition, individuals who were willing to participate in the study and signed an informed consent.

### 3.3.2 Exclusion Criteria

The study excluded HIV sero-discordant individual with mental incapacitation and individuals who is critically ill during the study. These category of individuals were excluded since they would not give credible information.

### 3.4 Sampling

#### 3.4.1 Sample Size Determination

Sample size was determined using a formula by Fisher, *et al.*, (1998) for population above 10000.

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

Where:

$n$ = desired sample size

$z$ = standard normal deviate which is equal to 1.96 corresponding to the 95% confidence limit.

$p$ = prevalence of discordant individuals was hypothesized to be assumed 50% in case proportion is unknown

$q=1.0- p = 0.5$

$d$ = Degree of accuracy set at 0.05

Thus,

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

$n = 384$



Accounting for 5% non-response, the sample size was adjusted to 404 respondents.

The sample size was further adjusted using the finite population correction factor (f.c.f) to 315 since target population was <10,000 (i.e. 1,400), as follows;

$$n_{f.c.f} = \frac{n}{1 + \frac{n}{N}}$$

Where n.f.c.f. = the minimum desired sample size if population is less than 10,000.

$$n_{f.c.f} = \frac{404}{1 + \frac{404}{1400}}$$

$$n_{f.c.f}=315$$

### **3.4.2 Sampling Procedure**

A systematic random sampling criterion was used in the selection of the study subjects from the target population attending the CCC facility at DFMH. The recruitment of participants in the study was conducted from Monday to Friday during the clinic hours (8.00am to 5.00pm). To achieve the n<sup>th</sup> interval, the target population was divided by the sample size. As a result every 4<sup>th</sup> client from the total population of 1,400 was recruited. The starting point was determined by picking a random number from 1-5, where number 2 was picked by the computer. Where a client who did not meet the inclusion criteria, the next immediate client who qualified to be included in the study was selected. This pattern was repeated on a daily basis until the desired sample size was acquired. Out of the 20 clients reviewed per day at the CCC, 5 were recruited into the study within a time frame of 63 days.

### **3.5 Data Management**

#### **3.5.1 Pre-Testing the Questionnaire**

The data collection tool was subjected to a pre-testing at Thika Partners in Prevention CCC among individuals in a sero-discordant relationship enrolled for care. Pilot

study was conducted on scheduled days of the week during clinic hours (9.00am to 4.00pm) where a total of 30 participants were subjected to the questionnaire. Pre-testing aimed at identifying ambiguous questions, detect anomalies in the flow of questions, and determine the amount of time it takes to complete the questionnaire. This results to a reliable and valid data collection tool.

### **3.5.2 Data Collection**

Data collection was done by use of semi-structured researcher-administered questionnaire (Appendix II). The questionnaire was used to collect quantitative data from 315 respondents. In addition, qualitative data was collected using a focus group discussion (FGD) guide (Appendix III). Four (4) FGDs constituting 2 for male participants and 2 for female participants each with twelve (12) members. Discussions for each gender for the FGDs were held separately at the CCC conference room to allow free interaction among the participants. Triangulation of different data collection methods synergized each other thus increasing reliability of the data collected.

### **3.5.3 Data Entry**

Quantitative data collected was entered into a computer database. Data cleaning and validation was performed to achieve a clean data which was then analyzed using Statistical Package for Social Sciences (SPSS) Version 21.0. On the other hand, qualitative data was recorded using a voice recorder for later transcription.

### **3.5.4 Data Storage**

Both clean sets of data were stored in both hard and soft copies and backed up in compact discs and removable disks. They were also stored in hard drive disks in the computer ready for analysis. A back up of these data was done regularly to avoid any loss or tampering. Any vital information collected and observed during the study period was coded for protection of participants' identity. All information was coded and password protected whereas filled questionnaires were arranged in folders and properly kept in lockable drawers for confidentiality.

### **3.5.5 Data Analysis**

Data from SPSS database was analyzed at the Data Centre, Department of Defense (DOD), using the SPSS Version 21.0 program. Descriptive statistics was used to analyze continuous and categorical variables. This analysis was performed on the percentages and means to describe the characteristics of study participants. Binary logistic regression analysis was used to measure the association between independent variables on HIV status disclosure. Binary logistic regression analysis was conducted to cater for confounders and effect modifiers. The Odds Ratios (OR) with 95% confidence interval (95% CI) were computed to determine the independent predictors. Statistical significance of p-value <0.05 was considered.

Thematic analysis was used to analyze qualitative data where data was classified in themes and described.

### **3.5.6 Dissemination of Findings**

The findings of the study were shared with the study participants individually in a private setting in order to help them make informed decisions about their future health care. These findings have also been shared with the military community and its leadership to help improve policy making regarding the HIV status disclosure as a preventive measure among highly-at-risk groups. The study has also been published at the East African Medical Journal for purposes of improving the HIV preventive measures both locally, regionally and internationally.

### **3.6 Ethical Considerations**

The study was presented for ethical approval at the University of Nairobi/Kenyatta National Hospital Ethical Review Committee (ERC) (KNH/ERC/A/260) (Appendix V) and the Medical and Administration Committee (MAC) of the Defence Forces Memorial Hospital. Informed consent was sought from the participants. The purpose of the study, selection criteria, benefits and risks relating to the study were explained to the participants. All study participants willing to participate were required to sign a written informed consent form (Appendix I). Questionnaires (Appendix II) were

administered to participants in secluded and private rooms to ensure privacy. The interviews were conducted on a one-on-one basis for confidentiality. Code numbers instead of names were used in questionnaires to ensure anonymity. Study participants faced risks such as stress, fear and anxiety related to confidentiality of their HIV status and the study's outcome. These risks were minimized by the researcher guiding and explaining to the participants the consent seeking protocol to ensure confidentiality. The study questionnaire contained no information linking the data to individuals. No social risk events were anticipated and adverse events were not relevant to this study, as this was a minimal risk study. All data collected was entered in pass-word protected computers without links to identifiers.

The study participants were counseled by the researcher on the various HIV preventive measures that they could use to ensure that their partner was not infected. They were also managed by the nurses and clinical officers for any condition that required healthcare and referred appropriately where necessary.

## CHAPTER FOUR

### RESULTS

#### 4.1 Socio-Demographic Characteristics among the Study Participants

A total of 315 study participants in a sero-discordant relationship were recruited and interviewed at Defense Forces Memorial Hospital, Nairobi - Kenya.

Most of the study participants were within the ages 30-35 years and 25-30 years at 27.9% and 26.3% respectively followed by 35-40 years (17.1%), 20-25 years (16.8%), 15-20 years (8.6%) and the least being those more than 40 years old at 3.2%. Majority (55.2%) of them were male.

Majority (98.1%) of the participants were married. Of those who were married, 86.4% were in a monogamous marriage while 13.6% in a polygamous marriage. At least 1.9% were separated.

Majority (88.6%) of the study participants had attained secondary education, 6.7% university level and the least (4.8%) primary education.

Most study participants (71.7%) were based in Nairobi region followed by Gilgil (5.4%), Coast (4.8%), Garissa (3.8%), Eldoret (3.3%) and Laikipia (3.3%) (Table 4.1).

**Table 4.1: Socio-Demographic Characteristics among the Study Participants**

<b>Characteristics</b>	<b>n=315</b>	<b>%</b>
<b>Age group</b>		
<b>15-20 Years</b>	27	8.6
<b>20-25 Years</b>	53	16.8
<b>25-30 Years</b>	83	26.3
<b>30-35 Years</b>	88	27.9
<b>35-40 Years</b>	54	17.1
<b>&gt;40 Years</b>	10	3.2
<b>Sex</b>		
<b>Male</b>	174	55.2
<b>Female</b>	141	44.8
<b>Marital status</b>		
<b>Married (monogamous)</b>	268	84.8
<b>Married (polygamous)</b>	42	13.3
<b>Separated</b>	5	1.9
<b>Highest level of education achieved</b>		
<b>Primary</b>	15	4.8
<b>Secondary</b>	279	88.6
<b>University</b>	21	6.7
<b>In which region is your current duty station</b>		
<b>Nairobi</b>	226	71.7
<b>Gilgil</b>	38	12
<b>Coast</b>	17	5.4
<b>Laikipia</b>	10	3.3
<b>Eldoret</b>	10	3.3
<b>Garrisa</b>	14	3.8

## **4.2 Risky Sexual Behaviors among the Study Participants**

### **4.2.1 Consistent and Correct use of Condom**

Findings from the study revealed that 88.6% of the study participants used condoms consistently and correctly during sexual intercourse with their partners while 11.4% did not. A significant majority (95.7%) of those who did not use condoms cited less pleasure as the main reason for not using during sexual intercourse. An insignificant 2.9% believed that they were protected by God during sexual intercourse while a

negligible 1.4% believed they had natural immunity against the disease. Estimated 27.2% of the study participants had engaged in sexual intercourse 12 months before the interview with majority of them (72.8%) using a condom during that period. Majority (86.7%) of the participants had no other sexual partners while 13.3% had other sexual partners apart from their partner. Most of those with sexual partners other than their partners (76.1%) engaged in sexual intercourse with condom use 12 months prior to interview while few (23.9%) engaged in sexual intercourse without condom use (Table 4.2).

Similar findings were echoed during FGD when one participant said,

*“There is no risk because I apply the use of protection”*. Yet another one added that, *“I believe sex is not an emergency, when I need sex I have to plan including use of condom”*.

On the contrary another participant said that the reason they do not use condoms is because,

*“In some beliefs and cultures men believe they are the boss and can therefore ask for sex any time without bothering whether you are tired or not, or having periods or not especially when drunk”*.

*“With us ladies we usually think a lot before going out there looking for another partner first you are married, you are HIV+, a kid or two, this guy keeps reminding you that he is tired of using condom so you are just hanging in there because of the kids you fear going out because if he knows then he might decide to expose you and maybe your family doesn't know”*, added yet another participant.

#### **4.2.2 Sexual Promiscuity during Deployment**

During the time of deployment away from their families, 257 (82.2%) of the participants didn't engage in sexual intercourse with other partners apart from their partner while 58 (17.8%) of them engaged in sexual intercourse. The reasons for engaging in sexual intercourse with other partners by the 58 study participants while away in deployment included satisfaction of sexual needs (71.7%) and work station

of deployment away from family (49.0%). A significant proportion (36.4%) of the 58 study participants that engaged sexual intercourse with other partners contracted a sexually related infection (SRI) whereas 63.6% did not. Majority of the study participants (65.4%) were deployed for a period of 3-6 months away from their family, 23.5% of them 7-12 months, 8.6% of them 1-2 years while only 2.5% were deployed for more than 4 years (Table 4.2).

#### **4.2.3 Alcohol Consumption in Sexual Context**

The study found that out of the 58 (17.8%) participants who had engaged in sexual intercourse with other partners apart from their partner, 21.0% of them did it under the influence of alcohol while 79.0% of them engaged in sexual intercourse but not under the influence of alcohol as shown in Table 4.2.

In a group discussion a discussant had this to say, *“In my opinion I think the risk is very high coz it is not very easy.....hiyo stigma ina affect both partners ule ako negative na ule ako positive, ule ako positive ata indulge kwa high risk behaviors kama drug abuse, atakua alcoholic, na akiwa alcoholic hakutakua na ile consistence in proper use of condom”*.

#### **4.2.4 Preventive Behaviors against Contracting Human Immunodeficiency Virus**

As shown in Table 4.2, consistent and correct condom use was the main preventive behavior used by majority of the participants (96.7%) to avoid infecting their HIV negative partner. Other preventive behaviors used by the participants were staying away from their partner (1.1%) and abstinence (1.1%) and separation of beds at 1.1%.

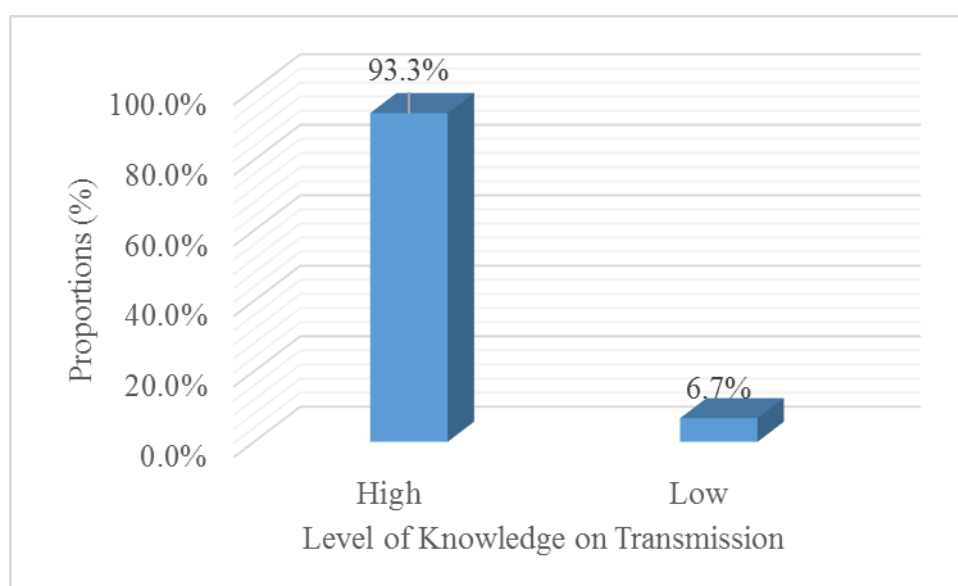


**Table 4.2: Risky Sexual Behaviors among the Study Participants**

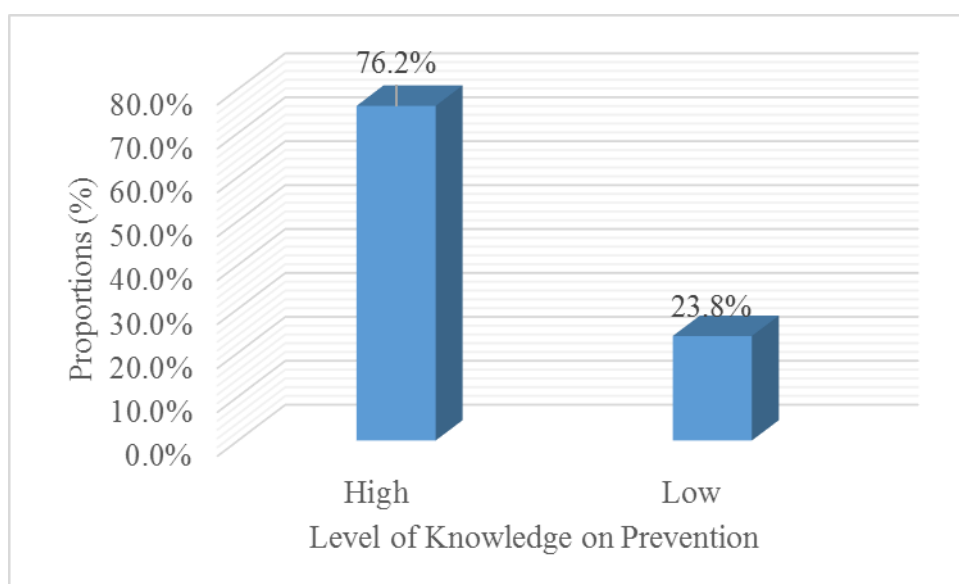
<b>Indicators</b>	<b>n=315</b>	<b>%</b>
Consistent and correct condom use each time you have sexual intercourse		
Yes	279	88.6
No	36	11.4
Reason for not using condom (n=36)		
Less pleasure	33	95.7
Protected by God	2	2.9
Protected by Natural immunity	1	1.4
Had sexual intercourse in the last 12 months		
Yes	229	72.8
No	88	27.8
Consistent and correct condom use in last sexual intercourse within last 12 months		
Yes	166	72.8
No	63	27.8
Used condom with other sexual partners (n=41)		
Yes	31	76.1
No	10	23.9
Engaged in sexual intercourse with other partners other than your partner		
No	257	82.2
Yes	58	17.8
Sexual needs was reason for sleeping with other partners (n=58)		
Yes	42	71.7
No	16	28.3
Work station was reason for sleeping with other sexual partners (n=58)		
Yes	28	49
No	30	51
Engaged in sexual intercourse with other partners apart from their partner under influence of alcohol (n=58)		
Yes	12	21
No	46	79
Contracted sexually related infections (n=58)		
Yes	21	36.4
No	37	63.6
Methods used to prevent contraction of HIV		
Condom use	305	96.7
Abstinence and separation of beds	7	2.2
Others	3	1.1
How long have you been deployed at the current work station		
3 - 6 Months	206	65.4
7 - 12 Months	74	23.5
1 - 2 Years	27	8.6
More than 2 Years	8	2.5

### 4.3 Distribution of Human Immunodeficiency Virus Prevention and Transmission Knowledge Score

The knowledge score was calculated based on the number of correct responses to questions on HIV prevention and transmission. There were 16 questions that required ‘Yes’ or ‘No’ responses. Every ‘Yes’ response attracted 1 point while ‘No’ attracted 0 point. Z-score method was used to determine the level of knowledge. Those with total points  $<8$  were considered having low knowledge level while those with  $\geq 8$  points were considered to have high knowledge level. Majority of the study participants had high knowledge score (93.3%) on HIV transmission compared to HIV prevention where participants who had high knowledge were 76.2% as depicted in Figures 4.1 and 4.2.



**Figure 4.1: Distribution of Human Immunodeficiency Virus Transmission Knowledge Score among Study Participants**



**Figure 4.2: Distribution of Human Immunodeficiency Virus Prevention Knowledge Score among Study Participants**

#### **4.4 Disclosure and Human Immunodeficiency Virus**

##### **4.4.1 Human Immunodeficiency Virus Status Disclosure among Study Participants**

A significant majority (97.1%) of the study participants reported that their partners had disclosed their HIV status while a negligible 2.9% didn't have knowledge of their partner's HIV status. Majority (95.2%) of the study participants had disclosed their HIV status to their partners while 4.8% of them hadn't disclosed their HIV status.

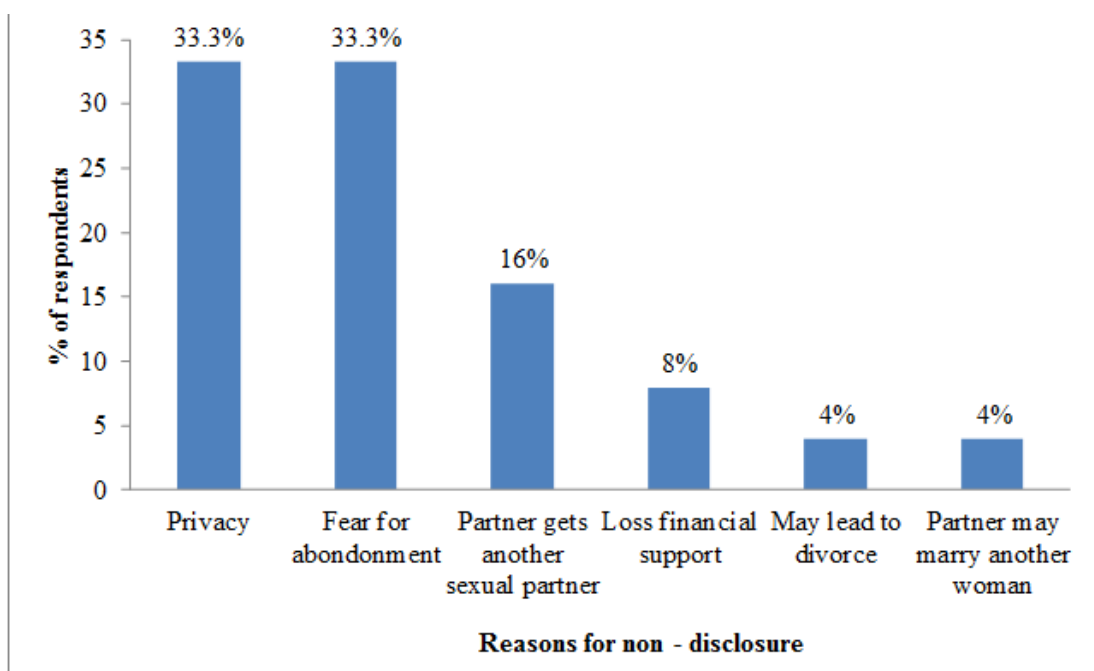
Most participants (36.3%) hadn't disclosed their HIV status to any other person. Some of the study participants (23.5%) had disclosed their HIV status to their friends, relatives (16.3%), both relatives and friends (12.2%), pastor/priest (4.1%) whereas others had disclosed to their children (5.7%) and employer (1.9%) (Table 4.3).

**Table 4.3: Human Immunodeficiency Virus Status Disclosure among Study Participants**

<b>Variables</b>	<b>n=315</b>	<b>%</b>
Partner's disclosure to study participant		
Yes	305	97.1
No	10	2.9
Study participant disclosure to partner		
Yes	300	95.2
No	15	4.8
Study participant disclosure to someone else other than partner		
None	115	36.3
Friend	74	23.5
Relative	51	16.3
Relative and friends	38	12.2
Children	18	5.7
Pastor/priest	13	4.1
Employer	6	1.9

#### **4.4.2 Reasons for Non-Disclosure among Study Participants**

Human Immunodeficiency Virus status disclosure had a negative effect on sexual intercourse and caused lack of trust for all study participants (100%). Reasons for HIV status non-disclosure by study participants included privacy (33.3%), fear of abandonment of female participants (33.3%). Other effects include divorce in 4.0% and loss of financial support in 8.0% of the relationships, partner getting another sexual partner (16.0%) while 4.0% of the female participants indicated that their husbands married another wife after the disclosure (Figure 4.3).



**Figure 4.3: Reasons for non-disclosure**

#### **4.5 Factors Associated with Disclosure of Human Immunodeficiency Virus Status among Study Participants**

##### **4.5.1 Association between Socio-Demographic Characteristics and Human Immunodeficiency Virus Disclosure**

Three socio-demographic characteristics were significantly associated with HIV status disclosure based on binary logistic regression,  $P < 0.05$ .

Age group of the respondent was significantly associated with HIV status disclosure. High proportions of HIV disclosure were observed among participants aged 30-35 years (94.0%) compared to those aged between 15-20 years, (85.2%). Participants aged 30-35 years were 15.13[95%CI = 1.61 - 141.9,  $P = 0.012$ ] times more likely to disclose compared to those aged 15-20 years.

Female participants were 6.65[95%CI = 1.94 - 22.74,  $P < 0.001$ ] times more likely to disclose HIV status compared to male counterparts.

Region of the current duty was associated with HIV disclosure. Participants from Nairobi region were 7.43[95%CI = 1.72 - 31.05, P=0.001] times more likely to disclose HIV status compared to those from other Garissa (Table 4.4).

**Table 4.4: Association between socio-demographic characteristics and Human Immunodeficiency Virus disclosure (n=315)**

Characteristics	Disclosed		Not disclosed		OR	95%CI		P-Value
	n	%	n	%		Lower	Upper	
Age group								
15-20 Years	23	85.2	4	14.8	Ref			
20-25 Years	40	75.5	13	24.5	0.53	0.15	1.83	0.315
25-30 Years	78	94.0	5	6.0	2.71	0.67	10.94	0.147
30-35 Years	87	98.9	1	1.1	15.13	1.61	141.9	0.012
35-40 Years	53	98.1	1	1.9	9.21	0.97	87.04	0.072
>40 Years	9	90.0	1	10.0	1.56	0.15	15.97	0.703
Sex								
Male	152	87.4	22	12.6	Ref			
Female	138	97.9	3	2.10	6.65	1.94	22.74	<0.001
Marital status								
Married (monogamous)	260	97.0	8	3.0	8.12	0.81	81.16	0.396
Married (polygamous)	26	61.9	16	38.1	0.41	0.04	3.96	0.761
Separated	4	80.0	1	20.0	Ref			
Highest level of education achieved								
Primary	12	80.0	3	20.0	0.2	0.01	2.14	0.37
Secondary	258	92.5	21	7.5	0.61	0.07	4.81	0.639
University	20	95.2	1	4.8	Ref			
In which region is your current duty station								
Nairobi	218	96.5	8	3.5	7.43	1.72	31.95	0.001
Gilgil	33	86.8	5	13.2	1.8	0.36	8.78	0.463
Coast	14	82.4	3	17.6	1.27	0.21	7.58	0.79
Laikipia	6	60.0	4	40.0	0.41	0.06	2.46	0.595
Eldoret	8	80.0	2	20.0	1.09	0.14	8.12	0.671
Garrisa	11	78.6	3	21.4	Ref			

n= Number of observations; OR = Odds Ratio; CI = Confidence Interval; P-Value = Probability value; Ref = Reference

#### **4.5.2 Association between Risky Sexual Behaviors and Human Immunodeficiency Virus Disclosure**

Three of the risky sexual behaviors were significantly associated with HIV disclosure based on binary logistic regression,  $P < 0.05$ . Participants who used a condom each time they had sexual intercourse were 12.58[95%CI = 5.15 - 30.71,  $P < 0.001$ ] times more likely to disclose their HIV status compared to those who indicated that they did not use a condom during sexual intercourse.

Likewise, participants who used condom in the last sexual intercourse within last 12 months were 15.85[95%CI = 6.89 - 36.52,  $P < 0.001$ ] times more likely to disclose HIV status compared to who indicated that they had not used a condom in the last 12 months.

Participants who didn't engage in sexual intercourse with other partners other than their partner were 4.31[95%CI = 2.27 - 8.16,  $P < 0.001$ ] times more likely to disclose HIV status compared to those engaged in sexual intercourse with other partners other than their partner (Table 4.5).

**Table 4.5: Association between Risky Sexual Behaviors and Human Immunodeficiency Virus disclosure (n=315)**

Indicators	Disclosed		Not disclosed		OR	95%CI		P-Value
	n	%	n	%		Lower	Upper	
Use condom each time you have sexual intercourse								
Yes	267	95.7	12	4.3	12.58	5.15	30.71	<0.001
No	23	63.9	13	36.1	Ref			
Reason for not using condom (n=36)								
Less pleasure	30	90.9	3	9.1	10	0.49	203.94	0.077
Protected by God	1		1	100	Ref			
Protected by immunity	0		1	100				
Had sexual intercourse in the last 12 months								
Yes	209	91.3	20	8.7	0.9	0.37	2.21	0.823
No	81	92.0	7	8.0	Ref			
Used condom in the last sexual intercourse within last 12 months								
Yes	157	94.6	9	5.4	15.85	6.89	36.52	<0.001
No	33	52.4	30	47.6	Ref			
Used condom with other sexual partners								
Yes	25	80.6	6	19.4	2.77	0.59	13.05	0.186
No	6	60.0	4	40.0	Ref			
Engaged in sexual intercourse with other partners other than your partner								
No	223	86.8	34	13.2	4.31	2.27	8.16	<0.001
Yes	35	60.3	23	39.7	Ref			
Sexual needs was reason for sleeping with other partners (n=58)								
Yes	25	59.5	17	40.5	1.31	0.42	4.06	0.643
No	9	56.3	8	43.8	Ref			
Work station was reason for sleeping with other sexual partners (n=58)								
Yes	19	67.9	9	32.1	0.76	0.24	2.38	0.647
No	22	73.3	8	26.7	Ref			
Had sexual intercourse with other partners apart from their partner under influence of alcohol								
Yes	4	33.3	8	66.7	0.38	0.1	1.46	0.152
No	26	56.5	20	43.5	Ref			
Contracted sexually related infections								
Yes	17	81.0	4	19.0	2.89	0.81	10.33	0.093
No	22	59.5	15	40.5	Ref			
Methods used to prevent contraction of HIV								
Condom use	295	96.7	10	3.3	4.91	0.54	44.77	0.118
Abstinence	6	85.7	1	14.3	Ref			
Others	3	100.0	0	0.0				
How long have you been deployed the current work station								
3 - 6 Months	171	83.0	35	17.0	1.62	0.32	8.41	0.556
7 - 12 Months	64	86.5	10	13.5	2.13	0.37	12.07	0.382
1 -2 Years	23	85.2	4	14.8	1.92	0.28	13.08	0.501
More than 2 Years	6	75.0	2	25.0	Ref			

n= Number of observations; OR = Odds Ratio; CI = Confidence Interval; P-Value = Probability value; Ref = Reference



### 4.5.3 Association between Knowledge on Human Immunodeficiency Virus and Human Immunodeficiency Virus Status Disclosure

Three variables were found to be significantly associated factors of HIV status disclosure,  $P < 0.05$ .

Participants who had high knowledge on HIV transmission were 2.57[95% CI: 1.09 - 6.04,  $P = 0.026$ ] times more likely to disclose their status as compared to those who had low knowledge on HIV transmission.

Likewise, participants who had high knowledge on HIV prevention were 5.37[95% CI: 1.79 - 16.20,  $P < 0.001$ ] times more likely to disclose their status as compared to those who had low knowledge on HIV prevention.

Participants who reported using condom on a regular basis while engaging in sexual intercourse were 2.73[95% CI: 1.01 - 7.39,  $P = 0.039$ ] times more likely to disclose their status as compared to those who did not use condoms regularly (Table 4.6).

**Table 4.6: Association between knowledge about Human Immunodeficiency Virus and Human Immunodeficiency Virus status disclosure**

Variables	Disclosed		Not disclosed		OR	95%CI		P-Value
	n	%	n	%		Lower	Upper	
Knowledge about HIV transmission								
High knowledge	204	94.4	12	5.6	2.57	1.09	6.04	0.026
Low knowledge	86	85.1	13	14.9	Ref			
Knowledge about HIV prevention								
High knowledge	154	96.8	5	3.2	5.37	1.79	16.2	<0.001
Low knowledge	136	87.2	20	12.8	Ref			
Use a condom regularly during sexual intercourse with partner								
Yes	260	93.2	19	6.8	2.73	1.01	7.39	0.039
No	30	83.3	6	16.7	Ref			

n = Number of observations; OR = Odds Ratio; CI = Confidence Interval; P-Value = Probability value; Ref = Reference

#### **4.6 Multivariate Analysis for Association between Risky Sexual Behaviours and Human Immunodeficiency Virus Status Disclosure among Study Participants**

Binary logistic regression was used to identify predictors of HIV disclosure among the participants. Nine factors associated to HIV disclosure ( $P < 0.05$ ) in bivariate analysis were considered for multivariable analysis. Six successive iterations were performed using backward conditional method retaining four predictors as presented in Table 4.7.

Adjusting for other factors such as confounders and effect modifiers, there was a significant association between sex of the participant and HIV status disclosure. Females were 4.55 [95% CI: 1.92 - 10.33,  $P < 0.001$ ] times more likely to disclose their status compared to their male counterparts.

Participants who had high knowledge on HIV transmission were 4.19 [95% CI: 1.65 - 8.16,  $P < 0.001$ ] times more likely to disclose their HIV status compared to who had low knowledge on HIV transmission.

Participants who had high knowledge on HIV prevention were 7.10 [95% CI: 2.79 - 12.47,  $P = 0.014$ ] times more likely to disclose their HIV status compared to who had low knowledge on HIV prevention.

Participants who used a condom regularly during sexual intercourse were 4.09 [95% CI: 1.52 - 7.25,  $P = 0.002$ ] times more likely to disclose their HIV status compared to those who didn't use a condom with their partners (Table 4.7).

**Table 4.7: Full model on predictors of Human Immunodeficiency Virus status disclosure**

Variables	aOR	95%CI		P-Values
		Lower	Upper	
Sex				
Male	Ref			
Female	4.55	1.92	10.33	<0.001
Knowledge about HIV transmission				
High knowledge	4.19	1.65	8.16	<0.001
Low knowledge	Ref			
Knowledge about HIV prevention				
High knowledge	7.10	2.79	12.47	0.014
Low knowledge	Ref			
Use a condom regularly during sexual intercourse with partner				
Yes	4.09	1.52	7.25	0.002
No	Ref			

aOR = Adjusted Odds Ratio; CI = Confidence Interval; P-Value = Probability value; Ref = Reference

## CHAPTER FIVE

### DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Discussion

##### 5.1.1 Socio-Demographic Characteristics among Study Participants

A total of 315 study participants in sero-discordant relationships were recruited and interviewed at Defense Forces Memorial Hospital, Nairobi-Kenya. Most of the study participants were within the ages 30-35 years and 25-30 years at 27.9% and 26.3% respectively followed by 35-40 years (17.1%), 20-25 years (16.8%), 15-20 years (8.6%) and the least being those more than 40 years old at 3.2%. These findings are similar to results of a study in Tanzania which reported that HIV sero-discordant relationship was associated with age (35-45 years) for both men and women (Adjusted Odds Ratio (AOR): 2.3, 95% Confidence Interval (CI): 1.7-3.2) and (AOR: 2.6, 95% CI 1.9-3.7) respectively (Ngilangwa *et al.*, 2015).

Majority (55.2%) of the study participants were male whereas 44.8% were female. Most of the participants (98.1%) were married at the time of the interview whereas only 1.9% of them had separated at that time. Findings from other studies show a similar trend where 46.7% were married, 40.8% were presexual partners, 4.6% sexual partners (Tadesse, 2014) and 40-50% of married or cohabitating HIV-infected persons are in an HIV-discordant partnership (Bunnell *et al.*, 2006).

The highest level of education for majority of the participants was secondary school (88.6%) followed by University with 6.7% of the study participants and the least was primary education with 4.8%. However, a study in Ethiopia showed contradictory findings in which 39.5% had secondary level whereas 32.2% and 28.3% of the respondents had educational level of primary education and tertiary (College/University) education respectively (Tadesse, 2014).

Study participants who had been in service for more than ten years were the majority (82.7%), while 13.6% of the participants had been in the military for six to ten years. Those who had spent between one and five years in the military were very few

(3.7%). Most study participants (71.7%) were based in Nairobi region followed by Gilgil (5.4%), Coast (4.8%), Garissa (3.8%) and Eldoret (3.3%) and Laikipia (3.3%). Similar findings have been shown by a study done in Ethiopia where it showed that those living in urban areas (77.8%) were more likely discordant than those from rural areas with COR = 3.79; 95% (1.46 to 2.37) (Tadesse, 2014). This also concurs with the findings of the KAIS report that stated that slightly more HIV sero-discordant couples (57.2% males and 51.1% females) resided in urban areas (KAIS, 2012).

### **5.1.2 Risky Sexual Behaviours among Study Participants**

Majority of the participants (88.6%) used condoms regularly during sexual intercourse with their partners while 11.4% did not. Similar findings were shown from a comparative study in Southern India where HIV sero-discordant patients were more likely to use condoms with their partners than concordant patients (49% versus 28.8%;  $P = 0.01$ ) (Kumarasamy *et al.*, 2010b). However, the KAIS report contradicts these findings by stating that less than a quarter (19.0% and 21.1% of uninfected women and men respectively) of HIV sero-discordant partners consistently used condoms with their HIV infected partner (KAIS, 2012). A significant number (95.7%) of those who did not use condoms cited less pleasure as the main reason for not using condoms during sexual intercourse. A Jeevan Saathi study in India showed similar findings where approximately 10% of couples reported inconsistent condom use in the past 3 months and 20% reported intimate partner violence (IPV) (Patel *et al.*, 2014). Most of those with multiple sexual partners other than their partner (76.1%) used a condom while engaging in sexual intercourse while 23.9% of them did not use a condom. This findings concur with evidence of studies that showed the use of condoms to be low or irregular in different sexual practices of PLHIV (Hanif *et al.*, 2014) and that sero-discordant couples have greater compliance than the general population, though it varies from 39.2% in sero-discordant couples in general, reaching 78.5% in sero-discordant couples where the woman is seropositive (Cunha & Galvão, 2011; Santos *et al.*, 2002).

Majority of the study participants (65.4%) were deployed for a period of 3-6 months away from their family, 23.5% of them 7-12 months, 8.6% of them 1-2 years while only 2.5% were deployed for more than 4 years. During the time of deployment away from their families, 257 (82.2%) of the participants did not engage in sexual intercourse with other partners apart from their partner while 58 (17.8%) of them did. This is in contrast to a study done at border-crossing zones in the Dominican Republic which showed that 41% reported having casual sex during the past 12 months, 37% of men had a history of having sex with a commercial sex worker (19% during the past 12 months), and 7% of men reported a history of having sex with a transmigrating Haitian (6% during the past 12 months) and while among sexually non-monogamous respondents (51%), inconsistent condom use exceeded 60% for those engaging in anal, vaginal, or oral sex (Anastario *et al.*, 2010).

Further, evidence from an epidemiological study among US Air Force (USAF) concluded that the highest risk of HIV infection in the USAF was among young unmarried deployment-naïve males, especially those in higher risk occupation groups (Hakre *et al.*, 2015).

The study found that out of the 58 (17.8%) participants who had engaged in sexual intercourse with other partners apart from their partner, 21.0% of them did it under the influence of alcohol while 79.0% of them had engaged in sexual intercourse but not under the influence of alcohol. These findings are in concurrence with studies that have shown that overall prevalence of at least one STI/HIV was 8.5 % (95%CI: 7.3–9.7), the prevalence of unprotected sex was 79.1 % (95 % CI 77.8–80.3) and alcohol consumption prior to sex with any of the last five sex partners in the previous 6 months was 68.9 % (95%CI: 66.9–70) (Maguina *et al.*, 2013) and that the association between alcohol use and prevalence or incident of HIV infection was particularly large among samples who reported problem drinking ( $OR = 2.17$ , 95% CI: 1.64–2.87) and drinking in sexual contexts ( $OR = 1.79$ , 95% CI: 1.55–2.0) (Woolf-King *et al.*, 2013).

A significant number (36.4%) of the study participants contracted a sexually related infection whereas 63.6% did not. Evidence from a study in the French Forces support this finding by showing that the incidence of STD and HIV seroconversion was respectively 19.2 and 2.8 cases per 100,000 and concluded that STD and HIV seroconversion remain a subject of concern for the French Medical Forces despite low rates of incidence (Ollivier *et al.*, 2009). Another study among Serbian Armed Forces found 36 out of 5617 soldiers to have some form of STD (Jadranin *et al.*, 2012).

### **5.1.3 Factors Associated with Disclosure of Human Immunodeficiency Virus Status among Study Participants**

Female participants were 6.65[95%CI = 1.94 - 22.74, P<0.001] times likely to disclose HIV status compared to male counterparts. A cross-sectional study in Soweto, South Africa concurs with this findings where women were 0.64[95%CI = 0.3-2.0, P<0.09] times likely to disclose their HIV status compared to their male counterparts (Longinetti, Santacatterina, & El-Khatib, 2014).

Region of the current duty was associated with HIV disclosure. Participants from Nairobi region were 7.43[95%CI = 1.72 - 31.05, P=0.001] times likely to disclose HIV status compared to those from other Garissa. A study in Nigeria showed similar findings, in which urban respondents, 93.8% had disclosed compared with 79.4% among rural respondents, the difference was statistically significant ( $P < 0.001$ ) (Agbor *et al.*, 2017).

The knowledge score was calculated based on the number of correct responses to questions on HIV prevention and transmission. Study participants with total points <8 were considered having low knowledge level while those with  $\geq 8$  points were considered to have high knowledge level. The mean HIV transmission knowledge score was 0.96 (SDV=0.061) while the mean HIV prevention knowledge score was 0.90 (SDV=0.11). Majority of the study participants had high knowledge score (93.3%) on HIV transmission as compared to HIV prevention where participants who had high knowledge were 76.2%. These findings concur with those of a study in Gauteng and North West provinces in South Africa that showed high knowledge

scores among participants where 87% on HIV-related knowledge, 98.6% on the modes of transmission, and 73% on prevention (Madiba & Mokgatle, 2014).

A significant majority (97.1%) of the study participants reported that their partners had disclosed their HIV status while a negligible 2.9% didn't have knowledge of their partner's HIV status. In addition, 94.3% of the study participants had disclosed their HIV status to their partners while only 5.7% of them hadn't. These results concur with findings of other studies which showed that majority (80%) had disclosed their HIV status to their partners, 64% knew their partner's HIV status (Bachanas *et al.*, 2013); in male-infected discordants 72.6% women knew their partner to be positive and in women-infected discordants 81.5% of these women knew their partner was negative (KAIS, 2012); rates of disclosure were 81.3% in male HIV-positive and 80.2% in female HIV-positive discordant couples (Kairania *et al.*, 2010). These results however contradict those of a study on factors associated with HIV infection in married or cohabitating couples in Kenya that showed that 83.6% of HIV-infected Kenyans living in married or cohabitating couples neither partner knew their HIV status (Kaiser *et al.*, 2011). Most participants (36.3%) hadn't disclosed their HIV status to any other person whereas some (23.5%) had disclosed their HIV status to their friends, relatives (16.3%), both relatives and friends (12.2%), pastor/priest (4.1%) whereas others had disclosed to their children (5.7%) and employer (1.9%). These finds are in concurrence with results of an exploratory study in Uganda that showed that 84% disclosed to family members, 63% to friends, 21% to workplace colleagues, and 18% to others (Ssali *et al.*, 2010). A previous study in United States of America (USA) also shows similar findings where 100% of all sexually active HIV-positive women had disclosed their HIV status to current or recent male sex partners, 33% had disclosed to at least one friend and 25% had told at least one family member (Lester *et al.*, 1995).

Reasons for HIV status non-disclosure by study participants included privacy (33.3%) and fear of abandonment of female participants (33.3%) by their husbands. Other effects included divorce in 4.0% and loss of financial support in 8.0% of the relationships, partner getting another sexual partner (16.0%) while 4.0% of the female participants indicated that their husbands married another wife after the



disclosure. These findings concur with results from various studies conducted in Africa showing the fear of rejection or abandonment (71.4%), fear of physical assault and abandonment (19.0%), fear of abandonment from partner (55.0%) as reasons for non-disclosure (Farquhar *et al.*, 2000; Issiaka *et al.*, 2001; Rakwar *et al.*, 1999), fear of abuse and divorce (Mucheto *et al.*, 2011) and fear of divorce (at 46.4%) (Kilewo *et al.*, 2001). Further, these findings are concur with the conclusion of a review paper where it was shown that negative outcomes included blame, abandonment, anger, violence, stigma, and depression (WHO, 2004).

Majority (71.8%) of the study participants feared that healthcare workers at the clinic would disclose their HIV status to their partners while 28.2% were okay. These findings however contradict those of a study in Uganda where 81.0% of HIV-positive partners in discordant relationships disclosed their status to their HIV-uninfected partners in the presence of the counsellor (Kairania *et al.*, 2010).

#### **5.1.4 Multivariate Analysis for Association between Risky Sexual Behaviours and Human Immunodeficiency Virus Status Disclosure among Study Participants**

Females were 4.55 [95% CI: 1.92 - 10.33,  $P < 0.001$ ] times more likely to disclose their status compared to their male counterparts. A study in Tanzania, Kenya and Namibia showed contrary findings, where females were less likely to report having disclosed their HIV status to sex partners than males (AOR: 0.71, 95% CI: 0.56, 0.90,  $P < 0.0047$ ) (Bachanas *et al.*, 2013). These findings were further supported by a study in Malaysia where the percentage of disclosure among males was 66.7% had a statistically significant ( $p < 0.05$ ) difference compared with females (70.2%) (Lemin *et al.*, 2018).

Participants who had correct knowledge on HIV prevention were 5.4 times more likely to disclose their status as compared to those who had incorrect knowledge (OR, 5.4; 95% CI, 1.79-16.2) while those who had correct knowledge on HIV transmission were 2.6 times more likely to disclose their status than the ones with incorrect knowledge on HIV transmission. This concurs with the findings of a study in South Africa that showed that only 30% of individuals thought sero-discordance

between couples was possible pre-CVCT compared to 95% post-CVCT and overall with positive changes in knowledge about HIV transmission and prevention (Kilembe *et al.*, 2015).

Participants who reported using condom on a regular basis while engaging in sexual intercourse were almost 3 times more likely to disclose their status as compared to those who did not use condoms regularly (OR, 2.7; 95% CI, 1.0–7.4). Concurring findings were shown by a study done in Tanzania, Kenya and Namibia in which participants who reported disclosing their HIV status to their partners (AOR: 1.45, 95% CI: 1.11, 1.91) were more likely to report consistent condom use (Bachanas *et al.*, 2013). Those who engaged in sexual intercourse but not under the influence of alcohol were 0.83 times more likely to disclose their status compared to those who had sexual relations under the influence of alcohol (OR, 0.83; 95% CI, 0.32–2.16). A recent study in Uganda showed similar findings where subjects reporting any alcohol use had a 68% higher prevalence of reporting risky sex compared to those subjects not reporting alcohol use (uPR = 1.68; 95% CI: 1.38–2.05) (Wandera *et al.*, 2015). Another review and meta-analysis based on 27 relevant studies demonstrated that any alcohol consumption (OR=1.63, CI=1.39-1.91), problematic drinking (OR=1.69, CI=1.45-1.97), and alcohol use in sexual contexts (OR=1.98, CI=1.63-2.39) were all found to be significantly associated with unprotected sex among PLWA (Shuper *et al.*, 2009).

## **5.2 Conclusions**

This study made the following conclusions:

1. Socio-demographic factors that include age, sex, region of duty station and period of stay in a station were important issues for disclosure of one's HIV status.
2. Risky sexual behaviors (condom use and sexual intercourse with other partners) were of significance in relation to HIV status disclosure.
3. Significant predictors of HIV status disclosure were high knowledge on HIV prevention and transmission, and regular condom use during sexual intercourse.

### **5.3 Recommendations**

This study therefore recommends the following:

1. Healthcare workers to increase HIV prevention interventions with emphasis on age, sex, region of duty station and period of stay in a station.
2. Healthcare workers to increase awareness on the need for consistent and correct condom use and avoidance of sexual intercourse with multiple partners.

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## APPENDICES

### Appendix I: Informed Consent Form

#### PART A: CONSENT EXPLANATION

**Project Title:** Factors associated with HIV status disclosure among individuals in a HIV sero-discordant relationship at the Defence Forces Memorial Hospital (DFMH).

#### Purpose of the Study

Sero-discordance is a major public health challenge globally which in turn brings about various challenges. These include psycho-social, socio-economic, and transmission risks among others.

This is the reason why we need to establish the factors associated with HIV status disclosure among individuals in a HIV sero-discordant relationship attending DFMH CCC clinic. We therefore need your permission before we administer the questionnaire.

The study has been approved by the Medical and Administration Committee of Memorial Hospital and the Kenyatta National Hospital-University of Nairobi Ethics and Research Committee (KNH-UoN ERC).

#### Procedures to be followed

You shall be taken through the consent form and explanations for various concerns that you will raise shall be given before you are enrolled into the study. However, if you wish to participate in this study, we shall require your signed consent. At the end of the study you shall be informed of the results. The results will also be communicated to the community and sponsors, and both in local and international scientific conferences.

**Benefits**

The results of this study will assist you and other clients to make informed choices about your future health. In addition, the finds will help in policy making with special regard to disclosure among HIV sero-discordant individuals including the aspect of preventive measures focusing on this risky group.

**Risks**

There are no major risks anticipated from this study since there is none that has ever been reported from similar studies that have been done in other areas.

**Compensation Mechanism**

This will not be applicable since there no foreseeable risks as highlighted above.

**Alternative Treatments**

There shall be no other treatments that will be conducted on you during the course of this study apart from your voluntary participation in answering the questions stated in the study questionnaire.

**Confidentiality**

All the information that shall be obtained from you shall be confidential to protect your privacy. This shall be done by giving codes to your medical records thereby avoiding the use of your name when gathering information from you. In addition, all hard copy records shall be under lock and key. Your information shall be accessed by professionals involved in the study and who are authorized to do so but can't recognize your identity.

There is no identity of any client that shall be disclosed in any public conferences, reports or publications.

## **Voluntarism**

I would like to inform you that there are problems anticipated in the course of the study. I also wish to inform you that your participation is voluntary and that you have the right to withdraw from the study at any time. In addition, in the event that you develop medical problems not directly related to this study, you shall be given immediate medical attention by qualified health professionals working at the clinic.

## **Inquiries**

I would like to urge you to ask as many questions as possible to enable you make an informed decision before the study. A copy of this agreement shall be made available to you.

In case you need more information or clarification about the study, you can contact us on the following numbers:

1. The Secretary, KNH-UoN Ethics and Research Committee

P.O. Box 20723-00202 Nairobi, Kenya. Tel: 020 - 2726300/19, 020 - 2726450/9

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## **PART B: CONSENT**

Please read the information sheet (PART A) or have the information read to you carefully before completing and signing this consent form. If you have questions about the study, please ask the investigator prior to signing your consent form.

### **Declaration of the volunteer**

I Mr./Miss/Mrs.....hereby give consent to .....  
to include me in the proposed study entitled; Factors associated with HIV status disclosure among attending Defence Forces Memorial Hospital (DFMH). I have read the information sheet concerning this study, I understand the aim of the study and what will be required of me if I take part in the study. The risks and benefits if any have been explained to me. Any questions I have concerning the study have been adequately answered. I understand that at any time that I may wish to withdraw from this study I can do so without giving any reason and without affecting the health care

delivery. I realize that I will be interviewed once. I consent voluntarily to participate in this study.

Participant's Signature..... Date  
.....

Investigator's Signature ..... Date .....



## **Appendix II: Semi-Structured Study Questionnaire**

**Title:** Factors associated with HIV status disclosure among individuals in a HIV sero-discordant relationship at the Defence Forces Memorial Hospital, Nairobi, Kenya

(Instructions: For all the questions, select one option)

### **Section A: Demographic Characteristics**

Interviewer: ..... Date: ..... ID No. (Code):.....

1. Age            Years

- a) 15-20 years
- b) 20-25 years
- c) 25-30 years
- d) 30-35 years
- e) 35-40 years
- f) >40 Years

2. Sex            (1) Male        (2) Female

3. Marital status

- (1) Single
- (2) Married
- (3) Separated

4. What highest level of education did you achieve?

- (1) None    (2) Primary    (3) Secondary    (4) University

5. In which region is your current duty station?

- (1) Nairobi    (2) Gilgil    (3) Coast    (4) Laikipia    (5) Eldoret

6. How long have you been in your current duty station? .....

**Section B: Socio-economic Data**

7. Which of the following is your income-generating activity?

Activity	1(main)	2(second)
Employment		
Business		
Farming		
Other (specify)		

Others (specify) .....

8. Since you knew your HIV status, are you able to support yourself and family financially?

- (1) Yes    (2) No

**Section C: Knowledge on HIV Transmission and Prevention**

	<b>Interviewer instructions: Please place a tick in the correct answer</b>	<b>Yes</b>	<b>No</b>
9.	Can HIV be transmitted through sexual intercourse?		
10.	Can a person be infected with HIV by sharing needle or syringe?		
11.	Is it possible to contract HIV through blood transfusion?		
12.	Can HIV be transmitted from one person to another by shaking hands?		

13.	Can HIV be transmitted from mother to child?		
14.	Can HIV be transmitted from a HIV positive partner to a HIV negative partner?		
15.	Can HIV be transmitted by eating and drinking from the same plate or glass used by a HIV-positive person?		
16.	Can HIV be transmitted by sharing a toilet with an HIV-positive person?		
17.	Can HIV be transmitted by wearing the same clothes used by a HIV-positive person?		
18.	Can HIV be transmitted through a mosquito bite?		
19.	Can the transmission of HIV be prevented by properly using a condom during sexual intercourse?		
20.	Is it possible to avoid the transmission of HIV by remaining faithful to a single partner?		
21.	Can transmission of HIV be prevented by doing a HIV blood test before marriage?		
22.	Can male circumcision prevent the transmission of HIV?		
23.	Can HIV be transmitted through kissing?		
24.	Can the transmission of HIV be minimized by use of anti-retroviral drugs (ARVs)?		
25.	Can family planning methods other than condom use prevent the spread of HIV?		

**Section D: Risky sexual behaviors associated with HIV**

26. Do you use a condom consistently and correctly during sexual intercourse with your regular partner?

- (1) Yes      (2) No

27. If no, what are the reasons for not using condoms regularly?

- (1) Believe they have natural immunity  
(2) Believe they are protected by God  
(3) Less pleasure/discomfort  
(4) Believe gentle sexual intercourse is safe  
(5) Believe certain positions  
(6) Believe certain timing reduces risk of transmission

28. Have you had sexual intercourse using condom with your regular partner in the last 12 months?

- (1) Yes      (2) No

29. How many sexual partners do you have apart from your regular partner?

- (1) None      (2) 1      (3) 2      (4) 3      (5) More than 3

30. Have you had sexual intercourse without a condom with other partners apart from your regular partner in the last 12 months?

- (1) Yes      (2) No

31. During the time of deployment away from your family, did you engage in sexual intercourse with other partners?

- (1) Yes      (2) No

32. If yes, did you engage in sexual intercourse under the influence of alcohol?

- (1) Yes      (2) No

33. What sexual behaviors do you use as a preventive strategy to avoid contracting HIV?

- (1) Consistent and correct condom use  
(2) Abstinence  
(3) Not sharing bed  
(4) Others (specify) .....

**Section E: HIV status disclosure**

34. When did you confirm HIV positive?

- (1) 1-3 months    (2) 4-6 months    (3) 7-9 months    (4) Others  
(Specify).....

35. Do you know the HIV status of your partner?      (1) Yes      (2) No

36. If no, what are reasons?

- (1) I trust my partner  
(2) I have never asked  
(3) Don't think my partner can be HIV positive  
(4) Am scared of asking my partner

(5) Others (specify) .....

37. Does your partners know your HIV status? (1) Yes (2) No

38. If no, why?

(1) It is private

(2) He/she trusts me

(3) He/she is scared of asking

(4) Others (specify) .....

39. Who else have you disclosed your status to?

(1) Relative (2) Friend (3) Pastor/Priest (4) Others (Specify)

.....

40. Do you fear that healthcare workers at the clinic would disclose your HIV status to your partner?

(1) Yes (2) No

### **Appendix III: Focus Group Discussion Guide**

**Title:** Factors associated with HIV status disclosure among individuals in a HIV sero-discordant relationship at the Defence Forces Memorial Hospital, Nairobi, Kenya

Code: ..... Date: .....

Time: ..... No. of Participants: .....

#### **PART A: CONSENT EXPLANATION**

**Project Title:** Factors associated with HIV status disclosure among individuals in a HIV sero-discordant relationship at the Defence Forces Memorial Hospital (DFMH).

##### **Purpose of the Study**

The HIV and AIDS stigma is a great public health concern in Sub-Saharan Africa (SSA) where majority of the infections and deaths occur. There is an urgent need to identify interventions to prevent new infections and HIV status disclosure is one of the interventions. Disclosure is likely to improve uptake of HIV testing, increase enrollment into HIV care, treatment and support services and reduce stigma, psychosocial and economic challenges faced by these individuals. I therefore need your permission before we begin the discussion. My purpose in talking with you today is to learn more about the factors associated with HIV status disclosure among individuals in a sero-discordant relationship.

Anything you tell me will not be personally attributed to you in any reports that result from this discussion. All the data both recorded and reports will be written in a manner that no individual comment can be attributed to a particular person.

##### **Procedures to be followed**

You shall be taken through the consent form and explanations for various concerns that you will raise shall be given before you are enrolled into the study. However, if you wish to participate in this study, we shall require your signed consent. At the end

of the study you shall be informed of the results. The results will also be communicated to the community and sponsors, and both in local and international scientific conferences.

### **Benefits**

The results of this study will assist you and other clients to make informed choices about your future health. In addition, the finds will help in policy making with special regard to disclosure among HIV sero-discordant individuals including the aspect of preventive measures focusing on this risky group.

### **Risks**

There are no major risks anticipated from this study since there is none that has ever been reported from similar studies that have been done in other areas.

### **Compensation Mechanism**

This will not be applicable since there no foreseeable risks as highlighted above.

### **Alternative Treatments**

There shall be no other treatments that will be conducted on you during the course of this study apart from your voluntary participation in answering the questions stated in the study questionnaire.

### **Confidentiality**

All the information that shall be obtained from you shall be confidential to protect your privacy. This shall be done by giving codes to your medical records thereby avoiding the use of your name when gathering information from you. In addition, all hard copy records shall be under lock and key. Your information shall be accessed by professionals involved in the study and who are authorized to do so but can't recognize your identity.



There is no identity of any client that shall be disclosed in any public conferences, reports or publications.

### **Voluntarism**

I would like to inform you that there are problems anticipated in the course of the study. I also wish to inform you that your participation is voluntary and that you have the right to withdraw from the study at any time. In addition, in the event that you develop medical problems not directly related to this study, you shall be given immediate medical attention by qualified health professionals working at the clinic.

### **Inquiries**

I would like to urge you to ask as many questions as possible to enable you make an informed decision before the study. A copy of this agreement shall be made available to you.

In case you need more information or clarification about the study, you can contact us on the following numbers:

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6. Dr. Dennis Gichobi Magu

Tel: 0722 574 388

*E-mail:* [magudennis@gmail.com](mailto:magudennis@gmail.com)

## **PART B: CONSENT**

Please read the information sheet (PART A) or have the information read to you carefully before completing and signing this consent form. If you have questions about the study, please ask the investigator prior to signing your consent form.

### **Declaration of the volunteer**

I have read the information sheet concerning this study and I voluntarily consent to participate in this study. I therefore give consent to .....

to include me in the proposed study entitled; Factors associated with HIV status disclosure among attending Defence Forces Memorial Hospital (DFMH).

1. Participant's Signature..... Date .....

2. Participant's Signature..... Date .....
3. Participant's Signature..... Date .....
4. Participant's Signature..... Date .....
5. Participant's Signature..... Date .....
6. Participant's Signature..... Date .....
7. Participant's Signature..... Date .....
8. Participant's Signature..... Date .....
9. Participant's Signature..... Date .....
10. Participant's Signature..... Date .....
11. Participant's Signature..... Date .....
12. Participant's Signature..... Date .....
13. Investigator's Signature..... Date .....

**PART C: FGD QUESTIONS**

Do you have any questions before we begin? Thanks in advance.

**Theme One: Knowledge of HIV transmission risk among individuals in a HIV sero-discordant relationship**

1. Considering your understanding of your status, what is your opinion on the risk of transmission of HIV among individuals in a HIV sero-discordant relationship?

Probe 1: Between you and your partner/partner .....

.....

Probe 2: Multiple sexual partners .....

.....

Probe 3: Future pregnancies .....

.....

Probe 4: Prevention strategies (ABCs, Voluntary male circumcision, ARVs)

.....

**Theme Two: Health Risk Behaviors among individuals in a HIV sero-discordant relationship**

3. What would be your comment on some of the following practices in relation to HIV transmission?

Probe 1: HIV status Disclosure.....

.....

Probe 2: Alcohol/substance abuse in sexual context.....

.....

Probe 3: Consistent and correct condom use .....

.....

Probe 4: Sexual engagement with multiple sexual partners .....

.....

Probe 5: Adherence to ART .....

.....

**Theme Three: Attitudes**

4. What is your feeling regarding your HIV status on the following:

Probe 1: Towards caregivers and them towards you .....

.....

Probe 2: Towards others and them towards you .....

.....

Probe 3: Towards your partner/sexual partner and him/her towards you .....

.....

Probe 4: Towards the CCC program .....

.....

5. Any other comments

.....

.....

.....

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**RISKY SEXUAL BEHAVIOURS AMONG HIV SERO-DISCORDANT INDIVIDUALS ATTENDING DEFENCE FORCES MEMORIAL HOSPITAL IN NAIROBI, KENYA**

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**RISKY SEXUAL BEHAVIOURS AMONG HIV SERO-DISCORDANT INDIVIDUALS ATTENDING DEFENCE FORCES MEMORIAL HOSPITAL IN NAIROBI, KENYA**

J. M. ORINA, F. M. KYALLO, J. MUTAI, and D. G. MAGU

**ABSTRACT**

**Background:** HIV/AIDS pandemic is a great public health concern hence the need to identify interventions to prevent new infections among risk groups.

**Objective:** To determine risky sexual behaviours among HIV sero-discordant individuals attending Defence Forces Memorial Hospital (DFMH).

**Design:** A descriptive cross-sectional study

**Setting:** Defence Forces Memorial Hospital (DFMH) Nairobi.

**Results:** Eighty eight point six per cent (88.6%) study participants used condoms regularly during sexual intercourse with their partners, with a large number (95.7%) of those who did not use condoms citing less pleasure or discomfort during sex as their main reason. Most of those with multiple sexual partners (76.1%) had used a condom 12 months prior to the interview while 23.9% had had sex without condom use. Fifty eight (17.8%) participants engaged in sexual intercourse with other partners while deployed away from their families while most of them (82.2%) did not.

**Conclusion:** There is need to enhance HIV interventions and preventive strategies among special risk groups in the society.

**INTRODUCTION**

HIV/AIDS remains a major public health concern with the sub-Saharan Africa region as the home to almost 70% of all HIV infected. Approximately 35.8 (32.2-38.8) million people infected globally, 2.3 (1.9-2.7) million newly infected and an estimated 1.6 million people dead due to AIDS-related illnesses by 2012(1).

In sub-Saharan Africa, a significant proportion of new HIV infections occur within cohabiting individuals(2) and married HIV-discordant individuals(3,4). Studies from SSA region show that between 30-50% of married HIV infected individuals have an HIV uninfected spouse, with new cases of HIV infection increasingly occurring among these relationships(5-7). A longitudinal study on HIV-1 transmission within marriage in Rural Uganda showed that 10.5% of the study participants were HIV sero-discordant(3). These relatively high rates of HIV infection among sero-discordant individuals is supported by findings from other studies in Rwanda and Zambia showing that about 55-93% of new heterosexually acquired HIV infections occurred within stable partnerships (9,10). According to the Kenya AIDS Indicator Survey (KAIS) Preliminary

Report, 5% of those individuals where both partners had HIV test results had a sero-discordant status which corresponded to an estimated 260,000 individuals (11). The statistics were lower compared to the KAIS 2007 report that indicated the percentage of sero-discordant individuals at 6%.

Risky sexual behaviours still remain a great challenge in combating the spread of HIV especially among at risk groups that includes uniformed personnel and sero-discordant individuals among others. An ecological analysis on HIV/AIDS in African militaries clearly indicated that the prevalence rates in most of these militaries are significantly elevated compared to their host communities (12). Peacekeeping operations worldwide tend to exacerbate the spread of HIV whereby peacekeepers could be a source of infection to the local populations or be infected by them in turn, becoming a possible source of infection when they return home. Military personnel therefore play a significant role in the spread of HIV among its personnel and the general population which could in turn lead to an increase in number of HIV sero-discordant individuals. In the Kenyan military, HIV sero-discordant individuals face similarly unique challenges due to the nature

of their working environment. Knowledge about the transmission, risky behaviour practices and poor attitudes portrayed amongst HIV sero-discordant individuals need to be explored. The limited information among HIV discordant couples is a major barrier to developing effective interventions. Such strategies can support positive behaviour and attitudes such as increased condom use, decreased unsafe sexual behaviour and decision making in relevant issues with regard to HIV prevention. Findings from this study will guide the formulation of policies for individuals in a HIV sero-discordant relationship in Kenya.

Despite having limited data on HIV sero-discordance, there is also limited knowledge on how to deal with 'discordance'. Additionally, the HIV negative partner in a HIV sero-discordant relationship is at an ever increasing risk of acquiring HIV infection from the HIV positive partner further compounding the situation.

This study therefore seeks to provide evidence based data to policy makers to improve preventive strategies, care and management and further minimize the spread of HIV among sero-discordant military personnel and to the civilian population in general.

The general objective of this study is to determine risky sexual behaviours among HIV sero-discordant individuals attending Defence Forces Memorial Hospital (DFMH).

The study aims to provide information on risky sexual behaviours, HIV status disclosure and factors associated with disclosure among sero-discordant clients at the military. It will also generate findings that will provide a basis for the development of prevention and treatment policies regarding HIV infected sero-discordant persons for more extensive and longer-term interventional studies.

## MATERIALS AND METHODS

The study will be conducted at the Defence Forces Memorial Hospital's Comprehensive Care Centre (CCC) that is located approximately 15 kilometers from the city centre, Nairobi (which is the Kenyan capital city), along Mbagathi Road off Ngong Road.

This will be a cross-sectional descriptive study. The study involved approximately 420 HIV sero-discordant clients attending the CCC at DFMH and who will be recruited as individuals into the study.

**Sample size determination:** Sample size was determined using a formula (as recommended by Fisher *et al.*, 1998)

$$n = z^2 pq / d^2$$

n= desired sample size

z= standard normal deviate which is equal to 1.96 corresponding to the 95% confidence limit.

p= prevalence of discordant individuals was hypothesized to be assumed 50%

p= 0.5

q=1.0- p = 0.5

6

d= the confidence limit of the prevalence (p) at 95% confidence interval

= 1 - Confidence interval

= 1 - 0.95

= 0.05

Degree of accuracy desired for the study was hence set at 0.05

Thus

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

n = 384

**Sampling Procedure:** A systematic random sampling criterion was used, to achieve the nth among the 384 participants.

**Pre-Testing the Questionnaire:** The data collection tool was subjected to a pre-testing at Thika Partners in Prevention CCC among individuals in a sero-discordant relationship enrolled for care.

**Data Collection:** Data collection was done by use of structured questionnaires ensuring high level of privacy and confidentiality. To collect qualitative data regarding attitude and practices a focus group guide was used.

**Data Storage:** The data collected were entered into a computer database designed using MS-Access application. Data cleaning and validation was performed to achieve a clean set that was exported to Statistical Package for Social Sciences (SPSS) Version 21.0. The information was coded and password protected whereas filled questionnaires will be arranged in folders and properly kept in lockable drawers for confidentiality.

**Data Analysis:** Data from the MS-Access database was analyzed at the Data Centre, Department of Defense (DOD), using the SPSS Version 21.0 program. Descriptive statistics was used to analyze continuous and categorical variables. Pearson's Chi-square test of association between independent and dependent variables was used and level of significance was 0.05 (p=0.05) at 95% confidence interval.

## RESULTS

Majority of the participants (88.6%) used condoms regularly during sexual intercourse with their partners and a large number (95.7%) of those who did not use condoms cited less pleasure or discomfort during sex as their main reason for not using. Others believed that they were being protected by God (2.9%) during sex while few others (1.4%) believed they had

natural immunity against the disease. Participants who had had sex with their spouse in the preceding 12 months before the interview were 27.2% and majority of them (72.8%) had used condom during that period. Majority of the participants (86.7%) had no other sexual partners apart from their spouse while 13.3% had other sexual partner apart from their spouse. Most of those with sexual partners other than their spouses (76.1%) had not had sexual intercourse with them without condoms 12 months prior to interview while few of them (23.9%) had had sexual intercourse without condom use.

The deployment away from family affected majority of the study participants (71.7%) in meeting the sexual needs of their spouses while family staying away from the subject's work station did not affect about 51.0% of the study participants. The longest duration for the majority of the study participants to have been deployed away from their family were three to six months indicated by 65.4% followed by seven to twelve months with 23.5% of the participants then one to two years with 8.6%. Participants who had been deployed for more than four years were very few (2.5%). During the time of deployment away from their families, 257 (82.2%) of the participants did not engage in sexual intercourse with other partners apart from their spouse while 58 (17.8%) of the participants did.

Participants who had got sexually related infection were 36.4% while those who had not were 63.6%.

### DISCUSSION

Majority of the participants (88.6%) used condoms regularly during sexual intercourse with their partners. This is supported by findings of a comparative study in Southern India that showed HIV sero-discordant patients were more likely to use condoms with their spouses than concordant patients (49% versus 28.8%;  $P = 0.01$ ) (13). A significant number (95.7%) of those who did not use condoms cited less pleasure or discomfort during sex as their main reason for not using. Findings of a Jeevan Saathi study in India support this by showing that approximately 10% of couples reported inconsistent condom use in the past 3 months and 20% reported intimate partner violence (IPV) (14). 76.1% with multiple sexual partners had sexual intercourse with a condom while few of them (23.9%) had had sexual intercourse without condom use. This finding is supported by evidence of studies that showed that the use of condoms may be low or irregular in different sexual practices of PLHIV (15) and that sero-discordant couples have greater compliance than the general population, though it varies from 39.2% in sero-discordant couples in general, reaching 78.5% in sero-discordant couples where the woman is seropositive (16,17).

During the time of deployment away from their families, 257 (82.2%) of the participants did not engage in sexual intercourse with other partners apart from their spouse while 58 (17.8%) of them did. Evidence from an epidemiological study among US Air Force concluded that the highest risk of HIV infection in the USAF was among young unmarried deployment-naïve males, especially those in higher risk occupation groups (18).

Participants who had got sexually related infection were 36.4% while those who had not were 63.6%. Evidence from a study in the French Forces support this finding by showing that the incidence of STD and HIV seroconversion was respectively 19.2 and 2.8 cases per 100,000 and concluded that STD and HIV seroconversion remain a subject of concern for the French Medical Forces despite low rates of incidence (19). Another study among Serbian Armed

Forces found 36 out of 5617 soldiers to have some form of STD (20).




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## Appendix V: ERC Letter



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Ref: KNH-ERC/A/260

13<sup>th</sup> July 2016

Joshua Mosoti Orina  
Reg. No. TM310-0059/07  
J.K.U.A.T

Dear Joshua,

**REVISED RESEARCH PROPOSAL: FACTORS ASSOCIATED WITH HIV STATUS DISCLOSURE AMONG INDIVIDUALS IN A SERO- DISCORDANT RELATIONSHIP AT THE DEFENCE FORCES MEMORIAL HOSPITAL IN NAIROBI, KENYA (P369/06/2014)**

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH-UoN ERC) has reviewed and **approved** your above proposal. The approval period is from 13<sup>th</sup> July 2016 – 12<sup>th</sup> July 2017.

This approval is subject to compliance with the following requirements:

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

“Protect to discover”

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

Yours sincerely,



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

c.c.     The Principal, College of Health Sciences, UoN  
          The Deputy Director, CS, KNH  
          The Assistant Director, Health Information, KNH  
          The Chair, KNH- UoN ERC  
          Supervisors: Dr. Florence Kyallo , Dr. Joseph Mutai, Dr. Dennis Gichobi Magu