THE INFLUENCE OF ANTIRETROVIRAL THERAPY ON RISKY SEXUAL BEHAVOURS: EXPERIENCE FROM DAR ES SALAAM REGION

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By

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A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Public Health of the Muhimbili University of Health and Allied Sciences

Muhimbili University of Health and Allied Sciences

October, 2008

DECLARATION AND COPYRIGHT

I, Grace Elias Magembe, declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

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DEDICATION

This work is dedicated to all People Living with HIV and AIDS who attend Care and Treatment Clinics in Dar es Salaam for their participation in the study and providing useful information in the fight of HIV epidemic.

I also dedicate this work to my parents Dr. Elias Magembe and Mrs. Abiah Magembe because they are the foundation of my success. May God bless you abundantly!

Lastly, I dedicate it to my husband Dr. Mugisha Clement and our daughter Kemilembe Gabriella Mugisha for their love and support.

ABSTRACT

Provision of ARV therapy may change the type of risky sexual behavior among PLWHA. Studies have shown that, this may happen however, little is known in Tanzania of how such behavior may change with ARV treatment. The study objective was to assess the influence of ARV therapy on sexual risk behavior among PLWHA.

An analytical cross-sectional study of patients attending ART clinics was conducted in July 2008 to assess sexual risk behavior and factors associated with such behavior. Risk sexual behavior was measured using three types of scores related to frequency of sexual activities, type of sexual partner and knowledge about sexual risks. Mean scores were computed and associations were determined using linear regression.

Out of a study sample of 502 HIV positive patients, 49.8% were on ARV and 50.2% were not. The results showed that, there were no differences between ARV users and non-ARV users in risk frequency and risk type scores, (p- value 0.144 and 0.096 respectively). Using risk knowledge scores, people not on ARV treatment were more likely to have high risk behaviors, (p- value 0.0280). Using ARV was not found to be a good predictor of risk sexual behavior, but when adjusted for age, sex, marital status and socio-economic status, ARV use was found to be a significant predictor of risk sexual behavior. ARV use alone did not seem to have an influence on risk sexual behavior; but when adjusted for age, sex, marital status and socio-economic status it was found that PLWHA not using ARV were more likely to engage in high risk sexual behavior. Integrated ART and Prevention programmes may reduce HIV transmission, however, the findings of this study merits further research.

DISSEMINATION OF RESEARCH FINDINGS

The information of this document will be disseminated to Muhimbili University of Health and Allied Sciences, National AIDS Control Programme, Dar es Salaam City Medical Officer, District Medical Officers of the three Municipalities in Dar es Salaam region and the MDH Care and Treatment Programme for HIV in Dar es Salaam.

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LIST OF ABBREVIATIONS AND ACRONYMYS

AIDS	-	**Acquired Immunodeficiency Syndrome**
AKC	-	**Amtulabai Kharimjee Clinic**
ART	-	**Antiretroviral Therapy**
ARV	-	**Antiretroviral Drugs**
DMO	-	**District Medical Officer**
FBO	-	**Faith Based Organization**
HAART	-	**Highly Active Antiretroviral Therapy**
HIV	-	**Human Immunodeficiency Virus**
IDC	-	**Infectious Disease Clinic**
IEC	-	**Information Education and Communication**
IPPF	-	**International Planned Parenthood Federation**
MDH	-	**Muhimbili University of Health and Allied Sciences-Dar es salaam City Council-Harvard School of Public Health**
MSF	-	**Medicins Sans Frontiers**
MSM	-	**Men Having Sex with Men**
NACP	-	**National AIDS Control Programme**
NGO	-	**Non-Governmental Organization**
PHC	-	**Primary Health Care**
PI	-	**Principal Investigator**
PLWHA	-	**People Living With HIV and AIDS**

PMTCT	-	**Prevention of Mother to Child Transmission of HIV**
RA	-	**Research Assistant**
RMO	-	**Regional Medical Officer**
SES	-	**Socio-economic Status**
STI	-	**Sexually Transmitted Infections**
TACAIDS	-	**Tanzania Commission for AIDS**
THIS	-	**Tanzania Health Indicator Survey**
UNAIDS	-	**Joint United Nations Programme on HIV and AIDS**
VCT	-	**Voluntary Counseling and Testing**
WHO	-	**World Health Organization**

CHAPTER ONE: INTRODUCTION

1.1 Background

It is estimated that, more than 40 million people world wide are now living with HIV. Sub-Saharan Africa is the world's severely affected region; data shows that with only 10% of the world's population, it harbors about two thirds of the global total number of people living with HIV and AIDS. (UNAIDS Report, 2007).

In Tanzania, the first cases of AIDS were reported in the year 1983 in Kagera region, thereafter, the HIV epidemic has spread rapidly to all districts and communities affecting all sectors of the society. With a national prevalence of 6%, this translates to 2million Tanzanians living with HIV, the most affected age group being 15-49 years. It is also reported that women are more affected than men i.e. 8% vs 6%; however, there is a wide regional variation. (THIS, 2005).

There have been promising developments in recent years in global efforts to address AIDS epidemic including access to effective treatment and prevention programmes. These include but not limited to the"3 by 5" target of putting 3 million people on ART—half of those in most urgent need—by the end of 2005 which was set by the World Health Organization and its partners in the Joint United Nations Programme on HIV/AIDS.

The theme of the 15th International AIDS Conference in Bangkok was "Access for All" demanding an extension to all those in need both sufficient resources and a set of proven interventions to prevent new infections and save lives through effective treatment. (UNAIDS Report, 2007).

This has led to a widespread access to effective antiretroviral therapy (ART) for people living with HIV/AIDS, ARV are now available and even in countries with severely limited resources.

Tanzania responded to this Global initiative by establishing the Care and Treatment Plan for HIV through the formation of the National AIDS Control Programme within the Ministry of Health and Social Work. This was followed by the formation of the Tanzania Commission for AIDS with a mandate to lead the multisectoral response (National Care and Treatment Plan, 2003-2008). The plan targeted to cover about 400,000 to 500,000 HIV infected Tanzanians on Anti-retroviral therapy in a period of five years starting from tertiary health facilities up to primary health facilities so as to ensure accessibility. In Tanzania, there are about 200 sites providing care and treatment to PLWHA in the country. A total of 172,736 have been enrolled in ARV clinics, of these 84,621(49%) are on ARV and 88,115 (51%) are on monitoring for disease progression (THIS, 2005). In Dar es Salaam the prevalence of HIV is estimated to be 11% which is higher than the national prevalence. It constitute 1/3 of all patients attending ARV clinics in the country and ¼ of patients receiving ARV therapy

treatment, with >90% of patients attending public facilities. (Dar es salaam Regional HIV/AIDS Report, 2007; THIS, 2005)

The impact of large-scale roll-out of treatment programs, however, is not certain. Experience to date is limited and comes mostly from Western countries and Brazil which shows an increase in risky sexual behavior among people using ARV. (Marins J et al, 2003; Cascade Collaboration, 2003). A number of studies have been conducted in Western countries looking at the impact of massive scale up of ARV treatment. Results have shown that there has been a tremendous decline in morbidity and mortality due to HIV and AIDS, but these success stories have been accompanied by a resurgence in HIV incidence due to increasing risk behavior as emphasis shifted from prevention to treatment in the 1990s (Katz M et al, 2002; Gremy I et al, 2001; Dukers N et al, 2002). This experience from high-income countries underscores the potential failures to adapt prevention strategies to an environment in which life-saving treatment becomes available on a large scale. Studies indicate that rising risk behavior is not an inevitable outcome of increased treatment access. (Wolf K et al, 2003; Moat J et al, 2003).

This could be due to a weakness in prevention strategies in many countries that target people living with HIV and failure to address the special needs of PLWHA. It is important to remember that, people with HIV have an essential role to play in preventing new infections and therefore, HIV/STI prevention strategies should address the distinct prevention needs of people with HIV and acknowledge their significant efforts to avoid infecting others. (Collins C et al, 2000).

On the other hand, wide spread access to ART also offers critical new opportunities for HIV prevention such as increased HIV testing rates, reduced stigma and possibly reduced infectivity for those on ART. (Fleming D et al, 1999). This implies that, with the advent of new treatment for HIV infection than ever before, a comprehensive prevention strategy must therefore include programmes to assist people with HIV to take measures to avoid the possibility of exposing others to HIV infection.

1.2 Problem Statement

Despite increased coverage of ARV treatment services, HIV prevention efforts have historically focused on "at risky populations"(i.e. uninfected individuals at risk for acquiring HIV due to risky sex or drug use behaviors).

Recently the focus of prevention has broadened to include individuals already infected with the virus. This has led to the introduction of a new concept of positive prevention i.e., prevention of HIV targeting individuals who are already infected with HIV virus. (International HIV/AIDS Alliance, 2003). In some countries sufficient resources and a set of proven interventions to prevent new infections and save lives through effective treatment with ARV have been put in place.

However some evidence suggests that, since ARV became available, some PLWHA have not been able to change their sexual behavior.

A study done in Uganda on sexual behaviors among people using ARV revealed that 15% were still practicing unsafe sex despite being on treatment for >6/12. (Crepaz N et al, 2004)

Another study done in Europe revealed that, since ARV became available the prevalence of unprotected sex and the incidence of sexually transmitted infections increased among men having sex with men. (Chen S et al, 2002)

Factors contributing to continuous infection among PLWHA could include beliefs that HIV is less severe and threatening due to the availability of HAART, lack of positive prevention strategies targeting infected people such as beneficial disclosure, partner notification and counseling for discordant couples and correct and consistent use of condoms. (Schiltz M et al, 2000). It is also important to put into consideration other factors that could influence such risk behavior as lack of knowledge on the concept of positive prevention and its consequences among PLWA since if not well included in adherence counseling to ARV, it could also significantly contribute to increased risk behaviors among PLWHA (International HIV and AIDS Alliance, 2003).

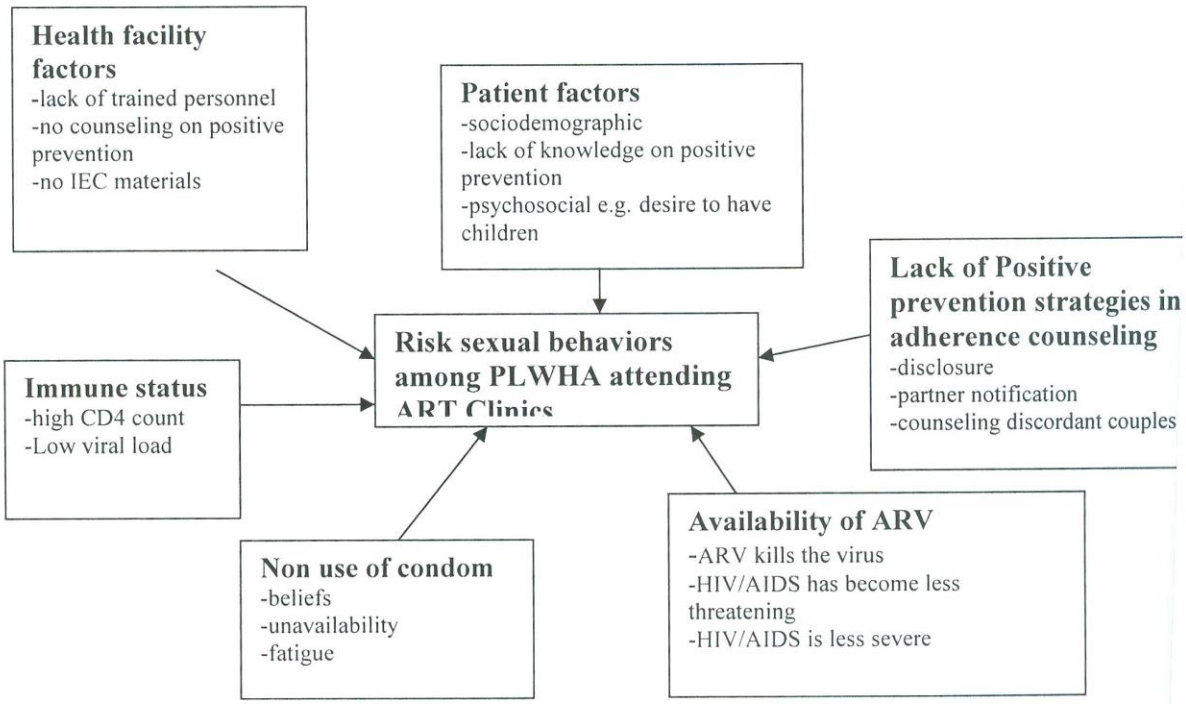
The Tanzania National Care and Treatment Plan gave guidance on how to provide positive prevention to people attending ARV clinics. The guidelines include the following services; treatment and prevention of STI among PLWHA, Condom Promotion, Prevention of Mother to Child Transmission of HIV, Promoting disclosure and identification of risk behaviors that could predispose PLWHA to new infections. (NACP Guidelines, 2005).

Despite all these efforts, many patients attending ARV clinics attempt to practice safer behaviors to protect themselves, their partners and other people, but they find it difficult to change their behavior and their efforts at reducing HIV transmission risks may be

inconsistent. Little is known in Tanzania on awareness of PLWHA as far as positive prevention is concerned and the influence of ARV availability on risky behavior.

Therefore, the purpose of this study is to uncover sexual risk behavior among PLWHA and factors associated with such behavior. The findings of this study will be used by implementers, policy makers and PLWHA to improve prevention services within ARV clinics and to put prevention strategies targeting PLWHA.

1.3 Conceptual Framework



1.4 Rationale of the Study

Helping HIV positive patients attending ARV clinics to reduce risk sexual behaviors and maintain behavioral changes has significant implications to themselves, their partners and the community at large.

It will reduce the incidence of HIV transmission to uninfected people since they represent a source from which future infections may be generated. If HIV infected individuals continue to practice unprotected sex they put their uninfected partners at risk of acquiring HIV infection. Even if they engage in unprotected sex with another infected individual, they and their partners are at risk of acquiring other STI and HIV dual infection.

Dual infections occur when an HIV individual is infected with two different strains from different sources. This is associated with faster disease progression as well as drug resistance and complications in ART treatment.

As ARV clinics continue to expand, more people will have access to ARV which will significantly prolong their life and health hence increasing the number of opportunities for HIV transmission to occur.

Therefore, findings of this study will help implementers, PLWHA and other stakeholders to design prevention strategies addressing specific needs of PLWHA attending ARV clinics.

1.5 Objectives

1.5.1 Broad objective

To assess the Influence of Antiretroviral Therapy on risky sexual behavior among PLWHA.

1.5.2 Specific Objectives

1. To determine the distribution of sexual risk behaviors among PLWHA attending ARV clinics.
2. To determine association between ARV intake and sexual risk behaviors among PLWHA attending ARV clinics.
3. To explore factors affecting sexual risk behaviors among PLWHA.
4. To assess awareness of positive prevention among PLWHA attending ARV Clinics.

CHAPTER TWO: LITERATURE REVIEW

2.1 Overview

Greater availability of treatment for the 40 million people currently infected with HIV is a humanitarian step that could prolong the lives of millions, restore economic productivity and stabilize societies in some of the hardest hit regions.

Access to HIV treatment and care in developing countries is at last becoming a global priority. Governments, international agencies and drug manufacturers and private organizations are mobilizing enough resources to increase access to life prolonging anti-retroviral therapy (Global Prevention HIV Working Group, June 2004).

But long successes against HIV require simultaneous expansion of both ART and prevention. For example the WHO/UNAIDS 3 by 5 initiative establishes the goal of having 3million people on ARV by 2005 but at the same time 5 million new infections do occur every year (WHO Report, 2006).

Several other studies have shown that, the encouragement provided by ART programmes have shown to benefit HIV prevention efforts (Kilmarx M et al, 1998).

However, it is important to remember that, provision of ART at a large scale could have both prevention benefits and consequences. Benefits include but are not limited to increased access to knowledge of HIV and behavioral changes, reduced stigma and reduced infectivity.

Consequences include beliefs that HIV is no longer a serious problem, people on ARV with low viral load are no longer infectious and ARV may kill the virus and increase

number of opportunities for HIV infection to occur.

2.2 Potential Prevention Benefits of ARV Treatment

Greater access to ART is likely to influence prevention in a variety of ways; these include:

- **Increased knowledge of HIV status and behavioral change**.

Studies have shown that, availability of ART may influence positive behavior towards HIV screening as it gives people confidence in their results whether positive or negative. Two pilot ART projects in Haiti and South Africa generated an increase in voluntary counseling and testing uptake to 300 % and 1200 % respectively. (Mukherjee J et al, 2003; MSF South Africa, 2003). Again in the year 1996 after former President Fernando Henrique Cardoso announced that ART would be provided in public facilities, demand for VCT increased from 1.8 million in 2002 to 2.3 million in 2003. (Global HIV Programme, 2003).

In a controlled trial in three developing countries (Kenya, Tanzania and Trinidad) ,individuals receiving VCT were nearly more than three times likely to reduce risky sexual behaviors than those who had only received health education, with HIV infected individuals being more likely than uninfected individuals to take protective measures.(Voluntary HIV-1 Counseling and Testing Efficacy Study Group, 2000)

- **Reduced Stigma**

Stigma may impede the dissemination of life-saving HIV prevention information within communities and discourages key social institutions from becoming engaged in efforts

to curb transmission. Experience from Cape town showed that, after the introduction of ART in Khayelitsha Township, people were more likely to express willingness to test for HIV, seek for HIV health information, counseling and use condoms compared to the time when ARV were not available (MSF South Africa, 2003) .

- **Reduced Infectivity**

Existing data suggest that broad access to ART when combined with adherence intervention might reduce an individual risk of transmitting HIV. (Porco D et al, 2004). This is because use of ARV reduces the amount of virus in body fluids such as semen, blood, vaginal fluids and saliva.

It is also believed that the incidence of HIV strongly correlate with the infected persons plasma viral load and therefore, people with high viral load are more likely to transmit the infection compared to individual patients on ART with significant reduction in viral load (Quinn T et al, 2001; Palella C et al, 1998).

2.3 The Potential Problems Associated with ART

It has been shown in some countries that, there is a possibility for the prevention benefits of ART to be overwhelmed by complacency about the threat of HIV and resulting in increased risk behavior and new HIV infections (Stolte I et al, 2004)

Increase in risk behavior may occur for a variety of reasons, including a belief by some that HIV is no longer as serious and the perception that HIV positive people on ART are no longer infectious.

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Some evidence suggests that since HAART became available, the prevalence of unprotected sex and the incidence of sexually transmitted infections including HIV have increased, mostly among men who have sex with men. (Chen S et al, 2002; Katz M et al, 2002).

HIV positive individuals receiving HAART, especially those with low viral load may feel protected from transmitting HIV sexually since evidence does suggest that a low viral load may reduce the level of infectiousness of PLWHA receiving HAART. (Quinn T et al, 2000). However, it should be remembered that, this may not in fact be the case since it also leaves them at risk of STIs if the couple is not monogamous and of unintended pregnancy if no other contraceptive method is used.

2.4 Delivering Prevention in ART Clinical Setting

With increased ART coverage, many people will access services provided in health care settings, this will in turn provide new opportunities to deliver and reinforce risk reduction interventions. However, this implies building capacity, providing the necessary infrastructure as well as provision of supplies at facility level for implementation of prevention at the ART clinical setting. This includes the following measures;

- **HIV prevention Training for Clinicians**

In stead of depending on the old counseling protocols for VCT, a brief intervention by a clinician could be suitable, for example remind the patients of the importance of safer sex, provide information on clinic-based access to condoms and counseling and ask if

the patient wishes to discuss issues related to prevention. A clinic based study found that, the delivery by medical providers of brief HIV prevention messages that emphasizes the dangers of unsafe sex reduces risk behavior among HIV positive patients (Richardson E et al, 2004). On the other hand, counselors need training, remuneration and strong support to provide prevention messages targeting PLWHA (Mutsungah Y et al, 2002).

- **Access to Condoms**

Male and female condoms should be readily available in ART settings. Correct and consistent use of condoms among PLWHA will prevent them from transmitting the infection to uninfected partners; prevent unwanted pregnancies, re-infection with new strains of HIV virus and acquisition of other sexually transmitted infections. Some may be reluctant to disclose their HIV status or negotiate condom use with their partners for fear that it would raise suspicions about infidelity, cause conflict or violence, or lead to the end of the relationship (Engender Health and UNFPA, 2006). It has been reported that, even highly motivated condom users may fail to purchase due to cost or simple lack of availability of male or female condoms. (The Guttmacher Report on Public Policy, 2005).

- **Encouraging Beneficial Disclosure and Ethical Partner Notification**

This is based on the informed consent of the people with HIV and, where possible, maintains the confidentiality of the source people with HIV so that their names are not revealed to the partners being notified /counseled. Ethical partner notification also takes into account the serious consequences of people with HIV not being willing to notify

their partners which could lead to possible HIV infection. Experience tells us that some HIV positive individuals who want to disclose their status to their partners or relatives may not feel able to do so for fear from violence, stress, uncertain stability of relationship (Stewart R et al, 2000) as well as emotional trauma, blame and stigmatization (Fenton K et al, 1997; UNAIDS/FHI, 2001).

- **Counseling of Discordant Couples**

Discordant couples may forget condoms when they think the HIV-positive partner's viral load is too low to permit transmission (Cooper et al, 2005; IPPF, 2005). However, for condom use to be of value and useful, they need to be used consistently and correctly.

Some studies have shown that, correct and consistent condom use over long periods as in the case of discordant couples is difficult for most people, and even the most well-intentioned may experience prevention "fatigue."(Cohen S et al, 2002).

Most prevention strategies to date have been targeted to uninfected people to prevent them from becoming infected with HIV, forgetting the fact that for every new infection that will occur, an HIV positive person must be involved, therefore, there are enough reasons to consider prevention strategies that will meet the particular needs of people living with HIV.

METHODOLOGY: CHAPTER THREE

3.1 Study Area

Dar es Salaam region has a population of about 4 million people with an annual growth rate of 4.3% (Population and Housing Census, 2002). Administratively, it has 3 districts, 11 divisions, 73 wards and 276 streets. In terms of health facilities, the City has 24 hospitals which include 3 district hospitals, 25 health centers and 473 dispensaries (Dar es salaam City Council Profile, 2007). It is one of the regions in Tanzania with a high prevalence of HIV about 11% and it constitutes ¼ of all patients enrolled in the ARV clinics in the country whose patients differ significantly in terms of socio-economic and socio-demographic characteristics. (THIS, 2005)

Currently eleven public health care facilities offer ART services; these include Amana, Temeke and Mwananyamala districts hospitals. Health centers include Sinza, Buguruni and Mbagala rangi tatu; dispensaries include Kigamboni, Tandale and Tabata. The other two clinics IDC and AKC are special; the former is dedicated to taking care of youths and the later for pregnant women and their spouses.

The Care and Treatment Programme is run jointly by Dar es salaam City Council, Muhimbli University of Health and Allied Sciences and Harvard School of Public Health.Until the end of June 2008, a total of 36,410 were enrolled in public facilities, out of which 21,180 (58%) were on treatment with ARV and 15,230 (42%) were on follow-up and monitoring for disease progression.

Private health facilities have less than 10% of the total patients attending ART clinics in Dar es salaam and therefore the study was conducted in public facilities because of their large number of patients, likely to get permission to conduct the study, longer duration in providing ARV services and consistency in following national guidelines.

3.2 Study population

All HIV positive adults attending selected public ART clinics, both patients on ARV and those not on ARV coming in the morning and afternoon shifts were included in the study.

3.3 Inclusion and Exclusion criteria

Men and women aged between 18-70 years attending public ART clinics for a period of three or more months were included in the study; patients who were very sick were excluded.

3.4 Study type

An analytical cross-sectional study using quantitative methods was conducted.

3.5 Sample size estimation

Study sample was determined by using the power formula for determining sample size using two proportions. The following inputs were used;

p_1=proportion of patients not using ARV who practice unsafe sex, 50%

p_2=proportion of patients using ARV who practice unsafe sex, 35%

z=level of confidence, 1.96 for 95% confidence level

β=power, probability of detecting a significance difference, 90%

α=significance level, 0.05

$Z_{1-\alpha/2} = 1.96$

$Z_{1-\beta} = 1.28$

Formula, $n = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 \ [p_2 (100-p_2) + p_1 (100-p_1)]}{(p_2 - p_1)^2}$

3.6 Sampling Technique

Study participants were recruited using a two stage sampling scheme.

In the first stage, ballot method was performed to obtain three health facilities out of four from Ilala district, these were Amana, IDC and Buguruni, two out of three from Temeke district, these were Temeke district hospital and Mbagala health centre and two from Kinondoni district, these were Mwananyamala district hospital and Sinza health center.

Subjects were selected from each district based on the proportion of patients enrolled in each district, the contributions from the three districts were as follows; Ilala 217 (43.2%) participants, Kinondoni 160 (31.9s %) participants and Temeke 125 (24.9%) participants.

The second stage involved a ballot method to select seven study participants from each clinic on each day in the evening from a list of patients expected to attend the next day. On each day, half of the participants enrolled were on ARV and the rest were not on ARV.

In case the participant did not show up on the day of interview or refused to participate in the study, the number was compensated the following day.

3.7 Data collection Technique and Tools

Data collection was done using structured questionnaires with both open and closed-ended questions.

The questionnaire consisted of 4 parts (I-IV) with a total of 27 questions. The questions covered background information (16 items), level of risk sexual behavior (5 items), factors predisposing PLWHA to risk sexual behaviors (2 items) and awareness on positive prevention (4 items)

3.8 Variables

- ***Dependent variables***

They were divided into three categories; risk frequency, risk type and risk knowledge. Risk frequency was determined by looking at the number of sexual partners a participant had in the last six months and at the time of interview, risk type was measured by looking at the type of sexual partner the participant had sex with and whether they used a condom or not. Lastly risk knowledge was measured by looking at disclosure status of the participant and his partner.

- ***Independent/explanatory variables***

The main explanatory variable was use of ARV or not. Other variables were socio demographic factors such as sex, age and marital status which were coded into male and

female, age less or equal to 30 years and above 30 years, single, married and divorced/separated respectively.

Socio economic factors included education level coded as primary and below and post secondary, occupation was coded as employed, unemployed and students and lastly socio economic status which was coded as low, medium and high.

In addition, integration of HIV Prevention and Treatment was examined by looking at counseling on risky reduction, disclosure status, partner notification, IEC materials, health education, VCT and PMTCT services.

3.9 Definition and Measurement of Risk Behavior

In the questionnaire there were questions assessing risk behavior, these questions were combined to assess risk behavior in terms of frequency of risk behavior, type of sexual partner and use of condom and knowledge on new infection. Three risk variables were developed using a set of questions from the questionnaire, the categories were put on a continuous scale. These were termed **RISK F, RISK T** and **RISK K**

Risk F was scored based on the last time a participant had sexual intercourse, those who had last sexual intercourse in the past one or more years had the lowest risk frequency and those who had sex in the last six or fewer months they were asked how many partners they had in the last six months and how many they had during the interview.

Risk T was scored based on the last time a participant had sexual intercourse, those who had last sexual intercourse in the past one or more years had the lowest risk type, for

those who had sex in the last six or less months they were then asked who they had sex with and whether they used a condom.

Risk K was scored based on the last time a participant had sexual intercourse, those who had last sexual intercourse had the in the past one or more years had the lowest risk knowledge, those who had sex in the last six or fewer months were then asked if they had disclosed to each other and scored accordingly.

3.9.1 Risk Frequency (Coded as Risk F)

The scores were coded as 0-3 with 0 being the lowest risk score and 3 being the highest risk score.

If the respondent had sexual intercourse in the last one year or more then, RISK F = 0

If the respondent had sexual intercourse in the last six months or less with one sexual partner and had none at the time of interview, then, RISK F = 1

Or if the respondent had sexual intercourse in the last six months or less with more than one partner and had none at the time of interview, then, RISK F = 1

If the respondent had sexual intercourse in the last six months or less with one sexual partner and still had one partner at the time of interview, then, RISK F = 2

Or if the respondent had sexual intercourse in the last six months or less with more than one sexual partner and had reduced the number of partners to one at the time of interview, then, RISK F = 2

If the respondent had sexual intercourse in the last six months or less with more than one sexual partner and still had more than one partner at the time of interview, then, RISK F = 3

Or if the respondent had sexual intercourse in the last six months or less with one partner but had more than one at the time of interview, then, RISK F = 3

With reference to appendix 1, the definition above is summarized below;

i. If question 17 is ≥ 3 then, RISK F=0 (LOWEST RISK)

ii. If question 17< 3 - and question 20 =1 and question 21=0, then

RISK F=1

- and question 20=1 and question 21=1, then

RISK F=2

- and question 20=1 and question 21=>1, then

RISK F =3

- and question 20>1 and question 21=0, then

RISK F=1

- and question 20>1 and question 21=1, then

RISK F=2

- and question 20>1 and question 21=1, then

RISK F=3

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3.9.2 Type of Partner (Coded as Risk T)

The scores were coded as 0-12 with 0 being the lowest risk score and 12 being the highest risk score. The scores were based on the last time a respondent had sexual intercourse, type of sexual partner and condom use.

If the respondent had sexual intercourse in the last one year or more then, RISK T = 0

If the respondent had sexual intercourse in the last six months or less then the score was determined by multiplying the code of the response of type of last sexual partner either a spouse, lover or prostitute and the code of the response on use of condom.

With reference to appendix 1, the above definition is summarized below;

i. If question 17 is ≥ 3 then, RISK T=0 (LOWEST RISK)

ii. If question 17 is < 3, then RISK T will be determined by

question 18 × question 22 to give the following options;

- 1×3=3 (spouse and used condom)
- 1×4=4 (spouse and didn't use condom)
- 2×3=6 (lover and used condom)
- 2×4=8 (lover and didn't use condom)
- 3×3=9 (prostitute and used condom)
- 3×4=12 (prostitute and didn't use condom) (HIGHEST RISK)

3.9.3 Risk Knowledge (Coded as Risk K)

The scores were coded as 0-8 with 0 being the lowest risk score and 8 being the highest risk score. The scores were based on the last time the respondent had sex, if the

respondent knew the serostatus of the partner and whether the respondent had disclosed his serostatus to his partner.

If the respondent had sexual intercourse in the last one year or more then, RISK T = 0

If the respondent had sexual intercourse in the last six months or less then the score was determined by multiplying the code of response whether the respondent knew the serostatus of his partner by the code of the response whether the respondent had disclosed his status to his partner.

With reference to appendix 1, the above definition is summarized below;

i. If question 17 is ≥ 3, then RISK K = 0 (LOWEST RISK)

ii. If question 17 is < 3, then RISK K will be determined by question 19 × question 23 to give the following options;

- 3×1=1 (both disclosed)
- 3×2=6 (know his/hers but don't disclose yours)
- 4×1=4 (don't know his/hers but disclosed yours)
- 4×2=8 (both not disclosed) (HIGHEST RISK)

3.9.4 Definition and Measurement of Socio-economic Status (SES)

SES was measured by using the type of items owned and the level of education of the respondent. The items included tape water, television, electricity and type of roof.

Each item was a binary variable given a code of 1 or 2.

1 = having the item and 2 = not having the item

Level of education was coded as 1=not attended school, 2= informal education, 5=primary education, 6=secondary/vocational and 7=college/university

If the respondent had none of the above items, then, SES = 0 (LOWEST)

If the respondent had any of the above mentioned items, then, the status was determined by multiplying the code of the response item by the code of the level of education.

The scores ranged from 0 being the lowest to 14 being the highest. Overall SES was measured on a continuous scale by using three categories namely low, medium and high SES. A score of 0 was low SES, 1-7 was medium SES and ≥ 10 was high SES.

With reference to appendix 1, the definition above is summarized below;

If none of the item in question 11 was selected, then SES was = 0 (LOWEST SCORE)

If question 11 was ≥ 1, then SES was determined by question 11 × question 9 to give the following options;

1×1=1

1×2=2

1×5=5

1×6=6

1×7=7

2×5=10

2×6=12

2×7=14 (HIGHEST SCORE)

3.10 Data collection and Management

The PI and research assistants collected the data for 10 working days in July. Each tool was administered to one person after obtaining his informed consent through a face to face interview. Every evening all filled tools were reviewed together by the PI and research assistants for consistency, quality assurance and clarification of ambiguities.

3.11 Data Processing and Analysis

A template for data entry was developed, all filled questionnaires were given identification numbers before entering into Epi Info Statistical package, coding was done for open ended questions and data was entered into the Epi Info 3.3.2 version. Data cleaning was done, then fifty entered questionnaires were compared against the original tool and only two questionnaires had minor corrections.

Frequencies, means and cross-tabulations were computed, linear regression using both univariate and multivariate analysis were computed for defined independent and dependent variables to obtain tables of results. MS-Excel was used to plot graphs and charts.

Continuous categories were tested by ANOVA test to determine association; statistical significance level was set at 0.05.

3.12 Training of research assistants

The PI trained seven research assistants with form four and a diploma in nursing who had experience in research, aged 30-45 years, all females, with an assistance of facility medical officer in charge. The training was done for one day and emphasis was on

understanding the aim of the research and the meaning of each question in the interview schedule so as to ensure consistency in data collection. Each research assistant was allocated a different clinic from her place of work.

3.13 Pretesting of data collection instruments

A pre-testing was done at Amtulabai Clinic in Ilala municipality, a site which was not included in the study; the tool was pretested to 15 interviewees. At the end of pre-testing few modifications were made to the tool.

3.14 Ethical issues and permission to conduct research

Ethical clearance was sought from Muhimbili University of Health and Allied Sciences Research and Publication ethical Committee.

Permission from Municipal administrative authorities and facility administration was requested.

Participation was voluntary after explaining the aim of the study and benefits of the study to the participant, there were no risks or penalty for those who refused to participate. Participants were given the right to withdrawal from the interview any time during the process.

All participants were given adequate information on the research before the interview; verbal consent was obtained from the respondents. Only participants who consented for the interview were interviewed.

Questionnaires were kept anonymous, the information given was treated confidentially and research assistants were trained to maintain confidentiality.

3.15 Definition of Terms

Disclosure- is the act of informing any individual or organization of the sero-status of a person with HIV.

Informed consent- is based on the principle that competent individuals are entitled to make informed decisions regarding their participation in or agreement to HIV tests, other HIV/AIDS related interventions, and to health providers disclosing their status.

Partner notification- is the process of contacting sexual or injecting partners of a person with HIV in order to advice them of their potential exposure to HIV and encourage them to come forward for counseling , testing and where applicable treatment.

People living with HIV- people infected with the HIV virus and/or experiencing AIDS-related illnesses or infections. Also defined as HIV positive or sero-positive

Prevention for negatives-HIV prevention strategies targeting uninfected people

Prevention for positives- HIV prevention strategies targeting people already infected with HIV so as to delay disease progression and reduce transmittion of new HIV infections.

Sero-discordant- where one partner is HIV positive and the other is HIV negative.

CHAPTER FOUR: RESULTS

This chapter presents and interprets the analysis of the collected data. Data were analyzed in accordance with the objectives of the study. The results are presented using tables, graphs and summary statistics.

4.1 Description of Study Sample

4.1.1 Socio-demographic characteristics

The socio-demographic characteristics of respondents are summarized in table 1 below:

All respondents approached agreed to participate in the study; one spoiled questionnaire was repeated immediately on site. As a result, a total of 502 respondents participated in the study of which 75.5 % were females and 24.5% were males. They all came from Dar es salaam Care and Treatment Clinics for PLHWA and they were distributed as follows; Ilala district 43.2%, Kinondoni district 31.9% and Temeke district 24.9%. Nearly 4/5 had age above 30 years, the mean age was 37 years with a range of 18 years (minimum) to 73 years (maximum) and the median was 36 years. Among males, 96.7% were above 30 years and among females 76.8% were above 30 years in age, 44.8% were married, 27.3% were single, 14.2% were widows and 12.9% were either separated or divorced.

Nearly 80% had not gone beyond primary education, 49% were petty traders, 32.3% unemployed while the rest were either employed or college students. Muslims and Christians constituted 57.4% and 42.6% of all respondents respectively.

Of all respondents, 31.9% had low socio-economic status 39% had medium and 29.1% had high socio-economic status. The proportion of participants on ARV was 49.8% and

50.2% had not started ARV but they were under care and monitoring. A total of 57.2% reported low CD4 levels, 30.3% reported high CD4 levels and 12.5% didn't know their CD4 count levels.

Table 1: Socio-demographic characteristics of the study population n=502

Socio-demographic characteristics		Number	Percentage
Age:	≤ 30 years	92	18.3
	> 30 years	410	81.7
Sex:	Male	123	24.5
	Female	379	75.5
Marital status:	Single	137	27.3
	Married/cohabiting	225	44.8
	Widowed	75	14.9
	Divorced/Separated	65	12.9
Level of education:	Informal education	55	11.0
	Primary education	335	66.7
	Secondary/Vocational	102	20.3
	College/University	10	2.0
	Student	7	1.4
Occupation:	Employed	87	17.3
	Petty business	246	49.0
	Unemployed	162	32.3
Religion:	Muslim	288	57.4
	Christian	214	42.6
Socio-economic status	Low	160	31.9
	Medium	196	39.0
	High	146	29.1

4.1.2 Antiretroviral therapy usage by Age Groups and Sex

Table 2 shows more older people had started using ARV compared to young people with more males being on ARV (65%) than females (45%).

Table 2: ARV status by Age Groups and Sex

Age groups and Gender		ARV usage status		
		On ARV N (%)	Not on ARV N (%)	Total
Age	≤ 30 years	32 (34.8%)	60 (65.2%)	92 (100%)
	> 30 years	218 (53.2%)	192 (46.8%)	410 (100%)
Sex	Male	80 (65.0%)	43 (35.0%)	123 (100%)
	Female	170 (44.9%)	209 (55.1%)	379 (100%)

4.1.3 Risk Behavior Characteristics

As explained earlier, risk behavior was measured in terms of Frequency, Type of Sexual Partner and Knowledge on new infection.

I. Distribution of Risk Frequency

Table 3 shows the distribution of scores in risk Frequency. A high proportion, 70.9% had high risk scores (2&3), average score was 1.723 (SD = 1.025) and median score was 2.

Table 3: Risk behavior in terms of Frequency

Risk score Frequency	Frequency	Percent
0	103	20.5
1	43	8.6
2	246	49.0
3	110	21.9
Total	**502**	**100**

II. Distribution of Risk Type

Table 4 shows the distribution of scores in risk Type. Somewhat less than half had low risk scores and the proportion of respondents with high risk scores decreased progressively. The average score was 4.821 (SD = 3.660) and median score was 4.000

Table 4: Risk behavior in terms of Type

Risk score Type	Frequency	Percent
0	104	20.7
3	119	23.7
4	66	13.1
6	65	12.9
8	76	15.1
9	21	4.2
12	51	10.2
Total	**502**	**100.0**

III. Distribution of Risk Knowledge

Table 5 shows the distribution of scores in risk Knowledge among respondents. The proportion of respondents with the highest risk score was twice that of the lowest score. The average score was 4.622 (SD = 3.147) and median score was 4.000.

Table 5: Risk behavior in terms of Knowledge

Risk score Knowledge	Frequency	Percent
0	103	20.5
3	132	26.3
4	47	9.4
6	12	2.4
8	208	41.4
Total	**502**	**100**

4.2 Relation between risk measures and potential Explanatory Variables

I present the results of univariate analyses relating each of the three risk measures to five potential explanatory variables; these are use of ARV, sex, age, marital status and socio-economic status.

Table 6 summarizes the main risk measures (Frequency, Knowledge and Type) in accordance with use of ARV, Sex and Age.

4.2.1 Risk measures and ARV Use

Using or not using ARV did not have a statistically significant association with the scores for risk frequency and risk type. However, ARV use was found to be significantly related with risk knowledge. Respondents not on ARV had higher mean risk scores for frequency.

4.2.2 Risk measures and Sex

The sex of respondents did not have a statistically significant association with the scores for risk frequency and risk knowledge. However, it was found to be significantly associated with risk type. Male respondents had higher risk scores in terms of type as compared to women.

4.2.3 Risk measures and Age

The age of respondents was found to have a statistically significant association with the scores for risk frequency, type and knowledge. Young respondents had higher risk scores in all forms of risks compared with older persons.

Table 6: Risk scores by ARV use, Sex and Age n = 502

	ARV use Status		p-value
Risk Type	**On ARV Mean +/- SD**	**Not on ARV Mean +/- SD**	
Frequency	1.656 +/- 1.034	1.790 +/- 1.014	0.144
Knowledge	4.312 +/- 3.151	4.929 +/- 3.120	0.028 *
Type	4.548 +/- 3.594	5.091 +/- 3.711	0.096
	Sex		
Risk Type	**Male Mean+/- SD**	**Female Mean+/ SD**	**p-value**
Frequency	1.797 +/- 0.991	1.699+/ 1.036	0.359
Knowledge	4.764 +/- 3.027	4.575 +/- 3.188	0.563
Type	5.407 +/- 3.887	4.631 +/- 3.567	0.040 *
	Age		
Risk Type	**≤ 30 years Mean+/SD**	**> 30 years Mean+/SD**	**p-value**
Frequency	2.000 +/- 0.864	1.661 +/- 1.049	0.004 *
Knowledge	5.348 +/- 2.842	4.459 +/- 3.192	0.014 *
Type	5.598 +/- 3.325	4.646 +/- 3.712	0.024 *

* = $p < 0.05$

4.2.4 Risk measures and Marital Status

Table 7 shows the mean scores of the three risk measures by marital status.

Marital status was found to have a statistically significant association with the scores for risk frequency, knowledge and type. Married and single respondents were more had high risk frequency scores; single respondents were found to have high risk knowledge scores, single and divorced had high risk type scores.

Table 7: Risk scores by Marital Status n = 502

	Marital status				
Risk Type	**Single**	**Married**	**Widowed**	**Divorced**	**p-value**
	Mean+/-SD	**Mean+/-SD**	**Mean+/-SD**	**Mean+/-SD**	
Frequency	1.803+/-1.084	2.036+/-0.713	0.933+/-1.131	1.385+/-1.128	0.009 *
Knowledge	5.212+/-3.271	4.751+/-2.569	2.973+/-3.594	4.831+/-3.569	0.007 *
Type	5.745+/-3.710	4.720+/-3.232	3.200+/-3.918	5.092+/-4.043	0.002 *

* = $p < 0.05$

4.2.5 Risk measures and Socio-economic Status

Table 8 shows the scores for the three risk measures by socio-economic status of the respondents. Socio-economic status did not have a statistically significant association with the scores for risk frequency and risk type. Respondents with low socio-economic status had higher risk knowledge scores.

Table 8: Risk scores by Socio-economic Status n = 502

	Socio-economic Status			
Risk Type	**High**	**Medium**	**Low**	**p-value**
	Mean+/-SD	**Mean+/-SD**	**Mean+/-SD**	
Frequency	1.705+/-0.991	1.684+/-1.068	1.788+/1.006	0.134
Knowledge	4.418+/-3.010	4.250+/-3.177	5.263+/-3.153	0.040 *
Type	4.473+/-3.280	4.735+/-3.814	5.244+/-3.775	0.103

* = $p < 0.05$

4.3 Multivariate Analysis of Risk Measures

This section gives the results of multiple linear regression analysis for each of the three risk measures of this study. First consider Risk Frequency.

Table 9 shows that increasing age, being widowed/divorced and low socio-economic status were significantly associated with low risk frequency scores. However, the model suggests that only 7% of the risk frequency was predicted by the five variables.

Table 9: Multiple Linear Regression analysis for Risk Frequency n = 502

Variable	**Regression coefficient**	**P-value**
ARV Use	0.143	0.114
Age	-0.269	0.025 *
Sex	-0.164	0.126
Marital status	-0.234	0.001 *
SES	-0.010	0.035 *
Constant	2.834	0.000

$R^2 = 0.07$, * = $p < 0.05$

Multiple Linear Regression analysis for Risk Type

The regression analysis in table 10 shows that increasing age, being a woman, being widowed/divorced and low socio-economic status were significantly associated with low risk type scores. However, the model suggests that only 5% of the risk type was predicted by the five variables.

Table 10: Multiple Linear Regression analysis for Risk Type

Variable	Regression Coefficient	P-value
ARV Use	0.606	0.065
Age	-0.972	0.025 *
Sex	-1.100	0.004 *
Marital status	-0.419	0.014 *
SES	-0.079	0.041 *
Constant	8.890	0.000

$R^2 = 0.05$, * = $p < 0.05$

Multiple Linear Regression analysis for Risk Knowledge

The regression analysis in table 11 shows that, increasing age, being widowed/divorced and low socio-economic status were significantly associated with low risk knowledge scores. However, not using ARV was more likely to be associated with high risk knowledge scores. The model suggests that only 5% of the risk knowledge was predicted by the five variables.

Table 11: Multiple Linear Regression analysis for Risk Knowledge

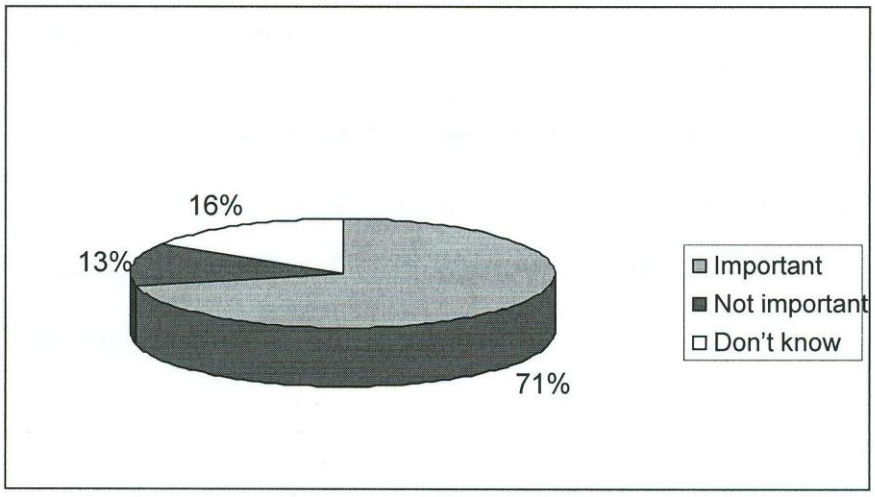
Variable	Regression Coefficient	P-value
ARV Use	0.602	0.033 *
Age	-0.777	0.037 *
Sex	-0.481	0.150
Marital status	-0.367	0.012 *
SES	-0.083	0.012 *
Constant	7.167	0.000

$R^2 = 0.05$, * = $p < 0.05$

4.4 Awareness on Positive Prevention

Figure 1 below shows that about 71% of respondents were aware on the importance of positive prevention, 13% said it was not important while 16% didn't know.

Figure 1: Awareness on Positive Prevention n = 502



4.4.1: Importance of Positive Prevention

More than 250 respondents reported reduction of re-infection and cross-infection as the main reason for prevention of new infections. Other reasons were avoiding CD4 drop, avoid other sexually transmitted infections. Few respondents mentioned avoiding viral resistance and reduction in viral load.

4.4.2: Reasons why Prevention among positives is not important

Majority said there was no reason of prevention while you already have the virus, some reported that if you have a high CD4 count and low viral load then there is no need to protect yourself and lastly was availability of ARV which are free and can prolong your life.

4.4.3: Risk Behavior for HIV Transmission

Frequently mentioned risk behaviors for HIV transmission were unprotected sex, sharing sharp objects. Others were multiple sexual partners, substance abuse and fewer mentioned sharing clothes.

4.4.4: Prevention Services at Care and Treatment Clinics

Frequently mentioned available prevention services at ART clinics were counseling on re-infection and infection, condom promotion and ARV provision. However, very few mentioned PMTCT and VCT.

CHAPTER FIVE: DISCUSSION

5.1 Introduction

For many years prevention efforts have primarily targeted persons at risk of HIV/AIDS, rather than those living with HIV. Most of these efforts such as peer education, condom distribution take place outside of health facilities. However, prevention is important regardless of the persons HIV status and therefore, Care and Treatment Clinics offer opportunities that are often missed to reach both negative and positive persons.

This study has addressed the issue of risk behavior that PLWHA may get involved in and attempted to identify the factors influencing such behavior. It also investigated the influence of ARV treatment on risk behavior among PLWHA attending Care and Treatment Clinics. The respondents provided information which may be used to address special prevention needs for PLWHA.

Three quarters of the study participants were females. This is somewhat consistent with the National HIV/AIDS/STI indicator survey of 2007 which revealed that 65% of the enrollment was female. Possibly women utilize care and treatment services more than men because women are more likely to be infected with HIV due to biological and anatomical reasons between men and women and also because more women are being tested for HIV. This happens during ANC visits where it is an opt-out situation. (National PMTCT Guidelines, 2007)

However, in our sample, more men had started using ARV compared to women. This is contrary to the survey conducted in the year 2005 in Tanzania which had a slightly

higher proportion of females on ARV. Possibly females test their HIV status at early stages of the disease and enroll themselves at CTC early for care while men come at late stages with advanced disease which makes them eligible for ARV.

Majority of respondents were aged more than 30 years, with mean age being 37 years, these findings were again consistent with the National HIV/AIDS/STI Indicator survey of 2005 which showed that the most affected age with HIV is 20-49 years, with a mean age of 36.5 years. This age group constitutes a period of maximum sexual activity. Further, care and treatment services are not youth friendly in terms of confidentiality, administration and staffing hence they do not attract young people.

Over 75% of participants had primary education and below. Since education level plays an important part in determining the socio-economic status of an individual, these findings imply that public facilities are mostly utilized by people with low socio-economic status. Those with high status possibly use other private facilities. Stigma may also play an important role here since people with high status would not like other people to know their HIV serostatus so as to protect their image in the community.

The proportion of participants on ARV and those not on ARV was almost the same. These findings were almost the same with those in the survey conducted in 2007 on HV/AIDS/STI surveillance in Tanzania in which 47% of people attending CTC were on ARV and the rest on care and monitoring. The proportion of participants aged more than 30 years on ARV was higher than that of age group of less or equal to 30 years. Older people are possibly more likely to have advanced disease requiring them to start treatment compared to young people. (HIV Medicine, 2006 edition)

5.2 Risk Behavior Characteristics

Risk behaviors were measured in terms of Frequency of sexual intercourse, Type of sexual activity and Knowledge on new infection.

5.2.1 Risk Behavior in terms of Frequency

About 70% of respondents had high risk scores. Either they had one or more sexual partner in the last six months or had one or more sexual partner at the time of interview. Thus many people maintain their risky sexual behavior even after a diagnosis of HIV. Behavioral change takes time as it is influenced by an interaction of social, cultural, economic and political factors. This proportion was lower than that found in an ART outpatient clinic in London which found about 90% (Stephenson M et al, 2002). Majority of the patients at the ART outpatient clinic in London were gay men who are more likely to be involved in high risk behavior in comparison to the general population. About 29% of respondents had low frequency risk scores; they had not had sex in the past six or more months. These findings were lower compared to a study done in Cote d'Ivoire which found 53%. Respondents in Cote d'Ivoire were interviewed by clinic staff. Probably a desire to impress their providers skewed their responses. Further, this study only looked at those using ARV. PLWHA therefore, continue being sexually active and at times with multiple partners.

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5.2.2 Distribution of Risk Behavior in terms of Type

Majority of respondents had sex with a spouse but without using a condom. The highest risk score given to those who had intercourse with a prostitute without using a condom, was attained by only 10.2%. The London outpatient clinic study found 22% of the respondents had unprotected sex with casual partners. Hence, people with committed relationships are less likely to use condoms due to mutual trust and probably fatigue which develops over time. A study by Hakins and colleagues reported PLWHA not using condoms because their partners also had HIV or because they or their partners refused to use the method (Hakins C et al, 1997). Having sex with a spouse, casual or steady partner or a prostitute without a condom puts an individual at more risk of being re-infected with a new virus or transmitting the infection to un-infected partner.

5.2.3 Risk Behavior in terms of Knowledge

For over 40% of the respondents both partners had not disclosed their HIV status to each other. Some HIV positive individuals may not be able to disclose their status to their partners or relatives for fear from violence, stress, uncertain stability of relationship (Stewart et al, 2000) as well as emotional trauma, blame and stigmatization (Fenton K et al, 1997; UNAIDS/ FHI, 2001). Non-disclosure also predisposes individuals to the risk of re-infection and cross-infection, especially in the case of discordant couples.

5.3 Main Risk Measures and Explanatory Variables

5.3.1 ARV Usage

The proportion of respondents not on ARV who had high risk frequency was found to be slightly higher. However, overall, risk frequency scores were found to be the same between respondents on ARV and those not on ARV with the majority still having one partner at the time of interview. While this may reflect our study sample, which included a high proportion of married people, similar findings have been reported from rural Uganda. (Bunnell R et al, 2006). This means that sexual desire might not differ markedly between ARV users and non users highlighting the importance of on going prevention intervention among PLWHA.

Disclosure was found to be a problem among both groups on ARV and not on ARV; however the proportion of non-ARV users who had the highest risk knowledge scores was higher compared to those on ARV. Similar findings have been reported in Yaoundé whereby over 50% of respondents not on ARV had not disclosed their status to their partners (Atangana M et al, 2000). Another study from Kampala Uganda reported that respondents on ARV were more likely to have disclosed their HIV status to their spouses compared to non ARV users (Batenganya M et al, 2005). In this study, respondents not on ARV were those with high immunity and still looked health, this might have biased their decision on whether to disclose their status or not. PLWHA may not disclose their status to avoid the consequences of disclosure which include but are not limited to stigma, discrimination, divorce, violence (Cooper D et al, 2005).

Findings with risk type scores suggest that, majority of respondents regardless of their ARV status, had sexual intercourse with a spouse but didn't use a condom. Findings in the Yaoundé study showed 38% of respondents had unprotected sex with a spouse. The explanation could be refusal of using condoms by the partner, desire to procreate and fear of raising suspicion of infidelity especially among undisclosed couples. Both studies were conducted in an African setting were condom use is culturally and religiously not accepted.

5.3.2 Sex

The mean scores in risk frequency did not differ among males and females; both had one sexual partner at the time of interview regardless of their past experience. This could be explained by counseling services provided to PLWHA on re-infection and cross-infection. The proportion of both males and females with the highest risk scores was found to be above 20%. This could be explained by the fact that behavioral change takes time and probably the availability of ARV make people believe that HIV/AIDS is a less severe and threatening disease. This issue merits attention in future research.

There was no difference in risk knowledge scores between the two sexes; disclosure was found to be a cross-cutting problem. In more than 40% of the two sexes, both partners had not disclosed to each other. Again risk type revealed majority of respondents had sex with a spouse but didn't use a condom. Findings from a study in Mombassa Kenya reported a significant association between non-disclosure and unprotected sex (Stanley L

et al, 2007). Ethical partner notification and disclosure if provided as part of routine care in ART clinics, might lead to safer sexual practices among PLWHA.

5.3.3 Age

Young age was found to be significantly associated with high risk frequency scores. This could be explained by the fact that young people are more likely to be sexually active due to peer pressure and physiological changes taking place at this stage of growth.

Disclosure was found to be a problem in both age groups; however the proportion of young people with higher risk knowledge scores was found to be slightly higher compared to older age. This difference could be a result of stigma and blaming attached to young people when they contract STIs including HIV as well as lack of enough knowledge in reproductive health and STIs among young people. These findings merits further research specifically targeting young people.

Risk Type shows that on average, younger people were more likely to have sex with a casual partner using a condom while those with old age were likely to have sex with a spouse without using a condom. Since young people are less likely to have committed relationships, they may be more likely to demand using a condom compared to old people in marriages who are less likely to challenge their partners to use condoms. Another important explanation is that young people may fear pregnancy especially adolescents while that may not be the case in old people.

5.3.4 Marital Status

On average, frequency scores showed a reduction in the number of sexual partners which could have resulted from ongoing counseling on positive prevention at ARV clinics. Similar findings were also reported by the study in Mombasa. Since this was based on self-reported sexual behavior, the information could have been skewed to impress the interviewer.

Single respondents were found to have high risk knowledge scores compared to other groups. Since single people in most cases have casual partners, they might find it difficult to disclose their serostatus to their partners fearing such consequences like violence, blame, separation and stigmatization.

The mean scores for risk type suggest that both single and married respondents had sexual intercourse with a lover and a spouse respectively but without a condom. In this case, safer sex fatigue among partners in long term relations becomes of paramount importance; however other factors like culture, beliefs, religion and desire to procreate could also play an important role.

5.3.5 Socio-economic Status

The average scores in both risk frequency and risk type did not show significant differences among the three socio-economic groups. The UNAIDS report of 2007, however, showed that people with low socio-economic status are more likely to engaged in risk sexual behavior.

The differences might be due to the different ways of measuring SES and since this was a small sample, it might have not been representative. Socio-economic status could play an important role in sexual risky behavior. However, it can not stand on its own. The impacts of other socio-demographic and socio-cultural factors need also to be put into consideration.

With risk knowledge, the means score show that disclosure was cross-cutting problem in all socio-economic status; however respondents with low status had a slightly higher risk scores compared to their counterparts. This could have resulted poor accessibility to information, stigma etc. These findings highlight the importance of equity in accessibility to information among all people regardless of their socio-economic status as an important step towards prevention of sexual risk behaviors among PLWHA. (National AIDS Control Programme, 2005)

5.4 Multivariate Association between Risk Measures and Explanatory Variables

Although the study design does not permit drawing causal explanations, our results suggests respondents with old age, widowed or divorced and with low socioeconomic status were less likely to have high risk scores in terms of both frequency, type and knowledge compared to those with young age, single or married and better socioeconomic status. Not using ARV was positively associated with high risk frequency and risk type scores though the findings were not statistically significant. However, with risk knowledge this finding was found to be statistically significant. The findings from the Uganda urban study reported consistent condom use and improved

disclosure among respondents on ARV compared to those not using, these findings were statistically significant. If counseling on risk reduction is going to be a routine part of adherence counseling to ARV, it is likely that there will be a significant drop in risk behavior among PLWHA in future.

Both models suggest that, when variables were adjusted, they could predict better the risk scores than in the univariate model.

However, the percentages of variation explained by all the models were very low. These variables could not adequately predict risk behavior. Other variables or differently formulated variables needed to be considered to make the model have better power. Improved study design, tools and research assistants merit further attention in that regard.

All the three districts were negatively associated with the three risk types; however the findings were not significant. The findings suggest that Mbagala and Temeke were negatively associated with risk frequency, Buguruni, Mbagala and Temeke had negative association with risk type, risk knowledge was positively associates with all the ART centers. These findings were not significant and the prediction power of the model was poor. Possibly this is because all the facilities were public and patients attending had almost the same socio-economic and socio-demographic characteristics. The types of services provided in all the facilities do not differ much due to similarities in infrastructure, human resource and administration.

5.5 Awareness on Importance of Positive Prevention

Nearly 3/4 of respondents agreed that positive prevention is important among PLWHA. Among the reasons given, majority said because this will prevent both re-infections with new strains and cross-infection. However fewer respondents mentioned other reasons such as avoiding other STIs, progression of immune deterioration, reducing the chances of development of resistance and avoid increased viral load. This highlights the need for strengthening the integration of prevention in the care and treatment settings for HIV as a standard of care (Global HIV Prevention Working Group, 2003).

Among reasons given as to why prevention for positives is not important, majority said if you already have the virus then there is no point in prevention since the disease is incurable , some said ARV are available and free so you don't need to worry since they can reduce multiplication of the virus, yet others said if you have high CD4 count and low viral load then you don't need to worry much because your immunity is still strong to fight the virus and you are less likely to infect others. Similar findings were reported in the United States of America among MSM attending ARV clinics, Sexual workers in Kenya and a meta-analytic review by Crepaz and colleagues.

These findings call for increased prevention messages through adherence counseling, IEC materials on the importance of prevention among PLWHA.

Mentioned risk behaviors for HIV transmission included multiple sexual partners, unprotected sex, and substance abuse and sharing sharp objects. This shows that more PLWHA have access to HIV information through continuous health education which is

part of routine services at CTC but it should be remembered that behavioral change takes time to occur.

However there were few, who didn't know, some mentioned sharing clothes, some said taking care of infected persons, blood transfusion and casual kissing. The message here is that still there is a lot to be done especially in providing the right message on HIV transmission otherwise more people will be stigmatized, refuse blood transfusion and hence failure to fight the epidemic.

Frequently mentioned prevention services were counseling, condom promotion and use of ARV, very few people from Mwananyamala and Sinza mentioned VCT and PMTCT. Possible explanation could be poor integration of prevention into care, services are not available or they are there but not communicated properly to recipients.

Some respondents mentioned multivitamins as a way of preventing re-infection and other opportunistic infection. There is a need to clarify the limitations of multivitamins to PLWHA, or else they will spend a lot of resources on multivitamins unnecessarily.

Some gaps in awareness of positive prevention could be explained by weak health systems in Tanzania, there is a shortage of health care personnel to address prevention issues in ART settings, and where personnel are available, some have received no training or even basic information about prevention for positives and HIV and sexual and reproductive health needs.

5.6 Limitations of the Study

- These might have emanated from possible unnoticed biases from data collection tools and research assistants through their own understanding which might have influenced responses through interviewer bias and information bias from respondent.
- Prevention in the ART setting is a new concept, therefore, references were mainly from published literature or in reports accessible from websites.
- A large proportion of literature focuses on gay men in Europe, USA and Australia and very few from developing countries. This limits the extent to which such literature can be applied to Tanzania and other developing countries where different factors may influence sexual risk behaviors.
- Most of the available studies are limited to descriptive studies, only a few experimental and longitudinal studies exist.
- Time allocated to conduct this study was limited

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Every new HIV infection through sexual behavior requires the participation of one individual who is HIV positive and one who is HIV negative. In addition HIV positive people can be re-infected with another strain of HIV and emerging evidence suggest that re-infection may accelerate the progression of HIV disease, morbidity, mortality and transmission of resistance strains in the population. Therefore, having strategies addressing the special sexual needs of positive people attending ART clinics becomes crucial in fighting the epidemic.

This study has clearly indicated that the risk sexual behaviors in terms of both frequency, knowledge and type was not significantly higher in the group of respondents receiving ART in the absence of other factors, therefore, it is very important to also look at other factors that could influence sexual behaviors among PLWHA.

Disclosure and partner notification were found to be a cross-cutting problem regardless of ARV use, age, sex, marital status and socioeconomic status. This situation can be explained by the widespread stigma, discrimination, gender violence in the community as well as in the care and treatment setting for HIV. This problem if not well addressed then it is more likely that the epidemic will spread to uninfected partners and emergency of HIV resistance strain will be unavoidable.

Young people were found to be more sexually active, this can be explained by the physiological changes taking place in the course of their growth but their enrollment is

very low which indicates low utilization CTC services, raising a very important concept of youth friendly services.

Condom utilization was found to be a problem especially among married couples, this could be due to desire to procreate, attitudes and beliefs on condoms, non-disclosure among couples, religious beliefs and safer sex fatigue. This problem needs to be addressed during adherence counseling and it also merits future research specifically among PLWHA.

Awareness on positive prevention was found to be good, however, there is still a need to strengthen prevention in the ART delivery clinics, communicate all prevention opportunities available in the facility e.g. VCT, PMTC, IEC materials and strengthen referrals between ART clinics and other clinics e.g. TB/HIV, VCT, PMTCT etc.

6.2 Recommendations

- New prevention programmes tailored to the needs of PLWHA should be developed and implemented. These include counseling on beneficial disclosure and ethical partner notification, information on ability of individuals to transmit HIV even while on ART or with high CD4 counts and undetectable viral load.
- ART clinics should acknowledge the natural desire of PLWHA to be sexually active and to procreate and therefore provide individually tailored support to facilitate safer sexual choice and conception as well as provide assistance in identifying and addressing barriers to safer sexual behaviors and promotion of accessible STI screening.

- Prevention services for PLWHA must be supported by strengthened and sustained efforts to combat HIV-related stigma, discrimination and gender violence and establishment and implementation of youth friendly ART services so as to increase utilization by young people.

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