ANTIRETROVIRAL THERAPY PROGRAMME ON CONTROL OF HIV TRANSMISSION IN MOROGORO MUNICIPALITY

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN RURAL DEVELOPMENT OF SOKOINE UNIVERSITY OF AGRICULTURE.
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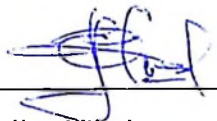
ABSTRACT

Increase in HIV-related risky sexual behaviours among persons on highly active antiretroviral therapy (HAART) is of worldwide concern. While the issue of prevention has received greater attention in developed countries, little is known about the extent to which persons living with HIV/AIDS (PLWHA) might continue to engage in high-risk sexual behaviors in sub-Saharan Africa. This study was conducted to examine the role of antiretroviral therapy (ART) programme on control of HIV transmission in order to inform and assist policy makers to design and implement effective ART programmes to combat HIV/AIDS. The study was conducted in Morogroro Municipality. A cross sectional design was adopted and ninety-three PLWHA participated in the study. Statistical Package for Social Sciences (SPSS) was used to analyze the data. Descriptive statistics, likert and index scales were used to gauge levels of risky sexual behaviour, awareness and attitude of PLWHA on the role of ART. *F-test* was used to measure the relationship at 5% (0.05) level of significance. The study found high level of knowledge and awareness among PLWHA on the role of ARV, and respondents had positive attitude towards ARV in prolonging their life. It was also found that PLWHA were sexually active; however, more than half of the respondents were categorized to fall under high risk sexual behaviour group. The relationship between age and risk sexual behaviour was statistically significant ($p = 0.006$). Risk sexual behaviour was highest in 18-35 years age group and lowest in the 50-64 years age group. The study recommends that communication campaigns should target PLWHA, encouraging them to talk openly to their partners and impart correct knowledge, communicate the availability of HIV and STI testing and stress the importance of knowing one's HIV status. The government should as well improve access to ART services to enable many PLWHA to access the services.

DECLARATION

I, OWEN JAILOS WIMBO, do hereby declare to the Senate of Sokoine University of Agriculture, that this dissertation is my original work and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.



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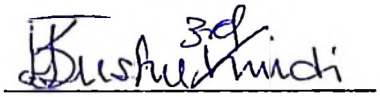
The above declaration is confirmed



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The number of people whose hands contributed to my success is obviously big to mention. However, I strongly feel and appreciate the helping hands from all instructors, classmates, friends and relatives whom in different ways made my study at SUA successful.

DEDICATION

I dedicate this dissertation to my wife - Eunice Pinda, my mother - Loy George, and my son - Ivan Wimbo. The decision to take a study opportunity at SUA came when I was the sole bread winner to my family as well as to mother who is a widow. It was a complex decision altogether as I had no sponsorship to support my studies and I had to comply with my private employer's policy by resigning from work, which was the main source of my earning. However, I and my wife decided that I take the opportunity right away. This risky decision was blessed by our parents. I adore them all.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

AIDS	-	Acquired Immune-deficiency Syndrome
ACORD	-	Agency for Co-operation and Research in Development
ART	-	Antiretroviral Therapy
ARV	-	Antiretrovirals
BASNEF	-	Belief, Attitude, Subjective Norms, and Enabling Factors
CTC	-	Care and Treatment Clinics
FAO	-	Food and Agricultural Organization
HAART	-	Highly Active Antiretroviral Therapy
HIV	-	Human Immune-deficiency Virus
MP	-	Member of Parliament
MSM		Men who have Sex with Men
NACP	-	National AIDS Control Programme
NBS	-	National Bureau of Statistics
NSGRP	-	National Strategy for Growth and Reduction of Poverty
PM	-	Prime Minister
PLWHA		People Living With HIV/AIDS
SCSRD	-	Sokoine University of Agriculture Centre for Sustainable Rural Development
SNAL		Sokoine National Agricultural Library
SPSS	-	Statistical Package for Social Sciences
STDs	-	Sexually Transmitted Diseases
STI	-	Sexually Transmitted Infections
SUA	-	Sokoine University of Agriculture

TACAIDS	-	Tanzania Commission for AIDS
TDHS	-	Tanzania Demographic and Health Survey
TDHS	-	Tanzania Demographic and Health Survey
THIS	-	Tanzania HIV/AIDS Indicator Survey
THMIS	-	Tanzania HIV/AIDS and Malaria Indicator Survey
UNAIDS	-	United Nation Programme on HIV/AIDS
UNICEF	-	United Nations Children's Fund
URT	-	United Republic of Tanzania
WAVUMO	-	Wanoishi na Virusi vya UKIMWI Morogoro (Organisation for PLWHA in Morogoro)
WHO	-	World Health Organization

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information on HIV/AIDS and ARV

Since Highly Active Antiretroviral Treatment (HAART) became available in 1996, lengths of hospital stays, frequency of opportunistic infections, and death rates have significantly decreased in developed countries (Herlitz and Steel, 2001). However, community perceptions of Antiretroviral Therapy (ART) and its implications on sexual behaviours and HIV/AIDS prevention remain largely unknown (Ezekiel *et al.*, 2008).

HIV/AIDS has emerged as a global health problem with serious medical, economic and social implications (UNAIDS/WHO, 2000). Throughout history, a few crises have presented such a threat to human health, social and economic progress as does the HIV/AIDS epidemic. The HIV and AIDS epidemic is a health and development crisis throughout much of sub-Saharan Africa, including Tanzania. The Joint United Nations Programme on AIDS (UNAIDS, 2005) estimated the number of infections worldwide at about 40.3 millions by the end of 2005, of which about 25.8 millions (64%) were found in Sub-Saharan Africa. About five millions became infected world-wide in 2005, of which three million were from sub-Saharan African. Again, about three million persons worldwide died from AIDS in 2005 of which sub-Saharan Africa accounted for more than two million of the total (TACAIDS, 2005).

In 2007, advances in the methodology of estimations of HIV epidemics applied to an expanded range of country data have resulted in substantial changes in estimates of numbers of persons living with HIV worldwide. However, the qualitative interpretation of the severity and implications of the pandemic has altered a little. The estimated number of

persons living with HIV worldwide in 2007 was 33.2 million [range 30.6–36.1 million], a reduction of 16% compared with the estimate published in 2006 (39.5 million [34.7–47.1 million]) (UNAIDS/WHO, 2007).

The single biggest reason for this reduction was the intensive exercise to assess India's HIV epidemic, which resulted in a major revision of that country's estimates. Important revisions of estimates elsewhere, particularly in sub-Saharan Africa, also had a dimension. Of the total difference in the estimates published in 2006 and 2007, 70% were due to changes HIV/AIDS estimates in six countries namely Angola, India, Kenya, Mozambique, Nigeria, and Zimbabwe. These conflicting statistics on the other hand append our understanding that the HIV/AIDS problem is either bigger or smaller respectively in some countries. It is also emphasized that these differences between estimates published in 2006 and those published in 2007 result largely from refinements in methodology, rather than trends in the pandemic itself. The methodological revisions have been applied retrospectively to all earlier HIV prevalence data, so that the estimates of incidence, prevalence and mortality from earlier years in the current report allow an assessment of trends over time. Nevertheless, the data are consistent that sub-Saharan Africa (SSA) carry disproportionate share of the HIV/AIDS burden.

Despite human suffering and loss of life, AIDS in Africa is reversing the development and socio-economic gains. Life expectancy has dropped by decade, growth of the already fragile economies decrease annually and governments experience increasing difficulty in the delivery of the health care services, welfare and national defense (Mayer, 2003).

For many years global effort to halt and reverse the spread of HIV have been centered on use of barrier methods such as use of condoms to control and prevent heterosexual

transmission, the perceived major course of spread of HIV world-wide. However, in the recent years, use of antiretroviral drugs therapy (ART) is gaining momentous attention. By the end of 2005 the World Health Organization (WHO) estimated that there were just over 1.3 million people receiving antiretroviral therapy (ART) in low income and middle income countries representing 20% of the 6.5 million estimated to need it. Since the need to close the treatment gap was declared a global public health emergence, initiatives by WHO, UNAIDS and other partners have resulted into the increased number of ART recipients in many countries (Ivers *et al.*, 2005). Given this achievement, it high time to explore the sexual behaviour of the ART recipients so that it contributes positively to combat further spread of HIV/AIDS.

Recent evidence shows that ART is of public health benefit when introduced earlier in an HIV epidemic (Abbas *et al.*, 2006). ART is a comprehensive program, which aim to offer supportive counseling to PLWHA, treat and manage opportunistic infection before and after one has started attending ART clinics. It also give advice and to PLWHA on when to start taking ARVs and the recommended drugs of choice specific to their health status.

It has also been revealed that ART benefits both the infected and uninfected persons in the community since it acts as an effective prevention tool and could potentially eradicate the epidemic in the long run even with high levels of drug resistance and sexual risk behaviour (Velasco-Hernandez *et al.*, 2002). This study was conducted to examine the influence of ART programme on control of HIV transmission in order to contribute to effective HIV/AIDS control policy and programme planning in Tanzania.

Morogoro Municipality where the study was conducted have HIV/AIDS prevalence rate of 4.2% which is below the national average that stands at 5.8 %. However, en given its

geographical location it stands to be one of the risk areas for HIV spread. Morogoro municipality is located to a junction to various regions in Tanzania and to other countries, especially Malawi, Zambiat, Congo DRC, Burundi, Rwanda and Uganda. Therefore, there are a lot of guests from within Tanzania and from countries neighbouring Tanzania the interactions of these guests and local residents may carry potential risks of HIV spread. Furthermore, Morogoro Municipality have counselling and treatment clinics that extend their services to many people hence a good case for this study.

1.2 Problem Statement

Increase in HIV-related risky sexual behaviours among persons on highly active antiretroviral therapy (HAART) is of concern worldwide. It is argued that improvements in the quality of health of patients due to access to effective treatment may cause them to continue or resume risky sexual behaviours (Moatti *et al.*, 2003). Indeed, while the issue of prevention has received greater attention in developed countries, little is known about the extent to which persons living with HIV/AIDS (PLWHA) might continue to engage in high-risk sexual behaviors in sub-Saharan Africa (Traore, 2005). Evidence shows that free antiretroviral therapy (ART) has been provided through the public health system in Tanzania since 2004. However, community perceptions on ART and its implications on risky sexual behaviours and HIV/AIDS prevention remain largely unknown. This is possibly due to the fact that there is only scant information on sexual behaviour of people on ART in Tanzania. Hence, the impact of ART use on sexual behavioural of PLWHA in Tanzania has not been well documented. This weigh down government efforts and makes it difficult to measure if desired outcome is being realized.

Health improvement of PLWHA who are on ART and risky sexual behaviour they express is raising a confusion and contradiction as to whether ART programme does or does not

have positive influence on efforts to control further transmission of HIV. This dynamic tension apparently observed call for research to generate empirical information that will contribute to make ART programmes bring expected outcomes. Confidentiality aspects emphasized in the health policy and guide for care and treatment clinics (CTC) service providers for instance, need to be informed by empirical information on sexual behaviour of people on ART in order to effectively address safer practices among PLWHA, their partner and community at large.

1.3 Justification of the Study

As antiretroviral (ARV) therapy becomes increasingly accessible in sub-Saharan Africa, it is important to understand whether and how the associated clinical improvements correspond with changes in the sexual behaviour of the recipients. The response of sexual behavior to HIV in Africa is an important input to predicting the path of the epidemic and to focusing prevention efforts. However, existing literature is inconclusive on sexual behavioural outcome of the response (Oster, 2007). In Tanzania, the success of the national HIV/AIDS response resides with the competence of the communities to live up to the challenges and threats of the epidemic and develop appropriate responses. Therefore, the focus of all HIV/AIDS related programmes and interventions must be geared towards strengthening of communities to openly discuss the realities in HIV transmission and its consequences, and develop appropriate interventions in prevention of HIV, care and support to those so far infected and affected by HIV/AIDS (URT, 2003). Prevention campaigns by governments, NGOs and development organizations have succeeded in raising people's awareness, but this has not translated into required behavioural changes (URT, 2005). This makes research in this area a priority, so as to understand linkage between knowledge, community perceptions on ART and its implications on sexual behaviours and HIV/AIDS behavioural change.

In Tanzania and in the study area, relatively few studies have been undertaken to measure the effectiveness of behavioral interventions for people living with HIV/AIDS. But emerging evidence indicates that such programmes are effective in reducing the likelihood that people with HIV/AIDS will engage in sexual activity that might expose others to the virus (Crepaz and Marks, 2005). This study data were sought from care and treatment clinics found in Morogoro municipality to get a better understanding of the situation. Therefore, findings from this study will make a valuable input to policy makers and programme designers in order to achieve an appropriate integration of antiretroviral and prevention interventions in programmes both to the care and treatment centres in Morogoro and in other regions in Tanzania. The findings from this study will be published in local and international journal for wide sharing. Specifically, the finding will be communicated back to CTC for sharing and programme improvement.

1.4 Research Objectives

1.4 .1 Overall objective

The overall objective of the study was to examine the influence of ART programme on control of further HIV transmission in order to contribute to effective HIV/AIDS policy and programme planning.

1.4.2 Specific objectives

Specifically this study sought to:-

(a) Determine awareness of PLWHA on the role of ART programme

(b) Examine attitudes of PLWHA on ART towards prolonging their lives

(c) Generate information on sexual behavior of PLWHA on ART

(d) Examine behavioral change interventions in ART programmes

1.5 Research Questions

The research was guided by the following research questions:-

(a) To what extent are PLWHA on ART informed about ART?

(b) How do PLWHA on ART address their own and their partners' sexual needs?

(c) How effective is ART programme in addressing issues related to control of HIV transmission from people diagnosed with HIV?

1.6 Conceptual Framework

The conceptual framework is a narrative outline presentation of variables to be studied, which describes hypothetical relationships between and among variables. The types of variables shown in the conceptual framework (Fig. 1) are: the background variables, which are age, sex, marital status and level of education. The independent variables consist of awareness on ART; attitude toward prolonging lives of PLWHA; Sexual behavior of PLWHA and behavior change interventions in ART programmes. The dependent variable, Control of HIV transmission constitute of indicators making independent variables. The background variables were expected to have little influence on independent variables - Awareness on role of ART, attitude of ART towards prolonging life, sexual behaviour of PLWHA and behavioural change interventions. Independent variables were expected to have influence on dependent variable. Operational definitions of these key variables are given in Appendix 2.

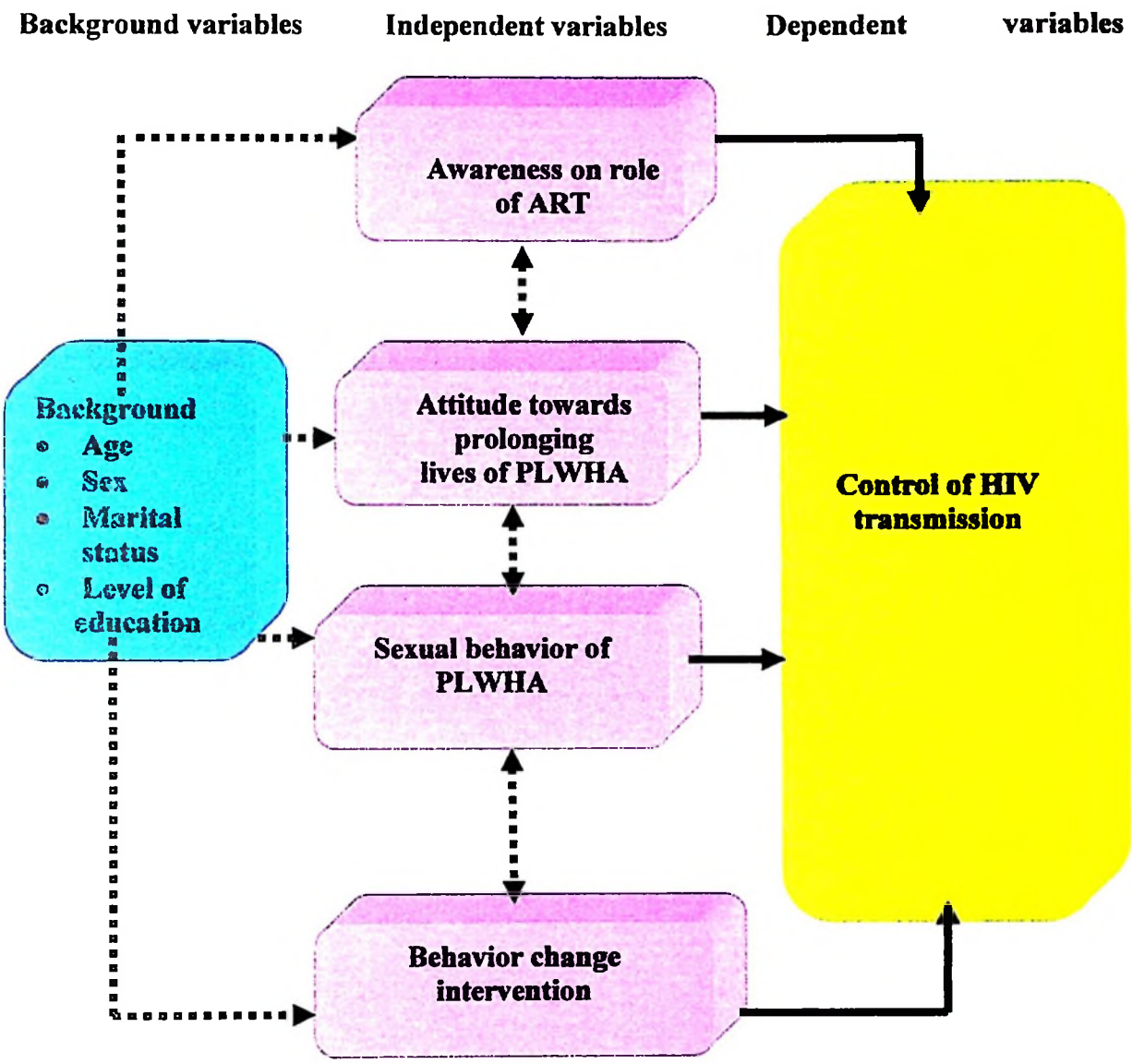

Figure 1: Conceptual framework

Source: Adopted from BASNEF (belief, attitude, subjective norms, and enabling factors) model for understanding human behavior (Hubley, 1993).

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 An Overview

In chapter one, an overview of global situation about HIV/AIDS was given and the importance of ARV in prolonging the life of people living with HIV. In this chapter, a review of what is known about contribution and influence of ART programmes on control of HIV transmission and its effectiveness in informing HIV/AIDS policy and programme planning will be reviewed.This information is important because it will form a building block (baseline) for the results of this study and enhance comparisons with other studies. Creswell (1994) report that literature review is important as it provides a framework for establishing the importance of the study, as well as a benchmark for comparing results of a study with other findings.

2.2 AIDS: An Epidemic and a Pandemic, and its Prevalence in the World

Acquired Immunodeficiency Syndrome (AIDS) caused by the Human Immunodeficiency Virus (HIV) was first diagnosed in the United States in 1981 (Getllieb *et al.,* 1988). Since the first case was diagnosed in North America, AIDS has grown into an international pandemic (Chin, 1990). According to Willis (2002), HIV/AIDS is both an endemic and a pandemic because it exhibits characteristics of both of the following definitions. An epidemic is a scourge affecting a great number of people in communities in a certain time moving from place to place, while a pandemic is a widespread endemic. The following subsections provide details as why AIDS is both epidemic and pandemic.

2.2.1 Global HIV/AIDS Estimates

According to UNAIDS/WHO (2007) about 33.2 million were estimated to be living with HIV/AIDS worldwide (Range 30.6–36.1 million) in 2007. About 2.5 million new HIV

cases occurred (Range 1.8-4.1million) and there were about 2.1 million deaths (Range 1.9 – 2.4 million) in the same year. The global prevalence rate and distribution is summarized in Table 1.

Table 1: World estimates of the global HIV/ AIDS epidemic at the end of 2007

Number of people living with HIV/AIDS in 2007	Estimate (million)	Range (million)
Adults (men an women)	30.8	28.2–33.6
Women	15.4	13.9–16.6
Children (under 15 years)	2.5	2.2–2.6
Total	**33.2**	**30.6–36.1**
People newly infected with HIV in 2007		
Adults	2.1	1.4–3.6
Children (under 15 years)	0.42	0.35–0.54
Total	**2.5**	**1.8–4.1**
AIDS deaths in 2007		
Adults	1.7	1.6–2.1
Children (under 15 years)	0.33	0.310.38
Total	**2.1**	**1.9–2.4**

Source: Adopted from UNAIDS/WHO (2007).

2.2.2 HIV/AIDS in sub-Saharan Africa

Africa especially sub- Saharan Africa (SSA) is the global epicenter of AIDS and it is estimated that 83 percent of world's AIDS cases/deaths are from this continent. Therefore SSA is the most severely affected region in the world. According to (UNAIDS/WHO, 2007), more than two out of three (68%) adults and nearly 90% of children infected with HIV live in this region, and more than three in four (76%) AIDS deaths in 2007 occurred there, illustrating the unmet need for antiretroviral treatment in Africa. The region's epidemics, however, vary significantly in scale, with national adult (15–49 years) HIV

prevalence ranging from less than 2% in some countries of the Sahel to above 15% in most of southern Africa. Southern Africa alone accounted for almost one third (32%) of all new HIV infections and AIDS deaths globally in 2007 (UNAIDS/WHO, 2007). Table 2 shows the regional distribution on HIV cases as it was estimated by UNAIDS/WHO in 2007.

Table 2: Regional statistics for HIV/AIDS end of 2007 compared to 2001 data

Region	Adults & children living with HIV/AIDS	Adults &children newly infected	Adult infection rate (%)	Deaths of adults & children
Sub-Saharan Africa (2007)	22.5(Mil)	1.7 (Mil)	5.0	1.6 (Mil)
Sub-Saharan Africa (2001)	20.9(Mil)	2.2(Mil)	5.8	1.4 (Mil)
Middle East and North Africa (2007)	380 000	35 000	0.3	25 000
Middle East and North Africa (2001)	300 000	41 000	0.3	22 000
South and South-East Asia (2007)	4.0 (Mil)	340 000	0.3	270 000
South and South-East Asia (2001)	3.5 (Mil)	450 000	0.3	170 000
East Asia 2007	800 000	92 000	0.1	32 000
Oceania 2007	75 000	14 000	0.4	1 200
Latin America 2007	1.6 (Mil)	100 000	0.5	58 000
Latin America 2001	1.3 (Mil)	130 000	0.4	51 000
Caribbean 2007	230 000	17 000	1.0	11 000
Caribbean 2001	1.6 (Mil)	150 000	0.9	55 000
Eastern Europe and Central Asia 2007	630 000	230 000	0.4	8000
Eastern Europe and Central Asia 2001				
Western and Central Europe 2007	760 000	31 000	0.3	12 000
Western and Central Europe 2001	620 000	32 000	0.2	10 000
North America 2007	1.3 (Mil)	46 000	0.6%	21 000
North America 2001	1.1 (Mil)	44 000	0.6	21 000
Total 2007	33.2 (Mil)	2. (Mil)	0.8	2.1 (Mil)
Total 2001	29.0 (Mil)	3.2 Mil)	0.8	1.7 (Mil)

Source: Adapted from UNAIDS/WHO (2007)

2.2.3 HIV situation in Tanzania

In Tanzania the first three AIDS cases were reported in 1983 in Kagera Region, although for sub-Saharan Africa as a whole the problem began to surface in the late 1970s (Heggenhougen and Lugalla, 2005). By 1986 all the regions in Tanzania mainland had reported AIDS cases. By the end of 1999 there were some 600 000 cases of HIV/AIDS and similar number of orphans in the country. The overall national trends show stabilizing figurers and some slight decrease in prevalence rate for last five years. The reported prevalence places Tanzania among the 12 worst-affected countries in the world (TACAIDS and NBS, 2005).

According to TACAIDS *et al.* (2008) the national adult HIV prevalence peaked at 8% in 1995, and then gradually decreased to 6.5% in 2004 and 5.8% in 2007. At the onset, the epidemic was growing fastest in areas with larger or border towns, high population mobility (temporary migration due to labour factors), amongst those who were employed, more wealthy, or more educated persons. However, over time, the nature of the HIV epidemic has shifted from an urban to a rural epidemic. Currently, females are at significantly higher risk of being HIV infected than males. The 2007 national survey showed that females aged 15 to 49 were 40% more likely to be HIV positive, and that aged 15 to 24 were 33% more likely to be HIV positive than their male counterparts (UNAIDS, 2008). The absolute number of new infections has grown steeply over time, particularly in rural areas, due to population demographics. Currently, it is estimated that more than an estimated 1.8 million persons in Tanzania are living with HIV. There are also significant differences in HIV prevalence levels across the various regions of Tanzania (Table 3). The reasons for these differences are related to prevalence of male circumcision in the region and percentage of population in urban areas in each region (UNAIDS, 2008).

However, more recent data by TACAIDS *et al.* (2008) found that 6 percent of the population age 15-49 in Tanzania is HIV/AIDS positive and HIV prevalence is still higher among women than men (7 percent and 5 percent, respectively). These rates are slightly lower than those recorded in the 2003-04 Tanzania HIV/AIDS Indicator Survey (THIS), which were 7 percent overall, 8 percent for women and 6 percent for men. Looking at the age pattern, HIV prevalence among women rises sharply with age from 1 percent among women age 15 -19 to peak at 10 percent among women age 30-34 before falling to a level of 7 percent among those age 45-49. Among men age 15-49, the HIV rate raises more gradually with age to a peak at age 35-39 (10 percent), before declining to 6 percent among men age 45-49. HIV prevalence in the urban areas is almost double than that in the rural areas. Among women, HIV prevalence is 11 percent in urban areas compared to 5 percent in rural areas. For men, the corresponding prevalence is 6 percent and 4 percent, respectively (TACAIDS *et al.*, 2008).

The epidemic has evolved from being rare and new disease to a common and widespread household problem, which has affected most Tanzania families. The development of the HIV/AIDS epidemic have its clear impact on all sectors of development through not only pressure on AIDS cases care and management of resources, but also through debilitation and depletion of economically active population especially young women and men.

Table 3: Percentage of HIV prevalence by Age and Sex in Tanzania

Region	Women 15-49		Men 15-49		Total	
	Number tested	% HIV Positive	Number tested	% HIV Positive	% HIV Positive	Number tested
Iringa	323	16.8	254	12.1	14.7	577
Dar es Salaam	835	10.2	693	7.3	8.9	1,528
Mbeya	448	7.6	432	8.3	7.9	880
Shinyanga	691	8.4	656	6.8	7.6	1,347
Tabora	460	6.8	417	5.3	6.1	877
Arusha	249	0.8	185	2.2	1.4	434
Mara	341	6.7	278	3.5	5.3	619
Kagera	534	3.8	475	2.9	3.4	1,009
Kigoma	365	1.5	297	0.1	0.9	662
Kilimanjaro	281	2.2	226	1.5	1.9	507
Lindi	201	4.9	155	2.6	3.9	356
Manyara	261	2.6	232	0.7	1.7	493
Morogoro	308	6.1	277	2.1	4.2	586
Mtwara	267	3.4	200	2.4	3.0	467
Mwanza	636	6.0	511	3.7	5.0	1,148
Pwani	152	6.6	101	3.2	5.3	253
Rukwa	260	4.7	249	4.3	4.5	509
Ruvuma	322	6.3	288	4.4	5.4	610
Singida	167	2.8	151	2.3	2.6	319
Tanga	334	5.3	281	2.1	3.8	615

Source: TACAIDS *et al.*, 2008.

2.3 Treatment of HIV/AIDS with Antiretroviral Therapy

The human immunodeficiency virus (HIV) destroys white blood cells that are essential to the immune system. Transmission in sub-Saharan Africa mostly occurs through sexual intercourse between men and women (UNAIDS, 2006). Normally, infected individuals go through a latent stage during which health status declines gradually and few symptoms are experienced. Almost all HIV-infected individuals then progress to developing AIDS, a stage associated with substantial weight loss (wasting) and opportunistic infections such as tuberculosis and pneumonia.

AIDS prevention programmes in Tanzania for long time have been focusing their efforts on three important aspects of behaviour: delaying sexual debut in young persons (abstinence), limiting the number of sexual partners (staying faithful to one partner) and use of condoms, (the ABC message) (TACAIDS *et al.*, 2005). These efforts have successfully raised the knowledge on HIV prevention. However, the high knowledge observed has failed to transform into HIV protective behaviour. Recently, the use of antiretroviral drugs has been introduced in an effort to prolong the life of the HIV infected persons.

Highly active antiretroviral therapy has been proven to prolong the life of HIV-infected individuals by reducing the likelihood of opportunistic infections. According to WHO guidelines, individuals are eligible for ARV therapy after they progress to AIDS. Once they start treatment, patients become asymptomatic and improve their functional capacity after several months of treatment. Positive results have been reported by numerous studies in various countries and patient populations (Herlitz and Steel, 2001). While the costs and the effects of ARV therapy on the health of treated patients have been widely documented, much less is known about the broader impact of treatment interventions.

Since highly active antiretroviral treatment (HAART) became available in 1996, lengths of hospital stays, frequency of opportunistic infections, and death rates have significantly decreased in developed countries (Herlitz and Steel, 2001). However, efforts to conceal one's diagnosis can pose a serious barrier to use of available medications. Fear of disclosing positive HIV status or HIV-related risk behaviors is directly associated with delays in HIV testing and entry into care after a positive diagnosis (Fortenberry *et al.*, 2002).

Disclosure of one's HIV status to potential helpers is required to garner maximum social support to improve access to HIV treatment or to cope with the potentially debilitating side related to antiretroviral therapy. Individuals who conceal their HIV status from friends and acquaintances within and outside the household may limit their access to information about available services, reduce potential peer support for engaging in treatment, or postpone treatment altogether than if the regimen would disclose his/her HIV/AIDS to household or other network members (Schrimshaw *et al.*, 2005). For example, if one discloses HIV to a supportive network, he or she could take advantage of the instrumental, informational, emotional, and financial resources contained in that network to improve access to medications. If the same individual attempts to maintain supportive networks while concealing HIV, his or her efforts to conceal the disease may override efforts to access care.

2.4 Antiretroviral Therapy (ART) Use in Tanzania

Free antiretroviral therapy (ART) has been provided through the public health system in Tanzania since 2004. The success of national ART roll out programme is premised upon collaborative efforts of health systems, communities and policy environment. Access to antiretroviral (ARV) drugs has been steadily improving in Tanzania. The number of people

receiving antiretroviral therapy has increased from 46 124 in October 2006 to 135 696 by December 2007 (WHO/UNAIDS/UNICEF, 2008). However, in many parts of the country access is limited due to socio-cultural, structural and health system factors (Mshana *et al.*, 2006; Stoeckle *et al.*, 2006).

Elsewhere, the availability of ARV has contributed to a reduction in morbidity and mortality; strengthened patients damaged immune systems and contributed to reducing stigma as reported by Pallela *et al.* (1998) and Castro and Farmer (2005). The fact that antiretroviral therapy (ART) sustains lives of HIV infected persons underscores its significance to public health. It also highlights the challenges that need to be addressed to manage therapeutic outcomes and achieve universal access.

2.5 Challenges Facing ART Use Programmes

Implementation of ART programmes have been facing challenges related to, among other things, treatment adherence, community attitudes to therapy, structural imbalances in different health systems and negative attitudes due to concerns with side-effects (Schrimshaw *et al.*, 2005). In this study, interview with CTC staff revealed that common problems associated ARV use in Morogoro Municipality were adherence to treatment and fear of being stigmatized in the community.

Furthermore, concerns regarding access, food costs, stigma, and service provider related factors have been identified in some parts of Tanzania (Mshana *et al.*, 2006; Stoeckle *et al.*, 2006). Previous studies show that availability of ART has been associated with increased sexual risk behaviours due to "treatment optimism" as discussed by several authors (Bateganya *et al.*, 2005; Rice *et al.*, 2006; UNAIDS, 2006). Antiretroviral therapy is also reported to greatly prolong survival with the potential to increase time available for

viral transmission of resistant strains (Cohen *et al.*, 2007). Contrary, some evidences show that improvement in health status after antiretroviral treatment did not result in unsafe sexual behaviour (Luchters *et al.*, 2007). Recent evidence shows that ART is of public health benefit when introduced earlier to an epidemic (Abbas *et al.*, 2006). Further evidence also shows that ART alone cannot control the HIV epidemic in mature epidemics unless combined with efforts to prevent behavioural disinhibition (Gray *et al.*, 2003). It has also been revealed that ART benefits both the infected and uninfected persons in the community since it acts as an effective prevention tool and could potentially eradicate the epidemic in the long run even with high levels of drug resistance and sexual risk behaviour (Velasco-Hernandez *et al.*, 2002). While enhanced access to ART was earlier feared to increase risky sexual behaviours in the community, to date an increased availability has been associated with improved attitudes towards ART among users (Schrimshaw *et al.*, 2005; Atuyambe *et al.*, 2008).

Most of the studies on attitudes and impact of ART have mostly been conducted among ARV users (Valasco Henandez *et al.*, 2002, Gray *et al.*, 2003, Batenganya *et al.*, 2005, Schrimshaw *et al.*, 2005; Luchters *et al.*, 2007). Previous studies underscore both the public health significance and potential public health consequences of ARV use on sexual conducts of HIV positive persons. However, perceptions about the social impact of ART among uninfected or people not aware of their HIV status in society remain largely unexplored. Furthermore, these previous studies have largely been quantitative and concentrated on clinical aspects of ARV particularly those pertaining to individuals on medication. As has been suggested earlier, intervening at the individual level may not necessarily illuminate the wider societal-level processes that affect people's relationships in the community (Crepaz and Marks, 2002). Individual patient factors and structural constraints to ART identified in previous studies may benefit from community

perspectives of ARVs. An understanding of people's attitudes and perceptions of ART may be crucial in supporting drug adherence and contribute to understanding of the changing dynamics of risk sexual behaviours in the context of ART.

2.6 Access to ART and Sexual Behaviour

As of December 2007, an estimated 3 million people in low and middle-income countries were receiving antiretroviral drugs, which represent 31% of those who need the medications world wide, and is a 45% increase over 2006 statistics (UNAIDS, 2008). In most countries, women are receiving more than expected coverage for antiretroviral therapy. This sex disparity is particularly pronounced in generalized epidemics, which may be related to the fact that many HIV-positive women have two portals of entry for treatment, HIV treatment programmes and programmes to prevent mother-to-child transmission (UNAIDS, 2008).

Although recent studies indicate increased awareness among PLWHA and their positive behaviour change towards risky sexual behaviour while on ARV, a lot of ambivalence still exist. Moatti *et al.* (2003) agitates that increase in HIV-related risky sexual behaviours among persons on highly active antiretroviral therapy (HAART) is of concern worldwide because improvements in the quality of life of patients due to access to effective treatment may cause them to continue or resume risky sexual behaviours. Research on risk behavior among HIV-positive individuals has found that unsafe sexual practices may continue even among those who know their status (Luchters *et al.*, 2007).

Bateganya *et al.* (2004) in their study to compare sexual behavior between antiretroviral experienced and antiretroviral naive of HIV/AIDS patients attending an urban center- Joint Clinical Research Center in Kampala Uganda found that, though ARV experienced

patients still engage in sex they have less partners and less reported STDs. Partly because patients were aware that HIV can still be transmitted even when taking ARVs.

2.7 Summary of Literature Review

The literature on risky sexual beahaviour of PLWHA is inconclusive. Some studies have indicated increased adoption of positive behaviour while some have found insignificant relationship between ARV use and adoption of risky sexual behaviour. This study was set to explore the contribution and implication of ARV programmes on sexual behaviour of PLWHA in order to contribute to ongoing debate of usefulness of ARV programme on halting further spread of HIV.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 An Overview

This chapter presents the methods used to collect and analyse data on the influence of ART programme on control of HIV transmission. The chapter is divided into six sections. Section one presents the study area and justification of its selection. Section two presents research design, while section three presents the sampling procedures employed. Section four describes data collection procedures, which is followed by data processing and analysis in section five. The last section presents limitation of the study.

3.2 Study Area and Justification for its Selection

This study was conducted in Morogoro municipality in Morogoro region, Tanzania. The region is composed of five administrative districts namely Morogoro, Kilosa, Mvomero, Mahenge and Kilombero. Morogoro district where the study was conducted have two district councils Morogoro Municipal Council and Morogoro rural district council. The municipality is situated on the foots of Uluguru mountains ranges, about 200 kilometers west of Dar es Salaam city. Morogoro municipality has a total area of 200 square kilometers divided into 19 administrative wards and 275 streets.

The area was selected because it has large number of PLWHA registered with ART programme than other districts in Morogoro region. As of June 2008, Morogoro region had a total of 9,501 PLWHA registered for ART. More than 4,000 (about 46%) of them were registered in Morogoro municipality (Morogoro Regional Hospital Records, 2008). Moreover, the municipality is more experienced in handling ART since it started providing ART earlier than other districts.

3.3 Research Design

The cross-sectional research design was used in this study. The design allows data collection at a single point in time and is widely used in descriptive study for determination of relationship of variables (Babbie, 1990; Bailey, 1998). The cross-sectional research design was considered favorable for this study because of resource and time limitations for data collection. The adoption of the cross sectional design is also justifiable on the basis that is the most common design used in survey research to compare extents to which at least two groups of people differ on a dependent variable (de Vaus, 1983).

3.4 Sampling Procedures

3.4.1 The study population

The population from which the sample for this study was drawn involved PLWHA both male and female aged 15 – 64 years, who were registered with ART programme in Morogoro municipality. This age group (15 – 64 years) was selected because it includes individuals who are mature enough to provide reliable information regarding attitudes and behavior to be studied. Moreover this age group is sexually active hence enabling comparison between this study and others. According to population census of 2002, Morogoro municipal has a total population of 228,863 people of which 50.4 percent are female, and population growth rate is 4.7 per annum (National Bureau of Statistics, 2002). Records obtained from Morogoro regional hospital in 2008 show that about 52% of PLWHA receiving ART in Morogoro region were registered in the Municipality (Morogoro Regional Hospital Records, 2008).

3.4.2 Sample size

A sample size of 93 respondents consisting of male and female people living with HIV/AIDS on ART (aged 15-64years) were requested to participate in this study by responding to prepared questions (see Appendix 2). According to Bailey (1998),

30 respondents is the bare minimum sample for social studies in which statistical data analysis can be done. A sample size of ninety respondents was therefore three times larger than that suggested by Bailey (1998). Care and Treatment Clinics (CTC) service providers were also selected for interview as key informants to this study based on their skills and qualifications and their guide is provided in Appendix 3.

3.4.3 Sampling methods

Because living with HIV/AIDS is very sensitive and personal issue, purposive sampling method was applied to select HIV CTCs in the study area. It was from the CTCs where PLWHA on ART were identified and asked to respond to the study questions. PLWHA usually attend for their regular consultancy, counseling, drug re-filling or check-ups. Simple random sampling method was applied to select seventy two respondents from regional hospital and twenty one respondents from Sabasaba Health Centre, who participated in this study. From these two CTC centers, a total of five respondents from each centre were interviewed per day. A client was randomly selected to be the first person to be interviewed for a day then every third client coming for CTC service was asked to participate in the study by responding to the questionnaire. Those who refused to participate were left and appropriate replacement made.

Three adult enumerators, one female and two males, were trained to collect data relating to this study. All had attained Ordinary level of Secondary Education (Form Four leavers) and were PLWHA with meaningful experience in the area of care and support of people living with HIV/AIDS in Morogoro Municipal. Moreover, they were trained in, and had been providing home-based care and adherence counseling services to PLHWA under WAVUMO (Wanaoishi na Virusi Vya UKIMWI Morogoro) a local organization of people living with HIV/AIDS in Morogoro.

3.5 Data Collection Procedures

3.5.1 Primary data collection

Questionnaire pre-testing preceded the actual study which was done to test the clarity and sequence of the questions. The information obtained was then used to modify and update the survey questionnaire for main data collection exercise. Corrected semi-structured interview questionnaires were established and administered to respondents in order to obtain both data regarding the respondents' awareness on the role of ART, attitude towards prolonging the lives of PLWHA and sexual behavior of PLWHA on ART. A checklist was employed to collect information from CTC service providers regarding behavioral change interventions in ART programmes (See Appendix 2 and 3 respectively). However, it was found that CTC service providers were few and did not qualify for statistical data analysis and their opinions were treated as qualitative information.

3.5.2 Secondary data

Secondary data were used to substantiate the primary data source, and was documented from various sources including library books, journals, magazines, policy documents, previous research reports and the internet. Sokoine National Agriculture Library (SNAIL), HIV/AIDS care and treatment clinics (CTCs), Morogoro municipal and regional medical officers' office, NACP, TACAIDS, other local and international organization dealing with HIV/AIDS formed part of secondary data sources. The focus was to obtain data, which could not be obtained sufficiently through primary data sources and have broad picture of the subject matter.

3.6 Data Processing

The data collected was coded, entered into computer, verified and cleaned before analysis. The Statistical Package for Social Sciences (SPSS) *Version 12* was used to analyze the

data. Descriptive statistics such as mean, frequencies and percentages were computed to describe the basic features, distribution and pattern of the data obtained in this study. Index scales were constructed to gauge levels of risky sexual behaviour and attitude of PLWHA on ART. Likert scale was constructed to measure attitude and determines awareness of PLWHA on the role of ART programme whereas the *F-test* was used to measure the relationship at 5% (0.05) level of significance.

3.7 Limitations of the Study

a) Some respondent requested to be given money before or after they have responded to the questionnaires. This necessitated the researcher and research assistants to explicitly explain to them the aim and the importance of the research to them and public at large. Those who refused to cooperate were excluded from the study and subsequent client were opted for the survey.

b) Some respondents felt nervous and had difficulties to respond to all items in the questionnaire as asked hence resulted to poorly filled questionnaires which were dropped during the analysis.

c) Some respondents kept on mixing some information on key aspects, despite being reminded. Hence, poor inconsistent information that was obtained was not useful hence dropped in the final analysis. Out of the 101 duly filled questionnaires, eight questionnaires were dropped from the analysis; hence the sample size that was used in the analysis was 93 respondents (N=93).

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Overview

In this chapter, the results of the study are presented and discussed in line with the study objectives. The chapter is divided into five sections. Section one describes the demographic and socio-economic characteristics of the respondents, while section two presents awareness of PLWHA on the role of ART. Section three describes the attitudes of PLWHA towards prolonging their lives. Section four discusses sexual behavior of PLWHA on ART and comparisons of sexual behaviour with selected demographic variables. Lastly, section five discusses behavioural change interventions in ART programmes.

4.2 Demographic and Socio-economic Characteristics of the Respondents

The demographic and socio economic characteristics (background variables) of respondents are important as they provide the background information for other findings of the study. The detailed parameters for demographic and socio-economic variables used in this study and selected socioeconomic and demographic variables are presented in Fig. 3-8.

4.2.1 Age and sex of respondents

The study involved both men and women. Age and sex distribution of respondents is presented in Fig. 3. Sex-wise, female were numerous (76.3%) than males. Age distribution in Fig. 3, shows that majority of respondent who participated in the study were those aged between 18-35years (49.5%) followed by those in the 36-49 years age group (30.1 %).

Respondents with age below 17 years and those aged above 50 years were few 2.2% and 18.3%, respectively. Such results are concurrent with that revealed by TACAIDS *et al.* (2005) that in Tanzania, persons aged between 18-45years are the most affected by HIV/AIDS.

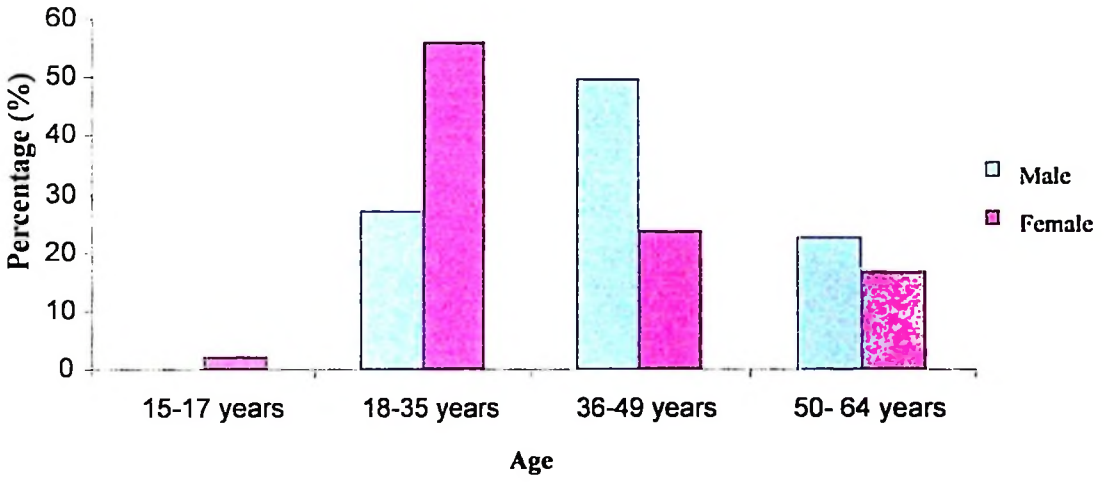

Figure 2: Age and sex of respondents (n=93)

ACORD (2007) conducted three studies in Tanzania, Mozambique and Burkina Faso on ARV Community Knowledge, Awareness, Accessibility and the Policy Environment, where it was also found that the majority of the ARV recipients were females and basically residing in urban areas. The gender disparity in access to ARVs treatment is partly a reflection of the openness exhibited by females who are living with HIV and AIDS compared to men. It is also a demonstration of better health seeking behaviour by females than males. Furthermore, women are the ones mostly hit by the pandemic, hence this also reflect their representation among people accessing ARV.

In several interviews, ARVs female users whose partners were also using ARVs commented that they started using ARVs before their partners did. UNAIDS (2008) note high incidence of HIV/AIDS among women partly due to fact that they have two portal of being tested.

4.2.2 Marital status

Marriage is an important factor of exposure of women and men to sexual intercourse which is the leading mechanism to HIV infection in Tanzania and Africa in general (TDHS, 1996). Respondents in this study were asked if they were married, live single, cohabiting or were widow/widower. Fig. 3 shows that majority of respondents in this study were living as single followed by those who were married (33.7% and 31.4%, respectively).

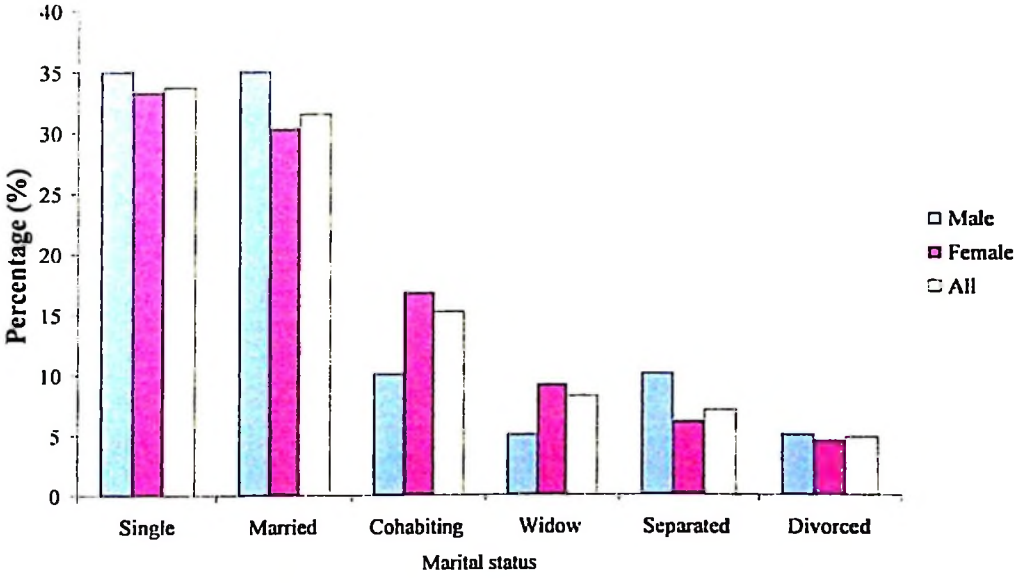

Figure 3: Marital status of respondents (n=93)

According to ACORD (2007), most of the ARV users in Tanzania and Mozambique are heads of households. By implication in the African context, household heads are breadwinners. A high dependency ratio at the household level where several household members depend on the household head, thus, in cases where the majority of breadwinners are living with HIV and AIDS, can represent an uncertain future for the entire household.

There is little published information disaggregated by gender, age or socio-economic status to indicate who is accessing ART in resource poor contexts. However, where data is available, it suggests that access to ART is often most common amongst educated men living in urban areas. Evidence suggests that poor women appear to be at particular disadvantage in accessing HIV treatment (UNAIDS, 2008). It is also not clearly known by this study why more singles were likely to attend VCT centers.

4.2.3 Education level of respondents

The education levels of most of the respondents were primary level education (79.3%) while those with secondary education made 16.3% of the respondents that participated in the study (see Figure 4). This result compares well with those obtained by ACORD (2007) who found that most of the ARV users in the three surveyed countries (i.e. Tanzania, Mozambique and Burkina Faso) had attained low levels of formal education i.e., having attained only primary education. More than a half of the ARV recipients in these three countries had attained primary level education. While available data suggest that there is strong association with increase in wealth and education level and HIV, those with post secondary school education did not feature in the study.

Interviews with key informants revealed that most of the civil servants and wealthy people prefer to remain anonymous when it comes to accessing and using ARVs. It was noted that the group of post-secondary people rarely disclose their HIV status for fear of being stigmatized and discriminated. Majority of such people have not had the courage and will not go for VCT rather they usually make their own arrangement to access ARV. Furthermore, those with low education and those from low income category opt for VCT largely due to lack of alternatives.

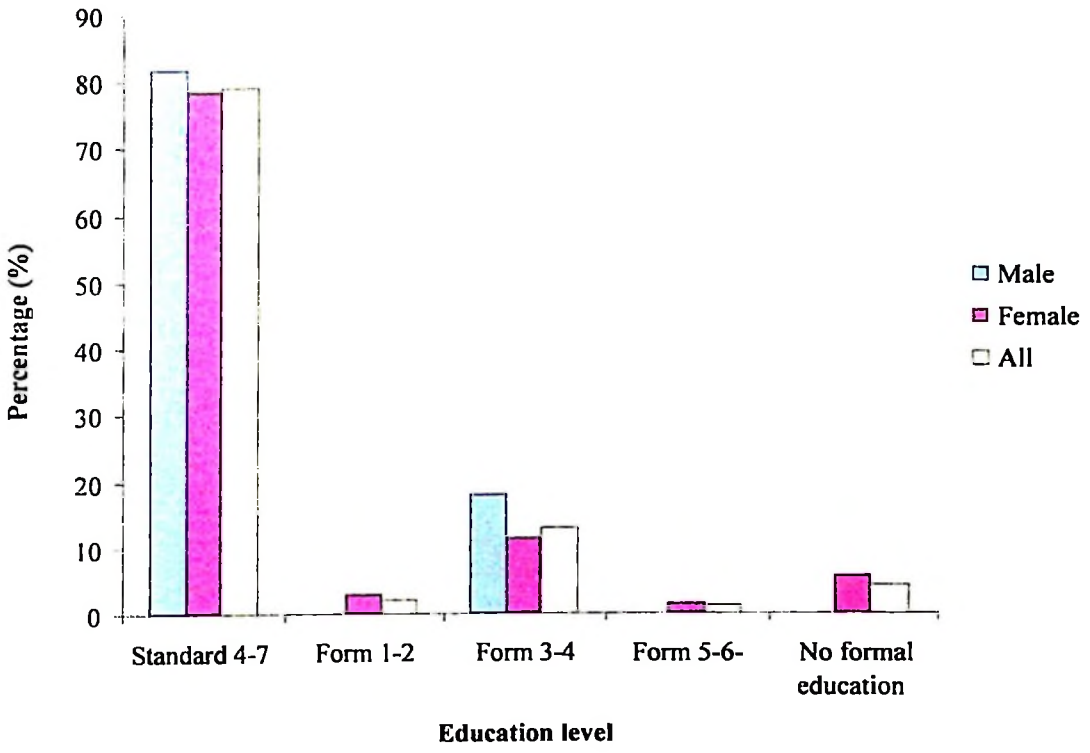

Figure 4: Education level of respondents (n=93)

4.2.4 Occupation of respondents

About one third of respondents (30.4%) were self employed and about a quarter of respondents were either housewives or peasant (27.2% and 22.8%, respectively) as shown in Figure 5. These findings are similar to those reported by ACORD (2007) who found that, most of the ARV beneficiaries in Tanzania were generally poor as reflected by their main occupation. For instance, in Tanzania, majority earned a living through petty trading (47%) while in Burkina Faso, over one third were housewives (ACORD, 2007). In all the three countries with exception of Mozambique, chances of finding civil servants and wealthy people among ARV recipients were minimal. Promisingly, in this study a higher representation of those with formal employment was obtained (Fig. 5).

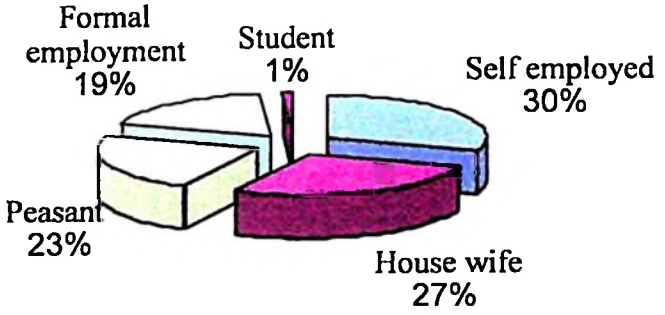

Figure 5: Main occupation of respondent (n=93)

4.2.5 Religious affiliation

Religion is considered as an important cultural variable. In some cases the type of religion of an individual has been found to relate to sexual behaviour which also may have implication to spread of HIV. On other hand, religion affiliations also have influence to accessibility and use of ARV. The variable was considered as a background one, because it was not the major focus of this study. This is also due to the fact that HIV/AIDS cuts across all religions. Respondents were asked to state the religion to which they belonged. Fig. 6 shows that the majority of respondents were Christians - Catholics (52.7%). Moslems accounted for 38.7% while Christians-Protestants were 8.6% only.

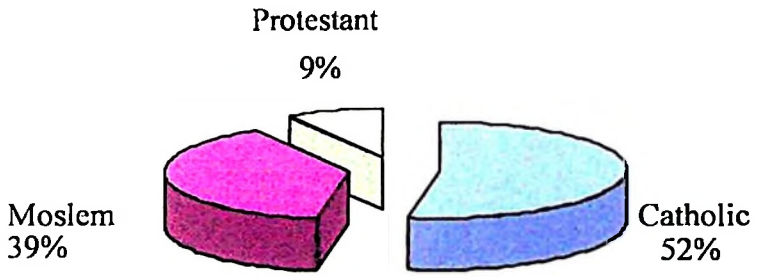

Figure 6: Religious affiliation of respondents (n=93)

4.2.6. Period on Antiretroviral Therapy

In this study respondents were requested to state for how long they have been attending ART clinics. The study found that majority of respondents was experienced in ART services.

Fifty seven percent of respondents had more than two years on the programme followed by those who had an experience ranging from one to two years (about 30%), while the rest (about 21 %) had less than one year in the programme (Fig. 8). The Figure depicts that PLWHA still continuing using ART and new clients still emerging which also shows persistence of HIV problem in our communities. These finding are comparable to those found by Bateganya *et al.* (2004) in Uganda on the existence of both experienced and non experienced ARV recipient.

More interesting was that, the difference in sexual behaviour and attitude between those with long experience on ART and those with little experience were not statistically significant (section 4.3 and 4.4). This can partly be explained by high knowledge found among both groups. However, reasons for non variations are not clear and call for more research in this area.

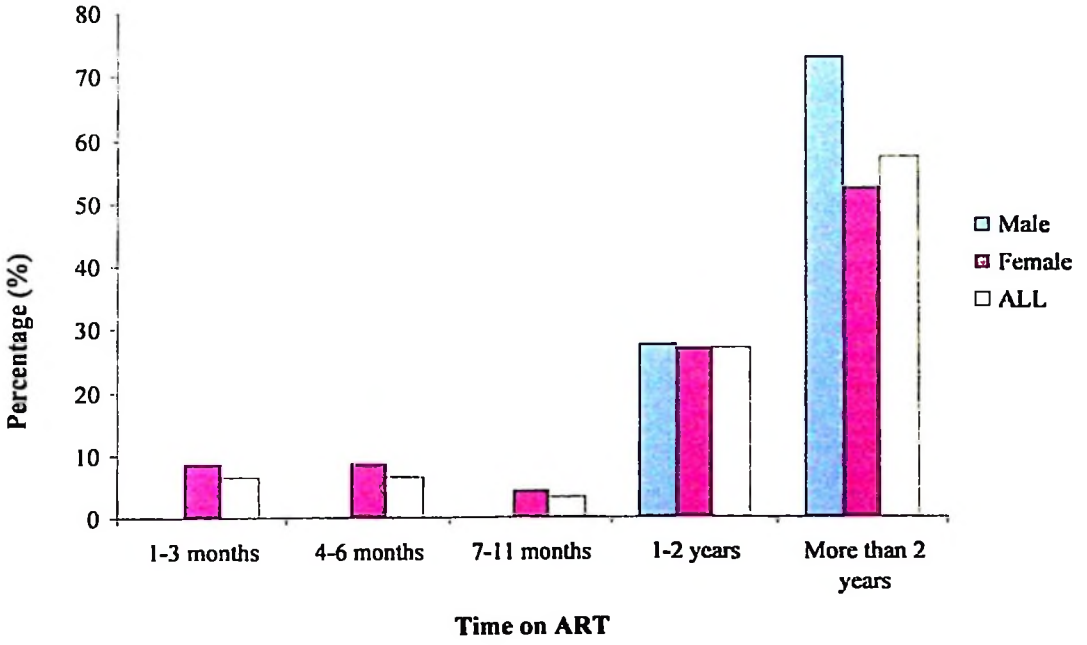

Figure 7: Period on ART (n=93)

4.3 Awareness of PLWHA on the Role of ART

One of the objectives of this study was to determine awareness of PLWHA on the role of ART programme. The level of awareness and knowledge an individual has on a particular aspect that determines how he/she relates to that aspect. In this case, knowledge of PLWHA on role of ARVs was deemed pertinent to using ARVs. This section, therefore, presents a synthesis of the study findings on the levels of awareness and knowledge about ARVs. Results from this inquiry are presented in Table 4.

Table 4: Awareness of PLWHA on the Role of ARV

Attributes	Percentage of respondent (N=93)		
	Agree	Disagree	Don't know
ARV does not cure HIV	94.6	1.1	4.3
ARV delays progression of disease in HIV infected persons	93.5	3.2	3.2
People on antiretroviral can still transmit HIV to uninfected ones	93.5	2.2	4.3
ARV is vital to inhibit replication of HIV in the body of infected persons	92.5	5.4	2.2
ARV is a vaccine for HIV	37.6	40.9	21.5

Respondents were asked to respond by showing whether they agree, disagree or uncertain (don't know) on statements designed to measure their awareness on the role of ART. They were also asked whether they thought ARV cures HIV, whether ARV is a HIV vaccine, or if ARV can inhibit replication of HIV in the body of infected persons and if ARV delays progression of disease in HIV infected persons. Respondents were also asked whether people on antiretroviral can still transmit HIV to uninfected ones.

Results in Table 4 revealed high level of knowledge and awareness among PLWHA on the role of ARV. The vast majority of respondents agreed with most of all four correct statements about the role of ARV. However, over a third of all respondents (37.6%)

harbored serious misconception and thought that ARV is a vaccine and this may further increase the spread of HIV by PLWHA. Consequently, ART programmes should also focus on imparting correct knowledge about ARV. Although CTC staffs who were interviewed reported that they have sessions on improving knowledge base of PLWHA, the efforts need to be strengthened to ensure coverage of wide topics and key issues with regard to ARV and HIV/AIDS. Other studies have for long time shown low attitude of PLWHA on the four variables measured in Table 4 contrary to this study. For instance, ACORD (2007) in research on ARV Community Knowledge, Awareness, Accessibility and the Policy Environment in Tanzania, Mozambique and Burkina Faso found that; people's knowledge about eligibility to use ARVs including those currently on ART was limited. The study results revealed insignificant variations across the three countries. For instance, more than two-thirds (67.9%) and almost all (89.5%) ARV recipients in both Tanzania and Mozambique respectively believed that all PLHAs should be on ARVs. This implies that only a third of ARV users in Tanzania and about a tenth of users in Mozambique had correct knowledge regarding who should be on ARVs.

Findings on knowledge on eligibility to ARV use further revealed that a significant proportion of ARV users shared the view that ARVs can be used in prevention of infection with HIV and AIDS. The knowledge gap was also evident in the perceived reasons for taking ARVs whereby over a third of the sample in Tanzania and a quarter in Mozambique believed that taking ARVs would prevent HIV and AIDS. This can particularly undermine the effectiveness of HIV and AIDS prevention campaigns especially the popular campaign "Abstinence, Be Faithful and Use Condoms.

However, emerging studies have started recognizing high level knowledge on ARV use similar to results of this study. Markos *et al.* (2008) in their study on Adherence to ART

among PLWHA in Ethiopia found the proportion of participants with good knowledge and adherence to ART. It was revealed that more than 99% of respondents were satisfied with the benefit they had obtained from ART. This is probably the reflection of efforts being made by government and non governmental organization where the primary focus have been to increase the knowledge on HIV/AIDS with the expectation that high levels of knowledge will transform into HIV protective behaviour.

4.4 Attitudes of PLWHA towards Prolonging their Lives

Another objective of this study was to determine the attitudes of PLWHA on ART towards prolonging their lives. This subsection presents attitude of PLWHA on ARV towards prolonging their lives. Since HIV/AIDS has emerged as a global problem with a disastrous impact on survival and human development, it has created fear, social anxiety and feeling against humanity (TACAIDS *et al.*, 2005).

In this study, attitude of PLWHA towards prolonging their lives was sought using Likert attitudinal scale. The Likert scale that was constructed had six statements which carried positive and negative statements about prolonging life of PLWHA. Respondents were requested to say whether they strongly agree, agree, uncertain/undecided, disagree or strongly disagree against each statement. Three statements had correct information and other three had incorrect information representing negative attitude. The response was analyzed first by using summated scale approach where scores on positive and negative statements were obtained and compared (Table 5). Then, an index scale on attitude towards PLWHA was constructed in order to facilitate comparison between attitude towards prolonging life of PLWHA and selected socio-demographic variables.

As per Table 5 most of the respondents received high percentage scores on all positive statements and relatively low percentage were obtained to all negative statements. This implies that respondents had positive attitude towards ARV in prolonging life of PLWHA. These findings are consistent with those obtained by Ezekiel *et al.* (2008) in their study on attitudes and perceived impact of antiretroviral therapy on sexual risk behaviour among young people in Kahe, Moshi Tanzania. The researchers found that many participants were aware of ART. Respondent reported to have heard about it from the radio, health facility and colleagues. The study also found that attitudes toward ARV comprised elements of both optimism and pessimism. Positive attitudes were associated with individual and public health benefits resulting from using medication. At the individual level, ART was perceived to be useful as it enabled HIV infected persons to get back to work and fulfill family and other social responsibilities like taking care of children. It was claimed that since AIDS has no cure, ARVs were the only option available to HIV positive persons (Ezekiel *et al.*, 2008).

Table 5: Attitudes of PLWHA towards Prolonging their Lives (N=93)

Attributes	Percent of respondent (N=93)				
	SA	A	UN	D	SD
Like any other persons, PLWHA have the right to live a longer decent life	96.8	2.2	0	0	1.1
Prolonging the lives of PLWHA is meant to enable you to lead normal, healthy and productive life to care and prepare your dependants to be independent individuals	96.8	2.2	0	1.1	0
As PLWHA you bear the responsibility to avoid exposing others to HIV	96.7	1.1	1.1	1.1	0
Prolonging the life of PLWHA means prolonging time for you to expose more people to HIV	36.3	1.1	1.1	38.5	23.1
As long as you are infected with HIV you do not have good reasons to protect yourself from further contracting HIV	33.7	0	0	37.0	29.3
As long as you are on antiretroviral you do not need to worry about contracting HIV	26.9	0	0	43.0	30.1

Key: SA=strongly agree, A= Agree, UN= Undecided, D= Disagree and SD= Strongly Disagree

In most cases attitudes about ART were described in relation to conducts of PLWHA; those with favourable attitudes thought that ARVs extended lives and provided an opportunity for infected persons to engage in different activities for their own and family livelihoods. Positive attitudes to ART appeared to bear strong indications of family and community values. On the contrary, ARV use was considered by some respondents as a waste of government and household resources as a way of prolonging time for a person to expose more people to HIV (36.3%) as presented in Table 6. The last three statements were a good representation of the misconception that unfortunately many PLWHA still harbour. Therefore, VCT centers should target on correcting these misconceptions. They should strive to get the correct education.

Table 6: Variables used in the index of attitude towards prolonging life of PLWHA

SN	Category	Response	Score
1	Like any other persons, PLWHA have the right to live a longer and decent life	Disagree Uncertain Agree	1 2 3
2	Prolonging the lives of PLWHA is meant to enable you to lead normal, healthy and productive life to care and prepare your dependants to be independent individuals	Disagree Uncertain Agree	1 2 3
3	As PLWHA you bear the responsibility to avoid exposing others to HIV	Disagree Uncertain Agree	1 2 3
4	Prolonging the life of PLWHA means prolonging time for you to expose more people to HIV	Agree Uncertain Disagree	1 2 3
5	As long as you are infected with HIV you do not have good reasons to protect yourself from further contracting HIV	Agree Uncertain Disagree	1 2 3
6	As long as you are on antiretroviral you do not need to worry about contracting HIV	Agree Uncertain Disagree	1 2 3

In order to obtain a summary measure, an index scale of attitude towards prolonging life of PLWHA was constructed. Responses were grouped into three categories namely: agree, uncertain and disagree. In all positive statements every "Agree" response was represented by 3 while "Uncertain" was represented by 2 and "Disagree" was represented by 1. For all negative statements every "Agree" response was represented by 1 while "Uncertain" was represented by 2 and "Disagree" was represented by 3. The list of these variables and their values are presented in Table 6 while Table 7 shows frequency of attitude towards prolonging life of PLWHA.

In this case an index ranging from 6 to 18 was constructed as the measure of attitude towards prolonging life of PLWHA and the scale had the mean of 10.01. The scores on the index were further categorized into negative and positive attitudes. Scores below the index mean were categorized as positive attitude where as scores above the index mean were categorized as negative attitude. Data in Table 7 show that more than half of the respondents (55.9%) had positive attitude towards prolonging life of PLWHA whereas the remaining percentage had negative attitude towards prolong life of PLWHA. Male respondents were more likely to express positive attitude than their female counterparts (59.1% versus 54.9%, respectively).

These results are comparable to those reported by TACAIDS *et al.* (2005) which found that Tanzanian adults have positive attitude towards HIV and PLWHA regardless of their serostatus.

Table 7: Frequency and attitude of PLWHA towards prolonging their life

Score	Sex (%)		All
	Male	Female	
6.00	4.5	11.3	9.7
7.00	4.5	1.4	2.2
8.00	18.2	19.7	19.4
9.00	0	1.4	1.1
10.00	31.8	21.1	23.7
11.00	0	2.8	2.2
12.00	40.9	42.3	41.9
Attitude of PLWHA towards prolonging their life			
Positive	59.1	54.9	55.9
Negative	40.9	45.1	44.1

The study also attempted to measure if the attitude of PLWHA towards prolonging their life varied with socio-demographic variables. Index scale was developed and compared with selected background variables and F-test analysis was used to test the association at 5% confidence interval. As per Table 8, attitude of respondents did not differ significantly with all variables measured at $p>0.05$.

This study has found that PLWHA have positive attitude towards ARV use and they believe in the health benefit of the ART program which is an important step towards maintaining ARV medication adherence. However, attitude of PLWHA did not differ significantly when compared to selected background variables; implying that selected background variables such as age, sex education, marital status, occupation and period on ART use have little influence on ones use or adherence to ART programmes.

Table 8: Mean index of attitude of PLWHA by selected background and demographic variables

Category (N = 360)	Mean index	F	P
Age			
15-17 years	12.00	1.130	0.341
18-35 years	9.82		
36-49 years	10.35		
50- 64 years	9.70		
Marital status			
Single	10.00	0.315	0.903
Married	9.85		
Divorced	11.00		
Widow	10.14		
Cohabiting	10.00		
Separated	10.66		
Religious affiliation			
Catholic	10.08	0.063	0.939
Protestant	9.87		
Moslem	9.94		
Highest level of education attained			
No formal education	10.00	1.102	0.361
Standard 4-7	9.80		
Form 1-2	12.00		
Form 3-4	10.58		
Form 5-6	12.00		
Main occupation of the respondent			
Student	12.00	1.054	0.384
Self employed	9.89		
Formal employment	9.94		
House wife	10.52		
Peasant	9.42		
Period on ART			
1-3 months	9.00	0.468	0.759
4-6 months	9.66		
7-11 months	10.00		
1-2 years	10.00		
More than 2 years	10.16		
Index mean	10.01		

4.5 Sexual Behavior of PLWHA on ART

The third objective of this study was to generate information on sexual behavior of PLWHA on ART. Sexual behaviour of PLHA in this study refers to behaviours related to sexual intercourse such as ever had sex since one started attending ART clinic, number of

sexual partners, condom use and consistence use of condom. Other behavioural parameters measured were, if one was aware that his/her partner is living with HIV, whether partner is registered with ART clinic, if one has abstained from sex and whether one has conceived while on ART. To elicit information on sexual behaviour of PLWHA, in depth questions were asked on these key variables. Table 9 summarizes sexual behaviour of PLWHA.

The study found that the vast majority of the respondents (78.3%) have had sex since they joined ART programme. Male respondents were more likely to report that they have had sex while on ART than their female counterparts (81% and 77.5% respectively). About a fifth of the respondents (21.7%) reported that they had never had sex since they joined ART programme (see Table 9). However, majority of respondents were sexually active, about eighty (80.6 %) had sexual intercourse in three weeks preceding the survey. More female respondents reported to have had sex than their male counterparts (81.8% and 76.5% respectively).

Results in Table 9 reveals that PLWHA are also sexually active. A study by Bateganya *et al.* (2004) compared sexual behavior between antiretroviral experienced and antiretroviral naive of HIV/AIDS patients attending an urban center- Joint Clinical Research Center, Kampala, Uganda. The study found that the ARV-Experienced group was more likely to have had sexual intercourse in the last 6 months than the ARV-naive group. Similar finding were also reported by Rickenbach *et al.* (2003) in their study on sexual health of people living with HIV/AIDS in Switzerland they found that about 72% of the respondents were sexually active during the preceding six months. The study also found that heterosexual men and women mostly had sex with steady partners whereas Men who had Sex with Men (MSM) reported sex with both steady and casual partners.

Table 9: Sexual behaviour of PLWHA

SN	Category	Sex (%)		
		Male (n=22)	Female (n=71)	All
1	Ever had sex since one started attending the ART programme			
	Yes	81.0	77.5	78.3
	No	19.0	22.5	21.7
2	Number of sexual partners			
	1	93.8	84.3	86.6
	More than one sexual partner	6.3	15.7	13.4
3	Had sex in the last thee weeks			
	Yes	76.5	81.8	80.6
	No	23.5	18.2	19.4
4	Condom use in the last time one had sex			
	Yes	100.0	89.1	91.5
	No	0	10.9	8.5
5	Use condom every time have sex			
	Yes	100	91.8	93.8
	No	0	8.2	6.2
6	Partner living with HIV			
	Yes	68.8	48.0	53.0
	No/Don't know	31.3	52.0	47
7	Partner(s) aware that you are living with HIV			
	Yes	78.6	84.8	66.2
	No	21.4	15.2	33.8
8	Abstaining from sex after knowing one is living with HIV			
	Yes	25.0	33.3	31.1
	No	75.0	66.7	68.9
9	Ever conceived while on ART			
	Yes	NA	15.8	15.9
	No	NA	84.2	84.1

In order to determine the level of risk of sexual behaviour, an index was developed using a list of sexual behaviour variables. Nine variables were used to form this index. These variables were: ever had sex since joining ART, number of sexual partners, condom use for the first time during sexual intercourse, condom use for the last time during sexual intercourse, general condom use, and awareness if partner is living with HIV, abstinence after knowing that one is living with HIV and if one has conceived while on ART. For each variable, every "Yes" response was given a value of 1, which indicated high risk, while "No/don't know" response was given a value of 0, meaning low risk. The list of these variables and how they have been assigned their values are presented in Table 10.

Table 10: Variables used in the risk sexual behaviour scale

SN	Variables	Description
1	Ever had sex since you started attending the ART programme	1 = Had sex 0 = Never had sex
2	Number of sexual partners	1 = More than one sexual partner 0 = No or one sexual partner
3	Had sex in the last thee weeks	1 = Had sex in the past three weeks 0 = Did not have sexual Intercourse
4	Condom use in the last sex	1 = Did not use condom for the last time had sexual intercourse 0 = Used condom for the last time had sexual Intercourse
5	Use condom every time have sex	1 = No/sometimes 0 = Uses condom every time s/he had sexual Intercourse
6	Partner(s) aware that you are living with HIV	1 = No 0 =Yes s/he is aware
7	Abstaining from sex after knowing one is living with HIV	1 = Not abstaining 0 = Abstaining
8	Ever conceived while on ART	1 = Conceived 0 = Did not conceive

Key: 1 = high risk, 0 = low risk

In this case, an index scale ranging from 0 (meaning low risk) to 8 (meaning high risk) was obtained as an indicator of risky sexual behaviour. The index had a mean of 4.05. Results in Table 11 show the frequency and level of risk of sexual behaviour. Furthermore, the values on the index of the risk of sexual behaviour were categorized into low risk, medium risk and high risk of sexual behaviour in order to get a meaningful analysis. Scores of 0 to 3 were considered as low risk, 4 medium and 5 to 8 high risk.

Table 11: Frequency and level of risk of sexual behaviour

Score	Sex (%)		All
	Male	Female	
0	9.1	4.2	5.4
1	13.6	22.5	20.4
2	9.1	1.4	3.2
3	0	5.6	4.3
4	9.1	11.3	10.8
5	9.1	19.7	17.2
6	45.5	31.0	34.4
7	4.5	4.2	4.3
Level of risk of sexual behaviour			
Low	31.8	33.8	33.3
Medium	9.1	11.3	10.8
High	59.1	54.9	55.9

As per Table 11, the majority of respondents (55.9%) were in the high risk category. Thirty three percent were categorized in low risk group and less than a quarter (10.8%) of respondents was in the medium risk category. Such results reveal that the high revel of HIV knowledge has not been transformed to HIV protective behaviour. Similar mishaps have also been reported in Tanzania HIV/AIDS Indicator Surveys (THIS) (TACAIDS *et al.*, 2005).

4.6 Demographic and Socio-economic Variables and Risk of Sexual Behaviour

In order to better understand the pattern of risky behaviour among PLWHA an index scale developed was compared to selected demographic variables. The mean index of sexual

behaviour have been used in the analysis and the *F-test* was used to ascertain the association at 5 % (P=0.05) level of confidence (Table 12).

Findings in Table 12 show that the mean index score on PLWHA' sexual behaviour was highest in 18-35 years age group and lowest in the 50-64 years age group. This finding is comparable to TACAIDS *et al.* (2005) who reported the same group to be sexually active and being more at risk of contracting and further spread HIV. The *F-test* analysis showed significant relationship between PLWHA' age and risk of sexual behaviour (P = 0.006).

As per Table 12, the relationship between respondents' sex and risk of sexual behaviour was statistically significant (P>0.05). Male and female scored different on the index scale implying they do not have the same risk. The mean index score was higher for male than female respondents (4.18 and 4.01, respectively). This indicates that, male respondents were more likely to involve into high risk sexual behaviour while on ART than their female counterparts.

Formal or informal unions are primary indicators of exposure to the risk of pregnancy, STDs and HIV infections (TACAIDS *et al.*, 2005). Hence, PLWHA who were married were expected to indulge into risk sexual behaviour while on ART. This study also found that the relationship between marital status and risky sexual behaviour was not statistically significant. Married and cohabiting respondents scored high on the index scales meaning were more at risk of further spreading HIV (4.70 and 4.84, respectively) (see Table 12).

Table 12: Mean index of sexual behaviour by selected background and demographic variables

Category (N = 93)	Mean index	F	P
Age group			
15-17 years	4.50	4.454	0.006
18-35 years	4.63		
36-49 years	4.03		
50- 64 years	2.47		
Sex			
Female	4.01	0.096	0.757
Male	4.18		
Marital status			
Single	3.89	1.548	0.184
Married	4.70		
Divorced	3.50		
Widow	2.71		
Cohabiting	4.84		
Separated	3.33		
Number children			
1	4.20	2.351	0.060
2	5.06		
3	4.15		
4	3.86		
4+	2.14		
Religious affiliation			
Catholic	3.89	0.529	0.591
Protestant	4.75		
Moslem	4.11		
Highest level of education attained			
Standard 4-7	4.32	2.452	0.052
Form 1-2	3.00		
Form 3-4	2.41		
Form 5-6	6.00		
No formal education	3.50		
Main occupation of the respondent			
Student	2.00	0.832	0.509
Self employed	4.50		
Formal employment	3.58		
House wife	4.20		
Peasant	3.71		
Period on ART			
1-3 months	3.16	1.163	0.333
4-6 months	2.66		
7-11 months	5.33		
1-2 years	4.20		
More than 2 years	4.16		
Index mean	**4.05**		

Results in Table 12 also reveal that the relationship between education attainments of PLWHA and their sexual behaviour was not statistically significant. This is possibly because the majority had the same primary education level. However, the index score was lowest among people with no formal education and highest among those who had attained advanced level of secondary education (form six) (3.50 and 6.00, respectively). Similar findings have also been reported, TACAIDS *et al.* (2005) in their study on Tanzania HIV/AIDS indicator survey revealed that the risky of HIV/AIDS infections increased with education.

Table 12 also reveals that the relationship between period on ART and ones sexual behaviour was not significant. However, the score on the index scale shows that those who had long time in ART scored high on the index scale, this imply that as one continue to attend on ART he/she is more likely to engage in more risky sexual behaviour. Clinical improvement because of highly active antiretroviral therapy has been thought to relate to increased risky sexual behaviours in HIV-infected persons. In a study conducted in Uganda among PLWHA (Bunnel, 2006) found that that sexual behaviour of PLWHA increased significantly; sexual intercourse was most common among those in stable relationships

In the cross-sectional study that was conducted in west Africa, patients who were informed of their serostatus and attending eight health centres involved in HIV care in Abidjan and Bouake in Cote d'Ivoire, between December 1999 and February 2000 (Moatti *at al.,* 2003) found that; patients on ART were significantly more likely to use condoms during their most recent sexual intercourse (80%) than those who were not on ART (59%). Surprisingly, the study also found that, access to ARVs was likely to increase risky sexual behaviours among HIV-infected patients on ART.

In another study in Mombasa, Kenya (Lutchers *et al.*, 2007) did not find enough evidence of increased sexual risk behaviors among persons receiving ART and prevention counseling. However, risk of HIV transmission remained high among sexually active participants. In the same study about 33% respondents were not aware of partner's HIV status and 28% reported unsafe sex.

Despite the above discussions, improvement of care, support and counseling associated with ARV may be one of the factors responsible for the lower risky behaviour among those on ART; hence government and non governmental organization should continue to empower ART centers to offer better services. This study also found that risky sexual behavior increased with time one on ARV which imply that as the health status of PLWHA stabilize they resume sexual activity and their risk perception decreases. If this trend continues those on ART will be active agents of further spreading the diseases. Therefore, supportive counseling should be maintained and emphasized at all times.

4.7 Disclosing HIV Status and Partner reaction

Some people living with HIV infection may generally conceal their HIV status from people in their lives, not just their sex partners. In addition, people who do not disclose their HIV status may have had adverse experiences related to previous disclosures, including loss of social support, loss of employment, violent reactions and other forms of discrimination. Finally, people who fail to disclose their HIV status may merely lack a sense of efficacy for being able to effectively disclose their HIV status, especially to their sex partners (Simbay *et al.*, 2006).

To assess general HIV concealment, respondents were asked whether they hide their HIV status from their sexual partner, whether there are people they have not told about their HIV status and their reaction and whether they find it difficult to tell people about their

HIV status. Those who disclosed their status to partners were asked how they did it. Results in Table 13 show how partners revealed their HIV status to their partners. The most popular means by which PLWHA disclosed their status was through discussion (45.8%). followed by scenarios where partners tested together (29.2%). Table 13 also reveals that few respondents (2.1%) discovered that their partners were living with HIV/AIDS after they discovered their partners were using ARV.

Table 13: Disclosing HIV status to partner

SN	Item	Percent (N=93)
1	Through discussion	45.8
2	Tested together	29.2
3	S/he asked me following changes s/he observed on my health	14.6
4	S/he heard from other people	8.3
5	S/he discovered that I am using ARV drug	2.1
	Total	**100.0**

Disclosing one's HIV test result to a sexual partner is an important factor in HIV/AIDS prevention interventions. Disclosure of one's HIV status enables for improved access to prevention and treatment programmes and provides increased opportunities for risk reduction and helps in planning for the future. An assessment of the barriers and outcomes for disclosure is necessary to enhance HIV test result disclosure among couples (Kebede *et al.,* 2005). In this study respondents were asked about their partner reactions after HIV status disclosure, the results are presented in Table 14. The majority of respondents revealed positive attitude to HIV result and they comforted each other (29.2%) and consoled one another to live positively with HIV (27.1%).

These findings are comparable to those obtained in TDHS (1996) and TACAIDS *et al.* (2005) where it was also found that Tanzanian adults generally have accepting attitude towards HIV and those living with HIV/AIDS, are empathetic towards HIV and people with AIDS regardless of their own perceived susceptibility to the disease. This can

positively contribute to reduce stigma and enable more people to declare their HIV status and therefore starts ARV treatment earlier.

Table 14: Partner reactions after HIV status disclosure

Item	Percent (N=93)
S /he comforted me	29.2
S /he consoled me to live positively with it	27.1
S/he was not pleased with the information	12.5
S /he went for HIV test too	12.5
S /he accused me of being unfaithful	10.4
S /he abandoned me	4.2
S /he separated	2.1
S /he divorced me	2.1
Total	**100.0**

Findings from other areas, however, revealed mixed reactions. In the study to find determinants and outcomes of disclosing HIV-sero positive status to sexual partners among women in Mettu and Gore towns, Illubabor Zone southwest Ethiopia Kebede *et al.* (2005) found that, 69% of the women reported that they had shared their HIV test results with their partners. Among the women who did not disclose their HIV status 62.5% said that it was due to fear of partner's reaction (fear of abandonment, rejection and accusation of infidelity). But 75.9 % of HIV positive women who disclosed their result reported positive partner's reaction. Most (81.3%) women who had prior discussion about HIV and HIV testing with their partners have disclosed their results.

A study in South Africa conducted by Mouyis *et al.* (2002) revealed that male partners who had shown a history of abusive behaviour were more likely to abuse their female partners, either verbally or physically. There was a tendency for the occurrence of abusive behaviour after disclosure to increase in cases when the male partner abused drugs or alcohol and social stigma appeared to play a role in influencing partner reaction following disclosure.

This study indicates that the outcomes of disclosure are encouraging. The anticipated partner reactions and the reality discovered by the study were different. Therefore it is important to assure HIV-positive men and women that the benefits of disclosure outweigh the potential risks. However, a large-scale study on the subject is also recommended. These findings have implications for the development of interventions to enhance one's disclosure of his/her HIV-positive status to partner.

Risky sexual behaviour among PLWHA is associated with non disclosure of HIV status to sex partners. In the study conducted in Uganda (Simbay *et al.*, 2006) found that, sexual transmission risk behaviours were reported mostly among people who had not disclosed their HIV status to sex partners. The relationship between engaging in unprotected intercourse and not disclosing HIV status to partners was most apparent when partners were of unknown HIV status. Specifically, people who had not disclosed their HIV status to all sex partners were 28 times more likely to have sex partners whose HIV status was unknown.

4.8 Behavioural Change Interventions in ART Programmes

The last objective of this study was to examine behavioral change interventions in ART programmes. This objective was achieved by asking respondents the source of ART information, behavioural interventions that are practiced in the ART centres and those which they have adopted. Then, respondents were asked to mention the challenges they are facing in trying to avoid contracting HIV or transmitting HIV to others. Lastly, respondents were asked for their opinion on what they thought need to be done to improve the effectiveness of behavioural change intervention in ART programme. Tables 15 and 16 present behavior change dynamics in ART programmes.

Table 15: Behavioural Change Interventions in ART Programmes

Category	Percent(N=93)*
Source of information about ART	
Medical staff	59.0
Community sensitization meeting	15.0
ART service provider	14.0
Radio	5.0
News paper	3.0
Leaflet	3.0
Work place campaign	3.0
Behavioral change interventions offered by the ART programme in the area	
Health education to community	41.7
Voluntary counseling and testing	29.6
Health based care services	18.5
Health education to patients	10.2
Sexual behaviors that ART programme advise clients to adopt and maintain	
Use of condom during sexual intercourse	47.9
Abstinence	25.0
To have tested and faithful partner	25.0
Birth control	1.4
Voluntary testing and counseling	0.7

***Multiple responses, categories may add up to more than 100**

Table 15 revealed that the most popular source of information about ART was medical staff followed by community sensitization meeting (59% and 15%, respectively). The least popular source of ART information was radio, leaflets and newspapers. While radio, television and newspapers were the most popular source of HIV/AIDS knowledge as documented by TACAIDS *et al.* (2005); it is not the case with ART which require in-depth knowledge and understanding before disseminating the same to PLWHA. Therefore, it is not surprising to find that most respondent mentioned medical staff as the major source of ART information. Furthermore, ARV in Tanzania is hosted within health system and hence medical personnel are better placed to give correct information on ART.

According to ACCORD (2007), study on ARV and ART services revealed varying degrees of popularity of the different sources of information on ARV treatment and services.

For instance, in Tanzania and Burkina Faso, health providers/counselors at the ARV dispensing sites were reported as the main source of information on ARVs. In Mozambique however, they were among the least cited sources, instead the commonly cited source of information about ARV treatment was the radio. In all the study areas, the commonly cited type of information received from the various modes of communication was on "access to ARV treatment centres". The major aspects of ARV treatment were not being disseminated outside the ARV dispensing sites in all the study countries.

In this study it was found that, behavioral change interventions offered by the ART programmes are consistent with those advocated by the Ministry of Health and Social Welfare. Health education to community and voluntary counseling and testing are among activities that were mentioned in Table 15 by majority (41.7% and 29.6%, respectively) of respondents. Sexual behaviors that ART programme advises clients to adopt and maintain include use of condom during sexual intercourse (47.9 %), abstaining and to have one partner who has is faithful and has tested for HIV (all scored 25.0%). Other advices that clients are advised to adopt were birth control and voluntary testing and counseling (1.4% and 0.7% in that order).

Implementation of ART programmes have been facing challenges related to: treatment adherence, community attitudes to therapy, structural imbalances in different health systems and negative attitudes due to concerns with side-effects (Schrimshaw *et al.*, 2005). In this study, respondents were asked to mention challenges they face in trying to avoid contracting or transmitting HIV to others. Difficulties in discussing and agree on condom use with partners (about 63%) and difficult to communicate ones' serostatus (23.4%) were the most popular challenges mentioned by respondents. Results presented in Table 16 also

show that the least popular factors mentioned were misconceptions about the role of ART and social pressure on the need to have children (2.4% and 1.6%, respectively).

Thomas *et al.* (2008) in their study on "Changes in Risk Behavior among HIV-Positive Patients during Their First Year of Antiretroviral Therapy in Cape Town South Africa" report that risk factors associated with unprotected sex at last sex were similar after one year of ART as compared to when patients were waiting to start or had just started ART. Inconsistence in use of condom were also found, largely due to challenges associated with negotiating use of condom and sexual decision making among partners including partners living with HIV.

Table 16: Challenges faced in efforts to avoid contracting HIV or transmitting HIV to others

SN	Item	Percent response (N=93)
1	It is difficult to discuss and agree on condom use with my partner	62.9
2	It is difficult to communicate my serostatus to my partner	23.4
3	It is difficult to maintain consistent use of condoms during sexual intercourse with my partner	5.6
4	Disclosure of serostatus may lead to separation / abandonment or divorce from a person you love or depend	4.0
5	Misconceptions about the role of ART - some think that it's a cure of HIV	2.4
6	Social pressure on the need to have children	1.6

Lastly, respondents were asked to give their opinion on what they thought need to be done to improve the status and effectiveness of ART service provision. This information is summarized in Table 17, where majority of respondents emphasized on improving provision of more education on the use of ARV and ART services.

Table 17: Opinions to improve the effectiveness of behavioural change intervention in ART programme

SN	Item	Percent response (N=93)
1	Education should focus rural people and those with little education	36.4
2	More education and public sensitization on VCT and ARV use	18.2
3	Educate more people using audio visual	12.1
4	In-depth counseling education on use of ARV is needed	9.1
	Education using peer groups may have more impact	6.1
5	More VCT centre should be set up	6.1
6	Door to door campaign is needed to be effective	3.0
7	Means of reducing poverty among PLWHA is needed	3.0
8	Efficiency in CD4 counts at clinics	3.0
9	ARV should be supplied through NGOs to promote anonymity	3.0
	Total	**100.0**

4.9 Chapter Summary

So far detailed discussion on dynamics of ART among PLWHA has been discussed. Results concur to hypothesized relationship and effectiveness of ART programmes on controlling further spread of HIV as reflected in conceptual framework. However, despite the remarkable success of ART programmes on increasing the level of knowledge and awareness on ARV and HIV/AIDS in general, same achievement have not been found to transform into adoption of HIV protective behaviour by PLWHA.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Overview

The overall objective of the study was to examine influence of ART programme on control of further HIV transmission in order to contribute to effective HIV/AIDS policy and programme planning. This chapter presents the summary of the major findings and conclusions. It also provides recommendations and suggestions for further research.

5.2 Summary of the Major Findings

5.2.1 Awareness of PLWHA on the role of ART Programme

This study found high level of knowledge and awareness among PLWHA on the role of ARV, the vast majority of respondents agreed with correct statements about the role of ARV. The agreed statements were, ARV does or does not cure HIV (94.6%), delays progression of disease in HIV infected persons (93.5%), people on antiretroviral can still transmit HIV to uninfected ones (93.5%) and whether they thought ARV is vital to inhibit replication of HIV in the body of infected persons (92.5%). About one third of respondents (37.6%) thought that ARV is a vaccine for HIV which is a serious misconception about the role of ARV. Such high knowledge and awareness is encouraging and provide an impetus to strengthen struggle to ensure that the pandemic is arrested.

5.2.2 Attitudes of PLWHA on ART towards prolonging their lives

The result from this study revealed that respondents had positive attitude towards ARV in prolonging life of PLWHA. Most of the respondents received high percentage scores on all positive statements and relatively low percentage were obtained to all negative statements about the role of ARV on prolonging their live.The attitude of PLWHA towards

prolonging their life did not vary with socio-demographic variables. Index scale developed when compared to selected socio-demographic variables with F-test analysis did not reveal any significant relationship ($p>0.05$).

5.2.3 Sexual behavior of PLWHA on ART

The study depicted that majority of PLWHA were sexually active, and about eighty one percent (81%) had sexual intercourse in the week preceding the survey. More female (about 82%) respondents reported to have had sex than their male counterparts (76.5%) in the week preceding the survey. An index scale developed revealed that more than half of respondents (about 56%) were categorized in the high risk category. Thirty three percent were categorized in low risk group and less than a quarter (about 11%) of respondents was in the medium risk category. F- test analysis revealed that the relationship between age and risk sexual behaviour was statistically significant ($p = 0.006$). The mean index score on PLWHA' sexual behaviour was highest in 18-35 years age group and lowest in the 50-64 years age group. This implies that PLWHA in 18-35 years age bracket were more at risk of indulging into risky behaviour and further transmits the HIV to other people, the relationship of risky sexual behaviour and all other variables did not reveal any statistical significance ($p > 0.05$) implying that they do not have large influence one's sexual behaviour.

The majority of respondents revealed positive attitude to HIV result with their partner and they comforted each other (29.2%) while others consoled one another to live positively with HIV (27.1%). This study indicates that the outcomes of HIV disclosure are encouraging. The anticipated partner reactions and the reality discovered by the study were different. HIV-related stigma and discrimination are associated with not disclosing HIV status to sex partners, and non-disclosure is closely associated with HIV transmission risk behaviour.

5.2.4 Behavioral change interventions in ART programmes

Besides, the study found that, behavioral change interventions offered by the ART programmes are consistent with those advocated by the Ministry of Health and Social Welfare. Health education to community and voluntary counseling and testing are among activities that were mentioned by majority (about 42% and 30%, respectively). Sexual behaviors that ART programme advises clients to adopt and maintain include use of condom during sexual intercourse (47.9 %), abstaining and to have tested and faithful partner (25.0%). Other least advices were birth control and voluntary testing and counseling (1.4% and 0.7% in that order).

Implementation of ART programmes has been facing several problems. Respondents mentioned such challenges to include difficulties they face in discussing and agree on condom use with their partners (62.9%) and to communicate ones' serostatus (23.4%). Other challenges mentioned include misconceptions about the role of ART and social pressure on the need to have children while on ART.

5.3 Conclusions

The following conclusions are made from the findings of this study

- High level of knowledge and awareness exist among PLWHA on the role of ARV in prolonging their life.
- PLWHA have accepting /positive attitude towards ARV.
- The attitude of PLWHA towards prolonging their life does not vary with socio-demographic variables.
- PLWHA are sexually active, and sometimes have many sexual partners and indulge in sexual intercourse with partners whose serostatus is not known.

- PLWHA are involved in risky sexual behaviour, hence the risk to further transmit the HIV to other people is high.
- Implementation of ART programmes is facing several challenges including difficulties in discussing issues related to condom use with their partners, communicate ones' serostatus and misconceptions about the role of ART.

5.4. Recommendations

5.4.1 Recommendations to policy makers

- Although high knowledge and awareness about the role of ARV was observed by this study, some misconceptions were also found and sexy risk behaviours still persist. Therefore, communication campaigns should also target PLWHA, encouraging them to talk openly to their partners.
- Communication campaigns should correct incomplete knowledge, challenge misconceptions, communicate the availability of HIV and STI testing and stress the importance of knowing one's HIV status.
- The government should improve access to ART service to enable many people especially rural people who need more education on the use of ARV and ART services.
- The government and non governmental organization should also focus on building the capacity of ART services providers as they are the main source of information for ARV users.

5.4.2 Recommendations to ART programmes

- The ART programme should develop and expand interventions to enhance campaigns of VCT and disclosure of ones HIV status to sexual partners.

- The ART programme should continue to support positive sexual behaviour and enhance care and support, post-test counseling and advocate for openness among PLWHA in the family and community.
- The ART programmes should advocate for the roles of health systems, non-governmental organizations, affected communities and government policy in managing sexual transmission of HIV/AIDS.
- ART programmes need to re-emphasize information about the benefits and shortcomings of ART in line with objectives of the national ART care and treatment plan as stipulated by MoH (2003). The fact that some study participants reported that ART could be misunderstood as cure for HIV/AIDS is an indication of a lack of appropriate information about ART. Appropriate information about ART is vital in addressing negative attitudes and misconceptions about ART.

5.5 Areas for Future Research

- The findings presented in this study are just based on micro survey conducted in only two ART centres in one district hence cannot be a true representative of the total population of PLWHA in Tanzania. Consequently, there is a need for more studies on the same subject which will cover more PLWHA to enable generalization of the observations.
- Though it was found in this study that many partners were willing to disclose their serostatus to partners and some positive reactions have been acknowledged. A large-scale and longitudinal study on the benefit against risk of disclosure of one's HIV status to partner and community is required.
- Further, longitudinal surveys and surveillance on sexual behaviour of PLWHA is needed to develop trends in sexual behaviour to enable policy makers and ART

programmes to have long term plans which are effective to prevent further spread HIV.

- As ART continue to be available to many people, there is need to conduct a study on the social and sexual impact of increased availability of ART, and challenges that ARV bring in response to HIV dynamics.

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APPENDICES

Appendix 1: Interview Guide for PLWHA on ART

Good morning / afternoon!

My name is ..... from Sokoine University of Agriculture. I am conducting HIV/AIDS research on ART programme. The main objective of the study is to examine the influence of ART programme on control of further HIV transmission in order to contribute to effective HIV/AIDS policy and programme planning.

CONFIDENTIALITY CONCENT

I want to assure you that answers will be kept strictly confidential and I will not keep record of your names if you do not feel like it. You have the right to stop the interview at any time, or to skip any questions that you do not want to answer. There are no wrong or right answers. Your honest answer will help us better understand challenges relating to ART and sexual behavior of PLWHA. This will help policy makers and programme planners design better strategies to improve PLWHA status and control further transmission of HIV. Your participation is completely voluntary but your experience could be very helpful to service providers and the community.

Do you have any questions so far?

A. QUESTIONNAIRE IDENTIFICATION

s/n	Attribute	Response
1	Date of interview	
2	Interview number	
3	Name of Care and Treatment clinic	
4	Location	
5	Ward	

B. BACKGROUND INFORMATION

In this section I would like to know your background information. Please, respond to the following questions about yourself.

Sex	Age(Years)	Marital status	No of children	Religious denomination	Highest Level of education	Main occupation	Period in ART
Female =1 Male=2	15-17 = 1 18-35 = 2 36-49 = 3 50-64 = 4	Single=1 Married=2 Divorced=3 Widow=4 Cohabitating=5 Separated=6 Others=7 (Specify)	0 = 1 1 = 2 2 = 3 3-4 = 4 4+ = 5	Catholic =1 Protestant =2 Moslem =3 Others=5 (Specify)	Standard 1-3 =1 Standard 4-7 =2 Form 1-2=3 Form 3-4=4 Form 5-6=5 College/University =6 Other (Specify=7	Student=1 Self employed =2 Formally employed =3 House wife=4 Peasant=5 Others=6 (Specify)	1-3months =1 4-6months=2 7-12months =3 1-2Years =4

C. AWARENESS OF PLWHA ON THE ROLE OF ART

I would like to determine your awareness on the role of ART. I need you to respond with a *Yes* or *No* or I don't know answer to each of the following statements

S/N	Attributes	Response(Alternatives)	Response
1	ART does not cure HIV	Yes = 1 ; No = 2; I don't know = 3	
2	ART is a vaccine for HIV	Yes = 1 ; No = 2; I don't know = 3	
3	ART is vital to inhibit replication of HIV in the body of infected persons	Yes = 1 ; No = 2; I don't know = 3	
4	ART delays progression of disease in HIV infected persons	Yes = 1 ; No = 2; I don't know = 3	
5	People on antiretroviral can still transmit HIV to uninfected ones	Yes = 1 ; No = 2; I don't know = 3	

D. ATTITUDES OF PLWHA TOWARDS PROLONGING THEIR LIVES

The following statements are aimed at to examine your attitude towards prolonging your life. I would like you to say whether you *strongly agree=5 or Agree=4 or Undecided=3 or Disagree=2 or strongly disagree=1*

s/n	Attributes	Response(scaling) – Tick				
		5	4	3	2	1
1	Like any other persons, PLWHA have the right to live a longer decent life					
2	Prolonging the lives of PLWHA is meant to enable you to lead normal, healthy and productive life to care and prepare your dependants to be independent individuals					
3	Prolonging the life of PLWHA means prolonging time for you to expose more people to HIV					
4	As long as you are infected with HIV you do not have good reasons to protect yourself from further contracting HIV					
5	As long as you are on antiretroviral you do not need to worry about contracting HIV					
6	As *PLWHA* you bear the responsibility to avoid exposing others to HIV					

E. INFORMATION ON SEXUAL BEHAVIOR OF PLWHA

In the following questions I would like you to give our research very important information about your sexual relations. For most of the questions in this part you will need to answer either Yes or No. However for a few questions I will need you to give brief explanations

s/n	Questions	Response(alternatives)	Response
1	Have you ever had sex since you started attending the ART programme?	**Yes = 1; No = 2**	
If YES... continue; If NO... Skip until number 11			
2	Have you had sex in the last three weeks?	Yes = 1; No = 2	
3	Did you use condoms?	Yes = 1; No = 2	
4	Do you use condom every time you have sex?	Yes = 1; No = 2	
5	How many sexual partners do you have?	One=1;More than =2	
6	Is/ are your partner (s) living with HIV?	Yes = 1; No = 2	**
7	Is/are your partner (s) registered with ART programme?	Yes = 1; No = 2	**
8	Is/are your partner(s) aware that you are living with HIV?	Yes = 1; No = 2	**

**** if the respondent has more than one partner, clarify the response in respect of each partner.**

If YES... continue; If NO... Skip until number 19

9. How did your partner know that you are living with HIV?

We tested together =1 Through discussion=2

S/he heard from other people=3 S/he discovered that I am using drugs=4

S/he asked me following changes s/he observed on my health=5 Others (specify) =6.....

10. What were his / her reactions?

S/he was not pleased with the information=1 S/he abandoned me=2

S/he separated=3 S/he divorced me=4

S/he comforted me =5 S/he consoled me to live positively with HIV=6

S/he went for HIV test too=7 S/he accused me of being unfaithful=8 Others (specify) =9..

Continue to number 11 if and only if you skipped No 2-10; otherwise, skip until No 19.

Yes=1	No=2

11. Are you abstaining from sex? (Tick appropriate box)

12. How do you meet your sexual needs?

I am doing masturbation =1 I am doing a lot of games and sports=2

I keep my self busy=3 I am doing prayers=4

Others (specify)=5.....

13. Is your partner part of the decision to abstain? (Tick appropriate box)

Yes=1	No=2

14. What did you consider to come to the decision to abstain?

We can live without sex =1 Abstaining preserves our body energy =2

Abstaining reduce the risk of contracting HIV =3 To avoid the risk of giving birth to an infected child=4

Others (Specify) =5

15. Is your partner registered with ART programme? (Tick appropriate box)

Yes=1	No=2

16. Is your partner aware that you are living with HIV? (Tick appropriate box)

Yes=1	No=2

If YES... continue; If NO... Skip until number 19

17. How did your partner know that you are living with HIV?

We tested together=1 Through discussion=2

S/he heard from other people=3 S/he discovered that I am using drugs=4

S/he asked me following changes she observed on my health=5

Others (specify) =6

18. What were his / her reactions?

S/he was not pleased with the information=1 S/he abandoned me=2

S/he separated=3 S/he divorced me=4

S/he comforted me=5 S/he consoled me to live positively with HIV=6

S/he went for HIV test too=7 S/he accused me of being unfaithful=8

Others (specify) =9

19. Have you ever conceived while on ART?

If YES... continue; If NO... Skip until number 23

20. Did you decide deliberately to conceive?

Yes=1	No=2

If YES... continue; If NO... Skip until part F (behavior change interventions)

Yes=1	No=2

21. Was your partner part of the decision?

22. What did you consider to come to the decision to conceive while you know you are living with HIV?

We have the right to get children=1

We needed a child / children=2

We needed a daughter=3

We needed a son=4

We can protect our child from mother to child HIV transmission=5

We new that there are chances that infected parents can give birth to un-infected child=6

My husband / wife needed a child=7

My parents needed a grand son=8

My parents needed a grand daughter=9

My in laws needed a grand son=10

My in laws needed a grand daughter=11

23. Have you opted birth control?

Yes=1	No=2

24. Is your partner part of the decision?

25. What did you consider to come to birth control option?

Yes=1	No=2

Risk of mother to child HIV transmission=2

We are supposed to give birth to a number of children we can raise=2

My partner is not reliable=3

Others (specify)=4

F. BEHAVIOR CHANGE INTERVENTIONS IN ART PROGRAMMES

Now we are going to the last but still an important part of our interview. In this part I will ask you questions about behavior change services for people living with HIV/AIDS

1. How did you get information about ART?

Through:

Radio=1 News papers=2

Leaflets=3

Medical staff =4 ART service providers=5

Community sensitization meetings=6

Work place campaign=7 Posters=8

Others (specify) =9 .....

2. List down behavior change interventions offered by the ART programme in your area

Health education to patients=1 Health education to community=2

ART adherence counseling=3 Voluntary counseling and testing=4

Home based care services=5 Others (specify) =6

3. Mention sexual behaviors that the ART programme have been advising you to adopt and maintain

Abstinence=1 Use of condoms during sexual intercourse=2

To have one HIV tested and faithful sexual partner=3 Carpel counseling and testing=4

Birth control =5 Others specify=6

4. Are there any challenges you are facing in trying to avoid contracting HIV or transmitting HIV to others?

Yes=1	No=2

5. What are they?

It is difficult to communicate my serostatus to my partner=1

It is difficult to discuss and agree on condom use with my partner=2

It is difficult to maintain consistent use of condoms during sexual intercourse with my partner=3

Disclosure of serostatus may lead to separation / abandonment or divorce from a person you love or depend=4

Social pressure on the need to have children=5

Misconceptions about the role of ART - some think that it's a cure of HIV=6

Others specify=7

6. What should be done to improve the effectiveness of behavior change interventions in ART programmes?

Thank you very much for your time and valuable information you contributed to this study.

Appendix 2: Operational definition of variables

S/N	Variables	Operational definition
1	Sex	Being a female or male in biological sense
2	Age	Ranges in years of birth
3	Marital status	Being married, single, divorced, separated or widowed
4	Level of education	Number of years the respondent has spent in school
5	Awareness of ART	A state of being knowledgeable about antiretroviral therapy and its role
6	Attitude	The way PLWHA think and feel about living longer with HIV
7	Sexual behavior	Had ever had sex while on ART; Abstinence; Number of sexual partners; Use of condom; Correct and Consistent use of condom.
8	Behavior change interventions	Provision of basic information about HIV and ART; counseling; building skills such as personal risk assessment and negotiating condom use with sex partners; and enhancing access to condoms and other prevention technologies.

Appendix 3: Checklist for Art Service Providers

Good morning / afternoon!

My name is ..... I am from Sokoine University of Agriculture. We are conducting HIV/AIDS research on ART programme. The main objective of the study is to examine influence of ART programme on control of further HIV transmission in order to contribute to effective HIV/AIDS policy and programme planning.

CONFIDENTIALITY CONSENT

I want to assure you that answers will be kept strictly secret and I will not keep record of your names if you do not feel like. You have the right to stop the interview at any time, or to skip any questions that you do not want to answer. There are no wrong or right answers. Your honest answer will help us better understand challenges relating to ART and sexual behavior of PLWHA. This will help policy makers and programme planners design better strategies to improve PLWHA status and control further transmission of HIV. Your participation is completely voluntary but your experience could be very helpful to service providers and the community.

Do you have any questions so far?

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4	Location	
5	Ward	

B. BACKGROUND INFORMATION

In this section I would like to know your background information. Please, respond to the following questions about yourself.

Sex	Age(Years)	Marital status	Profession	Religious denomination	Highest Level of education	Main occupation	Period in ART
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9. What is your position in the CTC?

.....

10. What do you do in the CTC?

.....

11. Have you been trained to perform your roles in the CTC? Yes / No

12. What kind of training did you receive?

Yes=1	No=2

.....

.....

C. BEHAVIOR CHANGE INTERVENTIONS IN ART PROGRAMMES

In this part there are questions about behavior change services for people living with HIV/AIDS. Please answer all questions properly.

14. What core elements of ART programme does your CTC offer?

Basic information about HIV=1

Basic information about ART=2

Provision of ART=3

Provision of services to prevent mother to child transmission – PMCTC=4

Adherence counseling=5

Personal risk assessment=6

HIV counseling and testing=7

Building skills - such as negotiating condom use with sex partners, and access to condoms and other prevention technologies=8

Others (specify) =9

15. List down behavior change interventions offered by the ART programme in your area

Health education to patients=1

Health education to community=2

ART adherence counseling=3

Voluntary counseling and testing=4

Home based care services=5

Others (specify) =6

16. What sexual behaviors have you been promoting among PLWHA in ART programme?

Abstinence=1

Use of condoms during sexual intercourse=2

To have one HIV tested and faithful sexual partner=3

Couple counseling and testing=4

Birth control=5

Others specify=6

17. Are there any challenges your clients are facing in trying to practice and sustain safer sexual behavior?

Yes=1	No=2

List some of the challenges

It is difficult to communicate my serostatus to my partner=1

It is difficult to discuss and agree on condom use with my partner=2

It is difficult to maintain consistent use of condoms during sexual intercourse with my partner=3

Disclosure of serostatus may lead to separation / abandonment or divorce from a person you love or depend=4

Social pressure on the need to have children=5

Misconceptions about the role of ART - some think that it's a cure of HIV=6

Others specify=7

18. Are there policy related limitations in the capacity of ART programme to influence sexual behavior of its clients – the PLWHA?

Yes=1	No=2

Brieflyexplain.....

.....

.....

19. What should be done to improve the effectiveness of behavior change interventions in ART programme?

.....

.....

.....

Thank you very much for your time and valuable information you contributed to this study